Leica
BIOSYSTEMS

# Advanced Staining Catalog

## Novocastra™ IHC Antibodies, Probes & Leica BOND Reagents

2014
International Edition

Novocastra™

# Pathologists see the difference

Over 20 Years of Expertise:
Trust our IHC and ISH solutions to deliver quality results

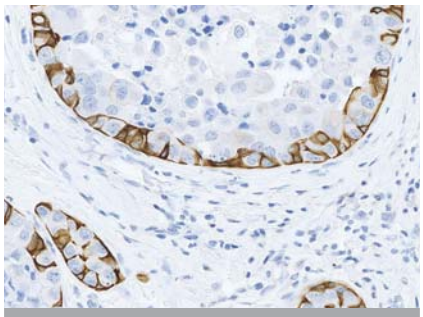
# Leica's dedication to immunohistochemistry has led to significant developments in advanced staining. Novocastra reagents deliver the high quality advanced stained slides that pathologists rely on.

## See the difference...

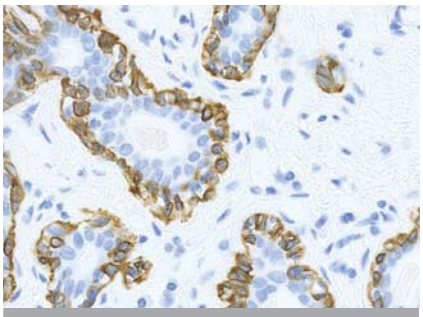
Novocastra antibodies, in combination with the Leica BOND platforms provide a fully integrated and automated approach to your advanced staining process.

- **Optimized for high-quality staining** – Confidence in interpretation for diagnosis
- **Flexible formats and sizes** – Reduce costs, save time
- **Robust antibody performance** – Right first time, minimizing repeats
- **Extensive antibody and reagent portfolio** – One stop shop for all your IHC requirements

## Your complete solution – fully automated, fully integrated and ready to go.



**Quality** - Novocastra and BOND Ready-to-Use Antibodies



**Confidence** - Highly specific and sensitive compact polymer detection systems

**Speed** - Reduce turnaround time and increase workflow efficiency with Leica BOND automation

## SEE THE DIFFERENCE FOR YOURSELF

Don't just take our word for it, see the results for yourself.
Contact your local Leica Representative to arrange your evaluation.
Visit **www.LeicaBiosystems.com/contact**

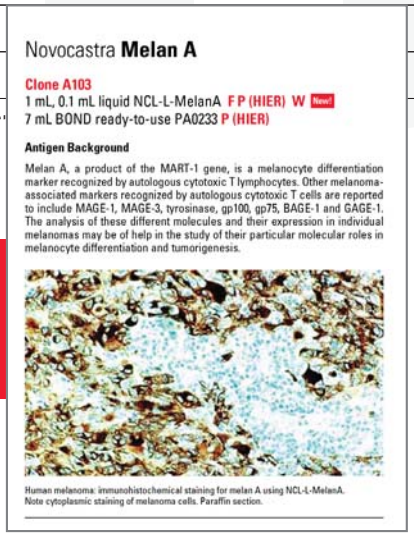
# Contents

All BOND and Novocastra reagents can be found by going to the sections listed below. To quickly find antibody and ordering information, use the Antibody Index Guide opposite

Use the simple Antibody Index Guide on the following pages to quickly view clones, formats, sizes and ordering codes.

| Page | Description | Clone | Lyophilized 0.1 mL | Lyophilized 1 mL | Liquid 0.1 mL | Liquid 1 mL | Manual RTU 7 mL | BOND RTU 7 mL |
|---|---|---|---|---|---|---|---|---|
| 168 | Matrix Metalloproteinase Antibodies | 15W2 | NCL-MMP9-439 | NCL-MMP9-439 | | | | |
| 168 | Matrix Metalloproteinase Antibodies | 17B11 | NCL-MMP2-507 | NCL-MMP2-507 | | | | |
| 168 | Matrix Metalloproteinase Antibodies | 5E4 | | NCL-MMP10 | | | | |
| 98 | MB2 (B Cell Marker) | MB2 | | NCL-MB2 | | | | |
| 124 | MCAM (CD146) | N1238 | NCL-CD146 | NCL-CD146 | | | | |
| 169 | MDM2 Protein | 1B10 | NCL-MDM2 | NCL-MDM2 | | | | |
| 169 | Melan A | A103 | | | NCL-L-MELANA | NCL-L-MELANA | RTU-MELANA | PA0233 |
| 119 | Melanoma Marker (CD63) | NKI/C3 | NCL-CD63 | NCL-CD63 | | | | |
| 157 | Melanoma Marker (HMB45) | HMB45 | | | | | | PA0027 |
| 170 | Merosin Laminin Alpha 2 Chain | | | NCL-MEROSIN | | | | |

Detailed information about each clone can be found by simply going to the page number listed.



Novocastra **Melan A**

Clone A103
1 mL, 0.1 mL liquid NCL-L-MelanA F P (HIER) W New!
7 mL BOND ready-to-use PA0233 P (HIER)

**Antigen Background**

Melan A, a product of the MART-1 gene, is a melanocyte differentiation marker recognized by autologous cytotoxic T lymphocytes. Other melanoma-associated markers recognized by autologous cytotoxic T cells are reported to include MAGE-1, MAGE-3, tyrosinase, gp100, gp75, BAGE-1 and GAGE-1. The analysis of these different molecules and their expression in individual melanomas may be of help in the study of their particular molecular roles in melanocyte differentiation and tumorigenesis.

Human melanoma: immunohistochemical staining for melan A using NCL-L-MelanA. Note cytoplasmic staining of melanoma cells. Paraffin section.

Use this Antibody Index Guide to quickly view clones, formats, sizes and ordering codes.

| | | | Ordering code for: | | | | | |
|---|---|---|---|---|---|---|---|---|
| Page | Description | Clone | Lyophilized 0.1 mL | Lyophilized 1 mL | Liquid 0.1 mL | Liquid 1 mL | Manual RTU 7 mL | BOND RTU 7 mL |
| 97 | Adenomatous Polyposis Coli Protein (APC) | EMM43 | | NCL-APC | | | | |
| 92 | Adenovirus | 10/5.1.2 | | NCL-ADENO | | | | |
| 92 | Akt (Phosphorylated) | LP18 | | | NCL-L-AKT-PHOS | NCL-L-AKT-PHOS | | |
| 125 | ALCAM (CD166) | MOG/07 | NCL-CD166 | NCL-CD166 | | | | |
| 93 | ALK (Anaplastic Lymphoma Kinase) (CD246) (p80) | 5A4 | NCL-ALK | NCL-ALK | NCL-L-ALK | NCL-L-ALK (0.5 mL) | | PA0306 |
| 93 | Alpha-1-Antitrypsin | Polyclonal | | NCL-A1Ap | | | | |
| 93 | Alpha-Actinin | RBC2/1B6 | | NCL-ALPHA-ACT | | | | |
| 94 | Alpha B Crystallin | G2JF | | NCL-ABCRYS-512 | | | | |
| 94 | Alpha-Catenin | 25B1 | | NCL-A-CAT | | | | |
| 94 | Alpha Fetoprotein | C3 | NCL-AFP | NCL-AFP | | | | PA0963 |
| 95 | Alpha-Methylacyl-CoA Racemase (AMACR, p504s) | EPUM1 | | | NCL-L-AMACR | NCL-L-AMACR | | |
| 95 | Alpha Smooth Muscle Actin (SMA) | ASM-1 | | NCL-SMA | | | RTU-SMA | PA0943 |
| 95 | Alpha-Synuclein | KM51 | | NCL-ASYN | | NCL-L-ASYN | | |
| 95 | Amyloid P Protein | B5 | | NCL-AMP | | | | |
| 96 | Amyloid Precursor Protein | 40.10 | | NCL-APP | | | | |
| 93 | Anaplastic Lymphoma Kinase (ALK) (CD246) (p80) | 5A4 | NCL-ALK | NCL-ALK | NCL-L-ALK | NCL-L-ALK (0.5 mL) | | PA0306 |
| 96 | Androgen Receptor | 2F12 | | NCL-AR-2F12 | | | | |
| 96 | Androgen Receptor | AR27 | NCL-AR-318 | NCL-AR-318 | | | | |
| 96 | APAF (Apoptosis Protease Activating Factor 1) | Polyclonal | | NCL-APAF1 | | | | |
| 97 | APC (Adenomatous Polyposis Coli Protein) | EMM43 | | NCL-APC | | | | |
| 129 | Apolipoprotein J (Clusterin) | 7D1 | | NCL-CLUSTERIN | | | | |
| 97 | Aurora Kinase 2 | JLM28 | | | | NCL-L-AK2 | | |
| 98 | B Cell Marker (MB2) | MB2 | | NCL-MB2 | | | | |
| 98 | B Cell Specific Octamer Binding Protein-1 (BOB-1) | TG14 | | | NCL-L-BOB-1 | NCL-L-BOB-1 | | PA0558 |
| 98 | Bcl-2 Oncoprotein | 3.1 | NCL-BCL-2-486 | NCL-BCL-2-486 | | | | |
| 98 | Bcl-2 Oncoprotein | BCL-2/100/D5 | NCL-BCL-2 | NCL-BCL-2 | | NCL-L-BCL-2 | RTU-BCL-2 | PA0117 |
| 98 | Bcl-3 Oncoprotein | 1E8 | | NCL-BCL-3 | | | | |
| 99 | Bcl-6 Oncoprotein | LN22 | | | NCL-L-BCL-6-564 | NCL-L-BCL-6-564 | | PA0204 |
| 99 | Bcl-6 Oncoprotein | P1F6 | NCL-BCL-6 | NCL-BCL-6 | | | | |
| 99 | Bcl-w | 6C1 | | NCL-BCL-W | | | | |
| 99 | Bcl-x | NC1 | | NCL-BCL-X | | | | |
| 100 | Beta 2 microglobulin | Polyclonal | | NCL-B2Mp | | | | |
| 100 | Beta Amyloid | 6F/3D | | NCL-B-AMYLOID | | | | |
| 100 | Beta-Catenin | 17C2 | NCL-B-CAT | NCL-B-CAT | | | | PA0083 |
| 100 | Beta-Dystroglycan | 43DAG1/8D5 | NCL-B-DG | NCL-B-DG | | | | |
| 112 | BL-CAM (CD22) | FPC1 | NCL-CD22-2 | NCL-CD22-2 | | | | PA0249 |
| 147 | Blood Coagulation Factor XIIIa (Factor XIIIa) | E980.1 | NCL-FXIIIA | NCL-FXIIIA | | NCL-L-FXIIIA | | PA0449 |
| 98 | BOB-1 (B Cell Specific Octamer Binding Protein-1) | TG14 | | | NCL-L-BOB-1 | NCL-L-BOB-1 | | PA0558 |
| 101 | CA19-9 (Sialyl Lewis$^a$) | C241:5:1:4 | | NCL-CA19-9 | | NCL-L-CA19-9 | | PA0424 |
| 101 | CA125 (Ovarian Cancer Antigen) | OV185:1 | | NCL-CA125 | | NCL-L-CA125 | RTU-CA125 | PA0539 |
| 102 | Calbindin | KR6 | | NCL-CALBINDIN | | | | |

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|---|---|---|---|---|---|---|---|---|
| 102 | Calcitonin | Polyclonal | | NCL-CALp (0.5 mL) | | | | PA0406 |
| 102 | Calcitonin | CL1948 | | | NCL-L-CALCITONIN | NCL-L-CALCITONIN | | |
| 103 | Calpain | CALP3C/11B3 | | NCL-CALP-11B3 (2.5 mL) | | | | |
| 103 | Calpain | CALP3C/12A2 | | NCL-CALP-12A2, NCL-CALP-12A2 (2.5 mL) | | | | |
| 103 | Calpain | CALP3D/2C4 | | NCL-CALP-2C4 (2.5 mL) | | | | |
| 103 | Calponin (Basic) | 26A11 | NCL-CALPONIN-B | NCL-CALPONIN-B | | | | PA0416 |
| 103 | Calretinin (5A5) | 5A5 | NCL-CALRETININ | NCL-CALRETININ | | NCL-L-CALRETININ | RTU-CALRETININ | |
| 103 | Calretinin (CAL6) | CAL6 | | | NCL-L-CALRET-566 | NCL-L-CALRET-566 | | PA0346 |
| 104 | Carbonic Anhydrase IX | TH22 | | | NCL-L-CAIX | NCL-L-CAIX | | |
| 104 | Carboxypeptidase M | 1C2 | | NCL-CPMM | | | | |
| 104 | Carcinoembryonic Antigen (CD66e) | 12-140-10 | | NCL-CEA-2 | | NCL-L-CEA-2 | RTU-CEA-2 | |
| 104 | Carcinoembryonic Antigen (CD66e) | II-7 | | | | | | PA0004 |
| 131 | Caspase-3 (CPP32) | JHM62 | NCL-CPP32 | NCL-CPP32 | | | | |
| 104 | Caspase-8 | 11B6 | | NCL-CASP-8 | | | | |
| 105 | Cathepsin B | CB131 | | NCL-CATH-B | | | | |
| 105 | Cathepsin D | C5 | NCL-CDM | NCL-CDM | | | | |
| 105 | Cathepsin G | 19C3 | | NCL-CATH-G | | | | |
| 106 | Caveolin-1 | 4D6 | | | | NCL-L-CAVEOLIN-1 | | |
| 106 | CD1a | JPM30 | NCL-CD1A-220 | NCL-CD1A-220 | | | | |
| 106 | CD1a | MTB1 | NCL-CD1A-235 | NCL-CD1A-235 | NCL-L-CD1A-235 NCL-L-CD1A-235 (0.5 mL) | NCL-L-CD1A-235 | RTU-CD1A-235 | PA0235 |
| 106 | CD2 (LFA-2) | AB75 | NCL-CD2-271 | NCL-CD2-271 | | NCL-L-CD2-271 | RTU-CD2-271 | |
| 106 | CD2 (LFA-2) | 11F11 | | | | | | PA0271 |
| 107 | CD3 | LN10 | | | NCL-L-CD3-565 | NCL-L-CD3-565 | | PA0553 |
| 107 | CD3 | PS1 | NCL-CD3-PS1 | NCL-CD3-PS1 | | NCL-L-CD3-PS1 | RTU-CD3-PS1 | |
| 107 | CD3 | UCHT1 | | NCL-CD3 | | | | |
| 107 | CD4 | 1F6 | NCL-CD4-1F6 | NCL-CD4-1F6 | | NCL-L-CD4-1F6 | RTU-CD4-1F6 | |
| 107 | CD4 | 4B12 | NCL-CD4-368 | NCL-CD4-368 | NCL-L-CD4-368 NCL-L-CD4-368 (0.5 mL) | NCL-L-CD4-368 | | PA0368 |
| 108 | CD4/CD8 Antibodies (duo pack) | 1F6/4B11 | | NCL-CD4/CD8D (2 x 0.5 mL) | | | | |
| 108 | CD5 | 4C7 | NCL-CD5-4C7 | NCL-CD5-4C7 | NCL-L-CD5-4C7 NCL-L-CD5-4C7 (0.5 mL) | NCL-L-CD5-4C7 | RTU-CD5-4C7 | PA0168 |
| 108 | CD7 | LP15 | | | NCL-L-CD7-580 | NCL-L-CD7-580 | | PA0266 |
| 108 | CD8 | 1A5 | NCL-CD8-295 | NCL-CD8-295 | | NCL-L-CD8-295 | RTU-CD8-295 | |
| 108 | CD8 | 4B11 | NCL-CD8-4B11 | NCL-CD8-4B11 | NCL-L-CD8-4B11 | NCL-L-CD8-4B11 NCL-L-CD8-4B11 (0.5 mL) | | PA0183 |
| 109 | CD9 (Motility-Related Protein-1) | 72F6 | | NCL-CD9 | | | | |
| 109 | CD10 | 56C6 | NCL-CD10-270 | NCL-CD10-270 | | NCL-L-CD10-270 | RTU-CD10-270 | PA0270 |
| 109 | CD11c | 5D11 | | | NCL-L-CD11C-563 | NCL-L-CD11C-563 | | PA0554 |

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|---|---|---|---|---|---|---|---|---|
| 110 | CD13 | 38C12 | NCL-CD13-304 | NCL-CD13-304 | | | | |
| 110 | CD14 | 7 | NCL-CD14-223 | NCL-CD14-223 | | NCL-L-CD14-223 | | |
| 110 | CD15 | BY87 | NCL-CD15 | NCL-CD15 | | NCL-L-CD15 | RTU-CD15 | |
| 110 | CD15 | CARB-1 | | | | | | PA0039 |
| 111 | CD16 | 2H7 | NCL-CD16 | NCL-CD16 | | | | |
| 111 | CD19 | 4G7/2E | | NCL-CD19-2 | | | | |
| 111 | CD19 | BT51E | | | NCL-L-CD19-163 | NCL-L-CD19-163<br>NCL-L-CD19-163<br>(0.5 mL) | | PA0843 |
| 111 | CD20 | L26 | | NCL-CD20-L26 | NCL-L-CD20-L26 | NCL-L-CD20-L26<br>NCL-L-CD20-L26<br>(0.5 mL) | RTU-CD20-L26 | |
| 111 | CD20 | MJ1 | NCL-CD20-MJ1 | NCL-CD20-MJ1 | | | | PA0906 |
| 111 | CD20 | 7D1 | NCL-CD20-7D1 | NCL-CD20-7D1 | | | | |
| 112 | CD21 | 2G9 | NCL-CD21-2G9 | NCL-CD21-2G9 | | NCL-L-CD21-2G9 | | PA0171 |
| 112 | CD22 (BL-CAM) | FPC1 | NCL-CD22-2 | NCL-CD22-2 | | | | PA0249 |
| 112 | CD23 | 1B12 | NCL-CD23-1B12 | NCL-CD23-1B12 | NCL-L-CD23-1B12 | NCL-L-CD23-1B12<br>NCL-L-CD23-1B12<br>(0.5 mL) | RTU-CD23-1B12 | PA0169 |
| 163 | CD25 (Interleukin-2 Receptor) | 4C9 | NCL-CD25-305 | NCL-CD25-305 | | | | PA0305 |
| 112 | CD27 | 137B4 | | NCL-CD27 | | | | |
| 113 | CD29 | 7F10 | NCL-CD29 | NCL-CD29 | | | | |
| 113 | CD30 | 15B3 | NCL-CD30-365 | NCL-CD30-365 | | | | |
| 113 | CD30 | 1G12 | NCL-CD30 | NCL-CD30 | | NCL-L-CD30 | RTU-CD30 | PA0153 |
| 113 | CD30 | JCM182 | | | NCL-L-CD30-591 | NCL-L-CD30-591 | | PA0790 |
| 114 | CD31 (PECAM-1) | 1A10 | NCL-CD31-1A10 | NCL-CD31-1A10 | | | | PA0250 |
| 114 | CD33 | PWS44 | | | NCL-L-CD33 | NCL-L-CD33 | | PA0555 |
| 114 | CD34 (Endothelial Cell Marker ) | QBEND/10 | NCL-END | NCL-END | NCL-L-END | NCL-L-END<br>NCL-L-END<br>(0.5 mL) | RTU-END | PA0212 |
| 115 | CD35 | RLB25 | NCL-CD35 | NCL-CD35 | | | | |
| 115 | CD37 | CT1 | | NCL-CD37 | | | | |
| 115 | CD38 | SPC32 | NCL-CD38-290 | NCL-CD38-290 | | NCL-L-CD38-290 | | |
| 115 | CD39 | 22A9 | | NCL-CD39 | | | | |
| 116 | CD40 | 11E9 | NCL-CD40 | NCL-CD40 | | | | |
| 116 | CD42b (GPIb) | MM2/174 | | NCL-CD42B | | | | |
| 116 | CD43 | MT1 | | NCL-MT1 | | NCL-L-MT1 | RTU-MT1 | PA0938 |
| 116 | CD44 (H-CAM) | DF1485 | NCL-CD44-2 | NCL-CD44-2 | | | | |
| 117 | CD44v3 | VFF-327V3 | | NCL-CD44V3 | | | | |
| 117 | CD44v6 | VFF-7 | | NCL-CD44V6 | | | | |
| 117 | CD45 | RP2/18 & RP2/22 | | NCL-LCA-RP | | NCL-L-LCA-RP | RTU-LCA-RP | |
| 117 | CD45 | X16/99 | NCL-LCA | NCL-LCA | NCL-L-LCA | NCL-L-LCA<br>NCL-L-LCA<br>(0.5 mL) | | PA0042 |
| 117 | CD45RA | X148 | | NCL-B1 | | | | |
| 118 | CD45RO | UCHL1 | NCL-UCHL1 | NCL-UCHL1 | | NCL-L-UCHL1 | RTU-UCHL1 | PA0146 |
| 161 | CD54 (ICAM-1) | 23G12 | | NCL-CD54-307 | | | | |

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|---|---|---|---|---|---|---|---|---|
| 118 | CD56 (NCAM) | 1B6 | NCL-CD56-1B6 | NCL-CD56-1B6 | | NCL-L-CD56-1B6 | RTU-CD56-1B6 | |
| 118 | CD56 (NCAM) | CD564 | NCL-CD56-504 | NCL-CD56-504 | NCL-L-CD56-504 | NCL-L-CD56-504 | | PA0191 |
| 118 | CD57 | NK-1 | NCL-NK1 | NCL-NK1 | | | RTU-NK1 | PA0443 |
| 118 | CD61 (GPIIIa) | 2F2 | NCL-CD61-308 | NCL-CD61-308 | | | | PA0308 |
| 144 | CD62E (E-Selectin) | 16G4 | | NCL-CD62E-382 | | | | |
| 193 | CD62P (P-selectin) | C34 | | NCL-CD62P-367 | | | | |
| 119 | CD63 (Melanoma Marker) | NKI/C3 | NCL-CD63 | NCL-CD63 | | | | |
| 119 | CD66a (CEACAM1) | 29H2 | | NCL-CD66A | | | | |
| 104 | CD66e (Carcinoembryonic Antigen) | 12-140-10 | | NCL-CEA-2 | | NCL-L-CEA-2 | RTU-CEA-2 | |
| 104 | CD66e (Carcinoembryonic Antigen) | II-7 | | | | | | PA0004 |
| 119 | CD68 | 514H12 | NCL-CD68 | NCL-CD68 | NCL-L-CD68 | NCL-L-CD68 | RTU-CD68 | PA0273 |
| 119 | CD68 | KP1 | | NCL-CD68-KP1 | | | | |
| 119 | CD69 | CH11 | | NCL-CD69 | | | | |
| 120 | CD71 | 10F11 | NCL-CD71-309 | NCL-CD71-309 | | | | |
| 120 | CD74 | LN-2 | | NCL-LN2 | | | | |
| 120 | CD75 | LN-1 | | NCL-LN1 | | | | |
| 120 | CD79a | 11D10 | | NCL-CD79A-192 | | NCL-L-CD79A-192 | RTU-CD79A-192 | |
| 120 | CD79a | 11E3 | NCL-CD79A-225 | NCL-CD79A-225 | | NCL-L-CD79A-225 | | PA0192 |
| 121 | CD79b | JS01 | | | | NCL-L-CD79B | | |
| 121 | CD82 | 5B5 | | NCL-CD82 | | | | |
| 121 | CD83 | 1H4B | | NCL-CD83 | | | | |
| 147 | CD95 (Fas) | GM30 | | NCL-FAS-310 | | | | |
| 122 | CD99 | 12E7 | | | | | | PA0509 |
| 122 | CD99 | HO-36.1.1 | NCL-CD99 | NCL-CD99 | | | | |
| 122 | CD99 | PCB1 | | | NCL-L-CD99-187 | NCL-L-CD99-187 | | |
| 122 | CD105 (Endoglin) | 4G11 | NCL-CD105 | NCL-CD105 | | | | |
| 128 | CD117 (c-kit Oncoprotein) | 57A5D8 | | NCL-CKIT | | | | |
| 128 | CD117 (c-kit Oncoprotein) | T595 | NCL-CD117 | NCL-CD117 | | NCL-L-CD117 | RTU-CD117 | |
| 123 | CD123 | BR4MS | | | NCL-L-CD123 | NCL-L-CD123 | | |
| 123 | CD137 | S16 | | NCL-CD137 | | | | |
| 123 | CD138 (Syndecan 1) | MI15 | | | | | | PA0088 |
| 200 | CD141 (Thrombomodulin) | 15C8 | NCL-CD141 | NCL-CD141 | | | | |
| 124 | CD146 (MCAM) | N1238 | NCL-CD146 | NCL-CD146 | | | | |
| 124 | CD147 (EMMPRIN) | AB1843 | | NCL-CD147 | | | | |
| 125 | CD151 (PETA-3) | RLM30 | | NCL-CD151 | | | | |
| 125 | CD163 | 10D6 | NCL-CD163 | NCL-CD163 | | NCL-L-CD163 | | |
| 125 | CD166 (ALCAM) | MOG/07 | NCL-CD166 | NCL-CD166 | | | | |
| 125 | CD168 (RHAMM) | 2D6 | | NCL-CD168 | | | | |
| 126 | CD205 (DEC-205) | 11A10 | | | | NCL-L-DEC205 | | |
| 188 | CD243 (P-glycoprotein) | 5B12 | | NCL-PGLYM | | | | |
| 93 | CD246 (Anaplastic Lymphoma Kinase) (ALK) (p80) | 5A4 | NCL-ALK | NCL-ALK | NCL-L-ALK | NCL-L-ALK (0.5 mL) | | PA0306 |
| 126 | CDX2 | AMT28 | NCL-CDX2 | NCL-CDX2 | | | | PA0535 |
| 119 | CEACAM1 (CD66a) | 29H2 | | NCL-CD66A | | | | |

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|---|---|---|---|---|---|---|---|---|
| Page | Description | Clone | Lyophilized 0.1 mL | Lyophilized 1 mL | Liquid 0.1 mL | Liquid 1 mL | Manual RTU 7 mL | BOND RTU 7 mL |
| 156 | c-erbB-2 Oncoprotein (HER-2) Antibodies | 10A7 | NCL-CBE-356 | NCL-CBE-356 | | NCL-L-CBE-356 | RTU-CBE-356 | |
| 156 | c-erbB-2 Oncoprotein (HER-2) Antibodies | 5A2 | | NCL-C-ERBB-2-316 | | | | |
| 156 | c-erbB-2 Oncoprotein (HER-2) Antibodies | CB11 | NCL-CB11 | NCL-CB11 | | NCL-L-CB11 | RTU-CB11 | |
| 156 | c-erbB-2 Oncoprotein (HER-2) Antibodies | CBE1 | | NCL-CBE1 | | | | |
| 127 | c-erbB-3 Oncoprotein | RTJ1 | | NCL-C-ERBB-3 | | | | |
| 127 | c-fos Oncoprotein | CF2 | | NCL-FOS | | | | |
| 127 | Checkpoint Kinase 1 | DCS-310.1 | | NCL-CHK1 | | | | |
| 128 | Choline Acetyltransferase | 38B12 | | NCL-CHAT | | | | |
| 128 | Chromogranin A | 5H7 | NCL-CHROM-430 | NCL-CHROM-430 | | | | PA0430 |
| 123 | c-kit Oncoprotein (CD117) | 57A5D8 | | NCL-CKIT | | | | |
| 129 | Clusterin (Apolipoprotein J) | 7D1 | | NCL-CLUSTERIN | | | | |
| 129 | c-MET (Hepatocyte Growth Factor Receptor) | 8F11 | NCL-CMET | NCL-CMET | | | | |
| 129 | c-myc Oncoprotein | 9E11 | NCL-CMYC | NCL-CMYC | | | | |
| 129 | Collagen Type II | Polyclonal | | NCL-COLL-IIp | | | | |
| 130 | Collagen Type IV | PHM-12 | | NCL-COLL-IV | | | | |
| 130 | Collagen Type VI | 64C11 | | NCL-COLL-VI | | | | |
| 130 | Collagen Type VII | LH7.2 | | NCL-COLL-VII | | | | |
| 131 | Complement Component C9 | 10A6 | | NCL-CCC9 | | | | |
| 131 | CPP32 (Caspase-3) | JHM62 | NCL-CPP32 | NCL-CPP32 | | | | |
| 131 | Cyclin A | 6E6 | | NCL-CYCLINA | | | | |
| 131 | Cyclin B1 | 7A9 | | NCL-CYCLINB1 | | | | |
| 132 | Cyclin D1 | DCS-6 | | NCL-CYCLIND1 | | | | |
| 132 | Cyclin D1 | P2D11F11 | NCL-CYCLIND1-GM | NCL-CYCLIND1-GM | | NCL-L-CYCLIND1-GM | RTU-CYCLIND1-GM | |
| 132 | Cyclin D3 | DCS-22 | | NCL-CYCLIND3 | | | | |
| 132 | Cyclin E | 13A3 | NCL-CYCLINE | NCL-CYCLINE | | | | |
| 132 | Cyclooxygenase-2 | 4H12 | | NCL-COX-2 | | | | |
| 133 | Cytokeratin 1 | 34BETAB4 | | NCL-CK1 (0.5 mL) | | | | |
| 133 | Cytokeratin 4 | 6B10 | | NCL-CK4 (0.5 mL) | | | | |
| 133 | Cytokeratin 5 | XM26 | NCL-CK5 | NCL-CK5 | NCL-L-CK5 | NCL-L-CK5 (0.5 mL), NCL-L-CK5 | RTU-CK5 | PA0468 |
| 134 | Cytokeratin 6 | LHK6B | | NCL-CK6 | | | | |
| 134 | Cytokeratin 7 | OV-TL12/30 | | NCL-CK7-OVTL | | NCL-L-CK7-OVTL | RTU-CK7-OVTL | |
| 134 | Cytokeratin 7 | RN7 | | | NCL-L-CK7-560 | NCL-L-CK7-560 | | PA0942, PA0138 (30 mL) |
| 135 | Cytokeratin 8 | TS1 | | NCL-CK8-TS1 | | NCL-L-CK8-TS1 | RTU-CK8-TS1 | PA0567 |
| 135 | Cytokeratin 10 | LHP1 | | NCL-CK10 | | | | |
| 135 | Cytokeratin 13 | KS-1A3 | | NCL-CK13 (0.5 mL) | | | | |
| 135 | Cytokeratin 14 | LL002 | | | NCL-L-LL002 | NCL-L-LL002 (0.5 mL), NCL-L-LL002 | RTU-LL002 | PA0074 |
| 136 | Cytokeratin 15 | LHK15 | NCL-CK15 | NCL-CK15 | | | | |
| 136 | Cytokeratin 16 | LL025 | | NCL-CK16 | | | | |
| 136 | Cytokeratin 17 | E3 | NCL-CK17 | NCL-CK17 | | | | PA0114 |

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|---|---|---|---|---|---|---|---|---|
| 136 | Cytokeratin 18 | DC-10 | NCL-CK18 | NCL-CK18 | | | | |
| 137 | Cytokeratin 19 | B170 | NCL-CK19 | NCL-CK19 | | | | PA0799 |
| 137 | Cytokeratin 20 | CK205 | | NCL-CK20-543 | | | | |
| 137 | Cytokeratin 20 | KS20.8 | | NCL-CK20 | NCL-L-CK20 | NCL-L-CK20 (0.5 mL), NCL-L-CK20 | RTU-CK20 | |
| 137 | Cytokeratin 20 | PW31 | | | NCL-L-CK20-561 | NCL-L-CK20-561 | | PA0918 |
| 137 | Cytokeratin (5/6/18) | LP34 | | NCL-LP34 | | NCL-L-LP34 | RTU-LP34 | |
| 137 | Cytokeratin (8/18) | 5D3 | NCL-5D3 | NCL-5D3 | | NCL-L-5D3 | RTU-5D3 | PA0067 |
| 174 | Cytokeratin, Multi | AE1/AE3 | | NCL-AE1/AE3 | | NCL-L-AE1/AE3 | RTU-AE1/AE3 | PA0909 |
| 174 | Cytokeratin, Multi (1/5/10/14) | 34BETAE12 | | NCL-CK34BE12 | | | RTU-CK34BE12 | PA0134 |
| 174 | Cytokeratin, Multi (4/5/6/8/10/13/18) | C-11 | | NCL-C11 | | | | |
| 174 | Cytokeratin, Multi (5/6/8/18) | 5D3/LP34 | NCL-CK5/6/8/18 | NCL-CK5/6/8/18 | | NCL-L-CK5/6/8/18 | RTU-CK5/6/8/18 | |
| 138 | Cytomegalovirus Antibodies | 2/6 | NCL-CMVPP65 | NCL-CMVPP65 | | | | |
| 138 | Cytomegalovirus Antibodies | QB1/06 | | NCL-CMV-LA | | | | |
| 138 | Cytomegalovirus Antibodies | QB1/42 | | NCL-CMV-EA | | | | |
| 126 | DEC-205 (CD205) | 11A10 | | | | NCL-L-DEC205 | | |
| 139 | Deleted in Colorectal Cancer Protein | DM51 | | NCL-DCC | | | | |
| 139 | Deleted in Pancreatic Cancer Locus 4 Protein | JM56 | | NCL-DPC4 | | | | |
| 139 | Desmin | DE-R-11 | NCL-DES-DERII | NCL-DES-DERII | | NCL-L-DES-DERII | RTU-DES-DERII | PA0032 |
| 140 | DOG-1 | K9 | | | NCL-L-DOG-1 | NCL-L-DOG-1 | | PA0219 |
| 140 | Dysferlin | HAM1/7B6 | NCL-HAMLET | NCL-HAMLET | | | | |
| 140 | Dysferlin | HAM3/17B2 | | NCL-HAMLET-2 | | | | |
| 140 | Dystrophin Antibodies | 13H6 | | NCL-DYSA | | | | |
| 140 | Dystrophin Antibodies | 34C5 | | NCL-DYSB | | | | |
| 140 | Dystrophin Antibodies | DY10/12B2 | | NCL-DYS3, NCL-DYS3 (2.5 mL) | | | | |
| 140 | Dystrophin Antibodies | DY4/6D3 | | NCL-DYS1, NCL-DYS1 (2.5 mL) | | | | |
| 140 | Dystrophin Antibodies | DY8/6C5 | | NCL-DYS2, NCL-DYS2 (2.5 mL) | | | | |
| 141 | E-Cadherin | 36B5 | NCL-E-CAD | NCL-E-CAD | | NCL-L-E-CAD | RTU-E-CAD | PA0387 |
| 141 | Elastin | BA-4 | | NCL-ELASTIN (0.5 mL) | | | | |
| 141 | Emerin | 4G5 | NCL-EMERIN | NCL-EMERIN | | | | |
| 124 | EMMPRIN (CD147) | AB1843 | | NCL-CD147 | | | | |
| 122 | Endoglin (CD105) | 4G11 | NCL-CD105 | NCL-CD105 | | | | |
| 114 | Endothelial Cell Marker (CD34) | QBEND/10 | NCL-END | NCL-END | NCL-L-END | NCL-L-END NCL-L-END (0.5 mL) | RTU-END | PA0212 |
| 142 | Enterovirus | 5-D8/1 | | NCL-ENTERO | | | | |
| 142 | Epidermal Growth Factor Receptor | EGFR.113 | NCL-EGFR | NCL-EGFR | | NCL-L-EGFR | | |
| 142 | Epidermal Growth Factor Receptor | EGFR.25 | NCL-EGFR-384 | NCL-EGFR-384 | | NCL-L-EGFR-384 | RTU-EGFR-384 | |
| 143 | Epithelial Membrane Antigen | GP1.4 | NCL-EMA | NCL-EMA | | NCL-L-EMA | RTU-EMA | PA0035 |

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| 143 | Epithelial-Related Antigen | MOC-31 | | NCL-MOC-31 | | | | |
| 143 | Epithelial Specific Antigen | VU-1D9 | | NCL-ESA | | | RTU-ESA | |
| 144 | Epstein-Barr virus-Induced Gene 3 Protein | EL8 | | NCL-EBI-3 | | | | |
| 144 | Epstein-Barr virus (LMP-1) | CS1/CS2/ CS3/CS4 | NCL-EBV-CS1-4 | NCL-EBV-CS1-4 | | | | |
| 144 | Epstein-Barr virus (nuclear antigen 2) | PE2 | NCL-EBV-PE2 | NCL-EBV-PE2 | | | | |
| 144 | E-Selectin (CD62E) | 16G4 | | NCL-CD62E-382 | | | | |
| 144 | Estrogen Receptor | 6F11 | NCL-ER-6F11 | NCL-ER-6F11, NCL-ER-6F11-2 (2 mL) | NCL-L-ER-6F11 | NCL-L-ER-6F11, NCL-L-ER-6F11/2 (2 mL) | RTU-ER-6F11 | PA0151 |
| 145 | Estrogen and Progesterone Receptor Antibodies (duo packs) | 6F11/16 | | NCL-ER/PGR-312 (2 x 1 mL) NCL-ER/PGR-312 (2 x 0.5 mL) | | | | |
| 145 | Estrogen Receptor (beta) | EMR02 | | NCL-ER-BETA | | | | |
| 145 | Ets-1 Oncoprotein | 1G11 | | NCL-ETS-1 | | | | |
| 146 | Excitatory Amino Acid Transporter | 10D4 | | NCL-EAAT1 | | | | |
| 146 | Excitatory Amino Acid Transporter | 1H8 | | NCL-EAAT2 | | | | |
| 146 | EZH2 (Enhancer of Zeste Homolog 2 (Drosophila)) | 6A10 | | | NCL-L-EZH2 | NCL-L-EZH2 | | |
| 160 | Factor VIII-related antigen (Human von Willebrand Factor ) | 36B11 | NCL-VWF | NCL-VWF | NCL-L-VWF | NCL-L-VWF | | PA0400 |
| 147 | Factor XIIIa (Blood Coagulation Factor XIIIa) | E980.1 | NCL-FXIIIA | NCL-FXIIIA | | NCL-L-FXIIIA | | PA0449 |
| 147 | Fas (CD95) | GM30 | | NCL-FAS-310 | | | | |
| 147 | Fascin | IM20 | NCL-FASCIN | NCL-FASCIN | | NCL-L-FASCIN | | PA0420 |
| 148 | Fas Ligand | 5D1 | | NCL-FAS-L | | | | |
| 148 | Feline Calicivirus (capsid protein) | 1G9 | | NCL-1G9 (0.5 mL) | | | | |
| 148 | Fibronectin | 568 | NCL-FIB | NCL-FIB | | | | |
| 148 | Filaggrin | 15C10 | | NCL-FILAGGRIN | | | | |
| 149 | Filamin | PM6/317 | | NCL-FIL | | | | |
| 149 | Folate Receptor Alpha | BN3.2 | | | NCL-L-FRALPHA | NCL-L-FRALPHA | | |
| 149 | Galectin-1 | 25C1 | NCL-GAL1 | NCL-GAL1 | | | | |
| 150 | Galectin-3 | 9C4 | NCL-GAL3 | NCL-GAL3 | | | | PA0238 |
| 150 | Gamma-Catenin | 11B6 | | NCL-G-CAT | | | | |
| 150 | Gastrin | Polyclonal | | NCL-GASp (0.5 mL) | | | | PA0681 |
| 150 | Geminin | EM6 | | | | NCL-L-GEMININ | | |
| 151 | Giardia intestinalis | 9D5.3.1 | | NCL-GI | | | | |
| 151 | Glial Fibrillary Acidic Protein | GA5 | NCL-GFAP-GA5 | NCL-GFAP-GA5 | | | | PA0026 |
| 151 | Glucagon | Polyclonal | | NCL-GLUCp (0.5 mL) | | | | PA0594 |
| 151 | Glucocorticoid Receptor | 4H2 | | NCL-GCR | | | | |
| 152 | Glutathione S-Transferase (GST) Antibodies | 10H6 | | NCL-GSTMU-437 | | | | |
| 152 | Glutathione S-Transferase (GST) Antibodies | LW29 | | NCL-GSTPI-438 | | | | |
| 116 | GPIb (CD42b) | MM2/174 | | NCL-CD42B | | | | |
| 118 | GPIIIa (CD61) | 2F2 | NCL-CD61-308 | NCL-CD61-308 | | | | PA0308 |
| 152 | Granzyme B | 11F1 | NCL-GRAN-B | NCL-GRAN-B | | NCL-L-GRAN-B | RTU-GRAN-B | PA0291 |
| 153 | Gross Cystic Disease Fluid Protein-15 | 23A3 | NCL-GCDFP15 | NCL-GCDFP15 | NCL-L-GCDFP15 | NCL-L-GCDFP15 | RTU-GCDFP15 | PA0708 |

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|---|---|---|---|---|---|---|---|---|
| 116 | H-CAM (CD44) | DF1485 | NCL-CD44-2 | NCL-CD44-2 | | | | |
| 153 | Heat Shock Protein 27 | 2B4 | | NCL-HSP27 | | | | |
| 153 | Heat Shock Protein 70 | 8B11 | | NCL-HSP70 | | | | |
| 154 | Heat Shock Protein 90 | JPB24 | | NCL-HSP90 | | | | |
| 154 | Heat Shock Protein 105 | 58F12 | | NCL-HSP105 | | | | |
| 154 | Helicobacter pylori | Polyclonal | | NCL-HPp | | | | |
| 154 | Helicobacter pylori | ULC3R | | | NCL-L-HPYLORI | NCL-L-HPYLORI | | |
| 155 | Hepatitis B virus Antibodies (Surface) | 1044/341 | | NCL-HBSAG-2 | | | | |
| 155 | Hepatitis B virus Antibodies (Core) | LF161 | NCL-HBCAG-506 | NCL-HBCAG-506 | | | | |
| 155 | Hepatitis C virus (NS3) | MMM33 | NCL-HCV-NS3 | NCL-HCV-NS3 | | | | |
| 129 | Hepatocyte Growth Factor Receptor (c-MET ) | 8F11 | NCL-CMET | NCL-CMET | | | | |
| 155 | Hepatocyte Specific Antigen | OCH1E5 | NCL-HSA | NCL-HSA | | | | |
| 156 | HER-2 Antibodies (c-erbB-2 Oncoprotein) | 10A7 | NCL-CBE-356 | NCL-CBE-356 | | NCL-L-CBE-356 | RTU-CBE-356 | |
| 156 | HER-2 Antibodies (c-erbB-2 Oncoprotein) | 5A2 | | NCL-C-ERBB-2-316 | | | | |
| 156 | HER-2 Antibodies (c-erbB-2 Oncoprotein) | CB11 | NCL-CB11 | NCL-CB11 | | NCL-L-CB11 | RTU-CB11 | |
| 156 | HER-2 Antibodies (c-erbB-2 Oncoprotein) | CBE1 | | NCL-CBE1 | | | | |
| 156 | Herpes simplex virus Antibodies | 12.3.4 & 1.1.1 | | NCL-HSV-2 | | | | |
| 156 | Herpes simplex virus Antibodies | 20.7.1 | | NCL-HSV-1 | | | | |
| 158 | HFSH (beta 2) (Human Follicle Stimulating Hormone) | INN-HFSH-60 | | NCL-HFSH | | | | PA0693 |
| 158 | HGH (Human Growth Hormone) | Polyclonal | NCL-HGH (0.25 mL) | | | | | PA0704 |
| 158 | HGM-45M1 (Human Gastric Mucin) | 45M1 | | NCL-HGM-45M1 | | | | |
| 157 | HLA Class II (DR) Antigen | LN-3 | NCL-LN3 | NCL-LN3 | | | | |
| 157 | HMB45 (Melanoma Marker) | HMB45 | | | NCL-L-HMB45 | NCL-L-HMB45 | | PA0027 |
| 157 | Human Chorionic Gonadotrophin (alpha) | 4E12 | | NCL-HCG-ALPHA | | | | |
| 158 | Human Chorionic Gonadotrophin (beta) | Polyclonal | | NCL-HCGp | | | | PA0014 |
| 158 | Human Follicle Stimulating Hormone (beta 2) (HFSH) | INN-HFSH-60 | | NCL-HFSH | | | | PA0693 |
| 158 | Human Gastric Mucin (HGM-45M1) | 45M1 | | NCL-HGM-45M1 | | | | |
| 158 | Human Growth Hormone (HGH) | Polyclonal | NCL-HGH (0.25 mL) | | | | | PA0704 |
| 159 | Human Herpesvirus (type 8) (latent nuclear antigen) | 13B10 | NCL-HHV8-LNA | NCL-HHV8-LNA | | | | |
| 159 | Human Neutrophil Defensins (1/2/3) | D21 | | NCL-DEFENSIN | | | | |
| 159 | Human Securin | DCS-280.2 | | NCL-SECURIN | | | | |
| 160 | Human Spasmolytic Polypeptide | GE16C | | NCL-HSP | | | | |
| 160 | Human von Willebrand Factor (Factor VIII-related antigen) | 36B11 | NCL-VWF | NCL-VWF | NCL-L-VWF | NCL-L-VWF | | PA0400 |
| 160 | Hypoxia Inducible Gene 2 Protein | HX34Y | | | NCL-L-HIG2 | | | |
| 161 | ICAM-1 (CD54) | 23G12 | | NCL-CD54-307 | | | | |
| 161 | Immunoglobulin A Antibodies | Polyclonal | | NCL-IGAp | | | | |
| 161 | Immunoglobulin A Antibodies | N1CLA | | | NCL-L-IGA | NCL-L-IGA | | |
| 161 | Immunoglobulin D Antibodies | DRN1C | | | NCL-L-IGD | NCL-L-IGD | | |
| 161 | Immunoglobulin D Antibodies | Polyclonal | | NCL-IGDp | | | | |
| 162 | Immunoglobulin G Antibodies | Polyclonal | | NCL-IGGp | | | | |

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| 162 | Immunoglobulin G Antibodies | RWP49 | | | NCL-L-IGG | NCL-L-IGG | | |
| 162 | Immunoglobulin M Antibodies | 8H6 | | | NCL-L-IGM | NCL-L-IGM | | |
| 162 | Inhibin (alpha) | AMY82 | | | NCL-L-INHIBINA | NCL-L-INHIBINA | | |
| 162 | Inhibin (Alpha) | R1 | | | | | | PA0110 |
| 163 | Insulin | 2D11-H5 | NCL-INSULIN | NCL-INSULIN | | | | PA0620 |
| 163 | Interleukin-2 Receptor (CD25) | 4C9 | NCL-CD25-305 | NCL-CD25-305 | | | | PA0305 |
| 163 | Interleukin 6 | 10C12 | | | NCL-L-IL6 | NCL-L-IL6 | | |
| 164 | Involucrin | SY5 | | NCL-INV | | | | |
| 164 | Kappa Light Chain | CH15 | | | NCL-L-KAP-581 | NCL-L-KAP-581 | | PA0606 |
| 164 | Kappa Light Chain | Polyclonal | | NCL-KAPp | | | | |
| 164 | Kappa Light Chain | KP-53 | | NCL-KAP | | | | |
| 164 | Kappa Light Chain | L1C1 | NCL-KAP-L1C1 | NCL-KAP-L1C1 | | | | |
| 164 | Ki67 Antigen | K2 | | | | NCL-L-ACK02 | | PA0230 |
| 164 | Ki67 Antigen | Polyclonal | NCL-KI67p (0.2 mL) | | | | | |
| 164 | Ki67 Antigen | MM1 | NCL-KI67-MM1 | NCL-KI67-MM1 | NCL-L-KI67-MM1 | NCL-L-KI67-MM1 | RTU-KI67-MM1 | PA0118 |
| 165 | Kip2 (p57 Protein) | 25B2 | NCL-P57 | NCL-P57 | | | | |
| 165 | Lambda Light Chain | HP-6054 | NCL-LAM | NCL-LAM | | | | |
| 165 | Lambda Light Chain | SHL53 | | | NCL-L-LAM-578 | NCL-L-LAM-578 | | PA0570 |
| 165 | Lambda Light Chain | Polyclonal | | NCL-LAMp | | | | |
| 165 | Lamin A/C | 636 | | NCL-LAM-A/C | | | | |
| 165 | Laminin | LAM-89 | | NCL-LAMININ (0.5 mL) | | | | |
| 166 | Langerin | 12D6 | NCL-LANGERIN | NCL-LANGERIN | | | | |
| 106 | LFA-2 (CD2) | AB75 | NCL-CD2-271 | NCL-CD2-271 | | NCL-L-CD2-271 | RTU-CD2-271 | |
| 166 | Linker for Activation of T Cells | 3.8 | | | | NCL-L-LAT | | |
| 144 | LMP-1 (Epstein-Barr virus) | CS1/CS2/ CS3/CS4 | NCL-EBV-CS1-4 | NCL-EBV-CS1-4 | | | | |
| 167 | Luteinizing Hormone | C93 | | | | | | PA0655 |
| 167 | Lysozyme (Muramidase) | Polyclonal | | NCL-MURAM | | | | PA0391 |
| 167 | Macrophage Marker (MAC387) | MAC387 | | | | | | PA0752 |
| 167 | MAGE-1 | 6C1 | | NCL-MAGE-1 | | | | |
| 167 | Maspin | EAW24 | | NCL-MASPIN | | | | |
| 168 | Mast Cell Chymase | CC1 | | NCL-MCC | | | | |
| 168 | Mast Cell Tryptase | 10D11 | NCL-MCTRYP-428 | NCL-MCTRYP-428 | | | | PA0019 |
| 168 | Matrix Metalloproteinase Antibodies | 15W2 | NCL-MMP9-439 | NCL-MMP9-439 | | | | |
| 168 | Matrix Metalloproteinase Antibodies | 17B11 | NCL-MMP2-507 | NCL-MMP2-507 | | | | |
| 168 | Matrix Metalloproteinase Antibodies | 5E4 | | NCL-MMP10 | | | | |
| 98 | MB2 (B Cell Marker) | MB2 | | NCL-MB2 | | | | |
| 124 | MCAM (CD146) | N1238 | NCL-CD146 | NCL-CD146 | | | | |
| 169 | MDM2 Protein | 1B10 | NCL-MDM2 | NCL-MDM2 | | | | |
| 169 | Melan A | A103 | | | NCL-L-MELANA | NCL-L-MELANA | RTU-MELANA | PA0233 |
| 119 | Melanoma Marker (CD63) | NKI/C3 | NCL-CD63 | NCL-CD63 | | | | |
| 157 | Melanoma Marker (HMB45) | HMB45 | | | NCL-L-HMB45 | NCL-L-HMB45 | | PA0027 |

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|---|---|---|---|---|---|---|---|---|
| 170 | Merosin Laminin Alpha 2 Chain | MER3/22B2 | NCL-MEROSIN | NCL-MEROSIN | | | | |
| 170 | Mesothelin | 5B2 | NCL-MESO | NCL-MESO | | NCL-L-MESO | RTU-MESO | PA0373 |
| 170 | Microphthalmia Transcription Factor (MITF) | 34CA5 | NCL-MITF | NCL-MITF | | NCL-L-MITF | | |
| 170 | Minichromosome Maintenance Protein Antibodies | CRCT2.1 | | NCL-MCM2 | | | | |
| 170 | Minichromosome Maintenance Protein Antibodies | DCS-141.1 | | NCL-MCM7 | | | | |
| 170 | Minichromosome Maintenance Protein Antibodies | MWS1927 | | | NCL-L-MCM2-597 (0.25 mL) | | | |
| 171 | Mismatch Repair Protein (MLH1) | ES05 | | | NCL-L-MLH1 | NCL-L-MLH1 | | |
| 172 | Mismatch Repair Protein (MSH2) | 25D12 | NCL-MSH2 | NCL-MSH2 | | | | PA0048 |
| 172 | Mismatch Repair Protein (MSH6) | PU29 | | | NCL-L-MSH6 | NCL-L-MSH6 | | |
| 172 | Mismatch Repair Protein (PMS2) | M0R4G | | | NCL-L-PMS2 | NCL-L-PMS2 | | |
| 109 | Motility-Related Protein-1 (CD9) | 72F6 | | NCL-CD9 | | | | |
| 173 | Muc Glycoprotein Antibodies | CCP58 | NCL-MUC-2 | NCL-MUC-2 | | | | |
| 173 | Muc Glycoprotein Antibodies | CLH2 | NCL-MUC-5AC | NCL-MUC-5AC | | | | |
| 173 | Muc Glycoprotein Antibodies | CLH5 | NCL-MUC-6 | NCL-MUC-6 | | | | |
| 173 | Muc Glycoprotein Antibodies | MA552 | | NCL-MUC-1-CORE | | | | |
| 173 | Muc Glycoprotein Antibodies | MA695 | | NCL-MUC-1 | | | | |
| 173 | Multiple Myeloma Oncogene 1 (MUM-1) | EAU32 | | | NCL-L-MUM1 | NCL-L-MUM1 | | PA0129 |
| 174 | Multi-Cytokeratin | AE1/AE3 | | NCL-AE1/AE3 | | NCL-L-AE1/AE3 | RTU-AE1/AE3 | PA0909 |
| 174 | Multi-Cytokeratin (1/5/10/14) | 34BETAE12 | | NCL-CK34BE12 | | | RTU-CK34BE12 | PA0134 |
| 174 | Multi-Cytokeratin (4/5/6/8/10/13/18) | C-11 | | NCL-C11 | | | | |
| 174 | Multi-Cytokeratin (5/6/8/18) | 5D3/LP34 | NCL-CK5/6/8/18 | NCL-CK5/6/8/18 | | NCL-L-CK5/6/8/18 | RTU-CK5/6/8/18 | |
| 175 | Multidrug Resistance-Associated Protein 1 | 33A6 | | NCL-MRP1 | | | | |
| 175 | Multidrug Resistance-Associated Protein 3 | DTX1 | | NCL-MRP3 | | | | |
| 175 | Muramidase (Lysozyme) | Polyclonal | | NCL-MURAM | | | | PA0391 |
| 175 | Muscle Specific Actin | HHF35 | | NCL-MSA | | | | PA0258 |
| 175 | Muscle Specific Actin | SC28 | | | | NCL-L-MSA-594 | | |
| 176 | Myelin Basic Protein | 7H11 | | NCL-MBP | | | | |
| 176 | Myeloperoxidase | 59A5 | NCL-MYELO | NCL-MYELO | | | | PA0491 |
| 176 | MyoD1 (Rhabdomyosarcoma Marker) | 5.8A | NCL-MYOD1 | NCL-MYOD1 | | | | |
| 177 | Myogenin (Myf-4) | LO26 | NCL-MYF-4 | NCL-MYF-4 | | NCL-L-MYF-4 | | PA0226 |
| 177 | Myoglobin | MYO18 | NCL-MYOGLOBIN | NCL-MYOGLOBIN | | | | PA0727 |
| 177 | Myosin Heavy Chain Antibodies (Developmental) | RNMY2/9D2 | NCL-MHCD | NCL-MHCD | | | | |
| 177 | Myosin Heavy Chain Antibodies (Smooth) | S131 | MHC-SM | NCL-MHC-SM | | | | PA0493 |
| 177 | Myosin Heavy Chain Antibodies (Fast) | WB-MHCF | NCL-MHCF | NCL-MHCF | | | | |
| 177 | Myosin Heavy Chain Antibodies (Neo-natal) | WB-MHCN | | NCL-MHCN | | | | |
| 177 | Myosin Heavy Chain Antibodies (Slow) | WB-MHCS | NCL-MHCS | NCL-MHCS | | | | |
| 177 | Myotilin | RSO34 | | NCL-MYOTILIN | | | | |
| 178 | Napsin A | IP64 | | | NCL-L-NAPSINA | NCL-L-NAPSINA | | |
| 178 | N-Cadherin | IAR06 | | | NCL-L-N-CAD | NCL-L-N-CAD | | |
| 118 | NCAM (CD56) | 1B6 | NCL-CD56-1B6 | NCL-CD56-1B6 | | NCL-L-CD56-1B6 | RTU-CD56-1B6 | |
| 118 | NCAM (CD56) | CD564 | NCL-CD56-504 | NCL-CD56-504 | | NCL-L-CD56-504 | | PA0191 |

| Page | Description | Clone | Ordering code for: Lyophilized 0.1 mL | Lyophilized 1 mL | Liquid 0.1 mL | Liquid 1 mL | Manual RTU 7 mL | BOND RTU 7 mL |
|---|---|---|---|---|---|---|---|---|
| 179 | Negative Control (Mouse) | MOPC-21 | | | | | | PA0996 |
| 179 | Negative Control (Rabbit) | | | | | | | PA0777 |
| 179 | Nerve Growth Factor Receptor (gp75) | 7F10 | | NCL-NGFR | | | | |
| 179 | Neuroblastoma Marker | NB84A | | NCL-NB84 | | | | |
| 180 | Neurofilament Antibodies | DA2 | | NCL-NF68-DA2 | | | | |
| 180 | Neurofilament Antibodies | N52.1.7 | | NCL-NF200-N52 | | | | PA0371 |
| 180 | Neurofilament Antibodies | NR4 | | NCL-NF68 | | | | |
| 180 | Neurofilament Antibodies | RT97 | | NCL-NF200 | | | | |
| 180 | Neuron Specific Enolase | 5E2 | | | | NCL-L-NSE2 | RTU-NSE2 | |
| 180 | Neuron Specific Enolase | 22C9 | | NCL-NSE-435 | | | | PA0435 |
| 180 | Nitric Oxide Synthase 1 | NOS-125 | | NCL-NOS-1 | | | | |
| 181 | nm23 Protein | 37.6 | | NCL-NM23 | | | | |
| 155 | NS3 (Hepatitis C virus) | MMM33 | NCL-HCV-NS3 | NCL-HCV-NS3 | | | | |
| 181 | OCT-2 | OCT-207 | NCL-OCT2 | NCL-OCT2 | | | | PA0532 |
| 181 | Oct-3/4 | N1NK | | | NCL-L-OCT3/4 | NCL-L-OCT3/4 | | PA0934 |
| 182 | Osteonectin | 15G12 | NCL-O-NECTIN | NCL-O-NECTIN | | | | |
| 182 | Osteopontin | OP3N | NCL-O-PONTIN | NCL-O-PONTIN | | | | |
| 101 | Ovarian Cancer Antigen (CA125) | OV185:1 | | NCL-CA125 | | NCL-L-CA125 | RTU-CA125 | PA0539 |
| 207 | p21 (WAF1 Protein) | 4D10 | | NCL-WAF-1 | | NCL-L-WAF-1 | | |
| 182 | p27 Protein | 1B4 | NCL-P27 | NCL-P27 | | | | |
| 183 | p53 Protein | IMX25 | NCL-P53-505 | NCL-P53-505 | | | | |
| 183 | p53 Protein (BP53-12) | BP53-12 | | NCL-P53-BP | | | | |
| 183 | p53 Protein (1801) | PAB1801 | NCL-P53-1801 | NCL-P53-1801 | | | | |
| 184 | p53 Protein (CM1) | Polyclonal | NCL-p53-CM1 (0.2 mL) | | | | | |
| 184 | p53 Protein (CM5) | Polyclonal | NCL-p53-CM5p (0.2 mL) | | | | | |
| 184 | p53 Protein (DO-1) | DO-1 | | NCL-P53-DO1 | | | | |
| 184 | p53 Protein (DO-7) | DO-7 | NCL-P53-DO7 | NCL-P53-DO7 | NCL-L-P53-DO7 | NCL-L-P53-DO7 (0.5 mL), NCL-L-P53-DO7 | RTU-P53-DO7 | PA0057 |
| 165 | p57 Protein (Kip2) | 25B2 | NCL-P57 | NCL-P57 | | | | |
| 185 | p63 Protein | 7JUL | | NCL-P63 | NCL-L-P63 | NCL-L-P63 | | PA0103 |
| 185 | p73 Protein | 24 | | NCL-P73 | | | | |
| 93 | p80 (Anaplastic Lymphoma Kinase) (ALK) (CD246) | 5A4 | NCL-ALK | NCL-ALK | NCL-L-ALK | NCL-L-ALK (0.5 mL) | | PA0306 |
| 186 | Papillomavirus Antibodies | 4C4 | NCL-HPV-4C4 | NCL-HPV-4C4 (2 mL) | | | | |
| 186 | Papillomavirus Antibodies | 5A3 | NCL-HPV18 | NCL-HPV18 (2 mL) | | | | |
| 186 | Parathyroid Hormone | 105G7 | NCL-PTH-488 | NCL-PTH-488 | | | | |
| 186 | Parvalbumin (Alpha) | 2E11 | | NCL-PARVALBUMIN | | | | |
| 187 | Parvovirus B19 | R92F6 | NCL-PARVO | NCL-PARVO | | | | |
| 187 | Pax-5 | 1EW | | | NCL-L-PAX5 | NCL-L-PAX5 | | PA0552 |
| 187 | P-Cadherin | 56C1 | | NCL-P-CAD | | | | |
| 114 | PECAM-1 (CD31) | 1A10 | NCL-CD31-1A10 | NCL-CD31-1A10 | | | | PA0250 |

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Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

| Page | Description | Clone | Ordering code for: Lyophilized 0.1 mL | Lyophilized 1 mL | Liquid 0.1 mL | Liquid 1 mL | Manual RTU 7 mL | BOND RTU 7 mL |
|---|---|---|---|---|---|---|---|---|
| 188 | Perforin | 5B10 | NCL-PERFORIN | NCL-PERFORIN | | | | |
| 188 | Peripherin | PJM50 | | NCL-PERIPH | | | | |
| 125 | PETA-3 (CD151) | RLM30 | | NCL-CD151 | | | | |
| 188 | P-glycoprotein 9 (CD243) | 5B12 | | NCL-PGLYM | | | | |
| 189 | Placental Alkaline Phosphatase | 8A9 | NCL-PLAP-8A9 | NCL-PLAP-8A9 | | NCL-L-PLAP-8A9 | RTU-PLAP-8A9 | PA0161 |
| 189 | Plasma Cell Marker | LIV3G11 | | NCL-PC | | | | |
| 189 | Plasminogen Activator Inhibitor (Type 1) | TJA6 | | NCL-PAI-1 | | | | |
| 190 | Platelet-Derived Endothelial Growth Factor | P-GF.44C | | NCL-PDEGF | | | | |
| 190 | Prealbumin | Polyclonal | | NCL-PREp | | | | |
| 190 | Progesterone Receptor (A Form) | 1A6 | | NCL-PGR, NCL-PGR-2 (2 mL) | | NCL-L-PGR | RTU-PGR | |
| 191 | Progesterone Receptor (A/B Forms) | 16 | NCL-PGR-312 | NCL-PGR-312, NCL-PGR-312/2 (2 mL) | NCL-L-PGR-312 | NCL-L-PGR-312, NCL-L-PGR-312/2 (2 mL) | RTU-PGR-312 | PA0312 |
| 191 | Progesterone Receptor (A/B Forms) | 16SAN27 | NCL-PGR-AB | NCL-PGR-AB | | NCL-L-PGR-AB | RTU-PGR-AB | |
| 191 | Progesterone Receptor (B Form) | SAN27 | | NCL-PGR-B | | | | |
| 191 | Proinsulin | 1G4 | | NCL-PROIN-1G4 | | | | |
| 192 | Proliferating Cell Nuclear Antigen | PC10 | NCL-PCNA | NCL-PCNA | | NCL-L-PCNA | | |
| 192 | Prostate Specific Antigen | 35H9 | NCL-PSA-431 | NCL-PSA-431 | | | | PA0431 |
| 192 | Prostate Specific Antigen | PSA28/A4 | | | | NCL-L-PSA-28A4 | RTU-PSA-28A4 | |
| 192 | Prostate Specific Membrane Antigen | 1D6 | | | | NCL-L-PSMA | | |
| 192 | Prostatic Acid Phosphatase | PASE/4LJ | | | | NCL-L-PAP | | PA0006 |
| 193 | Protein Gene Product 9.5 | 10A1 | NCL-PGP9.5 | NCL-PGP9.5 | | NCL-L-PGP9.5 | RTU-PGP9.5 | PA0286 |
| 193 | pS2 Protein | Polyclonal | | NCL-pS2 (0.5 mL) | | | | |
| 193 | P-selectin (CD62P) | C34 | | NCL-CD62P-367 | | | | |
| 193 | Renal Cell Carcinoma Marker | 66.4.C2 | NCL-RCC | NCL-RCC | | | | |
| 194 | Respiratory syncytial virus | 5H5N/2G12[2]/ 5A6/1C3 | | NCL-RSV3 | | | | |
| 195 | Retinoblastoma Gene Protein | 13A10 | NCL-RB-358 | NCL-RB-358 | | NCL-L-RB-358 | | |
| 195 | Retinoblastoma Gene Protein | 1F8 | | NCL-RB | | | | |
| 125 | RHAMM (CD168) | 2D6 | | NCL-CD168 | | | | |
| 195 | S-100 | S1/61/69 | NCL-S100 | NCL-S100 | | | | |
| 195 | S-100 | Polyclonal | | NCL-S100p | NCL-L-S100p | NCL-L-S100p | RTU-S100p | PA0900 |
| 196 | Sarcoglycan Antibodies (Gamma) | 35DAG/21B5 | NCL-G-SARC | NCL-G-SARC | | | | |
| 196 | Sarcoglycan Antibodies (Alpha) | AD1/20A6 | NCL-A-SARC | NCL-A-SARC | | NCL-L-A-SARC | | |
| 196 | Sarcoglycan Antibodies (Beta) | BETASARC1/ 5B1 | NCL-B-SARC | NCL-B-SARC | | NCL-L-B-SARC | | |
| 196 | Sarcoglycan Antibodies (Delta) | DELTASARC/ 12C1 | | NCL-D-SARC | | | | |
| 196 | Serotonin | Polyclonal | | NCL-SEROTp (0.5 mL) | | | | PA0736 |
| 101 | Sialyl Lewis[a] (CA19-9) | C241:5:1:4 | | NCL-CA19-9 | | NCL-L-CA19-9 | | PA0424 |
| 95 | SMA (Alpha Smooth Muscle Actin) | ASM-1 | | NCL-SMA | | | RTU-SMA | PA0943 |
| 197 | Spectrin Antibodies | RBC1/5B1 | | NCL-SPEC2 | | | | |

| Page | Description | Clone | Ordering code for: Lyophilized 0.1 mL | Lyophilized 1 mL | Liquid 0.1 mL | Liquid 1 mL | Manual RTU 7 mL | BOND RTU 7 mL |
|---|---|---|---|---|---|---|---|---|
| 197 | Spectrin Antibodies | RBC2/3D5 | NCL-SPEC1 | NCL-SPEC1 | | | | |
| 197 | Surfactant Precursor Protein B | 19H7 | | NCL-SPPB | | | | |
| 197 | Surfactant Protein A | 32E12 | NCL-SP-A | NCL-SP-A | | | | |
| 198 | Synaptic Vesicle Protein 2 | 15E11 | | NCL-SV2 | | | | |
| 198 | Synaptophysin | 27G12 | NCL-SYNAP-299 | NCL-SYNAP-299 | | NCL-SYNAP-299 | RTU-SYNAP-299 | PA0299 |
| 123 | Syndecan 1 (CD138) | MI15 | | | | | | PA0088 |
| 95 | Synuclein, Alpha | KM51 | | NCL-ASYN | | NCL-L-ASYN | | |
| 198 | Tartrate-Resistant Acid Phosphatase (TRAP) | 26E5 | NCL-TRAP | NCL-TRAP | | | | PA0093 |
| 199 | Tau | TAU-2 | NCL-TAU-2 | NCL-TAU-2 | | | | |
| 199 | Tenascin C | 49 | | NCL-TENAS-C | | | | |
| 199 | Terminal Deoxynucleotidyl Transferase | SEN28 | NCL-TDT-339 | NCL-TDT-339 | NCL-L-TDT-339 | NCL-L-TDT-339<br>NCL-L-TDT-339 (0.5 mL) | | PA0339 |
| 200 | Thrombomodulin (CD141) | 15C8 | NCL-CD141 | NCL-CD141 | | | | |
| 200 | Thyroglobulin | 1D4 | | | | NCL-L-THY | | PA0025 |
| 200 | Thyroid Peroxidase | AC25 | | | | NCL-L-TPO | | |
| 200 | Thyroid Stimulating Hormone | QB2/6 | | NCL-TSH | | | | PA0776 |
| 201 | Thyroid Stimulating Hormone Receptor | 4C1/E1/G8 | | NCL-TSH-R2 | | | | |
| 201 | Thyroid Transcription Factor-1 | SPT24 | NCL-TTF-1 | NCL-TTF-1 | | NCL-L-TTF-1 | | PA0364 |
| 201 | Tissue Inhibitor of Matrix Metalloproteinase Antibodies | 46E5 | | NCL-TIMP2-487 | | | | |
| 201 | Tissue Inhibitor of Matrix Metalloproteinase Antibodies | 6F6A | | NCL-TIMP1-485 | | | | |
| 202 | TNF-Related Apoptosis-Inducing Ligand (TRAIL) | 27B12 | | NCL-TRAIL | | | | |
| 202 | Topoisomerase I | 1D6 | | NCL-TOPOI | | | | |
| 202 | Topoisomerase II Alpha | 3F6 | NCL-TOPOIIA | NCL-TOPOIIA | | | | |
| 203 | Toxoplasma gondii P30 Antigen | TP3 | | NCL-TG | | | | |
| 203 | Transforming Growth Factor Beta | TGFB17 | NCL-TGFB | NCL-TGFB | | | | |
| 203 | Transforming Growth Factor Beta Receptor (Type 1) | 8A11 | | NCL-TGFBR1 | | | | |
| 204 | Troponin Antibodies | T1/61 | | NCL-TROPT | | | | |
| 204 | Troponin Antibodies | 1A2 | | NCL-TROPC | | | | |
| 204 | Tumor Necrosis Factor Receptor-Associated Factor 1 | 7C11 | | | | NCL-L-TRAF-1 | | |
| 204 | Tyrosinase | T311 | | NCL-TYROS | | NCL-L-TYROS | RTU-TYROS | PA0322 |
| 205 | Tyrosinase-Related Protein-1 | G3E6 | | NCL-TRP-1 | | | | |
| 205 | Tyrosine Hydroxylase | 1B5 | | NCL-TH | | | | |
| 205 | Ubiquitin | FPM1 | | NCL-UBIQM | | | | |
| 205 | Utrophin | DRP3/20C5 | | NCL-DRP2-S<br>NCL-DRP2 (2.5 mL) | | | | |
| 206 | Varicella-zoster virus | C90.2.8 | | NCL-VZV | | | | |
| 206 | Vascular Endothelial Growth Factor Receptor-3 | KLT9 | | | | NCL-L-VEGFR3 | | |

| Page | Description | Clone | Ordering code for: Lyophilized 0.1 mL | Lyophilized 1 mL | Liquid 0.1 mL | Liquid 1 mL | Manual RTU 7 mL | BOND RTU 7 mL |
|---|---|---|---|---|---|---|---|---|
| 206 | VE-Cadherin (CD144) | 33E1 | | | | NCL-L-VE-CAD | | |
| 207 | Villin | CWWB1 | NCL-VILLIN | NCL-VILLIN | | NCL-L-VILLIN | | |
| 207 | Vimentin | SRL33 | | | NCL-L-VIM-572 | NCL-L-VIM-572 | | PA0033 |
| 207 | Vimentin | V9 | NCL-VIM-V9 | NCL-VIM-V9 | NCL-L-VIM-V9 | NCL-L-VIM-V9 (0.5 mL), NCL-L-VIM-V9 | RTU-VIM-V9 | PA0640 |
| 160 | von Willebrand Factor (Factor VIII-related antigen) (Human von Willebrand Factor) | 36B11 | NCL-VWF | NCL-VWF | NCL-L-VWF | NCL-L-VWF | | PA0400 |
| 207 | WAF1 Protein (p21) | 4D10 | | NCL-WAF-1 | | NCL-L-WAF-1 | | |
| 208 | Wilms' Tumor | WT49 | | | NCL-L-WT1-562 | NCL-L-WT1-562 | | PA0562 |
| 208 | Zap-70 | L453R | | | | NCL-L-ZAP-70 | | PA0998 |

# Bond Oracle HER2 IHC System

# Fully Automated HER2 IHC Testing

Leica Bond Oracle HER2 IHC System for Breast Cancer

# With treatment decisions dependant on a stained slide, you need confidence that your HER2 IHC staining is consistent and accurate.

**The Leica Bond Oracle HER2 IHC system gives you the confidence that comes with demonstrated HER2 IHC FISH concordance and complete assay validation.** With the Oracle system, you get the accurate results needed for effective patient management.

## Maximize Efficiency

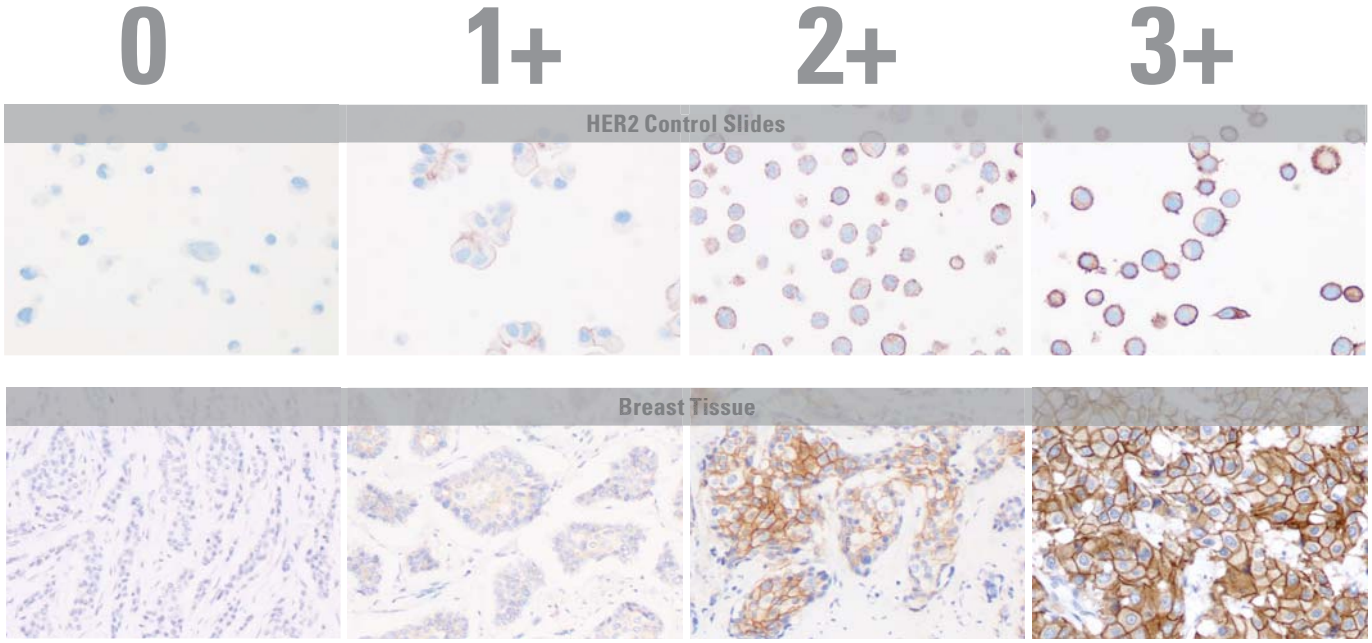
A complete solution of Ready-to-Use reagents, HER2 Control Slides, Leica BOND automation and a validated, standardized protocol reduce the potential for repeat testing and free skilled staff for other high-value tasks.

## Drive Consistency

A validated, standardized protocol for uniform staining consistency is supported by convenient e-learning which reinforces and tests consistent interpretation of Oracle HER2 IHC staining.


## Increase Confidence

Confidence in HER2 testing is enhanced by HER2 control slides demonstrating 0, 1+ , 2+ and 3+ staining, and excellent FISH concordance.




**Leica Bond Oracle HER2 IHC System**

| | |
|---|---|
| Product code: | TA9145 |
| Clone: | CB11 |
| No. of tests: | 60 tests (150 slides) |

**Contents:**

| |
|---|
| HER2 Control Slides (x15) |
| HER2 Primary Antibody |
| HER2 Negative Control |
| Integrated DAB Detection System |

# Leica HER2 FISH

## Easy. Efficient. Accurate.

Fully Automated Leica HER2 FISH System for BOND

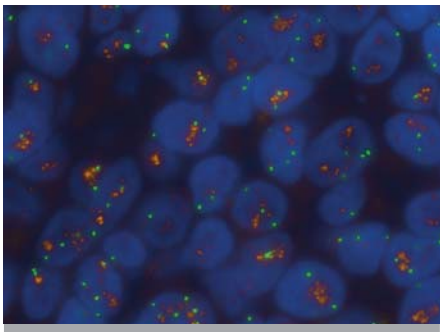
# Fully automated Leica HER2 FISH System: With 99.67% concordance to the Abbott PathVysion* DNA probe kit, you can now produce consistent, high quality HER2 FISH staining

**Easy - Reduce errors and increase standardization**

Eliminate complexity and reduce human errors that may compromise patient care.

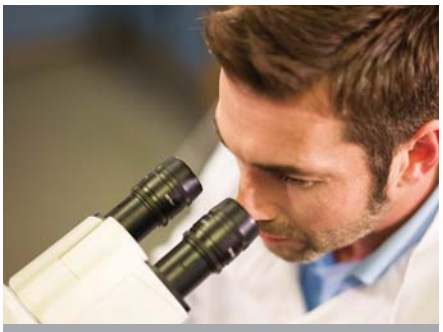
The Leica HER2 FISH System uses familiar PathVysion LSI®* HER2/CEP17®* FISH probes supplied by Abbott Molecular Inc, Ready-to-Use on the Leica BOND System.

With fully automated staining, laboratories will find it easy to produce the consistent, high-quality stained slides that pathologists rely on.



**Efficient - Create a Lean workflow**

Work smarter, increase efficiency and provide an improved service to your clinicians and customers. Leica BOND automation brings optimized workflow to HER2 FISH staining. With automation, an optimized protocol and standardized Ready-to-Use reagents, the HER2 FISH System provides the flexibility, reduced hands-on time and reduced turnaround time that today's Lean workflow demands.



**Accurate - Deliver accurate results for diagnostic confidence**

The Leica HER2 FISH System provides a Total Solution. The system combines Abbott Molecular Inc's HER2 FISH probes with the industry-leading Leica BOND automated platform. The reduction in variation delivers a high level of diagnostic confidence when combined with proprietary Leica HER2 FISH Control Slides.

**Leica HER2 FISH System**

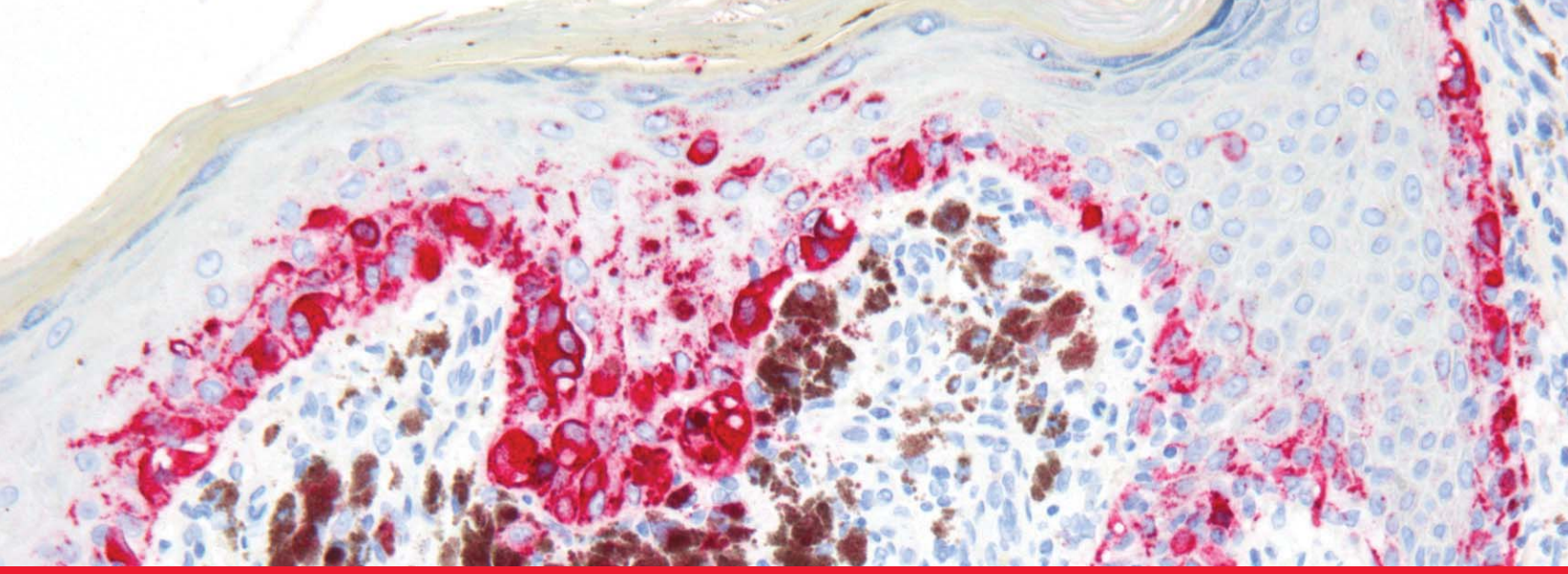
| | |
|---|---|
| Product code: | TA9217 |
| No. of tests: | 30 tests (30 slides) |

**Contents:**

| |
|---|
| RTU LSI HER2/CEP17 dual probe |
| Post Hybridization Wash Solution |
| Leica BOND Enzyme Diluent |
| Leica BOND Enzyme Concentrate 2 |
| Leica BOND Open Containers |

## FOR FURTHER INFORMATION:

visit our website today at:
**www.LeicaBiosystems.com/TA9217-IFU**



# BOND Reagents and Ancillaries

Deliver results you can trust, for confidence in diagnosis.

Novocastra Antibodies, in combination with the BOND platforms provide a fully integrated and automated approach to your advanced staining process.

Leica BOND Systems

# Quality, efficiency and total tissue care

Fully automated IHC & ISH

# Leica BOND: Rapid delivery of high quality IHC and ISH for accurate diagnosis and optimal patient care.

The Leica BOND system helps you complete slides with high-quality staining and total tissue care. Ready-to-Use antibodies and advanced connectivity complete a solution that helps you ensure patients quickly receive the definitive answers they are waiting for.

## QUALITY

Leica BOND helps you create diagnostic confidence. Covertile™ technology optimizes tissue care through gentle reagent application within a protective shield. Novocastra Compact Polymer™ detection technology delivers exceptional sensitivity. Leica BOND is the complete advanced staining solution that helps you minimize repeats and ensure consistency.

## SPEED

Help more patients receive critical answers sooner. Leica BOND is optimized for increased throughput. Integrated automation systems ensure speed and organization to expedite urgent cases, decrease turnaround times and process more slides each day.

## EFFICIENCY

Developed with Leica's Lean culture, Leica BOND increases efficiency, eliminates bottlenecks and cuts costs. With the smallest footprint, Leica BOND saves valuable laboratory space. Case-based organization promotes productive workflow so existing resources complete more slides in less time. Also, the lowest waste volumes and smallest daily maintenance demands of any automated IHC/ISH stainer eliminate downtime.

# Choose the stainer that is right for you

**Leica BOND RX**
Research IHC and ISH Staining.

**Leica BOND-MAX**
Flexible and compact with consistent staining excellence.

**Leica BOND-III**
Same staining excellence, faster, and more autonomy to easily manage large case loads.

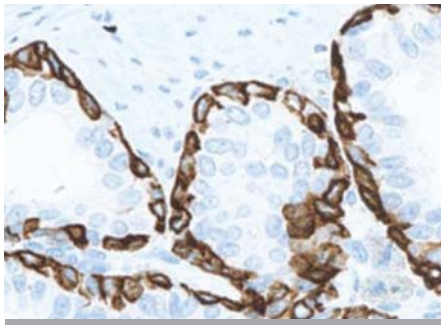
## Compact Polymer Detection for Leica BOND Systems

# Accurate Diagnosis and Enhanced Laboratory Efficiency

Advanced detection systems delivering reliable, high-quality staining in IHC and ISH

# With your results impacting patient diagnosis, delivering reliable, high-quality staining in immunohistochemistry and in situ hybridization is paramount. Your choice of detection chemistry is important, affecting every patient slide.

**Using Leica's compact polymer detection on Leica BOND systems allows you to achieve specific and sensitive staining, while minimizing endogenous background staining.** The result is high-quality staining, facilitating accurate slide interpretation, improving diagnostic confidence and enhancing laboratory workflow efficiency.

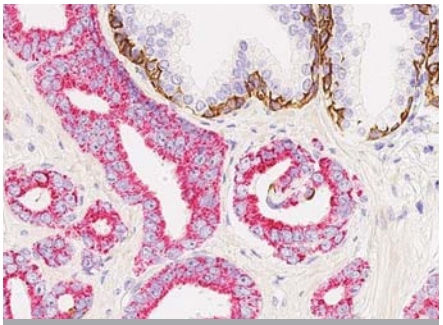


## Excellent ease of interpretation

The high specificity and sensitivity of the compact polymer, together with the clear color differentation provided by both red and brown chromogens, provides you with the intensity and accuracy required for diagnosis. The biotin-free system reduces the presence of non-specific background staining, giving you a clear picture.

## Minimize repeats and achieve "right first time" staining

Deliver exceptional staining in your laboratory using the full range of pre-optimized reagents and fully validated rapid staining protocols. Complete automation, including on-board chromogen mixing, ensures consistent and accurate staining every time, enhancing workflow efficiency.



## Increase confidence

Leica BOND systems are the only fully-automated immunostaining platforms which enable both sequential and single-step parallel dual-color staining of tissue sections. Parallel staining with ChromoPlex™ 1 Dual Detection for BOND enables laboratories to perform dual-color staining, quickly and cleanly using antibody cocktails. The open reagent architecture of the BOND system allows for the use of commercial or laboratory-validated cocktails, as clinical needs dictate.

## BOND Polymer Refine Detection

200 Tests DS9800 **P**

### Background

**Immunohistochemistry (IHC)**

Primary antibody binding to tissue sections can be visualized using BOND Polymer Refine Detection, where it provides intense, high resolution staining. A range of BOND ready-to-use primary antibodies are available, or alternatively, use antibody concentrates diluted with BOND Primary Antibody Diluent (AR9352).

### Background

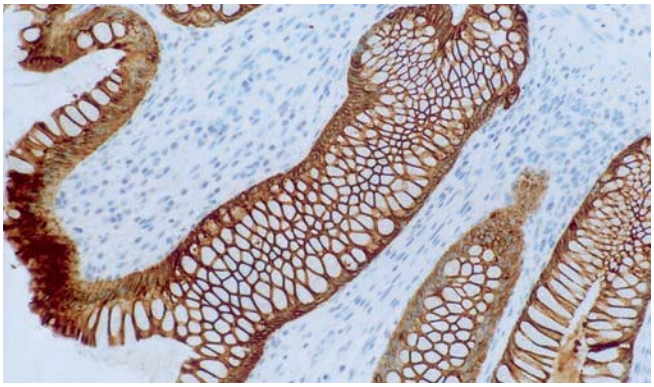
**Chromogenic in Situ Hybridization (ISH)**

BOND Polymer Refine Detection produces highly specific, sensitive and reproducible demonstration of nucleic acid sequences through controlled hybridization reactions.

### Components

A state-of-the-art Compact Polymer detection system for use in both immunohistochemistry and chromogenic in situ hybridization. Small multifunctional linkers enhance tissue penetration, producing unsurpassed sensitivity. The system is biotin-free.

BOND Polymer Refine Detection contains a peroxide block, post primary, polymer reagent, DAB chromogen and hematoxylin counterstain. It is supplied ready-to-use for the automated BOND system.



Colon mucosa: immunohistochemical staining with BOND ready-to-use Cytokeratin 8/18 (5D3) (PA0067) using BOND Polymer Refine Detection.

BOND Polymer Refine Detection.

## BOND Polymer Refine Red Detection

100 Tests DS9390 **P**

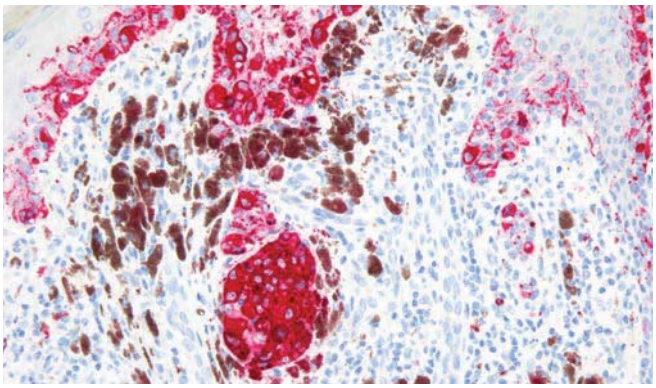
### Background

**Immunohistochemistry (IHC)**

Primary antibody binding to tissue sections can be visualized using the BOND Polymer Refine Red Detection, providing an intense and high resolution stain.

### Components

BOND Polymer Refine Red Detection is an IVD labeled red detection system for the automated BOND system. BOND Polymer Refine Red Detection is biotin-free, utilizing alkaline phosphatase (AP)-linked compact polymer to provide enhanced tissue penetration and unsurpassed reagent sensitivity. It contains post primary, polymer reagent, Fast Red chromogen, and hematoxylin counterstain and is supplied in a convenient, ready-to-use format.



Human skin stained for melanoma marker HMB45 with NCL-HMB45 using BOND Polymer Refine Red Detection. Note intense cytoplasmic staining of melanocytes in contrast to the brown endogenous melanin.

BOND Polymer Refine Red Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

## ChromoPlex™ 1 Dual Detection for BOND

100 Tests DS9477 **P**
50 Tests DS9665 **P**

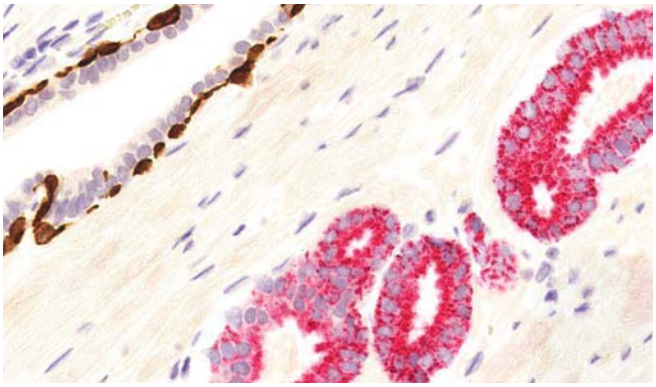
### Background

**Immunohistochemistry (IHC)**

When tissue is limited and a diagnosis is required, the most effective use of tissue sections becomes imperative. With ChromoPlex 1 Dual Detection for BOND, you can view multiple antibodies using two distinctive chromogens on a single slide, to give you a faster, more comprehensive result for clinical assessment.

### Components

ChromoPlex 1 Dual Detection is a biotin-free, polymeric horseradish peroxidase (HRP)-linker and polymeric alkaline phosphatase (AP)-linker antibody conjugate system for the detection of tissue-bound mouse and rabbit IgG primary antibodies. It is intended for staining sections of formalin-fixed, paraffin-embedded tissue on the BOND automated system.



Sensitive and specific staining of the basal cell layer of a prostate biopsy with DAB chromogen. Excellent staining intensity of malignant cells detected with Fast Red chromogen. Prostate Biopsy stained with ChromoPlex 1 Dual Detection and a prostate cocktail (PIN-4).

## BOND Intense R Detection

200 Tests DS9263 **P F**

### Background

By allowing a free choice of biotinylated secondary antibody, BOND Intense R Detection is ideal for the detection of primary antibodies from any species. Research applications such as IHC staining of mouse tissues can be accommodated in this manner. The intense deposition of DAB reaction product produces strong immunostaining.

### Components

BOND Intense R Detection is a peroxidase detection system optimized for use on the automated BOND system and is ideal for research applications. It contains a peroxide block, streptavidin/peroxidase conjugate, DAB chromogen and hematoxylin counterstain. Users must supply a biotinylated secondary antibody of their choice.

BOND Intense R Detection.

## BOND Research Detection

200 Tests DS9455

### Background

BOND Research Detection offers researchers the ability to tailor applications and fully automate staining for ease of use.

### Components

This open detection system consists of six standard 30 mL open containers in a reagent tray. The tray is registered on BOND like any other detection system (one barcode only), but each of the containers can be configured with reagent of the user's choice.

BOND Research Detection.

## BOND Wash Solution 10X Concentrate

1 L AR9590 **P**

### Components

BOND Wash Solution 10X Concentrate is a concentrated buffer solution specifically for use on the automated BOND system. It is available in 1 L quantities, and when diluted will make up 10 L of working solution.

### Background

BOND Wash Solution is the only wash buffer that should be used in BOND automated staining procedures. It is formulated for smooth and gentle reagent flow under the BOND Covertile to help ensure that excess reagent is removed from the tissue section before new reagent is added.

BOND Wash Solution 10X Concentrate.

## BOND Primary Antibody Diluent

500 mL AR9352 **P**

### Components

BOND Primary Antibody Diluent is ready-to-use and available in a quantity of 500 mL.

### Background

BOND Primary Antibody Diluent is specifically for diluting concentrated primary antibodies for use on the automated BOND system. It is not intended for the reconstitution of lyophilized reagents.

BOND Primary Antibody Diluent.

## BOND DAB Enhancer

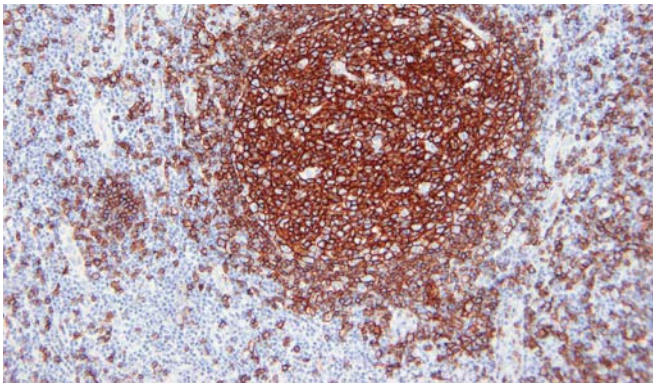
30 mL AR9432 **P**

### Components

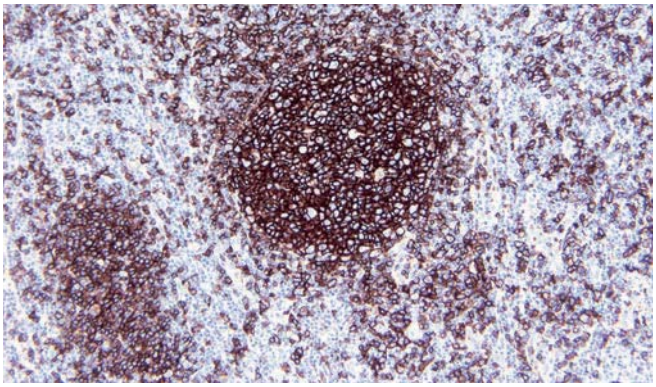
BOND DAB Enhancer is a heavy metal solution for use on the automated BOND system. The no-mix, ready-to-use format simplifies laboratory workflow.

### Background

BOND DAB Enhancer changes the color of the DAB reaction deposit from golden to dark brown, providing an increase in contrast between chromogen-specific staining and the slide back drop. This can assist in qualitative identification of antigens.



Staining without DAB Enhancer. Human tonsil stained for CD20 with NCL-CD20-MJ1 using BOND Polymer Refine Detection.



Staining with DAB Enhancer. Human tonsil stained for CD20 with NCL-CD20-MJ1 using BOND Polymer Refine Detection.


BOND DAB Enhancer.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# BOND Dewax Solution

1 L AR9222 **P**

### Components

BOND Dewax Solution is a deparaffinization solution specifically designed for use on the automated BOND system. It is provided ready-to-use in 1 L bottles and can be poured directly into the appropriate bulk reagent container on the instrument.

### Background

The use of BOND Dewax Solution allows paraffin wax to be removed from tissue sections before rehydration and staining on BOND. It is specially formulated to be compatible with the automated BOND system, and efficiently removes wax from slides while retaining the integrity of tissue antigens and probe binding sites. BOND Dewax Solution is less harmful than alternative deparaffinization solutions such as xylene.

BOND Dewax Solution.

# BOND Enzyme Pretreatment Kit

1 kit AR9551 **P**

### Components

BOND Enzyme Concentrate, 1 mL
BOND Enzyme Diluent, 200 mL
3 x BOND Open Containers, 7 mL
The enzyme is diluted before use in the BOND Open Containers supplied. The diluted enzyme solution is used for enzymatic digestion on the automated BOND system.

### Background

#### Immunohistochemistry (IHC)

The BOND Enzyme Pretreament Kit can be used for enzymatic digestion on formalin-fixed, paraffin-embedded tissue sections to assist in epitope exposure. Enzymatic pretreatment improves the staining of some antibodies by exposing epitopes within tissue that have been masked during fixation.

### Background

#### In Situ Hybridization (ISH)

The diluted enzyme solution can also be used for ISH. Enzymatic digestion of tissue assists in the penetration of probes and facilitates binding.

BOND Enzyme Pretreatment Kit.

# BOND Epitope Retrieval Solution 1

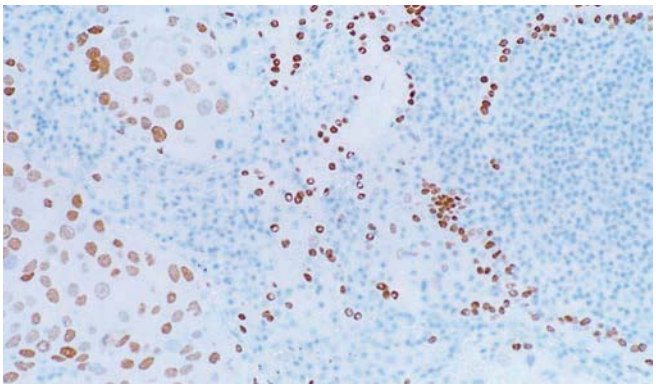
1 L AR9961 **P**

### Components

BOND Epitope Retrieval Solution 1 is a 1 L ready-to-use, citrate based pH 6.0 solution. It is specifically for heat-induced epitope retrieval (HIER) on the automated BOND system.

### Background

BOND Epitope Retrieval Solution 1 is for use on formalin-fixed, paraffin-embedded tissue sections to expose epitopes within tissue that have been masked during fixation. The solution is gentle on sections as it has a reduced boiling temperature and utilizes BOND's Covertile technology to prevent reagent evaporation.



Human lung stained for TTF-1 with BOND ready-to-use Thyroid Transcription Factor-1 (SPT24, PA0364), using BOND Polymer Refine Detection and BOND Epitope Retrieval Solution 1.


BOND Epitope Retrieval Solution 1.

# BOND Epitope Retrieval Solution 2

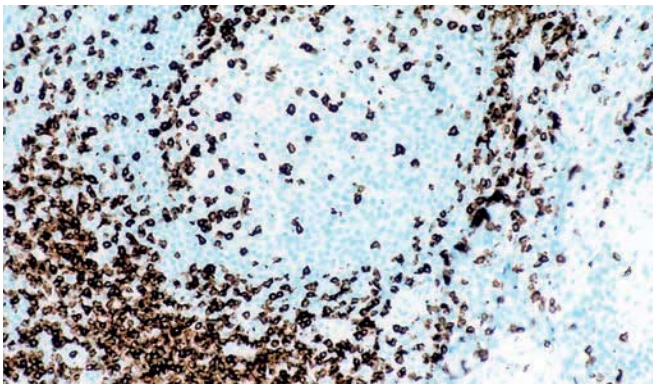
1 L AR9640 **P**

### Components

BOND Epitope Retrieval Solution 2 is a 1 L ready-to-use, EDTA based pH 9.0 solution. It is specifically for heat-induced epitope retrieval (HIER) on the BOND system.

### Background

BOND Epitope Retrieval Solution 2 is for use on formalin-fixed, paraffin-embedded tissue sections to expose epitopes within tissue that have been masked during fixation. The solution is gentle on sections as it has a reduced boiling temperature and utilizes BOND's Covertile technology to prevent reagent evaporation.



Human tonsil stained for CD3 with BOND ready-to-use CD3 (LN10, PA0533), using BOND Polymer Refine Detection and BOND Epitope Retrieval Solution 2.


BOND Epitope Retrieval Solution 2.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

Novocastra™ HD
**Highly Definitive Antibodies**

# Put our antibodies to the test

Independently evaluated* for results you can depend on

# Pathologist qualified accuracy for diagnosis.

An independent*, head-to-head assessment of Novocastra HD products vs. leading equivalents, evaluated and qualified each antibody regarding staining quality and application for diagnostic use. Notable advantages in staining performance were observed on several occasions, sometimes even for the same clone.


## See the difference for yourself

**CD10**

A comparison of CD10 Ready-to-Use antibodies from leading manufacturers on human tonsil.


Leica BOND system using BOND Ready-to-Use CD10 demonstrates high quality staining when compared directly to Ready-to-Use antibodies from other leading manufacturers on serially cut sections of human tonsil. Images supplied by NordiQC.

**CD3**

A comparison of CD3 liquid concentrated antibodies from leading manufacturers on human T cell lymphoma.


Leica BOND system using Novocastra liquid concentrate CD3 demonstrates high quality staining when compared directly to liquid concentrated CD3 antibodies from other leading manufacturers on serially cut sections of human T cell lymphoma. Images supplied by NordiQC.

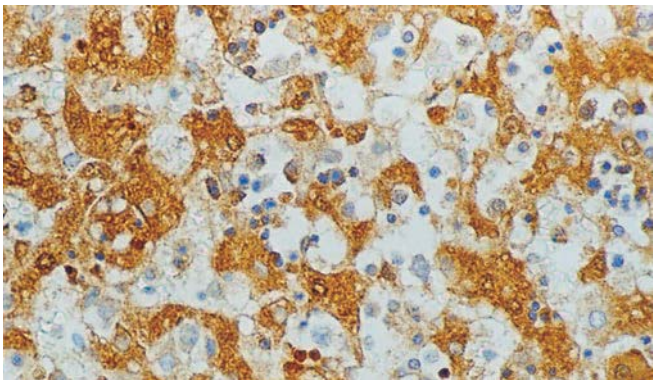
*Independent analysis commissioned by Leica Biosystems and conducted by Nordi QC according to the manufacturers' instructions for use and on the corresponding staining platform.

## Alpha Fetoprotein

**Clone C3**
7 mL BOND ready-to-use PA0963 **P**

**Antigen Background**

Alpha fetoprotein (AFP) is an oncofetal antigen of 70 kD found in body fluids which if detected in high concentrations has clinical implications. AFP is expressed in fetal liver but is not present under normal circumstances in healthy adult tissues. It is reported to be expressed in a proportion of germ cell tumors, with high frequency in yolk sac tumors.



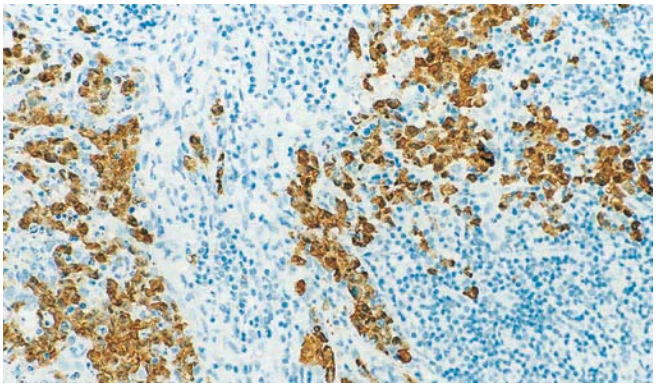
Human fetal liver: immunohistochemical staining for alpha fetoprotein using NCL-AFP. Note cytoplasmic staining of hepatocytes. Paraffin section.

## Anaplastic Lymphoma Kinase

**Clone 5A4**
7 mL BOND ready-to-use PA0306 **P (HIER)**

**Antigen Background**

Anaplastic large cell lymphoma (ALCL) is usually composed of large pleomorphic cells which are reported to express CD30 antigen and the epithelial membrane antigen (EMA). These tumor cells tend to occur in younger individuals and may be associated with cutaneous and extranodal involvement. A proportion of these cases contain a chromosomal translocation t(2;5) (p23; q35). This results in a hybrid gene encoding part of the nucleophosmin (NPM) gene joined to the cytoplasmic domain of the anaplastic lymphoma kinase (ALK) gene, giving rise to the protein, p80. Large cell lymphomas account for approximately 25 percent of all non-Hodgkin's lymphomas in children and young adults, of which one third carries the NPM-ALK gene translocation.



Human anaplastic lymphoma: immunohistochemical staining for anaplastic lymphoma kinase (p80) using NCL-ALK. Note cytoplasmic staining of large pleomorphic cells. Paraffin section.

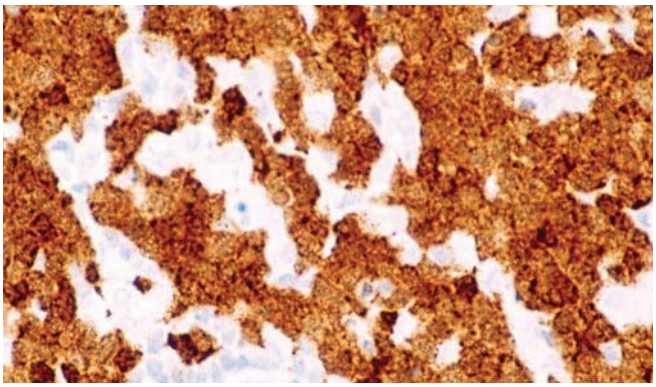
## B Cell Specific Octamer Binding Protein-1 (BOB-1)

**Clone TG14**
7 mL BOND ready-to-use PA0558 **P (HIER)**

**Antigen Background**

B cell specific octamer binding protein-1 (BOB-1), also known as OBF-1 and OCA-B, is a lymphocyte specific transcriptional coactivator protein. It interacts with OCT1 and OCT2 transcription factors and contributes to the transcriptional activity of octamer motifs. BOB-1 has been reported to be detectable in all B cell populations found in reactive lymphoid tissues. The strongest expression being found in germinal center B cells and plasma cells. The expression of BOB-1 in B cell tumors has been reported to be variable.

Also available as a liquid concentrate, refer to page 98



Lymphoma: immunohistochemical staining with BOND ready-to-use BOB-1 (TG14) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

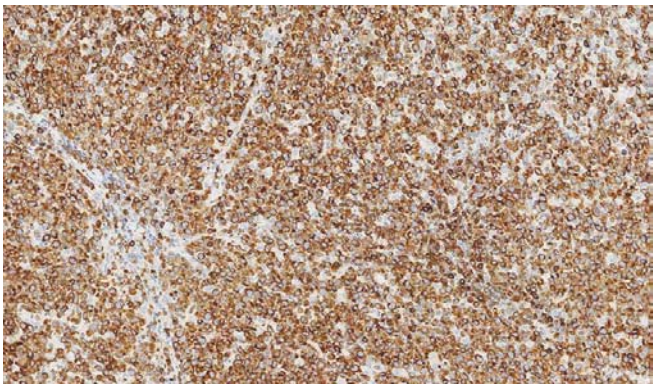
# Bcl-2 Oncoprotein

**Clone bcl-2/100/D5**
7 mL BOND ready-to-use PA0117 **P (HIER)**

**Antigen Background**

Bcl-2 is a member of a family of proteins that are involved in apoptosis. Bcl-2 is an integral inner mitochondrial membrane protein of 25 kD and has a wide tissue distribution. It is considered to act as an inhibitor of apoptosis. For this reason, bcl-2 expression is inhibited in germinal centers where apoptosis forms part of the B cell production pathway. In 90 percent of follicular lymphomas a translocation occurs which juxtaposes the bcl-2 gene at 18q21, to an immunoglobulin gene. This t(14;18) translocation can deregulate gene expression and bcl-2 over-expression can be demonstrated immunohistochemically in the vast majority of follicular lymphomas.

Also available as a liquid concentrate, refer to page 98



Human follicular lymphoma: immunohistochemical staining for Bcl-2 using PA0117. Note moderate cytoplasmic staining reaction of neoplastic cells, while normal peripheral lymphocytes show a strong staining reaction. Paraffin section.

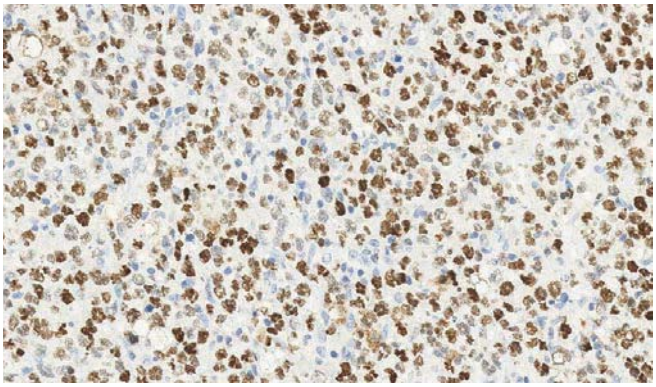
# Bcl-6 Oncoprotein

**Clone LN22**
7 mL BOND ready-to-use PA0204 **P (HIER)**

**Antigen Background**

Bcl-6 is a proto-oncogene that encodes a Kruppel-type zinc-finger protein of 95 kD and shares homology with other transcription factors. Bcl-6 protein is mainly expressed in normal germinal center B cells and related lymphomas. It has been shown that the Bcl-6 proto-oncogene is involved in chromosome rearrangements at 3q27 in non-Hodgkin's lymphomas and Bcl-6 rearrangements have also been detected in 33 to 45 percent of diffuse large B cell lymphomas. Immunohistochemistry has been reported to show the Bcl-6 gene product to be detectable in follicular lymphomas, diffuse large B cell lymphomas, Burkitt's lymphomas and in nodular, lymphocyte predominant Hodgkin's disease.

Also available as a liquid concentrate, refer to page 99



Human diffuse large B cell lymphoma: immunohistochemical staining for Bcl-6 using PA0204. Note nuclear staining of neoplastic cells. Paraffin section.

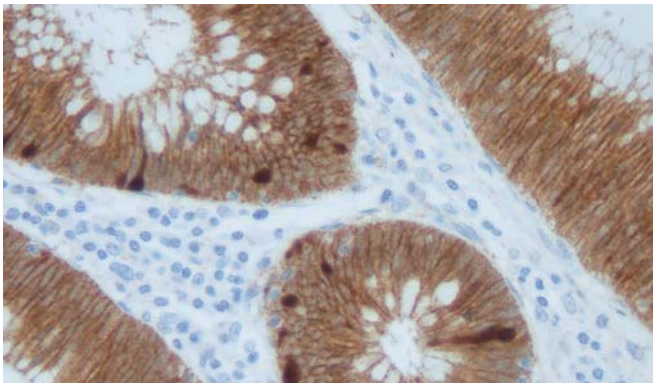
# Beta-Catenin

**Clone 17C2**
7 mL BOND ready-to-use PA0083 **P (HIER)**

**Antigen Background**

The catenins, (alpha, beta and gamma) are cytoplasmic proteins which bind to the highly conserved tail of the E-cadherin molecule. Beta-catenin is a component of the adherens junction, a multiprotein complex which supports Ca2+ -dependent cell to cell contact which in itself is critical for adhesion, signal transmission and for anchoring the actin cytoskeleton. Beta-catenin's role is as a transcription effector of the wnt-signalling pathway. Immunohistochemistry is the best way to demonstrate nuclear expression of beta-catenin and wnt-pathway activation. This aberrant expression is observed in human tumorigenesis and especially in colorectal cancer.

Also available as a liquid concentrate, refer to page 100



Colon polyp: immunohistochemical staining with BOND ready-to-use Beta-Catenin (17C2) using BOND Polymer Refine Detection.

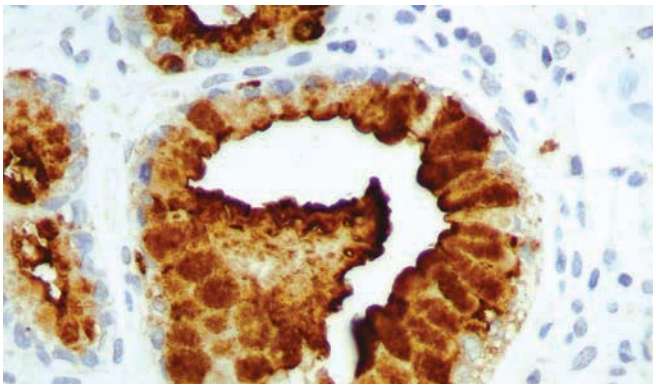
# CA19-9 (Sialyl Lewis[a])

**Clone C241:5:1:4**
7 mL BOND ready-to-use PA0424 **P (HIER)**

**Antigen Background**

CA19-9 is an epitope on the sialylated Lewis[a] carbohydrate structure. Sialylated Lewis[a] plays a role in cell adhesion by acting as a functional ligand for the inducible adhesion molecule E-selectin. CA19-9 and CA50 (carcinoma associated mucin antigen) are useful serum markers in the diagnosis and follow up of gastrointestinal and pancreatic cancers. In carcinoma of the pancreas, it is reported that the immunohistochemical expression of both CA19-9 and CA50 correlates with tumor differentiation where the strongest staining is observed in well differentiated tumors. These two markers are also reported in a number of benign lesions such as chronic pancreatitis.

Also available as a liquid concentrate, refer to page 101



Adenocarcinoma: immunohistochemical staining with BOND ready-to-use CA19-9 (Sialyl Lewis[a]) (C241:5:1:4) using BOND Polymer Refine Detection.

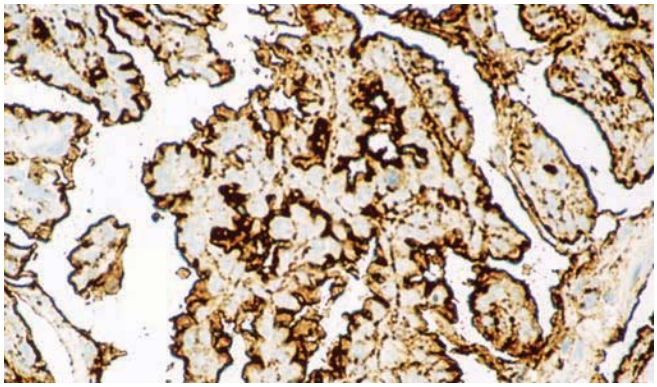
# CA125 (Ovarian Cancer Antigen)

**Clone Ov185:1**
7 mL BOND ready-to-use PA0539 **P (HIER)**

**Antigen Background**

CA125 antigen is usually associated with ovarian epithelial malignancies. Serum assays are widely used to detect this protein in the monitoring of ovarian cancers. CA125 antigen may also be detected by immunohistochemistry and expression has been found in neoplasms such as seminal vesicle carcinoma and anaplastic lymphoma. CA125 antigen is not found exclusively in malignant tumors. CA125 is also known as MUC16.

Also available as a liquid concentrate, refer to page 101



Mucinous adenocarcinoma: immunohistochemical staining with BOND ready-to-use CA125 (Ov185:1) using BOND Polymer Refine Detection.

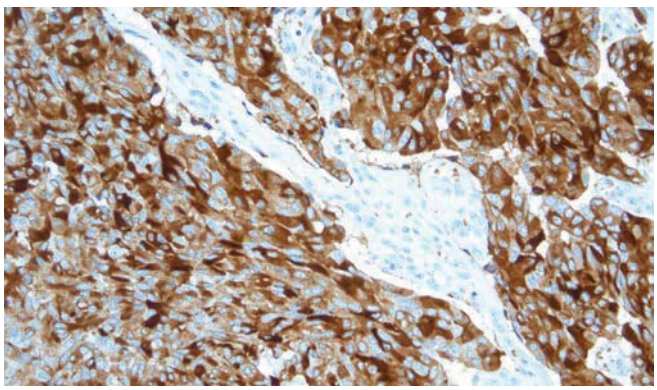
# Calcitonin

**Polyclonal**
7 mL BOND ready-to-use PA0406 **P (Enzyme)**

**Antigen Background**

Calcitonin (CT) is a 32 amino acid peptide synthesized by the parafollicular C cells of the thyroid. It acts through its receptors to inhibit osteoclast mediated bone resorption, decrease calcium resorption by the kidney and decrease calcium absorption by the intestines. The action of calcitonin is therefore to cause a reduction in serum calcium, an effect opposite to that of parathyroid hormone. The calcitonin gene transcript also encodes the calcitonin gene-related peptide (CGRP), which is thought to be a potent vasodilator. The tissue specificity of the transcript produced depends on alternative splicing of the CT/CGRP gene transcript. In the parafollicular cells of the thyroid 95 percent of the CT/CGRP is processed and translated to produce CT, however, in neuronal cells 99 percent of the CT/CGRP RNA is translated into CGRP. The C cells of the thyroid give rise to an endocrine tumor, medullary thyroid carcinoma (MTC), which occurs in a sporadic (75 percent of cases) and hereditary form (25 percent of cases). Familial MTC is associated with C cell hyperplasia (CCH), whereas sporadic MTC is thought not to be. However, in the general population CCH is present in 20-30 percent of thyroid glands, either with normal histology, thyroiditis or follicular tumors.

Also available as a liquid concentrate, refer to page 102.



Medullary carcinoma: immunohistochemical staining with BOND ready-to-use Calcitonin (Polyclonal) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

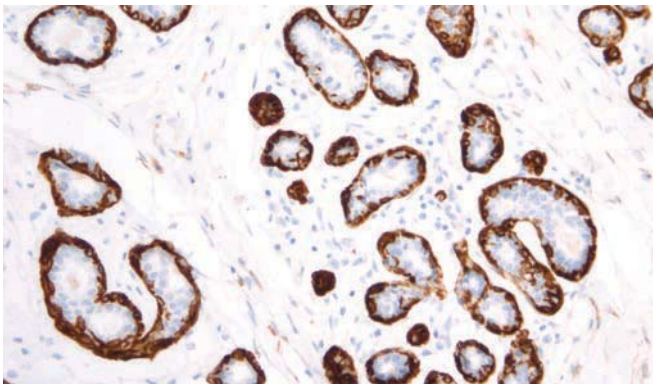
# Calponin (Basic)

**Clone 26A11**
7 mL BOND ready-to-use PA0416 **P (HIER)**

**Antigen Background**

Calponin (Basic) is an actin, tropomyosin and calmodulin binding protein thought to be involved in the regulation of smooth muscle contraction. The expression of basic calponin is reported to be restricted to smooth muscle cells and is a marker of the differentiated contractile phenotype of developing smooth muscle. Vascular smooth muscle cells convert to a synthetic dedifferentiated phenotype when this protein is lost and this is a key stage in both atherosclerosis and restenosis of coronary arteries after balloon angioplasty. It is thought that basic calponin exerts its effect via the cortical actin cytoskeleton and therefore influences proliferation, the transformed phenotype and the metastatic potential of tumor cells. Basic calponin mRNA is expressed in smooth muscle of prostate, bowel and aorta whereas neutral and acidic calponin mRNAs are expressed in non-smooth muscle tissues such as heart, placenta, lung, kidney, pancreas, spleen, testis and ovary as well as in smooth muscle-containing tissues.

Also available as a liquid concentrate, refer to page 103.



Breast carcinoma: immunohistochemical staining with BOND ready-to-use Calponin (Basic) (26A11) using BOND Polymer Refine Detection.

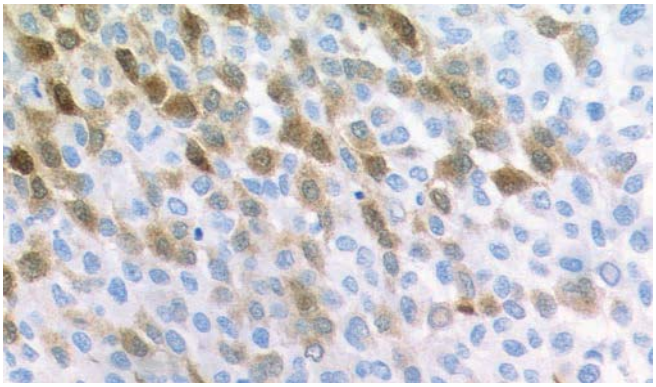
# Calretinin (CAL6)

**Clone CAL6**
7 mL BOND ready-to-use PA0346 **P (HIER)**

**Antigen Background**

Calretinin is a calcium-binding protein of 29 kD that is a member of the family of so-called EF-hand proteins that also includes S-100 proteins. Calretinin is reported to be abundantly expressed in neurons. Outside the nervous system, calretinin is reported to be expressed in a range of cell types including mesothelial cells, steroid producing cell, (eg adrenal cortical cells, Leydig cells, ovarian theca interna cells as well as Sertoli cells, some neuroendocrine cells, eccrine sweat glands) and other cell types.

Also available as a liquid concentrate, refer to page 103.



Mesothelioma: immunohistochemical staining with BOND ready-to-use Calretinin (CAL6) using BOND Polymer Refine Detection.

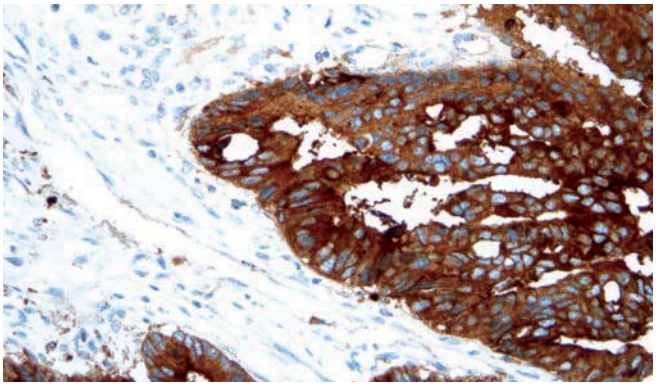
# Carcinoembryonic Antigen

**Clone II-7**
7 mL BOND ready-to-use PA0004 **P (HIER)**

**Antigen Background**

Carcinoembryonic antigen (CEA) is a heterogeneous cell surface glycoprotein produced by cells of fetal colon. Low levels are also found on normal mucosal epithelia of the adult colon and a variety of other normal tissues. CEA is encoded by the CEA gene that is located on chromosome 19. It is a member of the CEA gene family, which in turn is a subfamily of the immunoglobulin superfamily. Cell adhesion properties are now well recognized for CEA. It is believed that the expression of this glycoprotein in conjunction with other known adhesion molecules will influence the cell-cell interaction.

Also available as a liquid concentrate, refer to page 104.



Colon adenocarcinoma: immunohistochemical staining with BOND ready-to-use Carcinoembryonic Antigen (II-7) using BOND Polymer Refine Detection.

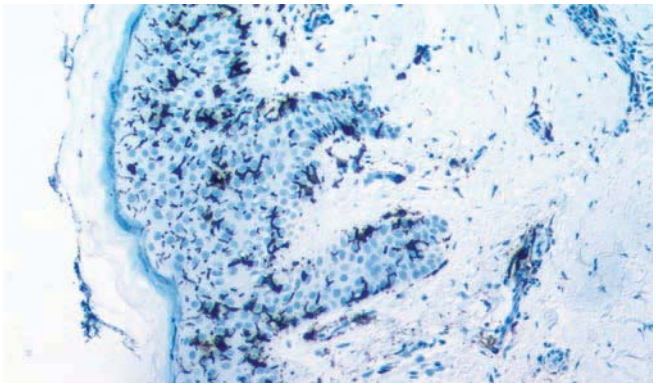
# CD1a

## Clone MTB1
7 mL BOND ready-to-use PA0235 **P (HIER)**

### Antigen Background

CD1a is a protein of 43 to 49 kD expressed on dendritic cells and cortical thymocytes. CD1a antigen expression has been shown to be useful in differentiating Langerhans cells, powerful antigen presenting cells present in skin and epithelia, from interdigitating cells. Immunohistochemical studies for CD1a antigen have reported a reduction in epidermal Langerhans cells in graft versus host disease and the participation of CD1a antigen-positive dendritic cells in atherosclerotic lesion formation and asthmatic inflammation.

Also available as a liquid concentrate, refer to page 106.



Skin: immunohistochemical staining with BOND ready-to-use CD1a (MTB1) using BOND Polymer Refine Detection.

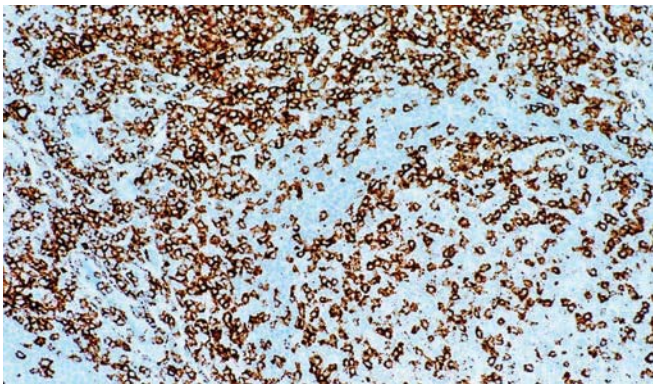
# CD2

## Clone 11F11
7 mL BOND ready-to-use PA0271 **P (HIER)**

### Antigen Background

The CD2 antigen (LFA-2) is a monomeric 45 to 58 kD glycoprotein. It is an accessory molecule important in mediating the adhesion of activated T cells and thymocytes with antigen-presenting cells and target cells.

Also available as a liquid concentrate, refer to page 106.



Tonsil: immunohistochemical staining with BOND ready-to-use CD2 (11F11) using BOND Polymer Refine Detection.

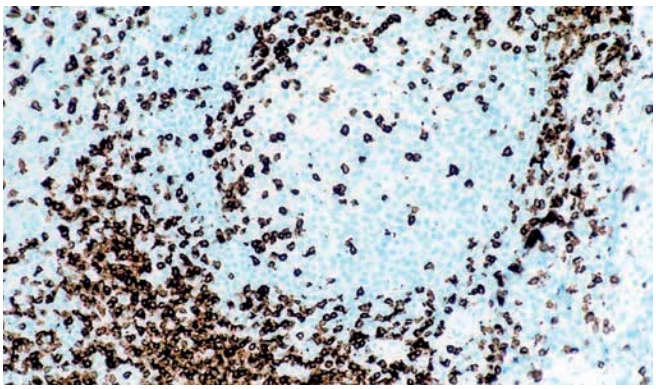
# CD3

## Clone LN10
7 mL BOND ready-to-use PA0553 **P (HIER)**

### Antigen Background

The CD3 molecule consists of five different polypeptide chains with molecular weights ranging from 16 to 28 kD. The CD3 antigen is first detected in early thymocytes and its appearance probably represents one of the earliest signs of commitment to the T cell lineage.

Also available as a liquid concentrate, refer to page 107.



Tonsil: immunohistochemical staining with BOND ready-to-use CD3 (LN10) using BOND Polymer Refine Detection.

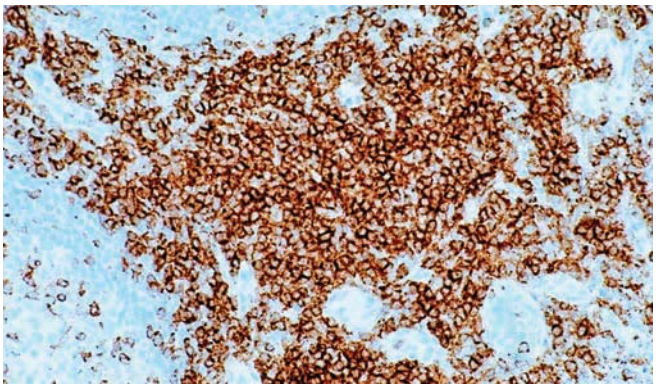
# CD4

## Clone 4B12
7 mL BOND ready-to-use PA0368 **P (HIER)**

### Antigen Background

The CD4 molecule (T4) is a single chain transmembrane glycoprotein with a molecular weight of 59 kD. The CD4 antigen is expressed on a T cell subset (helper/inducer) representing 45 percent of peripheral blood lymphocytes and at a lower level on monocytes. Most cases of cutaneous T cell lymphoma, including mycosis fungoides, express the CD4 antigen and HTLV-1 associated adult T cell leukemia/lymphoma is also generally CD4 positive.

Also available as a liquid concentrate, refer to page 107.



Tonsil, T cell helper/inducer cells: immunohistochemical staining with BOND ready-to-use CD4 (4B12) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

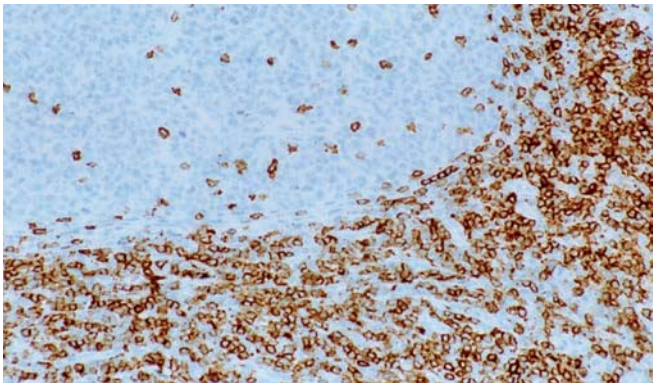
# CD5

## Clone 4C7
7 mL BOND ready-to-use PA0168 **P (HIER)**

### Antigen Background

CD5 antigen is reported to be expressed on 95 percent of thymocytes and 72 percent of peripheral blood lymphocytes. In lymph nodes, the main reactivity is observed on T cells. CD5 antigen is also expressed by many T cell leukemias, lymphomas, activated T cells and on a subset of B cells located primarily in the mantle zones of normal lymph nodes. CD5 antigen expression is also reported in T cell acute lymphocytic leukemias (T-ALL), some B cell chronic lymphocytic leukemias (B-CLL) as well as B and T cell lymphomas.

Also available as a liquid concentrate, refer to page 108.



Tonsil: immunohistochemical staining with BOND ready-to-use CD5 (4C7) using BOND Polymer Refine Detection.

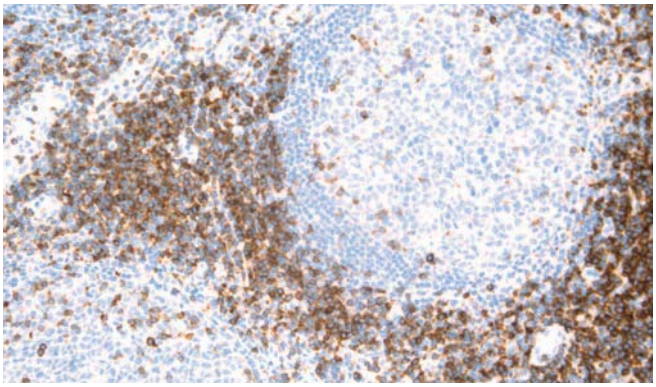
# CD7

## Clone LP15
7 mL BOND ready-to-use PA0266 **P (HIER)**

### Antigen Background

The CD7 molecule is a membrane-bound glycoprotein of 40 kD and is the earliest T cell specific antigen to be expressed in lymphocytes. CD7 antigen is also the only early marker to persist throughout differentiation. The function and role of the CD7 molecule has not yet been fully identified, although the activation of T cells with gamma/delta receptors has been proposed based on mAb-induced activation. CD7 antigen is reported to be found on the majority of peripheral blood T cells, most natural killer cells and thymocytes.

Also available as a liquid concentrate, refer to page 108.



Tonsil: immunohistochemical staining with BOND ready-to-use CD7 (LP15) using BOND Polymer Refine Detection.

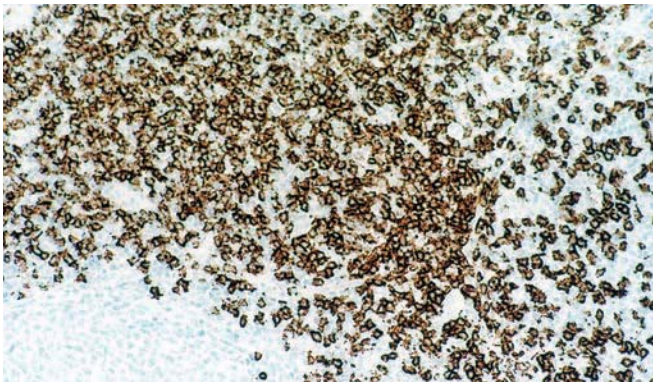
# CD8

## Clone 4B11
7 mL BOND ready-to-use PA0183 **P (HIER)**

### Antigen Background

The CD8 molecule is composed of two chains and has a molecular weight of 32 kD. It is found on a T cell subset of normal cytotoxic/suppressor cells which make up approximately 20 to 35 percent of human peripheral blood lymphocytes. The CD8 antigen is reported to be detected on natural killer cells, 80 percent of thymocytes, on a subpopulation of 30 percent of peripheral blood null cells and 15 to 30 percent of bone marrow cells.

Also available as a liquid concentrate, refer to page 108.



Tonsil: immunohistochemical staining with BOND ready-to-use CD8 (4B11) using BOND Polymer Refine Detection.

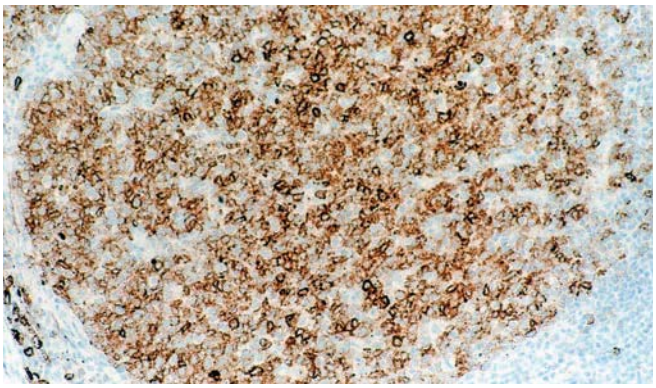
# CD10

## Clone 56C6
7 mL BOND ready-to-use PA0270 **P (HIER)**

### Antigen Background

CD10 antigen, also called neprilysin, is a 100 kD cell surface metalloendopeptidase which inactivates a variety of biologically active peptides. It was initially identified as the common acute lymphoblastic leukemia antigen (CALLA) and was thought to be tumor-specific. Subsequent studies, however, have shown that CD10 antigen is expressed on the surface of a wide variety of normal and neoplastic cells. In other lymphoid malignancies, CD10 antigen is reported to be expressed on cells of lymphoblastic, Burkitt's and follicular lymphomas. CD10 antigen has been identified on the surface of normal early lymphoid progenitor cells, immature B cells within adult bone marrow and germinal center B cells within lymphoid tissue. It is also expressed in various non-lymphoid cells and tissues, such as breast myoepithelial cells, bile canaliculi, fibroblasts, with especially high expression on the brush border of kidney and gut epithelial cells. (G. McIntosh et al. American Journal of Pathology. 154(1): 77-82 (1999)).

Also available as a liquid concentrate, refer to page 109.



Tonsil: immunohistochemical staining with BOND ready-to-use CD10 (56C6) using BOND Polymer Refine Detection.

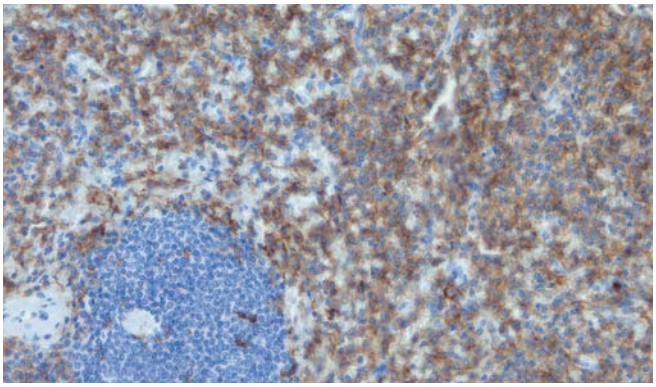
# CD11c

## Clone 5D11
7 mL BOND ready-to-use PA0554 **P (HIER)**

### Antigen Background

CD11c is a member of the leukocyte integrin family of adhesion proteins. It is reported to be expressed in normal tissues, mainly on myeloid cells eg in bone marrow myelocytes, premyelocytes, metamyelocytes, non-segmented and segmented neutrophils with high levels reported on tissue macrophages and monocytes and with lowest levels in granulocytes. It is also reported to be expressed on NK cells, activated T cells, lymphoid cell lines, including hairy cell leukemias and a proportion of interdigitating dendritic cells.

Also available as a liquid concentrate, refer to page 109.



Hairy cell leukemia: immunohistochemical staining with BOND ready-to-use CD11c (5D11) using BOND Polymer Refine Detection.

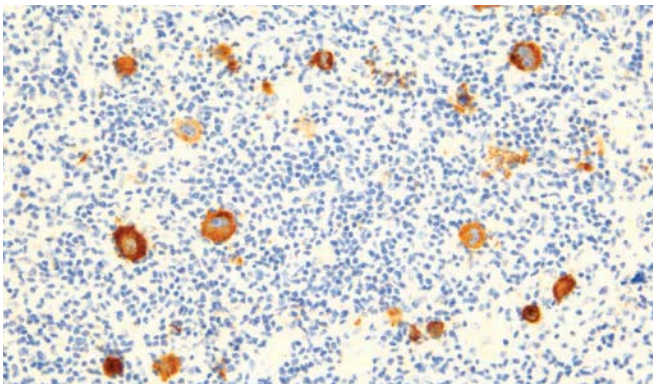
# CD15

## Clone Carb-1
7 mL BOND ready-to-use PA0039 **P (HIER)**

### Antigen Background

CD15 antigen, also known as X-hapten, is reported to be expressed on 90 percent of circulating human granulocytes, 30 to 60 percent of circulating monocytes and is absent from normal lymphocytes. The CD15 antigen is also expressed on Reed Sternberg cells of Hodgkin's disease and some leukemias.

Also available as a liquid concentrate, refer to page 110.



Hodgkin's lymphoma: immunohistochemical staining with BOND ready-to-use CD15 (Carb-1) using BOND Polymer Refine Detection.

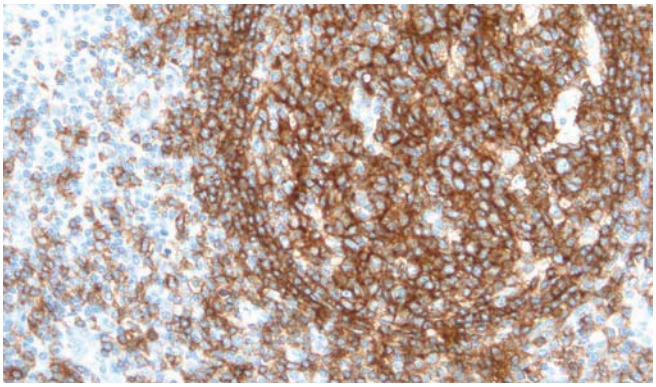
# CD19

**Clone BT51E**
7 mL BOND ready-to-use PA0843 **P (HIER)**

**Antigen Background**

CD19 is a member of the immunoglobulin superfamily and has two Ig like domains. It is a single chain glycoprotein present on the surface of B lymphocytes and follicular dendritic cells of the hematopoietic system. CD19 is a crucial regulator in B cell development, activation and differentiation. On B cells, CD19 associates with CD21, CD81 and CD225 (Leu-13) forming a signal transduction complex. CD19 is expressed from the earliest recognizable B cell lineage stage, through development to B cell differentiation but is lost on maturation to plasma cells.

Also available as a liquid concentrate, refer to page 111.



Normal tonsil: immunohistochemical staining with BOND ready-to-use CD19 (BT51E) using BOND Polymer Refine Detection.

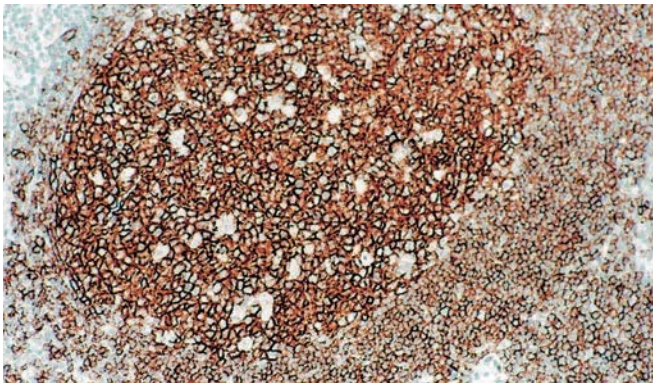
# CD20

**Clone MJ1**
7 mL BOND ready-to-use PA0906 **P (HIER)**

**Antigen Background**

The CD20 antigen is a non-glycosylated phosphoprotein of approximately 33 kD which is expressed on normal and malignant human B cells and is thought to act as a receptor during B cell activation and differentiation. CD20 antigen has been reported to be expressed on normal B cells from peripheral blood, lymph node, spleen, tonsil, bone marrow, acute leukemias and chronic lymphocytic leukemias.

Also available as a liquid concentrate, refer to page 111.



Tonsil: immunohistochemical staining with BOND ready-to-use CD20 (MJ1) using BOND Polymer Refine Detection.

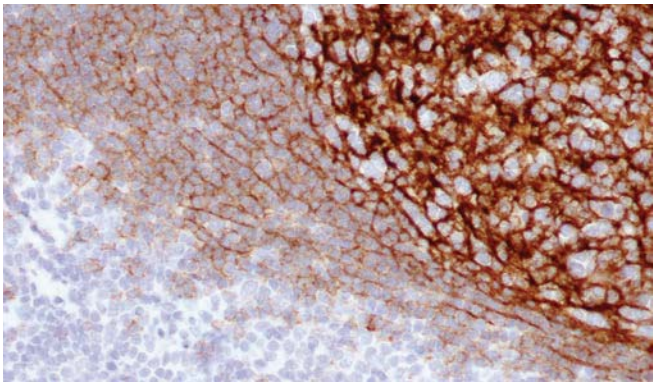
# CD21

**Clone 2G9**
7 mL BOND ready-to-use PA0171 **P (HIER)**

**Antigen Background**

CD21 antigen is a type I integral membrane glycoprotein of molecular weight 140 kD, which functions as the receptor for the C3d fragment of the third complement component. The CD21 molecule, present on mature B cells, is involved in transmitting growth-promoting signals to the interior of the B cell and acts as a receptor for Epstein-Barr virus. CD21 antigen is reported to be found in B cell chronic lymphocytic leukemias and in a subset of T cell acute lymphocytic leukemias but is absent on T lymphocytes, monocytes and granulocytes. CD21 antigen is also reported to be expressed in follicular dendritic cells and in follicular and mantle cell lymphomas, mature leukemias and lymphomas.

Also available as a liquid concentrate, refer to page 112.



Tonsil: immunohistochemical staining with BOND ready-to-use CD21 (2G9) using BOND Polymer Refine Detection.

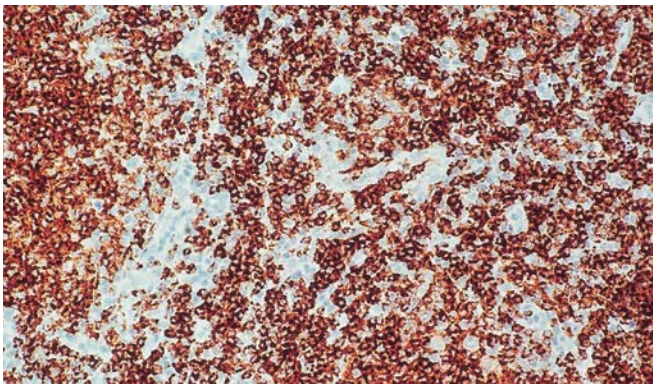
# CD22

## Clone FPC1
7 mL BOND ready-to-use PA0249 **P (HIER)**

### Antigen Background

The CD22 antigen (BL-CAM) is a type 1 integral membrane glycoprotein with a molecular weight of 130 to 140 kD. It is a heterodimer of two independently expressed glycoprotein chains, present both on the membrane and in the cytoplasm of B lymphocytes. Expression of the CD22 antigen is reported to appear early in B cell lymphocyte differentiation at approximately the same stage as that of the CD19 antigen expression. Surface antigen expression is variable and may be lost upon differentiation. CD22 antigen is also reported to be strongly expressed on hairy cell leukemias. It is absent on peripheral blood T cells, T cell leukemias, granulocytes and monocytes.

Also available as a liquid concentrate, refer to page 112.



Follicular lymphoma: immunohistochemical staining with BOND ready-to-use CD22 (FPC1) using BOND Polymer Refine Detection.

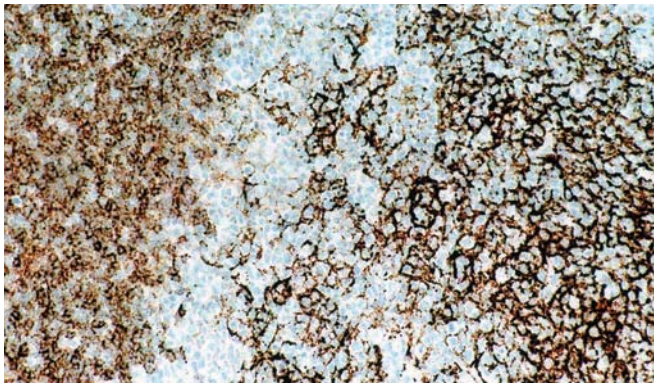
# CD23

## Clone 1B12
7 mL BOND ready-to-use PA0169 **P (HIER)**

### Antigen Background

The CD23 molecule is the low affinity IgE receptor found on B cells. It is a membrane glycoprotein of 45 kD and is reported to be found on a sub-population of peripheral blood cells, B lymphocytes and on EBV-transformed B lymphoblastoid cell lines. Expression of CD23 antigen has been reported on monocytes and dendritic cells.

Also available as a liquid concentrate, refer to page 112.



Tonsil: immunohistochemical staining with BOND ready-to-use CD23 (1B12) using BOND Polymer Refine Detection.

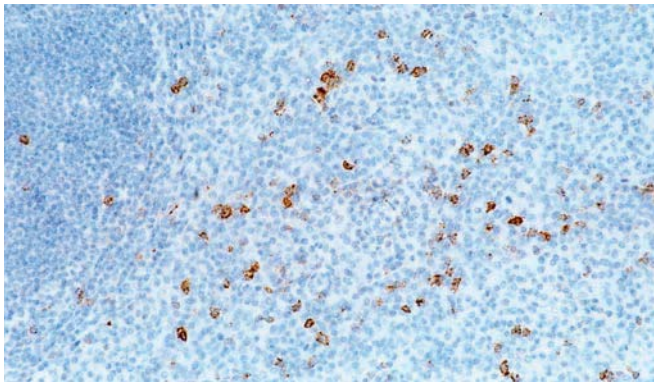
# CD25

## Clone 4C9
7 mL BOND ready-to-use PA0305 **P (HIER)**

### Antigen Background

CD25 antigen, the alpha subunit of interleukin-2 receptor, is a single-chain glycoprotein with a molecular weight of 55 kD. Following the activation of T cells interleukin-2 (IL-2) is rapidly synthesized and secreted. In response to this a subpopulation of T cells expresses high affinity receptors for IL-2. These cells proliferate, expanding the T cell population which is capable of mediating helper, suppressor and cytotoxic functions. IL-2 receptor is not exclusively found on T cells and is reported to be expressed on HTLV-transformed T and B cells, EBV-transformed B cells, myeloid precursors and oligodendrocytes. It is absent on thymocytes, resting T cells, non-activated B cells and null cells. IL-2 receptor expression is reported to be associated with inflammatory and malignant conditions, lymphoid neoplasia, auto-immune diseases and allograft rejection.

Also available as a liquid concentrate, refer to page 163.



Tonsil, activated T cells and NK cells: immunohistochemical staining with BOND ready-to-use CD25 (4C9) using BOND Polymer Refine Detection.

# CD30

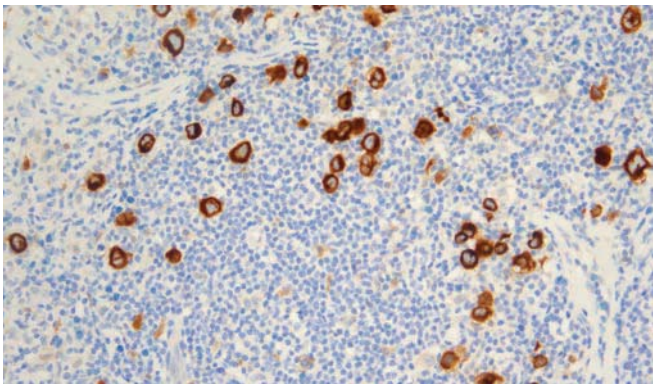
**Clone JCM182**
7 mL BOND ready-to-use PA0790 **P (HIER)**

**Clone 1G12**
7 mL BOND ready-to-use PA0153 **P (HIER)**

### Antigen Background

The CD30 antigen is a single chain glycoprotein with a molecular weight of 120 kD. CD30 antigen is known to act as a receptor for a cytokine ligand, CD30L, and may also play a role in the regulation of cellular growth and transformation. CD30 antigen is reported to be expressed on the surface of multinucleated Reed Sternberg cells, mononuclear Hodgkin's cells and in the majority of anaplastic large cell lymphomas. The CD30 antigen is expressed in non-Hodgkin's lymphoma and virally transformed cells, eg EBV-transformed B cells.

Also available as a liquid concentrate, refer to page 113.



Hodgkin's lymphoma: immunohistochemical staining with BOND ready-to-use CD30 (JCM182) using BOND Polymer Refine Detection.

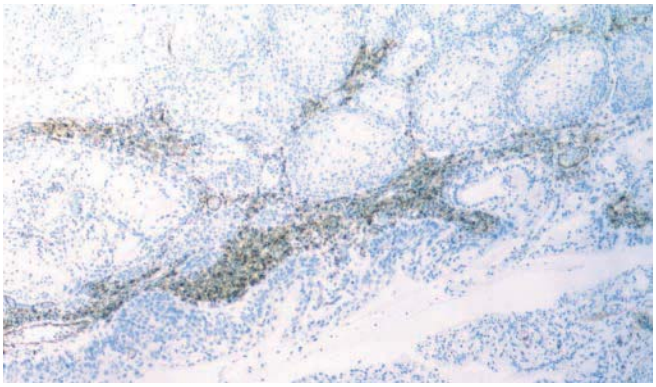
# CD31

**Clone 1A10**
7 mL BOND ready-to-use PA0250 **P (HIER)**

### Antigen Background

CD31 antigen (PECAM-1) is a single chain transmembrane glycoprotein with a molecular weight of 130 to 140 kD. The CD31 molecule is expressed on the surface of platelets, monocytes, granulocytes, B cells and at the endothelial intracellular junction. The molecule has an extracellular domain that contains six Ig-like homology units of C2 subclass, typical of cell to cell adhesion molecules. This domain mediates endothelial cell to cell adhesion, plays a role in endothelial contact and may serve to stabilize the endothelial cell monolayer. The CD31 molecule also has a cytoplasmic domain with potential sites for phosphorylation after cellular activation. The properties of CD31 antigen suggest that it is involved in interactive events during angiogenesis, thrombosis and wound healing. Angiogenesis is essential for tumor growth and metastases.

Also available as a liquid concentrate, refer to page 114.



Esophagus: immunohistochemical staining with BOND ready-to-use CD31 (1A10) using BOND Polymer Refine Detection.

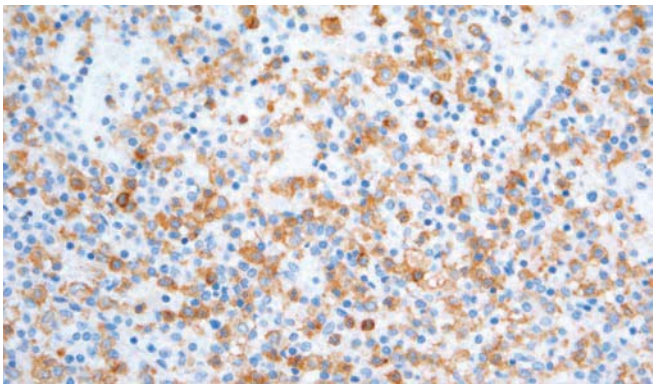
# CD33

**Clone PWS44**
7 mL BOND ready-to-use PA0555 **P (HIER)**

### Antigen Background

CD33 antigen is reported to appear on myelomonocytic precursor cells after CD34 antigen expression. It then continues to be expressed on both the myeloid and monocyte lineages, although it is reported to be absent on granulocytes. It has been reported that expression of CD33 is restricted to monocytes, premyelocytes, myeloid blasts, some acute undifferentiated leukemias and acute lymphoblastic leukemias.

Also available as a liquid concentrate, refer to page 114.



Granulocytic sarcoma: immunohistochemical staining with BOND ready-to-use CD33 (PWS44) using BOND Polymer Refine Detection.

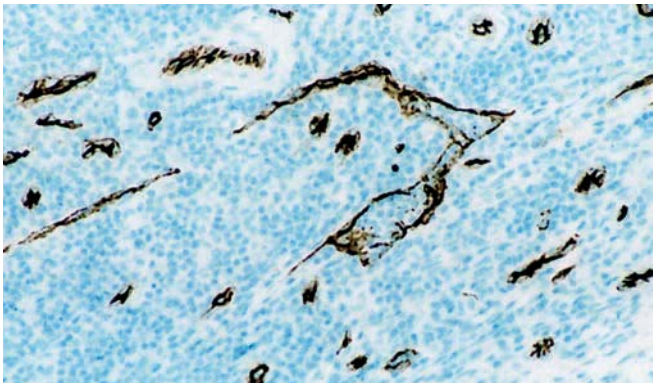
# CD34

## Clone QBEnd/10
7 mL BOND ready-to-use PA0212 **P (HIER)**

### Antigen Background

CD34 antigen is a single chain transmembrane glycoprotein with a molecular weight of 110 kD. The CD34 protein is selectively expressed on human lymphoid and myeloid haemapoietic progenitor cells. The CD34 protein is also expressed on vascular endothelium.

Also available as a liquid concentrate, refer to page 114.



Tonsil: immunohistochemical staining with BOND ready-to-use CD34 (QBEnd/10) using BOND Polymer Refine Detection.

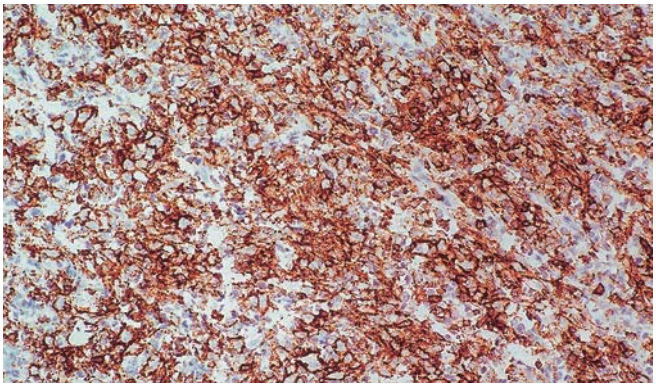
# CD43

## Clone MT1
7 mL BOND ready-to-use PA0938 **P (HIER)**

### Antigen Background

The CD43 antigen is expressed on the membrane and in the cytoplasm of T cells and cells of myeloid lineage. The molecule itself exhibits molecular weight heterogeneity with bands of 90 to 140 kD observed on SDS-PAGE between different cell lines. Cells expressing the CD43 antigen are reported to include normal and neoplastic T cells. A small proportion of B cell chronic leukemias and centrocytic lymphomas are also reported to express CD43 antigen.

Also available as a liquid concentrate, refer to page 116.



Diffuse large B cell lymphoma: immunohistochemical staining with BOND ready-to-use CD43 (MT1) using BOND Polymer Refine Detection.

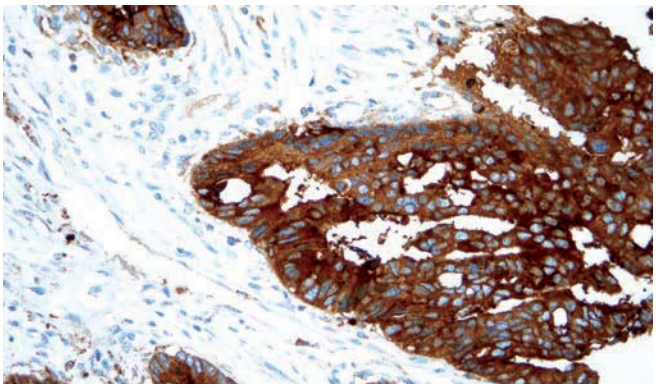
# CD45

## Clone X16/99
7 mL BOND ready-to-use PA0042 **P (HIER)**

### Antigen Background

The CD45 antigen (leukocyte common antigen) is a family of five or more high molecular weight glycoproteins present on the surface of the majority of the human leukocytes (including lymphocytes, monocytes and eosinophils) but absent from erythrocytes and platelets. Various isoforms of CD45 are generated by alternative splicing of three exons. Expression of CD45 is necessary for signalling through the T cell receptor.

Also available as a liquid concentrate, refer to page 117.



Tonsil: immunohistochemical staining with BOND ready-to-use CD45 (X16/99) using BOND Polymer Refine Detection.

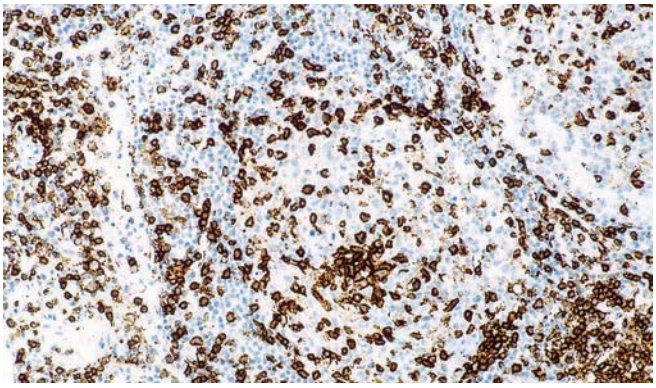
# CD45RO

## Clone UCHL1
7 mL BOND ready-to-use PA0146 **P (HIER)**

### Antigen Background

The CD45RO molecule, a 180 kD isoform of CD45, is reported to be expressed on 48 percent of peripheral blood T lymphocytes, 37 percent of CD4 positive lymphocytes, 80 percent of thymocytes and on the majority of T cell malignancies. Monocytes and granulocytes show surface expression of the antigen whereas tissue macrophages exhibit cytoplasmic expression.

Also available as a liquid concentrate, refer to page 118.



Follicular lymphoma: immunohistochemical staining with BOND ready-to-use CD45RO (UCHL1) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

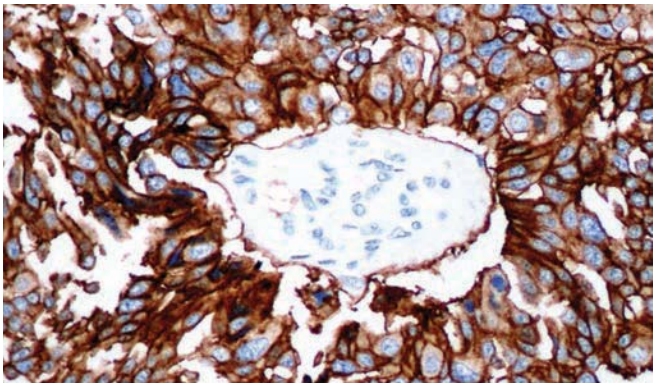
# CD56

**Clone CD564**
7 mL BOND ready-to-use PA0191 **P (HIER)**

**Antigen Background**

The neural cell adhesion molecules are a family of closely-related cell surface glycoproteins thought to play a role in embryogenesis, development and contact-mediated interactions between neural cells. The CD56 antigen (NCAM) consists of four major isoforms generated by differential splicing of the RNA transcript from a single gene located on chromosome 5. The CD56 antigen is expressed on neurons, astrocytes, Schwann cells, NK cells and a subset of activated T lymphocytes and some neuroendocrine tumors.

Also available as a liquid concentrate, refer to page 118.



Medullary carcinoma of the thyroid: immunohistochemical staining with BOND ready-to-use CD56 (CD564) using BOND Polymer Refine Detection.

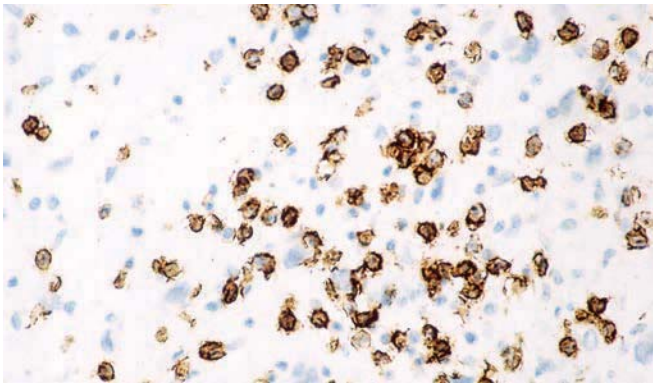
# CD57

**Clone NK-1**
7 mL BOND ready-to-use PA0443 **P (HIER)**

**Antigen Background**

The CD57 glycoprotein, also known as HNK-1, has a molecular weight of 110 kD. It is found on a subset of mononuclear cells with natural killer activity and on neuroectodermal cells expressing myelin-associated glycoprotein. Many cells which co-express CD57 and CD8 proteins are a subset of suppressor/cytotoxic T cells. These cells play a role in the rejection of grafts in acute graft versus host disease. The CD57 molecule is not expressed on erythrocytes or platelets.

Also available as a liquid concentrate, refer to page 118.



Sarcoma: immunohistochemical staining with BOND ready-to-use CD57 (NK-1) using BOND Polymer Refine Detection.

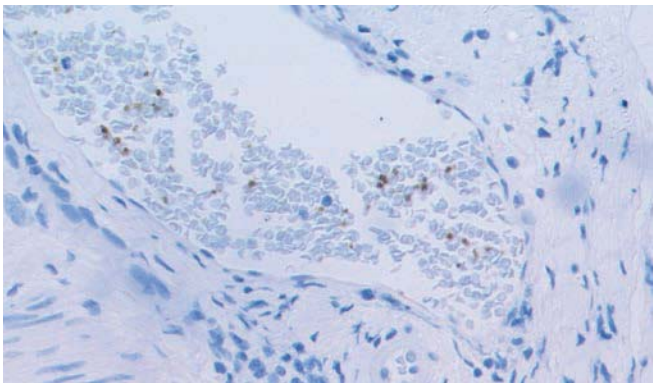
# CD61

**Clone 2f2**
7 mL BOND ready-to-use PA0308 **P (HIER)**

**Antigen Background**

The CD61 antigen, also known as GPIIIa, is a glycoprotein that is expressed on platelets, megakaryocytes, monocytes, macrophages and endothelial cells. CD61 combines with CD41 to form the platelet glycoprotein IIb/IIIb (integrin alibß3) and with CD51 to form the vitronectin receptor (integrin aVß3).

Also available as a liquid concentrate, refer to page 118.



Tonsil: immunohistochemical staining with BOND ready-to-use CD61 (2f2) using BOND Polymer Refine Detection.

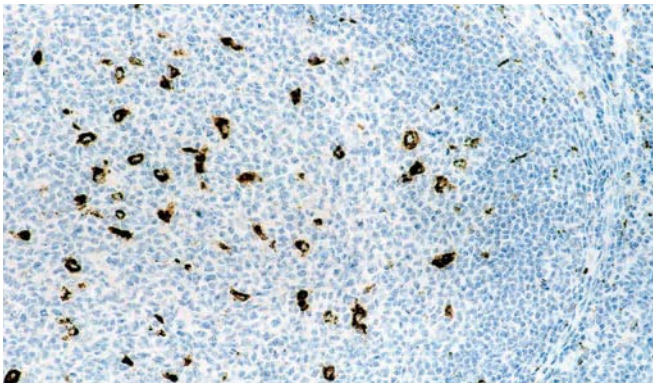
# CD68

## Clone 514H12
7 mL BOND ready-to-use PA0273 **P (HIER)**

### Antigen Background

The CD68 antigen is an intracellular molecule, which has primarily been associated with cytoplasmic granules and, to a lesser extent, the membranes of macrophages, monocytes, neutrophils, basophils and large lymphocytes. CD68 expression has been reported in stimulated T cells, NK cells, lymphomas, sarcomas and carcinomas, and in liver and renal tubules.

Also available as a liquid concentrate, refer to page 119.



Tonsil: immunohistochemical staining with BOND ready-to-use CD68 (514H12) using BOND Polymer Refine Detection.

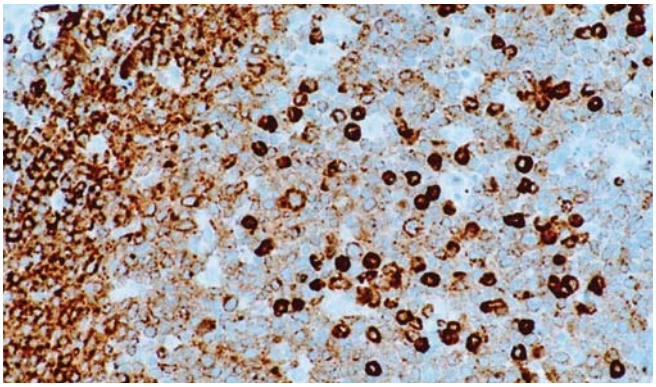
# CD79a

## Clone 11E3
7 mL BOND ready-to-use PA0192 **P (HIER)**

### Antigen Background

The CD79 complex is a disulfide-linked heterodimer which is non-covalently associated with membrane-bound immunoglobulins on B cells. This complex of polypeptides and immunoglobulin constitute the B cell antigen receptor. The two components of this complex are designated CD79a and CD79b. The CD79a antigen is reported to first appear at the pre-B cell stage, early in maturation, and persist until the plasma cell stage where it is found as an intracellular component. The CD79a antigen is reported to be expressed in the majority of acute leukemias of precursor B cell type, B cell lines, B cell lymphomas and in some myelomas. It is not present in myeloid or T cell lines.

Also available as a liquid concentrate, refer to page 120.



Tonsil, B cell-plasma cell transition: immunohistochemistry staining with BOND ready-to-use CD79a (11E3) using BOND Polymer Refine Detection.

# CD99

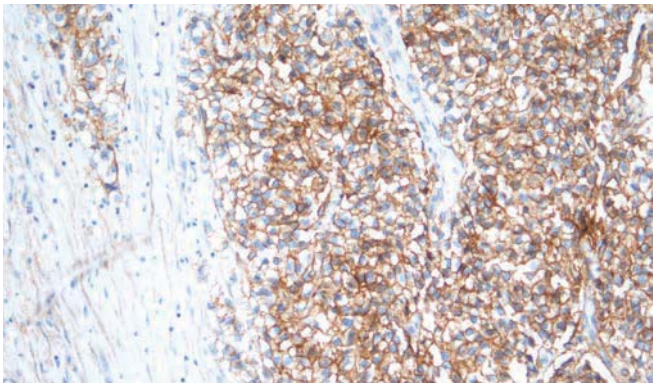
## Clone 12E7
7 mL BOND ready-to-use PA0509 **P**

### Antigen Background

CD99 is a 32 kDa transmembrane glycoprotein, encoded by the MIC2 gene, which is located in the pseudoautosomal region of the human X and Y chromosomes. Recently, the MIC2 gene has been shown to encode two distinct proteins which are produced by alternative splicing of the CD99 gene transcript and are identified as bands of 30 and 32 kDa (p30/32).

Although its function is not fully understood, CD99 has been implicated in various cellular processes including homotypic aggregation of T cells, upregulation of T cell receptor and MHS molecules, apoptosis of immature thymocytes and leukocyte diapedesis. CD99 is reported to be expressed on most human tissues including cortical thymocytes, pancreatic islets cells, Leydig and Sertoli cells, virtually all hematopoietic cell types (except granulocytes), peripheral blood lymphocytes, granulose cells of the ovary, endothelial cells and basal/parabasal squamous epithelial cells. CD99 expression has been reported in a wide range of tumors, including Ewing's sarcoma and T cell lymphoma.

Also available as a liquid concentrate, refer to page 122.



Ewing's sarcoma: immunohistochemical staining with BOND ready-to-use CD99 (12E7) using BOND Polymer Refine Detection.

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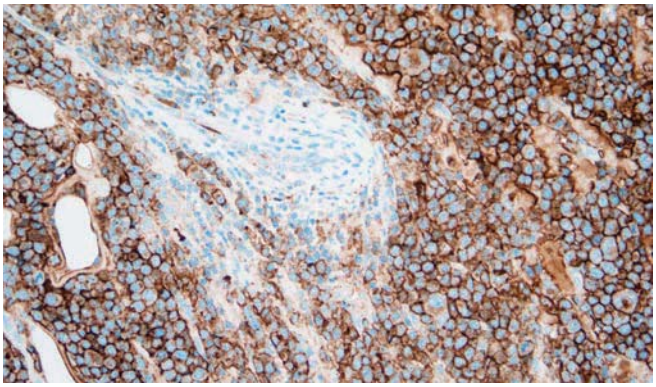
# CD138 (Syndecan 1)

**Clone MI15**
7 mL BOND ready-to-use PA0088 **P (HIER)**

**Antigen Background**

The CD138 molecule is a transmembrane heparan sulphate glycoprotein expressed at distinct stages of differentiation in normal lymphoid cells such as pre-B cells, immature B cells and Ig-producing plasma cells as well as being expressed in stratified and simple epithelia. The loss of CD138 expression from atypical cells is reported to be an early event during cervical carcinogenesis whereas CD138 antigen expression shows a close association with preserved epithelial morphology and differentiation, however, the major utility of CD138 as a marker in immunohistochemistry is the quantification of plasma cells.



Plasmacytoma: immunohistochemical staining with BOND ready-to-use CD138 (Synedcan-1) (MI15) using BOND Polymer Refine Detection.

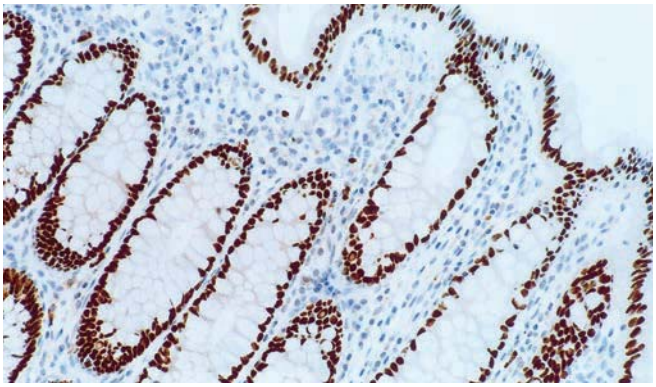
# CDX2

**Clone AMT28**
7 mL BOND ready-to-use PA0535 **P (HIER)**

**Antigen Background**

CDX2 is a caudal-type homeobox, intestine-specific transcription factor that is expressed early in intestinal development and may be involved in the regulation of proliferation and differentiation of intestinal epithelial cells. CDX2, as well as CDX1, is of particular interest as the intestine is the only organ that contains detectable levels of either gene product. This pattern of restricted expression is unusual for homeobox genes. Phosphorylation of the CDX2 activation domain can modulate its function and different spatial expression patterns in the intestinal epithelium. CDX2 is primarily expressed on the surface of the villus and in the crypts. In contrast to CDX1, intense CDX2 expression is reported to occur in all but the distal portions of the developing intestine. The loss of CDX2 has been reported to contribute towards the progression of some sporadic colorectal cancers. It has been reported that CDX2 may also be associated with carcinogenesis of the stomach as expression of CDX2 mRNA progressively decreases with the transition from well differentiated to poorly differentiated gastric cancer cell lines.

Also available as a liquid concentrate, refer to page 126.



Bowel epithelium: immunohistochemical staining with BOND ready-to-use CDX2 (AMT28) using BOND Polymer Refine Detection.

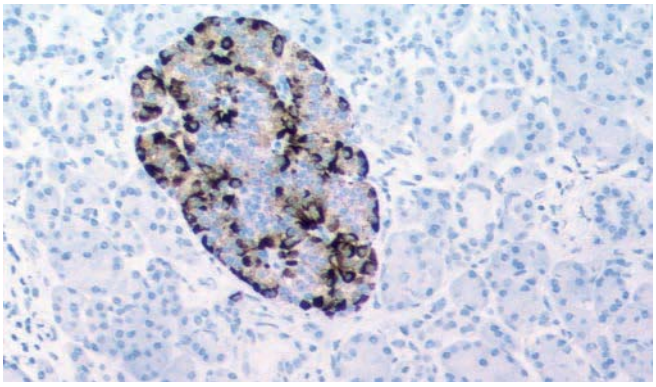
# Chromogranin A

**Clone 5H7**
7 mL BOND ready-to-use PA0430 **P (HIER)**

**Antigen Background**

Chromogranin A is a 68 kD acidic protein which is reported to be widely expressed in neural tissues and in secretory granules of human endocrine cells eg parathyroid gland, adrenal medulla, anterior pituitary gland, islet cells of the pancreas and C cells of the thyroid. Chromogranin A expression has been reported in neuroendocrine tumors such as pituitary adenomas, islet cell tumors, phaeochromocytomas, medullary thyroid carcinomas, Merkel cell tumors and carcinoids.

Also available as a liquid concentrate, refer to page 128



Pancreas: immunohistochemical staining with BOND ready-to-use Chromogranin A (5H7) using BOND Polymer Refine Detection.

# Cytokeratin 5

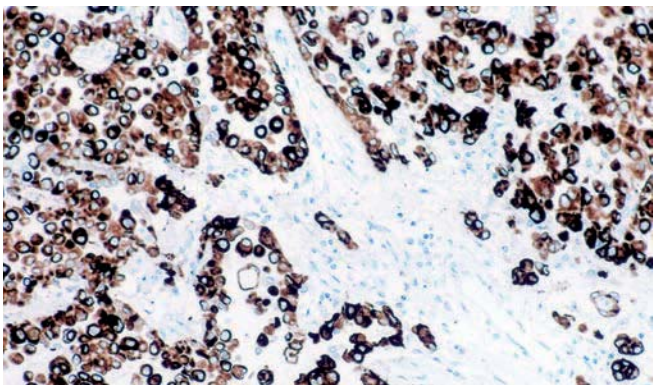
## Clone XM26

7 mL BOND ready-to-use PA0468 **P (HIER)**

### Antigen Background

Cytokeratins are a large family of cytoskeletal proteins found in epithelial cells. They are coordinately synthesized in pairs so that at least one member of each family is expressed in each epithelial cell. Cytokeratins assemble into obligatory heteropolymers composed of type I (acidic) and type II (basic) polypeptides to form higher order tetramers and protofilaments. Basal cells of human epidermis express acidic keratin 14 and basic cytokeratin 5. Cytokeratin 5 is a 58 kD protein that is closely related to cytokeratin 6. They share similar tissue distribution and are found in various proportions in many non-keratinizing stratified squamous epithelia eg tongue mucosa, as well as in basal epithelia of trachea, basal cells of epidermis, hair follicles, sebaceous and sweat glands of skin, luminal cells of the mammary gland, basal cells of prostate, urothelium, vagina and endocervical mucosa. Cytokeratins 5 and 6 are also expressed in basal cell epitheliomas, squamous cell carcinomas of skin, tongue, epiglottis and of the rectal-anal region. Point mutations in the cytokeratin 5 gene at locus 12q11-q13 can cause various types of epidermolysis bullosa simplex. Cytokeratin 5 is also reported to be expressed in most epithelial and biphasic mesotheliomas.

Also available as a liquid concentrate, refer to page 133.



Infiltrating carcinoid of the bowel: immunohistochemical staining with BOND ready-to-use Cytokeratin 5 (XM26) using BOND Polymer Refine Detection.

# Cytokeratin 7

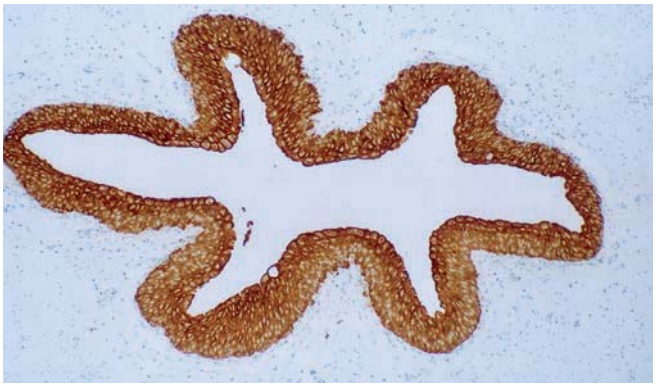
## Clone RN7

7 mL BOND ready-to-use PA0942 **P (HIER)**
30 mL BOND ready-to-use PA0138 **P (HIER)** New!

### Antigen Background

Cytokeratins are intermediate filament proteins present in epithelial cells. They are expressed in a tissue-specific manner in normal organs and the tumors that arise from them. Cytokeratin 7 belongs to the neutral basic type B subfamily of cytokeratins. Its distribution is confined to glandular and transitional epithelia. Cytokeratin 7 is reported to be expressed in abundance in cultured bronchial and mesothelial cells but only at lower levels in cultured epidermal cells. The predicted amino acid sequence of this keratin has revealed a striking difference between this keratin and the type II keratins expressed in epidermal cells. Cytokeratin 7 has been reported in adenocarcinomas of the lung, breast, endometrium, ovary, thyroid as well as in carcinomas of the bladder and chromophobe renal cell carcinoma. Cytokeratin 7 and Cytokeratin 20 expression have been reported to show characteristic patterns on primary and metastatic lung and colorectal adenocarcinomas.

Also available as a liquid concentrate, refer to page 134.



Ureter: immunohistochemical staining with BOND ready-to-use Cytokeratin 7 (RN7) using BOND Polymer Refine Detection.

# Cytokeratin 8

## Clone TS1

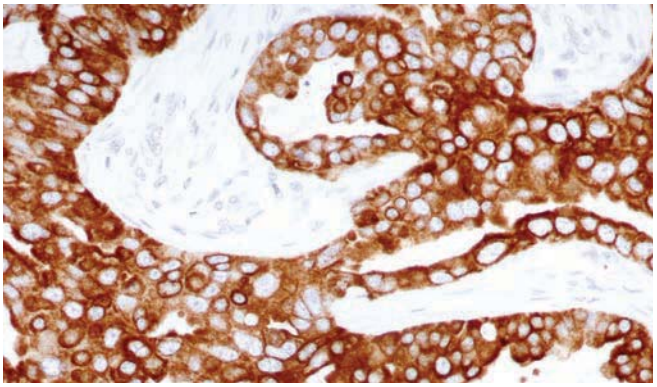
7 mL BOND ready-to-use PA0567 **P (HIER)**

### Antigen Background

Cytokeratin 8, also known as tissue polypeptide antigen (TPA), together with Cytokeratin 18, is one of the first cytokeratins expressed in the embryo and persists in adult tissues. Both cytokeratins, 8 and 18, are major components of all simple epithelia but not of stratified squamous epithelia. Cytokeratin 8, reported to be expressed in the adenocarcinomas of individuals, is also found to be present in their sera.

Also available as a liquid concentrate, refer to page 135.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting



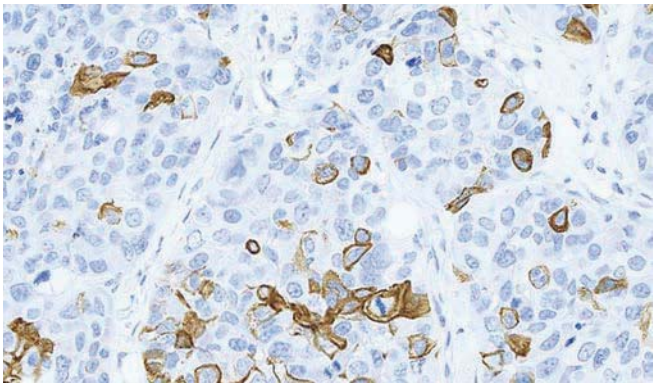
Papillary adenocarcinoma of the breast (infiltrating ductal carcinoma): immunohistochemical staining with BOND ready-to-use Cytokeratin 8 (TS1) using BOND Polymer Refine Detection.

## Cytokeratin 14

**Clone LL002**
7 mL BOND ready-to-use PA0074 **P (HIER)** New!

**Antigen Background**

Cytokeratins 14 and 5 are useful to distinguish stratified epithelial cell types from simple epithelial cell types. Cytokeratin 14 has been reported to be expressed in neoplasms of squamous cell origin.



Human invasive breast cancer: immunohistochemical staining for cytokeratin 14 using NCL-L-CK14. Note intense membrane and cytoplasmic staining of a proportion of tumor cells. Paraffin section.

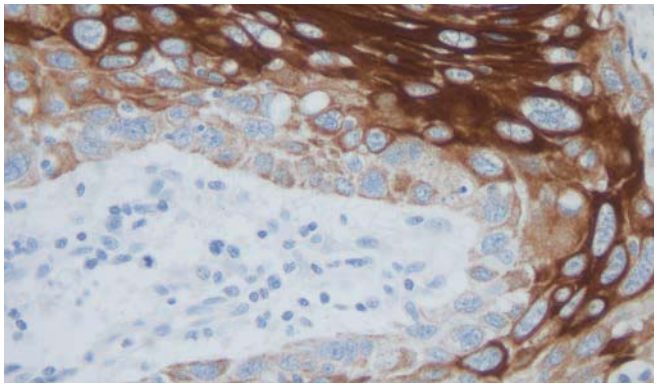
## Cytokeratin 17

**Clone E3**
7 mL BOND ready-to-use PA0114 **P (HIER)**

**Antigen Background**

In normal tissues cytokeratin 17 is reported to be expressed in basal cells of complex epithelia eg basal cells of pseudostratified epithelium in the trachea, larynx, bronchi, myoepithelial cells in salivary glands and sweat glands. In neoplastic tissue, cytokeratin 17 is reported to be expressed in squamous cell carcinomas of the lung, cervix and oral cavity.

Also available as a liquid concentrate, refer to page 136.



Squamous cell carcinoma in esophagus: immunohistochemical staining with BOND ready-to-use Cytokeratin 17 (E3) using BOND Polymer Refine Detection.

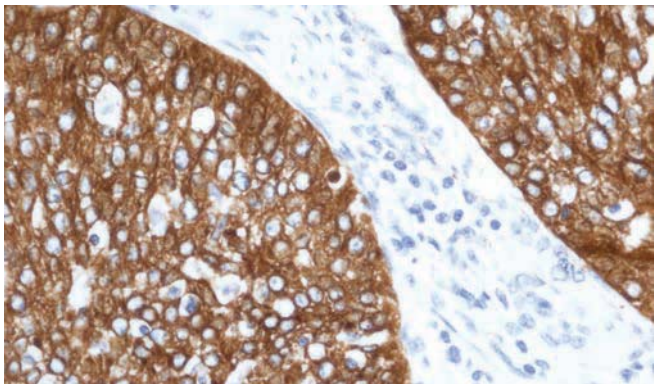
## Cytokeratin 19

**Clone b170**
7 mL BOND ready-to-use PA0799 **P (Enzyme)**

**Antigen Background**

The smallest human cytokeratin filament protein (40 kD) has been identified as Cytokeratin 19 and has been reported to be expressed in a large number of epithelial cell types, including many ductal and glandular epithelia.

Also available as a liquid concentrate, refer to page 137.



Uterus invasive carcinoma: immunohistochemical staining with BOND ready-to-use Cytokeratin 19 (b170) using BOND Polymer Refine Detection.

# Cytokeratin 20

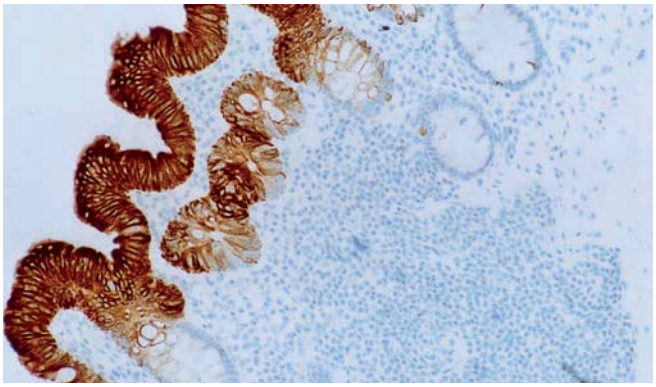
**Clone K$^{s}$20.8**
7 mL BOND ready-to-use PA0022 **P (HIER)**
30 mL BOND ready-to-use PA0037 **P (HIER)** New!

**Clone PW31**
7 mL BOND ready-to-use PA0918 **P (HIER)**

**Antigen Background**

Cytokeratin 20 has been demonstrated to be almost entirely confined to the gastric and intestinal epithelium, urothelium and Merkel cells of the skin. Cytokeratin 20 is less acidic than other type I cytokeratins and is of interest due to its restricted tissue expression. In normal tissue, cytokeratin 20 is expressed in intestinal epithelium, gastric foveolar epithelium, a number of endocrine cells in the upper portions of the pyloric glands, urothelium and Merkel cells in epidermis. In tumors it is reported, there is a marked difference in the expression of cytokeratin 20 within different carcinomas. Neoplasms expressing cytokeratin 20 are derived from normal epithelia which themselves expressed cytokeratin 20. Colorectal carcinomas consistently express cytokeratin 20, while gastric adenocarcinomas express cytokeratin 20 to a lesser degree. Adenocarcinomas of the gall bladder and bile duct, ductal cell adenocarcinomas of the pancreas, mucinous ovarian tumors, Merkel cell tumors and transitional cell carcinomas have also been reported to express cytokeratin 20.

Also available as a liquid concentrate, refer to page 137.



Colon: immunohistochemical staining with BOND ready-to-use Cytokeratin 20 (PW31) using BOND Polymer Refine Detection.

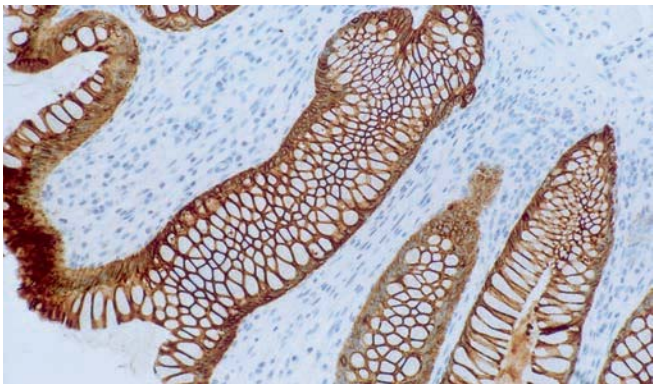
# Cytokeratin 8/18

**Clone 5D3**
7 mL BOND ready-to-use PA0067 **P (HIER)**

**Antigen Background**

In normal tissues, Cytokeratins 8 and 18 are reported to be expressed in all simple and glandular epithelium. In neoplastic tissues they have been shown to be expressed in adenocarcinomas and most squamous cell carcinomas.

Also available as a liquid concentrate, refer to page 137.



Colon mucosa: immunohistochemical staining with BOND ready-to-use Cytokeratin 8/18 (5D3) using BOND Polymer Refine Detection.

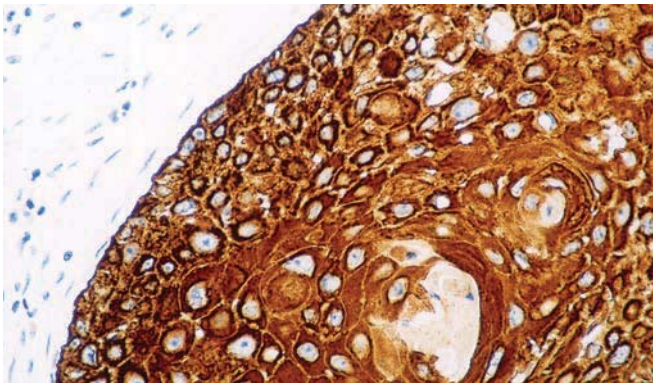
# Cytokeratin (High Molecular Weight)

**Clone 34βE12**
7 mL BOND ready-to-use PA0134 **P (Enzyme)**

**Antigen Background**

Cytokeratin (High Molecular Weight) 34ßE12 reacts with human cytokeratin intermediate filament proteins 1, 5, 10 and 14. Expression: squamous epithelium and sweat ducts in normal skin, some pneumocytes, bronchial epithelium and mesothelium in normal lung and bile ducts in normal liver. Also ductal cells of the normal pancreas, some acinar and ductal cells of normal breast, some follicular epithelia of normal thyroid and some epithelia and mesothelium of the normal small and large bowel.

Also available as a liquid concentrate, refer to page 174.



Squamous cell carcinoma: immunohistochemical staining with BOND ready-to-use Cytokeratin (High Molecular Weight) using BOND Polymer Refine Detection.

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## Cytokeratin Multi

**Clone AE1 and AE3**
7 mL BOND ready-to-use PA0909 **P (Enzyme)**

See also Multi Cytokeratin on page 62.

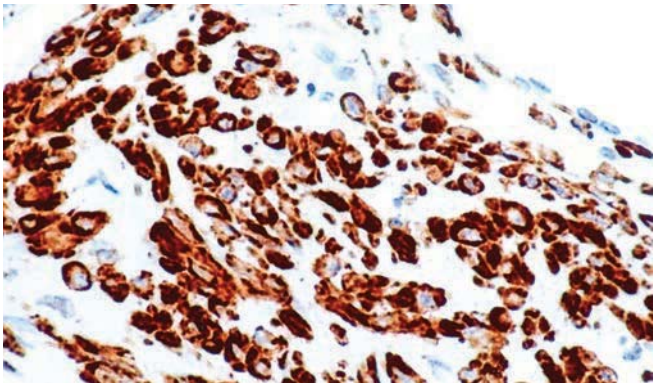
## Desmin

**Clone DE-R-11**
7 mL BOND ready-to-use PA0032 **P (HIER)**

**Product Specific Information**

Clone DE-R-11 reacts with the 18 kD rod region of the intermediate filament protein desmin (53 kD) in both striated and smooth muscle cells. The labeling is confined to the Z bands in cardiac and striated muscle giving a characteristic striated staining pattern. It does not appear to react with any other filament proteins.

Also available as a liquid concentrate, refer to page 139.



Leiomyosarcoma: immunohistochemical staining with BOND ready-to-use Desmin (DE-R-11) using BOND Polymer Refine Detection.

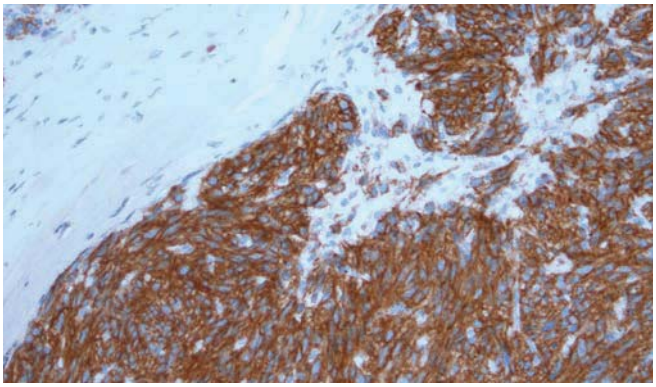
## DOG-1

**Clone K9**
7 mL BOND ready-to-use PA0219 **P (HIER)**

**Antigen Background**

DOG-1, a 986 amino acid protein of unknown function, is expressed predominantly on the plasma membrane of gastrointestinal stromal tumors (GISTs) and is rarely expressed in other soft tissue tumors, which, due to appearance, can be confused with GISTs. Reactivity for DOG-1 has been suggested to aid in the identification of GISTs, including Platelet-Derived Growth Factor Receptor Alpha mutants that fail to express KIT antigen.

Also available as a liquid concentrate, refer to page 140.



Gastrointestinal stromal tumor: immunohistochemical staining with BOND ready-to-use DOG-1 (K9) using BOND Polymer Refine Detection.

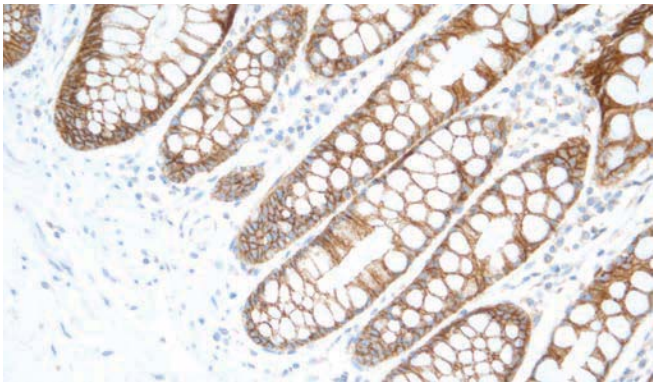
## E-Cadherin

**Clone 36B5**
7 mL BOND ready-to-use PA0387 **P (HIER)**

**Antigen Background**

E-cadherin is a $Ca^{2+}$ -dependent, transmembrane cell adhesion molecule. It plays an important role in the growth, development and the intercellular adhesion of epithelial cells. Most tumors have an abnormal architecture and any subsequent loss of adhesiveness is thought to be an important step in the development of local invasion. E-cadherin may have a role in neoplastic progression, particularly as a suppressor of invasion. In prostate cancers, for example, the expression of E-cadherin is reported to be reduced or absent in comparison with its expression in normal prostate which is uniformly strong. Reduced expression or absence of E-cadherin in addition to alpha, beta and gamma-catenin in primary breast carcinomas has also been reported and these four proteins are associated with the development of metastases.

Also available as a liquid concentrate, refer to page 141.



Bowel: immunohistochemical staining with BOND ready-to-use E-Cadherin (36B5) using BOND Polymer Refine Detection.

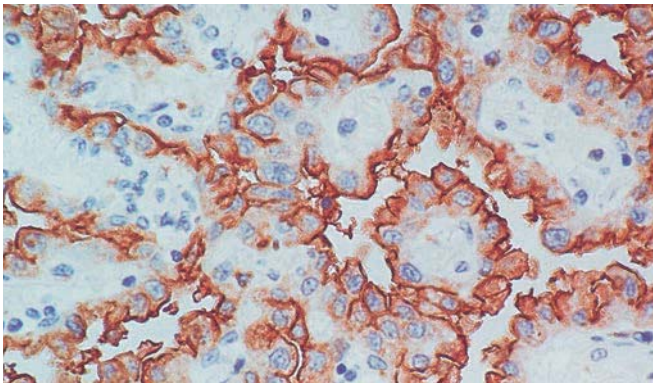
# Epithelial Membrane Antigen

**Clone GP1.4**
7 mL BOND ready-to-use PA0035 **P (HIER)**

**Antigen Background**

Epithelial membrane antigen (EMA), also known as episialin, is reported to be expressed in a variety of normal and neoplastic epithelia. It has been reported that markers to CD45 (LCA) when used in conjunction with markers to EMA are useful in labelling cells of lymphoid origin whereas the combination of anti-cytokeratin antibodies together with EMA is useful to characterize cells of epithelial origin. EMA is also notably described to be expressed in a subset of Hodgkin's lymphomas.

Also available as a liquid concentrate, refer to page 143.



Rectal adenocarcinoma: immunohistochemical staining with BOND ready-to-use Epithelial Membrane Antigen (GP1.4) using BOND Polymer Refine Detection.

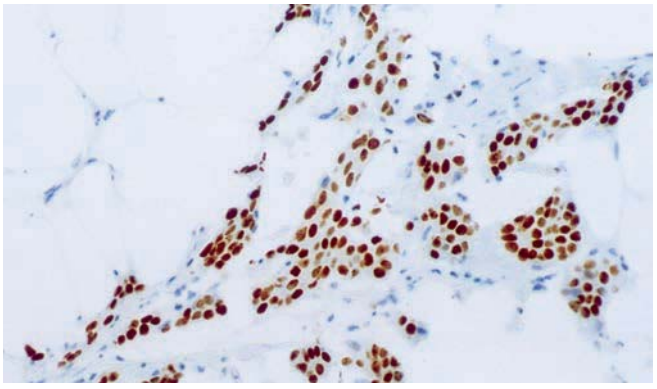
# Estrogen Receptor

**Clone 6F11**
7 mL BOND ready-to-use PA0151 **P (HIER)**

**Antigen Background**

Estrogen receptor (ER) content of breast cancer tissue is an important parameter in the prediction of prognosis and response to endocrine therapy. The introduction of highly specific monoclonal antibodies to ER has allowed the determination of receptor status of breast tumors to be carried out in routine histopathology laboratories.

Also available as a liquid concentrate, refer to page 144.



Breast carcinoma: immunohistochemical staining with BOND ready-to-use Estrogen Receptor (6F11) using BOND Polymer Refine Detection.

# Factor VIII related antigen (von Willebrand Factor (vWF))

**Clone 36B11**
7 mL BOND ready-to-use PA0400 **P (HIER)**

See also von Willebrand Factor (Factor VIII related antigen (vWF)) on page 72.

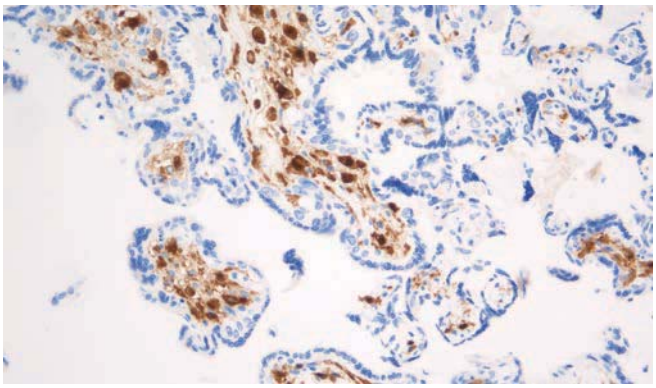
# Factor XIIIa

**Clone E980.1**
7 mL BOND ready-to-use PA0449 **P (HIER)**

**Antigen Background**

Factor XIIIa also known as fibrinoligase and fibrin-stabilizing factor, is the last enzyme generated in the blood coagulation cascade. It is a $Ca^{2+}$ - dependent transglutaminase or transamidating enzyme which forms intermolecular gamma-glutamyl-epsilon-lysine crosslinks between fibrin molecules resulting in the mechanical stabilization of the fibrin clot and its resistance to proteolysis. Factor XIIIa may also function to stabilize cell surface molecules and membranes. These $Ca^{2+}$ -dependent trans-glutaminases with thiol active centers are widespread in animal tissues and have been associated with cell proliferation, embryonic development and growth through the proliferation of mammary stroma and epithelial elements. Normal mammary stroma, like most collagenous connective tissue contains resident populations of CD34 positive dendritic interstitial cells and scattered factor XIIIa positive collagen-associated dendrophages. Factor XIIIa has been examined to determine its expression in normal and inflamed skin. Factor XIIIa positive cells in human skin represent a specific population of bone marrow dermal dendritic cells, distinct from Langerhans cells which share some features common to mononuclear phagocytes. In benign skin conditions such as inflammatory dermatoses eg atopic eczema and psoriasis, an increased number of factor XIIIa positive cells in the upper dermis, closely associated with lymphocytes, has been described.

Also available as a liquid concentrate, refer to page 147.



Placenta: immunohistochemical staining with BOND ready-to-use Factor XIIIa (E980.1) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

# Fascin

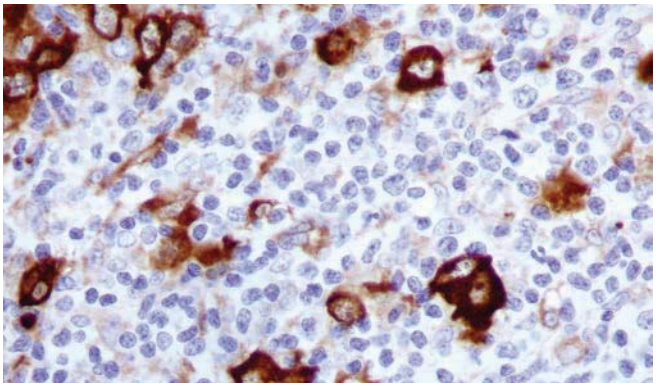
## Clone IM20
7 mL BOND ready-to-use PA0420 **P (HIER)**

### Antigen Background

Human fascin is a 55 to 58 kD actin-bundling protein, whose actin binding ability is regulated by phosphorylation. In normal tissues the detection of fascin is reported to be predominantly restricted to dendritic cells and in the thymus has been observed only in medullary dendritic cells. In reactive nodes, interdigitating reticulum cells of T cell zones, cells in subcapsular areas, and cells of the reticular network express fascin.

Variable expression is seen in follicular dendritic cells and endothelial cells. Lymphoid cells, myeloid cells and plasma cells do not express fascin. However, in cases of Hodgkin's disease, including nodular sclerosis, mixed cellularity lymphocyte depletion and unclassified cases, most or all Reed Sternberg cells are reported to be positive for fascin. Fascin expression may be induced by Epstein-Barr virus (EBV) infection of B cells with the possibility that viral induction of fascin in lymphoid or other cell types must also be considered in EBV-positive cases.

Also available as a liquid concentrate, refer to page 147.



Hodgkin's lymphoma: immunohistochemical staining with BOND ready-to-use Fascin (IM20) using BOND Polymer Refine Detection.

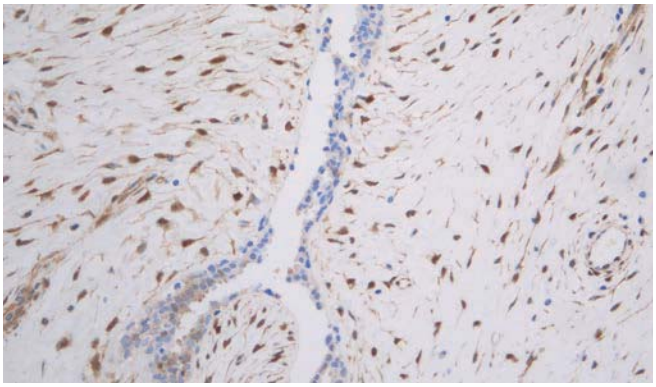
# Galectin-3

## Clone 9C4
7 mL BOND ready-to-use PA0238 **P (HIER)**

### Antigen Background

Galectin-3 is a member of the beta-galactosidase-binding lectin family. It is involved in several biological events including binding to the basement membrane glycoprotein laminin. Cell surface galectin-3 may be involved in homotypical cell adhesion and is downregulated in colon cancer as the disease progresses. This downregulation has also been examined in breast carcinoma with a similar correlation of expression reported. Downregulation of galectin-3 could be one of the many events that enable cancer cells to interact with laminin to facilitate invasion and metastasis and may indicate activation of the invasive phenotype in various tumor types.

Also available as a liquid concentrate, refer to page 150.



Breast: immunohistochemical staining with BOND ready-to-use Galectin-3 (9C4) using BOND Polymer Refine Detection.

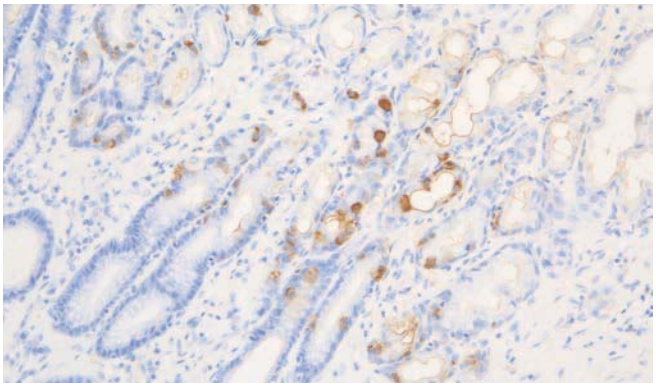
# Gastrin

## Polyclonal
7 mL BOND ready-to-use PA0681 **P**

### Antigen Background

Gastrin, a polypeptide hormone, occurs naturally in three forms: gastrin-14, gastrin-17 and gastrin-34. Both primary and secondary G cell hyperplasia are reported to be characterized by clustering of the immunoreactive cells which sometimes project buds from the mucous glands.

Also available as a liquid concentrate, refer to page 150.



Stomach: immunohistochemical staining with BOND ready-to-use Gastrin (Polyclonal) using BOND Polymer Refine Detection.

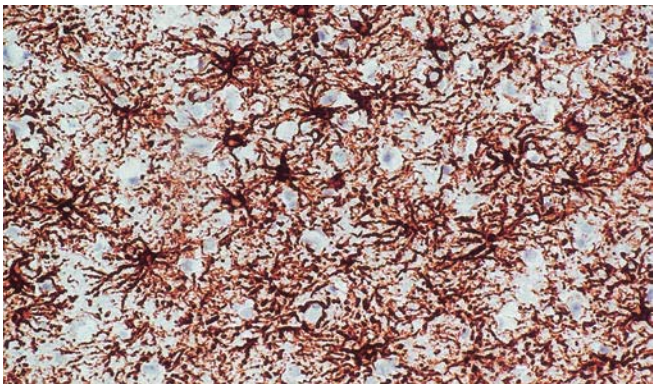
# Glial Fibrillary Acidic Protein

**Clone GA5**
7 mL BOND ready-to-use PA0026 **P (HIER)**

**Antigen Background**

Glial fibrillary acidic protein (GFAP) is an intermediate filament protein of 52 kD reported to be expressed in glial cells eg astrocytes and ependymal cells. In the peripheral nervous system, GFAP has been reported to be expressed in Schwann cells, enteric glial cells and satellite cells of human sensory ganglia and in neoplastic tissues GFAP has been reported to be expressed in astrocytomas and ependymomas.

Also available as a liquid concentrate, refer to page 151.



Astrocytes: immunohistochemical staining with BOND ready-to-use Glial Fibrillary Acidic Protein using BOND Polymer Refine Detection.

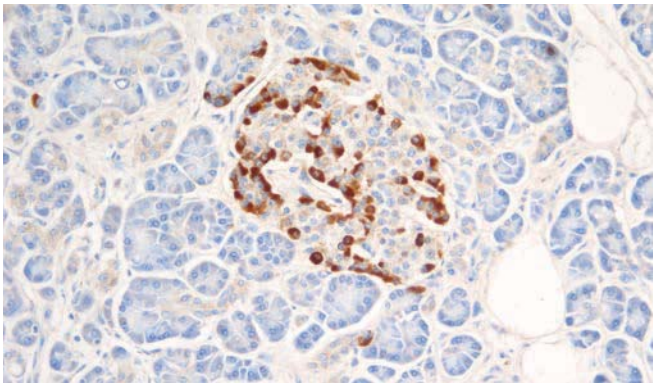
# Glucagon

**Polyclonal**
7 mL BOND ready-to-use PA0594 **P**

**Antigen Background**

Glucagon expression has been reported in the endocrine cells of the pancreatic islets and also in the mucosa of the small and large intestine. Pancreatic glucagon, a peptide of 29 amino acids, has biological activities including glycogenolysis, lipolysis, gluconeogenesis and ketogenesis. These effects are all antagonistic to insulin action and, therefore, lead to increased blood sugar levels. The majority of glucagonomas are reported to arise from the pancreas and produce pancreatic glucagon. These tumors are found chiefly in the main body or tail of the pancreas.

Also available as a liquid concentrate, refer to page 151.



Pancreas: immunohistochemical staining with BOND ready-to-use Glucagon (Polyclonal) using BOND Polymer Refine Detection.

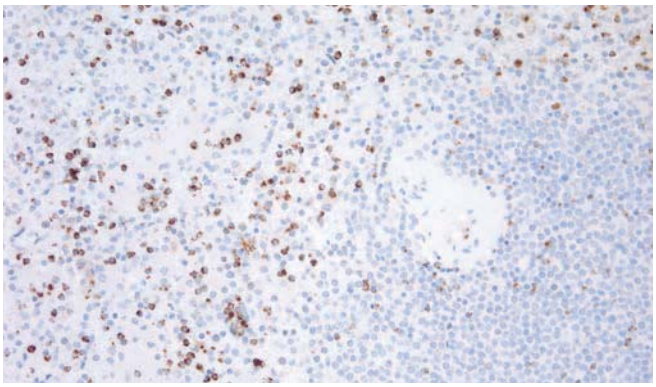
# Granzyme B

**Clone 11F1**
7 mL BOND ready-to-use PA0291 **P (HIER)**

**Antigen Background**

Granzymes are neutral serine proteases which are stored in specialized lytic granules of cytotoxic T lymphocytes (CTL) and in natural killer (NK) cells. These CTL and NK cells are heavily involved in the elimination of neoplastic and virally infected cells. Secretory granules containing perforin and granzymes are instrumental in undertaking cytolytic activity. Granzyme B is understood to enter a target cell through a perforin pore-formed channel to induce DNA fragmentation and apoptosis. Expression is also reported in neoplastic CTL and NK cells.

Also available as a liquid concentrate, refer to page 152.



Spleen: immunohistochemical staining with BOND ready-to-use Granzyme B (11F1) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

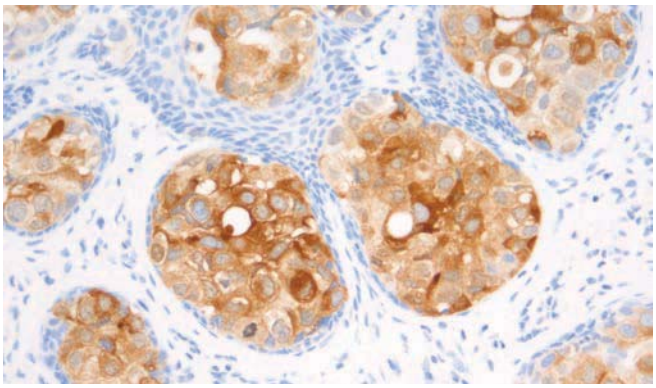
# Gross Cystic Disease Fluid Protein-15

**Clone 23A3**
7 mL BOND ready-to-use PA0708 **P (HIER)**

**Antigen Background**

Gross cystic disease of the breast is a benign premenopausal disorder in which cysts are a predominant pathological lesion. These cysts appear to be formed from excessive apocrine cystic secretions. This fluid is composed of several glycoproteins including a unique 15 kD monomer protein, GCDFP-15. It has been reported that cytosolic analysis of normal tissue from all major organs has demonstrated GCDFP-15 in apocrine epithelia, lacrimal, ceruminous and Moll's glands and in numerous serous cells of the submandibular, tracheal, bronchial, sublingual and minor salivary glands. Cytosol from breast carcinoma lesions are reported to contain GCDFP-15 at a wide range of concentrations. The concentration is reported to be highest in more differentiated carcinomas and GCDFP-15 shows only a few positive individual epithelial cells within lobules and small ducts in normal breast. Expression has also been reported in fibroadenomas within areas of apocrine metaplasia.

Also available as a liquid concentrate, refer to page 153.



Breast (Pagets Disease): immunohistochemical staining with BOND ready-to-use Gross Cystic Disease Fluid Protein-15 (23A3) using BOND Polymer Refine Detection.

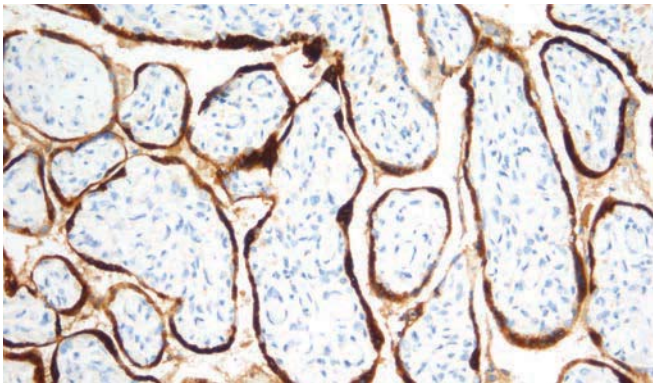
# Human Chorionic Gonadotrophic Hormone

**Polyclonal**
7 mL BOND ready-to-use PA0014 **P (HIER)**

**Antigen Background**

Human chorionic gonadotrophin (hCG) is a glycoprotein hormone produced by trophoblastic cells of the placenta beginning 10 to 12 days after conception. Maintenance of the fetus in the first trimester of pregnancy requires the production of hCG, which binds to the corpus luteum of the ovary which is stimulated to produce progesterone which in turn maintains the secretory endometrium. hCG is composed of two subunits, alpha and beta. The alpha subunit of hCG is identical to the subunit of luteinising hormone, thyroid stimulating hormone and follicle stimulating hormone. The common alpha chain and the hormone-specific beta chains have molecular weights of 14 kD and 17 kD, respectively. The hCG beta-subunit is unique in the family of beta-containing glycoprotein hormones in that it contains an extension of 29 amino acids at its COOH end. It is believed that the C-terminal region of the HCG-beta subunit plays a role in the intracellular behavior of the heterodimer.

Also available as a liquid concentrate, refer to page 158.



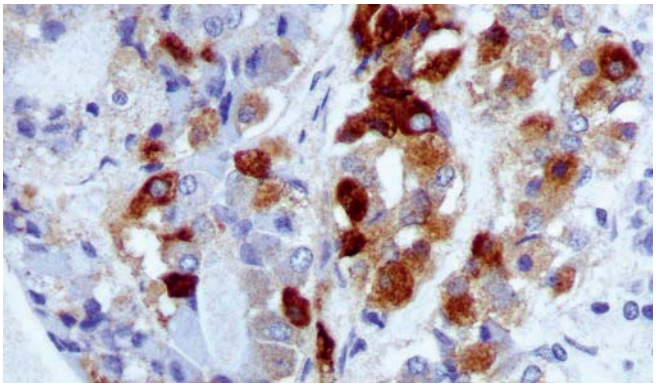
Placenta: immunohistochemical staining with BOND ready-to-use Human Chorionic Gonadotrophic Hormone (Polyclonal) using BOND Polymer Refine Detection.

# Human Follicle Stimulating Hormone

**Clone INN-hFSH-60**
7 mL BOND ready-to-use PA0693 **P (Enzyme)**

Follicle stimulating hormone (FSH) is a pituitary hormone of 35 kD which is involved in the maturation of ovarian follicles and estrogen secretion in females. In males, FSH stimulates the secretion of testosterone.

Also available as a liquid concentrate, refer to page 158.



Pituitary: immunohistochemical staining with BOND ready-to-use Human Follicle Stimulating Hormone (INN-hFSH-60) using BOND Polymer Refine Detection.

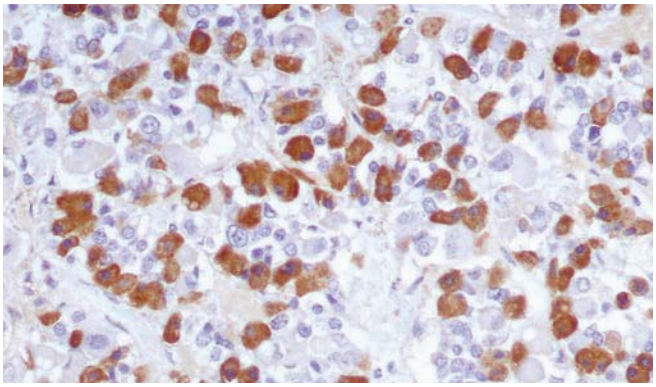
# Human Growth Hormone

**Polyclonal**
7 mL BOND ready-to-use PA0704 **P**

**Antigen Background**

Growth hormone (GH), somatotropin, is the primary hormone responsible for regulating overall body growth and is also important in organic metabolism. It is synthesized by acidophilic or somatotropic cells of the anterior pituitary gland. Human GH has a molecular weight of 22 kD. GH stimulates growth indirectly by promoting the liver's production of somatomedins, which act directly on bone and soft tissue to cause growth. GH exerts direct metabolic effects on the liver, adipose tissue and muscle. In general, growth hormone enhances protein synthesis, conserves carbohydrates and uses up fat stores.

Also available as a liquid concentrate, refer to page 158.



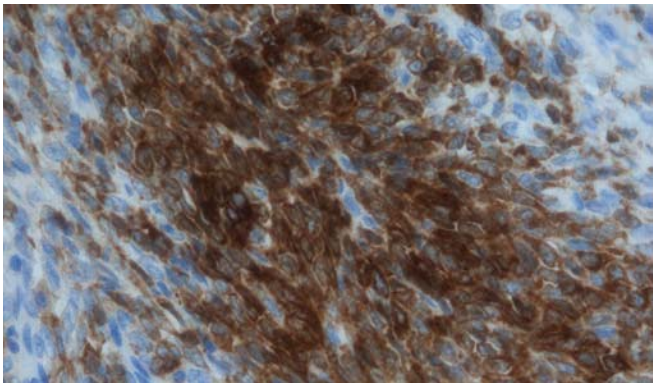
Pituitary: immunohistochemical staining with BOND ready-to-use Human Growth Hormone (Polyclonal) using BOND Polymer Refine Detection.

# Inhibin (alpha)

**Clone R1**
7 mL BOND ready-to-use PA0110 **P (HIER)**

**Antigen Background**

Inhibins and activins are members of the transforming growth factor beta (TGF ) family of cytokines. Inhibins are heterodimers consisting of a common -subunit linked to either a A subunit ( - A, forming inhibin A) or a B subunit ( - B, forming inhibin B). Activins share the -subunit with the inhibins and may be homo or heterodimers of -subunits forming activin A ( A- A), activin AB ( A- B) or activin B ( B- B). The expression of the -subunit, and therefore of inhibins appears to be more restricted than that of the -subunit, and therefore of activins. Inhibins and activins play a role in the regulation of pituitary follicle stimulating hormone (FSH) secretion. The actions of inhibins and activins are thought to oppose one another, with inhibins suppressing FSH secretion and activins stimulating FSH secretion. Inhibins are secreted by granulosa cells in female follicles and Sertoli cells of the testis in the male. Inhibins are thought to have local regulatory roles in a variety of tissues, in addition to the ovary, including the brain, adrenal glands, bone marrow, fetus and placenta.



Granulosa theca cell tumor: immunohistochemical staining with BOND ready-to-use Inhibin (R1) using BOND Polymer Refine Detection.

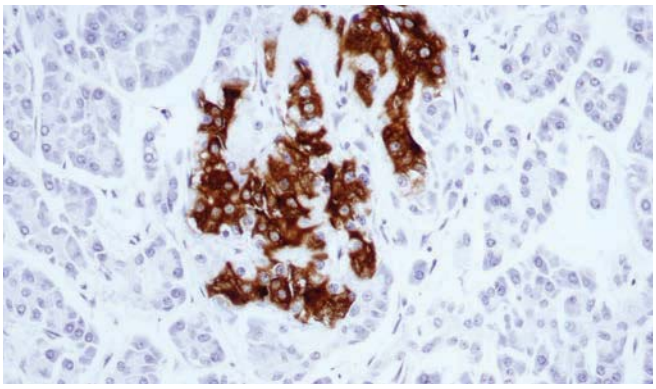
# Insulin

**Clone 2D11-H5**
7 mL BOND ready-to-use PA0620 **P**

**Antigen Background**

Insulin is a hormone secreted by the beta cells of the islets of Langerhans in the pancreas. It promotes glycogen storage, formation of triglycerides, and synthesis of protein and nucleic acids. Reports of immunocytochemical investigation reveal the presence of insulin in the cytoplasm of certain islet tumors. However, in some instances insulin-positive granules are sparse and form a margin against the cell membrane.

Also available as a liquid concentrate, refer to page 163.



Pancreas: immunohistochemical staining with BOND ready-to-use Insulin (2D11-H5) using BOND Polymer Refine Detection.

# Ki67

**Clone MM1**
7 mL BOND ready-to-use PA0118 **P (HIER)**

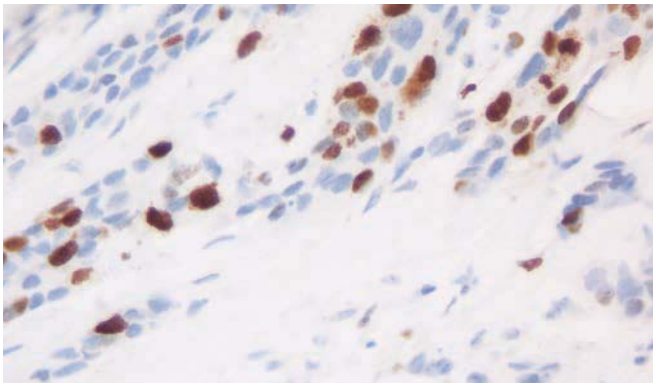
**Clone K2**
7 mL BOND ready-to-use PA0230 **P (HIER)**

**Antigen Background**

The Ki67 antigen is a nuclear protein which is expressed in all active parts of the cell cycle (G1, S, G2 and mitosis) but is absent in resting cells (G0). In contrast to many other cell cycle-associated proteins, the Ki67 antigen is consistently absent in quiescent cells and is not detectable during DNA repair processes. Thus, the presence of Ki67 antigen is strictly associated with the cell cycle and confined to the nucleus, suggesting an important role in the maintenance and/or regulation of the cell division cycle.

Also available as a liquid concentrate, refer to page 164.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting



Breast invasive ductal carcinoma: immunohistochemical staining with BOND ready-to-use Ki67 (K2) using BOND Polymer Refine Detection.

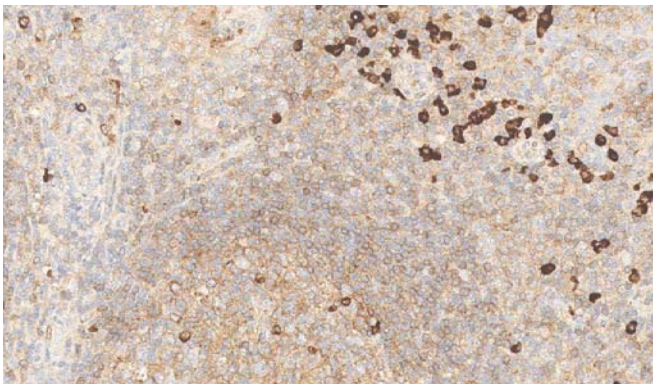
## Kappa Light Chain

### Clone CH15

7 mL BOND ready-to-use PA0606 **P (HIER)**

Immunoglobulins are polypeptides and comprise five major classes; immunoglobulin G (IgG), IgA, IgM, IgD and IgE. Each immunoglobulin consists of two identical heavy (H) chains and two identical light (L) chains. These are also subdivided into sub classes eg IgG1. There are two classes of light chain; kappa and lambda. The ratio of kappa chains and light chains varies between Ig classes and sub classes, but is also species specific. In humans, approximately 60 percent of light chains are kappa. However, in any particular immunoglobulin molecule the light chain will be either kappa or lambda. B cells contain either kappa or lambda mRNA.

Also available as a liquid concentrate, refer to page 164.



Human tonsil: immunohistochemical staining for Kappa Light Chain using NCL-L-KAP-581. Note moderate staining of mantle zone B-cells and strong staining of dispersed plasma cells. Paraffin section.

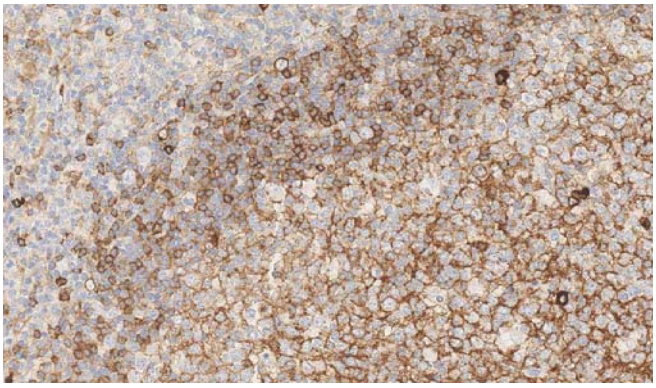
## Lambda Light Chain

### Clone SHL53

7 mL BOND ready-to-use PA0570 **P (HIER)**

The basic structure of an immunoglobulin molecule consists of two identical heavy chains, either γ, μ, α, δ or ε, and two identical light chains, either kappa or lambda. Any heavy chain can associate with either light chain but on any immunoglobulin molecule both light chains are of the same type. The ratio of kappa and lambda light chains varies between Ig classes and subclasses. In a polyclonal population the ratio of kappa to lambda bearing B cells is approximately 2:1, with individual B cells thought to express kappa or lambda light chains, never both. The majority of kappa and lambda chains are bound to heavy chain immunoglobulin, however in normal individuals low levels of free light chain are present in serum. The occurrence of a mixture of kappa and lambda chain expressing cells suggests a polyclonal population and a reactive or nonneoplastic proliferation of B cells.

Also available as a liquid concentrate, refer to page 165.



Human tonsil: immunohistochemical staining for Lambda Light Chain using NCL-L-LAM-578. Note moderate staining of mantle zone B-cells and strong staining of dispersed plasma cells. Paraffin section.

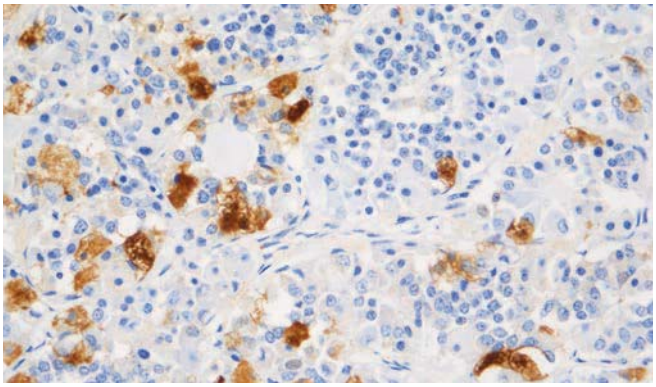
## Luteinizing Hormone

### Clone C93

7 mL BOND ready-to-use PA0655 **P**

**Antigen Background**

Luteinising hormone (LH) is a trophic hormone which modulates the secretory activity of other endocrine glands. It is produced by the anterior hypophysis of the pituitary gland. This glycoprotein hormone, like human follicle stimulating hormone and thyroid stimulating hormone, is composed of a common alpha-subunit and a specific beta-subunit which characterizes each of these hormones.



Pituitary: immunohistochemical staining with BOND ready-to-use Luteinizing Hormone (C93) using BOND Polymer Refine Detection.

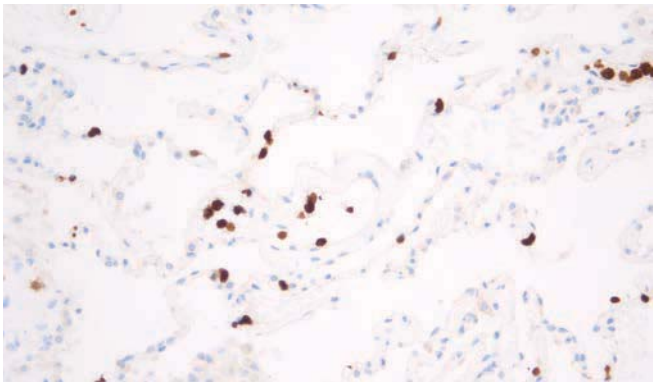
## Macrophage Marker

**Clone MAC387**
7 mL BOND ready-to-use PA0752 **P (HIER)**

**Antigen Background**

L1, a member of the S-100 family of proteins, is reported to be found on neutrophils, monocytes, certain reactive macrophages and squamous mucosal epithelia.

Also available as a liquid concentrate, refer to page 167



Lung: immunohistochemical staining with BOND ready-to-use Macrophage Marker (MAC387) using BOND Polymer Refine Detection.

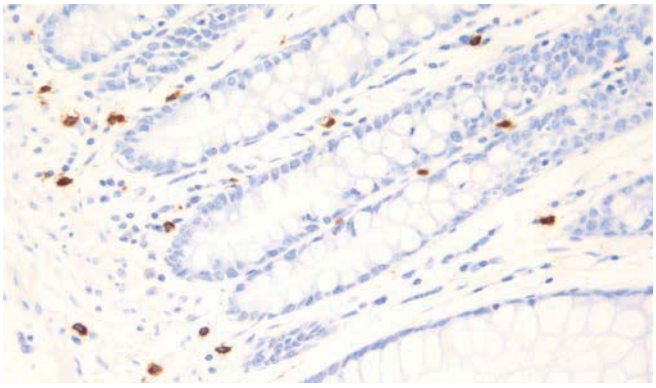
## Mast Cell Tryptase

**Clone 10D11**
7 mL BOND ready-to-use PA0019 **P**

**Antigen Background**

Mast cells contain a number of preformed chemical mediators such as histamine, chymase, carboxypeptidase and proteolytic tryptase. A substantial quantity of tryptase is reported to be found in mast cells of skin and lung and suggests this enzyme plays a major role in mast cell mediated events. In vitro studies indicate tryptase can cleave C3 to form C3a anaphylatoxin, inactivate fibrinogen as a coaguable substrate for thrombin and activate latent collagenase. Models of allergenic disease in the skin, nose and lung have each indicated elevated tryptase levels. Human mast cell tryptase has been reported to be implicated as a mediator of inflammation. Mast cell degranulation in the gut causes mucus secretion, mucosal edema, increased gut permeability and may be responsible for some of the symptoms and signs of inflammatory bowel disease.

Also available as a liquid concentrate, refer to page 168.



Bowel: immunohistochemical staining with BOND ready-to-use Mast Cell Tryptase (10D11) using BOND Polymer Refine Detection.

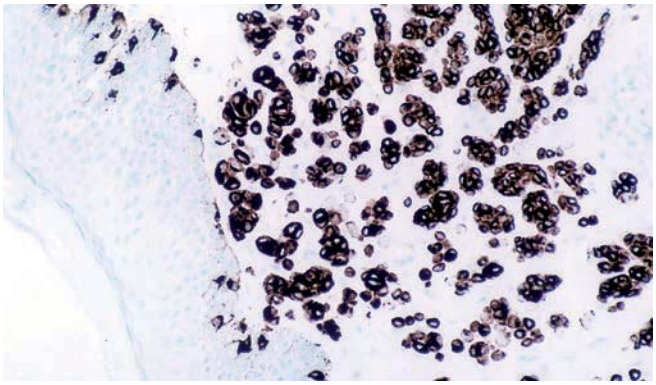
## Melan A

**Clone A103**
7 mL BOND ready-to-use PA0233 **P (HIER)**

**Antigen Background**

Melan A, a product of the MART-1 gene, is a melanocyte differentiation marker recognized by autologous cytotoxic T lymphocytes. Other melanoma-associated markers recognized by autologous cytotoxic T cells are reported to include MAGE-1, MAGE-3, tyrosinase, gp100, gp75, BAGE-1 and GAGE-1. The analysis of these different molecules and their expression in individual melanomas may be of help in the study of their particular molecular roles in melanocyte differentiation and tumorigenesis.

Also available as a liquid concentrate, refer to page 169.



Malignant melanoma: immunohistochemical staining with BOND ready-to-use Melan A (A013) using BOND Polymer Refine Detection.

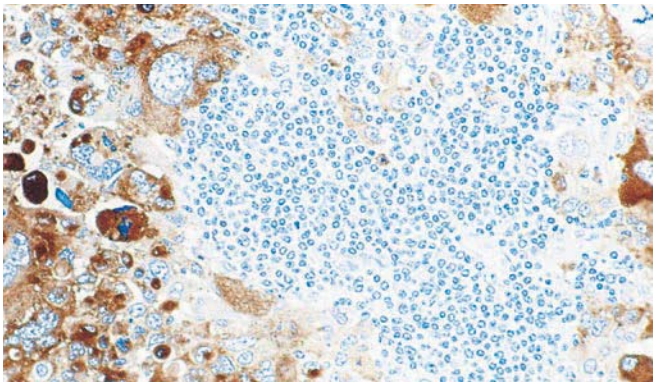
## Melanoma Marker HMB45

**Clone HMB45**
7 mL BOND ready-to-use PA0027 **P (Enzyme)**

**Antigen Background**

The HMB45 antigen has also been identified in retinal pigment epithelium (RPE) but is reported to be reactive only with the transient prenatal and infantile RPE. No reaction is reported to be observed with intradermal nevi and normal adult melanocytes and non-melanocytic cells. Tumor cells of epithelial, lymphoid, glial and mesenchymal origin are reported to be negative.

Also available as a liquid concentrate, refer to page 157.



Human metastatic melanoma: immunohistochemical staining for melanoma cells using NCL-L-HMB45. Note cytoplasmic staining of malignant cells. Paraffin section

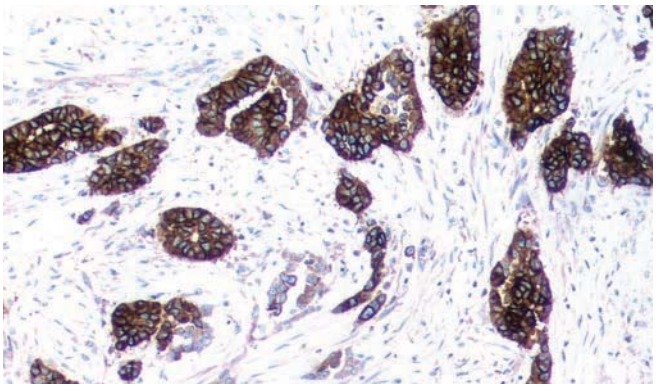
## Mesothelin

**Clone 5B2**
7 mL BOND ready-to-use PA0373 **P (HIER)**

**Antigen Background**

Mesothelin is a glycosyl-phosphatidylinositol-linked (GPI) glycoprotein of 40 kD present on the surface of mesothelial cells, mesotheliomas, epithelial ovarian cancers and some squamous cell carcinomas. It is synthesized as a 69 kD precursor which is enzymatically processed into an N-terminal secreted form of 30 kD and the GPI-linked membrane-bound form of 40 kD. The secreted form is identical to the megakaryocyte potentiating factor, but it is the GPI-linked membrane-bound form which has generated interest. Mesothelin is abundantly expressed in the kidney and in occasional epithelial cells of the trachea, tonsil and fallopian tube. The function of mesothelin is unclear but it may have a role in cellular adhesion. Mesothelin is reported to be abundant in the normal mesothelial cells from which malignant mesotheliomas and ovarian cystadenocarcinomas are derived.

Also available as a liquid concentrate, refer to page 170.



Mesothelioma: immunohistochemical staining with BOND ready-to-use Mesothelin (5B2) using BOND Polymer Refine Detection.

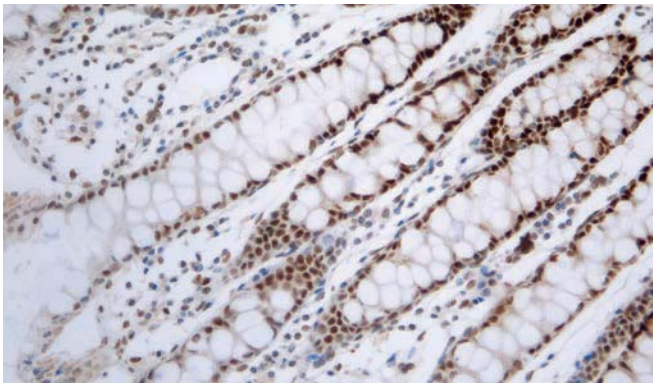
## MSH2 (Mismatch Repair Protein)

**Clone 25D12**
7 mL BOND ready-to-use PA0048 **P (HIER)**

**Antigen Background**

MSH2 is involved in the initial recognition of mismatched nucleotides during the post replication mismatch repair process. The loss of MSH2 function leads to the accumulation of replication errors, which in turn may be responsible for the multiple mutations required for multistage carcinogenesis. Mutations in mismatch repair genes have been linked to hereditary nonpolyposis colon cancer and to sporadic cancers which exhibit microsatellite instability. MSH2 is reported to be expressed in the nuclei of cells from a variety of tissues including thyroid, heart, smooth muscle and the germinal centers of lymphoid follicles. In ileum and colon, MSH2 expression has been reported in the crypts, the cells of which are undergoing rapid renewal. They are responsible for the continuous production of differentiated cells which migrate over 2 to 4 days before being sloughed into the lumen.

Also available as a liquid concentrate, refer to page 172.



Bowel: immunohistochemical staining with BOND ready-to-use MSH2 (25D12) using BOND Polymer Refine Detection.

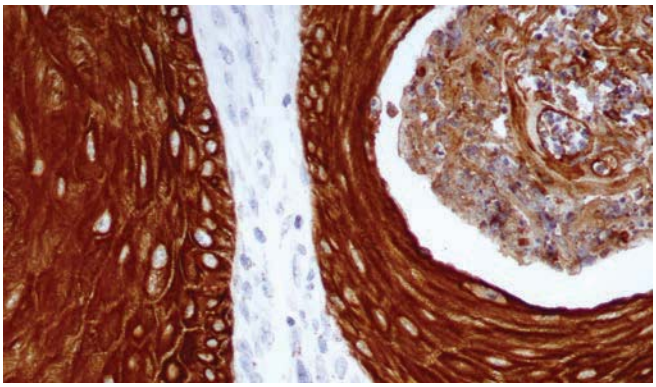
# Multi Cytokeratin

**Clone AE1 and AE3**
7 mL BOND ready-to-use PA0909 **P (Enzyme)**

**Antigen Background**

Keratins are a family of water insoluble proteins of 40 to 70 kD. These proteins form tonofilaments, a class of intermediate filament, in epidermis as well as in almost all other epithelia. The process of normal epidermal differentiation is characterized by a series of morphological and bio-chemical changes as cells progress from the germinative basal layer through the spinous and granular layers to the outer cornified layer. The 65 to 67 kD cytokeratins are reported to be present only above the basal layer, the 58 kD cytokeratin is reported to be expressed throughout the entire epidermis including the basal layer and the 56 kD cytokeratin is reported to be absent from the basal layer and is normally eliminated during stratum corneum formation. The 56 and 65 to 67 kD cytokeratins are reported to be characteristic of epidermal cells undergoing terminal differentiation and may be considered as molecular markers for keratinization.

Also available as a liquid concentrate, refer to page 174.



Squamous cell carcinoma: immunohistochemical staining with BOND ready-to-use Multi-Cytokeratin (AE1/AE3) using BOND Polymer Refine Detection.

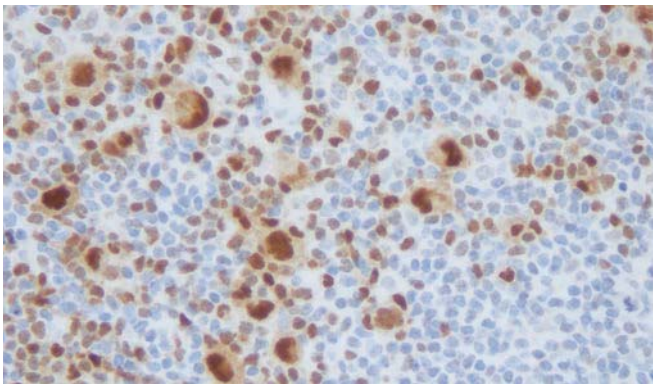
# Multiple Myeloma Oncogene 1 (MUM-1)

**Clone EAU32**
7 mL BOND ready-to-use PA0129 **P (HIER)**

**Antigen Background**

MUM-1 (Multiple Myeloma Oncogene 1)/FR4/ACSAT/PiP gene was originally identified because of its involvement in the t(6:14) translocation observed in multiple myeloma, which causes the juxtaposition of the MUM-1 gene to the Ig heavy chain locus. An antibody to MUM-1 indicates that the protein is strongly expressed in late plasma cell directed stages of B cell differentiation and in activated T cells and suggests that MUM-1 may serve as a marker for lympho-hemopoietic neoplasms derived from these cells. The morphologic spectrum of MUM-1 expressing cells has been found to range from that of a centrocyte to that of a plasmablast/plasma cell. Consequently the histogenic value of MUM-1 may be to provide a marker to aid in the identification of the transition from BCL-6 positive (germinal center B cells) to CD138 positive (immunoblasts and plasma cells).

Also available as a liquid concentrate, refer to page 173.



Hodgkin's lymphoma: immunohistochemical staining with BOND ready-to-use Multiple Myeloma Oncogene 1 (MUM1) (EAU32) using BOND Polymer Refine Detection.

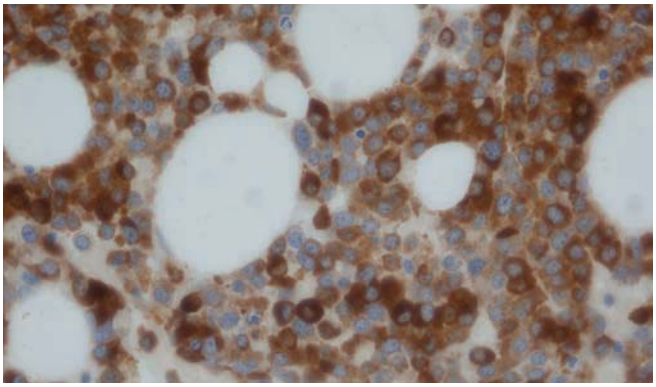
# Muramidase (Lysozyme)

**Polyclonal**
7 mL BOND ready-to-use PA0391 **P (Enzyme)**

**Antigen Background**

Intracellular muramidase, also known as lysozyme, has been reported to be expressed in myeloid and monocytic cells, in leukocytes and in myelo-proliferative disorders. Muramidase is also reported to be expressed in poorly differentiated leukemic monoblasts.

Also available as a liquid concentrate, refer to page 167.



Acute myeloid leukemia: immunohistochemical staining with BOND ready-to-use Muramidase (polyclonal) using BOND Polymer Refine Detection.

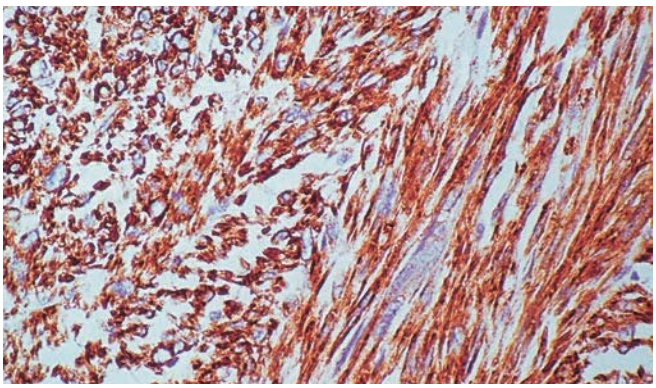
## Muscle Specific Actin

**Clone HHF35**
7 mL BOND ready-to-use PA0258 **P**

**Antigen Background**

Muscle Specific Actin (MSA) is a highly conserved, ubiquitous protein found in muscle and some non-muscle cells. Actins can be divided into three subsets, alpha actins found in muscle tissue cells, beta and gamma actins found in non-muscle cells and a small subset of gamma actins also found in muscle tissue cells. In normal tissues, expression is found in striated fibers of skeletal muscle, smooth muscle in arteries, veins and pericytes of smaller arteries, muscle in bowel, myometrium of the uterus, prostatic stroma, capsule cells of liver, kidney, lymph node and spleen, the myoepithelial layers of mammary ducts and glands, eccrine sweat glands and salivary glands. Expression is not found in epithelial cells, lymphoid cells, macrophages, connective tissue and neuronal cells. In neoplastic tissues, expression can be found in soft tissue tumors with muscle differentiation e.g. leiomyomas, leiomyosarcomas and rhabdomyosarcomas of varying subtypes.Non-muscle sarcomas, carcinomas, melanomas and lymphomas do not express muscle specific actin.

Also available as a liquid concentrate, refer to page 175.



Leiomyosarcoma: immunohistochemical staining with BOND ready-to-use Muscle Specific Actin (HHF35) using BOND Polymer Refine Detection.

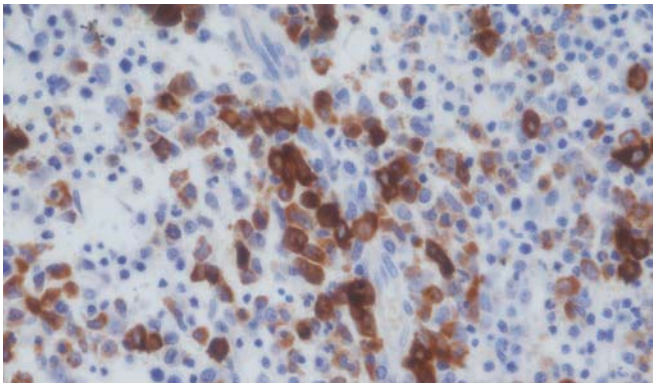
## Myeloperoxidase

**Clone 59A5**
7 mL BOND ready-to-use PA0491 **P**

**Antigen Background**

Myeloperoxidase is a lysosomal enzyme found in cells of the myeloid series which metabolises most of the hydrogen peroxide generated by activated phagocytes. It is a major constituent of azurophilic cytoplasmic granules that uses hydrogen peroxide to oxidise a variety of aromatic compounds and chloride ions to hypochlorous acid (HOCl), a strong oxidant. HOCl is the most bacteriocidal oxidant known to be produced by neutrophils. HOCl reacts with proteins to form cytotoxic chloramines. Myeloperoxidase is reported to be a major component in all myeloid cells, including mature granulocytes and is a superior marker to myeloperoxidase mRNA, whose level decreases with the maturation of the cell and is not detectable from the myelocyte stage onwards. Myeloperoxidase is reported to be expressed in neutrophil granulocytes and monocytes in blood, in precursors of granulocytes in the bone marrow and in Kupffer cells of the liver.

Also available as a liquid concentrate, refer to page 176.



Acute myeloid leukemia: immunohistochemical staining with BOND ready-to-use Myeloperoxidase (59A5) using BOND Polymer Refine Detection.

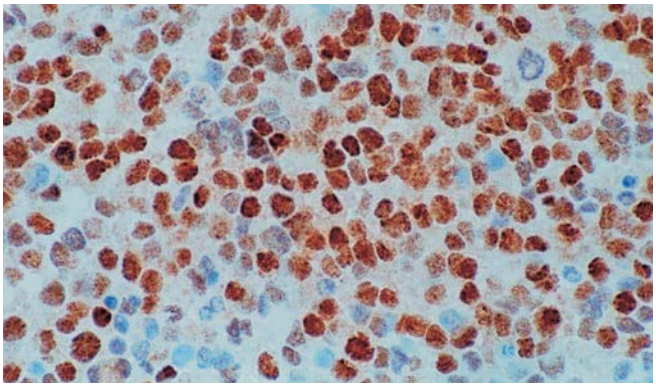
## Myf-4 (Rhabdomyosarcoma Marker)

**Clone LO26**
7 mL BOND ready-to-use PA0226 **P (HIER)**

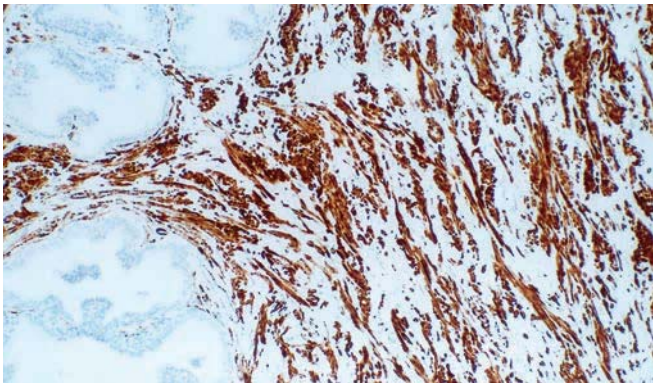
**Antigen Background**

Rhabdomyosarcomas are a class of myoblast-derived soft tissue sarcomas that usually express a number of muscle-specific genes and primarily affect children and young adults. Differentiation of myogenic cells is controlled by a set of regulatory genes including MyoD1, myogenin, Myf-5 and Myf-6. Myf-4 is the human homolog of myogenin. Its gene product, together with that of The, accumulates in the nucleus of differentiated cells. Myf-4 has been shown to be useful in the sub typing of small round blue cell tumors.

Also available as a liquid concentrate, refer to page 177.



Rhabdomyosarcoma: immunohistochemical staining with BOND ready-to-use Myf-4 (Rhabdomyosarcoma Marker) (LO26) using BOND Polymer Refine Detection.



Prostate: smooth muscle immunohistochemical staining with BOND ready-to-use Myosin Heavy Chain (smooth muscle) (S131) using BOND Polymer Refine Detection.

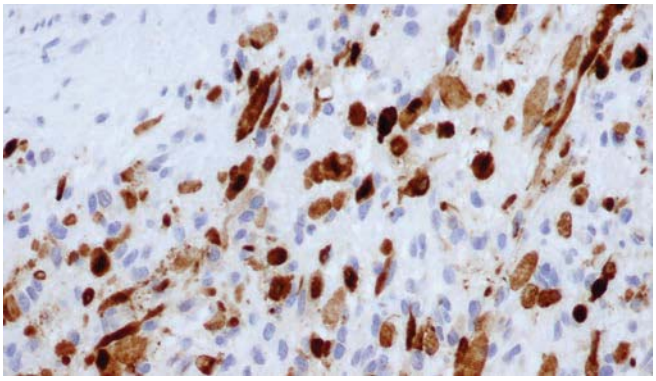
# Myoglobin

**Clone MYO18**
7 mL BOND ready-to-use PA0727 **P (HIER)**

### Antigen Background

Myoglobin is a cytoplasmic, single chain polypeptide of 153 amino acids that contains a single heme group. Myoglobin is reported to be expressed in skeletal and cardiac muscle but not in smooth muscle and functions as an oxygen transporting pigment.

Also available as a liquid concentrate, refer to page 177.



Rhabdomyosarcoma: immunohistochemical staining with BOND ready-to-use Myoglobin (MYO18) using BOND Polymer Refine Detection.

# Myosin Heavy Chain (Smooth Muscle)

**Clone S131**
7 mL BOND ready-to-use PA0493 **P (HIER)**

### Antigen Background

Myosin is a contractile muscle specific protein composed of two heavy and four light chains. The myosin heavy chain has many isoforms which are specific for different muscles or fiber types, some of which are developmentally regulated. Smooth muscle myosin heavy chain (SM-MHC) is a cytoplasmic structural protein that is a major component of the contractile apparatus in smooth muscle cells. It has been reported to be specific for smooth muscle development.

Also available as a liquid concentrate, refer to page 177.

# Negative Control (Mouse)

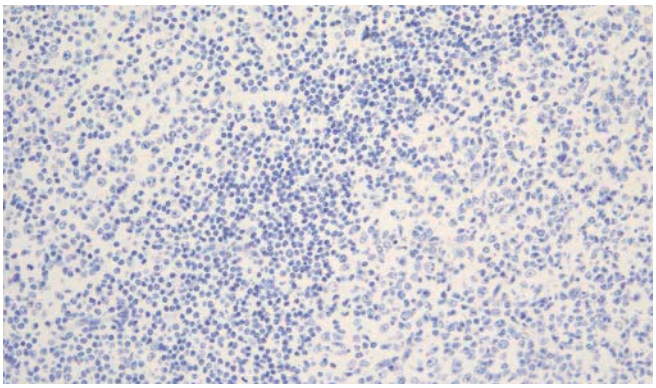
**Clone MOPC-21**
7 mL BOND ready-to-use PA0996 **P**

### Antigen Background

In some tissues, non-specific binding may occur, especially in neoplastic or necrotic tissue.

### Product Specific Information

The use of Negative (Mouse) antibody is recommended to aid in the identification of cells, tissues or tissue components, which may non-specifically bind mouse antibodies and will allow better interpretation of specific staining at the antigenic site.



Tonsil: immunohistochemical staining with BOND ready-to-use Negative (Mouse) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

# Negative Control (Rabbit)

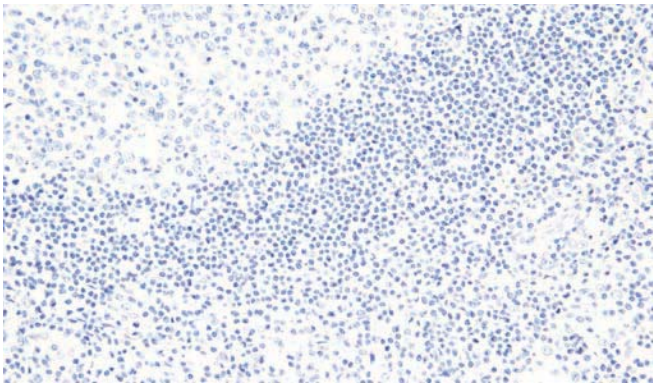
7 mL BOND ready-to-use PA0777 **P**

**Antigen Background**

In some tissues, non-specific binding may occur, especially in neoplastic or necrotic tissue.

**Product Specific Information**

The use of Negative (Rabbit) is recommended to aid in the identification of cells, tissues or tissue components, which may non-specifically bind rabbit antibodies and will allow better interpretation of specific staining at the antigenic site.



Tonsil: immunohistochemical staining with BOND ready-to-use Negative (Rabbit) using BOND Polymer Refine Detection.

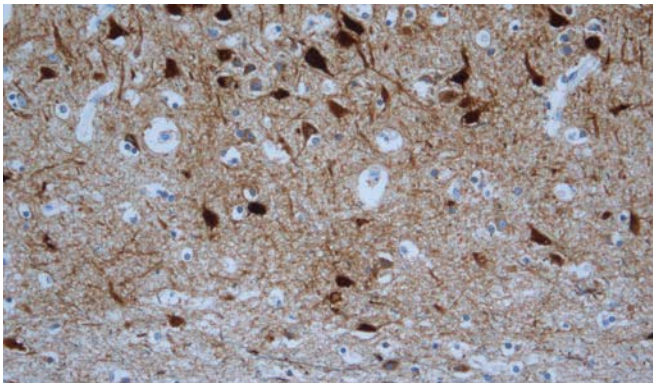
# Neurofilament 200kD

**Clone N52.1.7**
7 mL BOND ready-to-use PA0371 **P (HIER)**

**Antigen Background**

Neurofilaments constitute the main structural elements of neuronal axons and dendrites. Neurofilaments are composed of three major subunits referred to as the neurofilament triplet, with molecular weights of 68 kD, 160 kD and 200 kD. Neurofilament subunits are reported to be present in neurons, neuronal processes, peripheral nerves and sympathetic ganglion cells. Within tumors, only neoplastic cells of neural origin or those exhibiting neuronal differentiation, have been reported to express neurofilaments.

Also available as a liquid concentrate, refer to page 180.



Cerebrum: immunohistochemical staining with BOND ready-to-use Neurofilament (N52.1.7) using BOND Polymer Refine Detection.

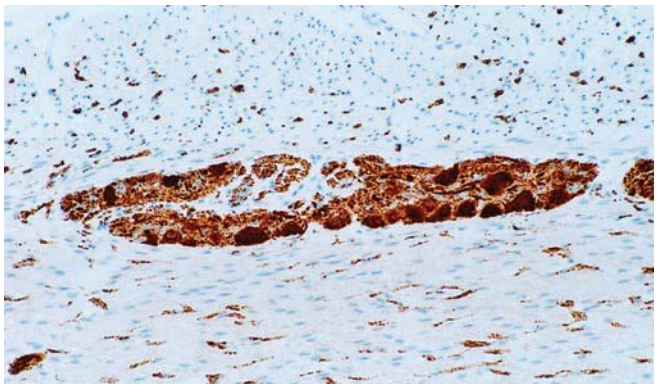
# Neuron Specific Enolase

**Clone 22C9**
7 mL BOND ready-to-use PA0435 **P (HIER)**

**Antigen Background**

Enolase is a glycolytic enzyme catalysing the reaction pathway between 2-phosphoglycerate and phosphoenol pyruvate. In mammals, enolase molecules are dimers composed of three distinct subunits ($\alpha$, $\beta$ and $\gamma$) whereas, in rats, five forms have been found. The $\alpha$ subunit and $\gamma$ subunit are of approximately 47 kD and 45 kD, respectively. The $\gamma\gamma$ and $\alpha\gamma$ enolases are located mainly in the nervous tissue and neuroendocrine cells.

Also available as a liquid concentrate, refer to page 180.



Carcinoid: immunohistochemical staining with BOND ready-to-use Neuron Specific Enolase (22C9) using BOND Polymer Refine Detection.

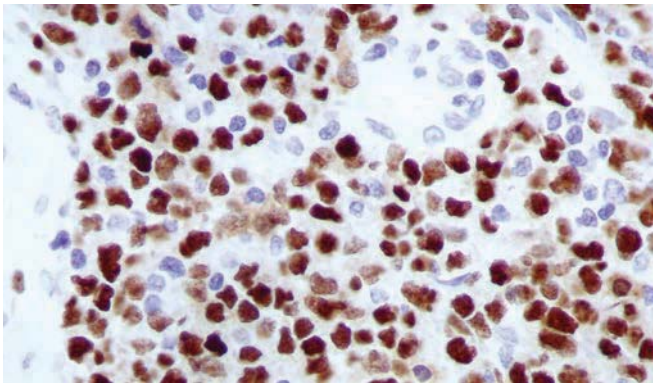
# Oct-2

**Clone Oct-207**
7 mL BOND ready-to-use PA0532 **P (HIER)**

**Antigen Background**

Oct-2 is a transcription factor belonging to the POU homeo-domain family that binds to the Ig gene octamer sites regulating B cell specific genes. It is dependent on the activity of B cell restricted coactivators such as BOB-1/OBF-1. Reed Sternberg (RS) cells represent the malignant cells in classical Hodgkin's disease and are derived from germinal center B cells. In a number of these cases, cells do not express immunoglobulin due to the presence of crippling mutations within the Ig genes. As Ig gene expression in B cells also requires an interaction between octamer sites and the transactivating factors Oct-2 and BOB.1, the absence of both Oct-2 and BOB-1 expression represents a novel mechanism for immunoglobulin gene deregulation in RS cells. Oct-2 protein expression is not restricted to B cells, although expression levels are much higher in these cells. Germinal center B cells show higher expression for Oct-2 and BOB-1/OBF-1. Oct-2 expression is reported to be significantly greater in germinal center derived lymphomas, although other B cell lymphomas also display high levels of expression.

Also available as a liquid concentrate, refer to page 181.



B cell lymphoma: immunohistochemical staining with BOND ready-to-use Oct-2 (Oct-207) using BOND Polymer Refine Detection.

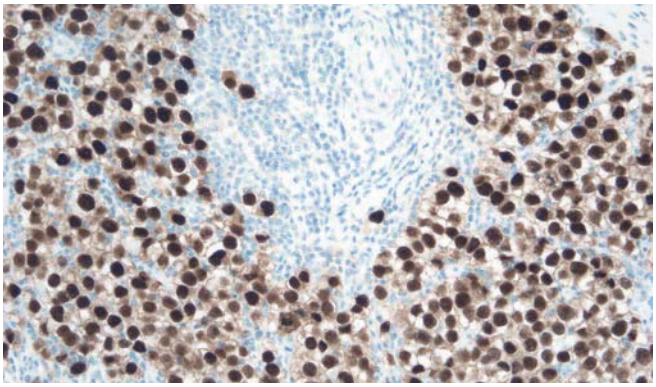
# Oct 3/4

**Clone N1NK**
7 mL BOND ready-to-use PA0934 **P (HIER)**

### Antigen Background

Oct3/4 is a member of the POU homeodomain family of transcription factors, which is expressed by embryonic stem cells and germ cells. A critical amount of Oct3/4 levels are associated with loss of pluripotency. Oct3/4 has been proposed as a useful marker for germ cell tumors which exhibit features of pluripotentiality, including seminoma/dysgerminoma and embryonal carcinoma, and establishing a germ cell origin for some metastatic tumors of uncertain primary tumor.

Also available as a liquid concentrate, refer to page 181.



Seminoma: immunohistochemical staining with BOND ready-to-use Oct-3/4 (N1NK) using BOND Polymer Refine Detection.

# p53 Protein

**Clone DO7**
7 mL BOND ready-to-use PA0057 **P (HIER)**

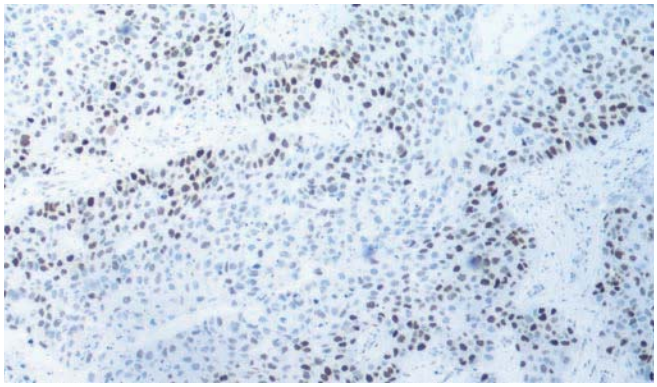
### Antigen Background

p53 protein plays a vital role in suppressing the development of cancer. The accumulation of p53 protein in response to DNA damage in vitro is well established and appears to induce growth arrest and apoptosis by the transcriptional regulation of other genes.

### Product Specific Information

This monoclonal antibody recognizes both wild type and mutant forms of human p53 protein. BOND ready-to-use p53 (DO7) is recommended for determining the p53 status of a variety of carcinomas, including breast and colorectal carcinomas.

Also available as a liquid concentrate, refer to page 184.



Bladder carcinoma: immunohistochemical staining with BOND ready-to-use p53 Protein (DO-7) using BOND Polymer Refine Detection.

# p63 Protein

**Clone 7JUL**
7 mL BOND ready-to-use PA0103 **P (HIER)**

### Antigen Background

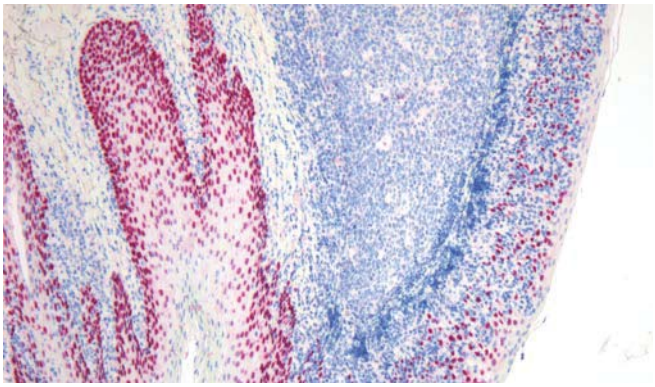
p63 is a member of the p53 gene family and encodes for at least six major isotypes with transactivating, death-inducing activities (TAp63) and also dominant-negative activities (deltaNp63). p63 protein is reported to be expressed in a variety of normal human and mouse tissues, including proliferating cells of epithelium, cervix, urothelium and prostate. p63 protein is also reported to be expressed in most poorly differentiated squamous cell carcinomas. In epithelial cells, the dominant isotype, deltaNp63, lacks an acidic N-terminus corresponding to the transactivating domain of p53. The deltaN-isotype is also reported to be abundantly expressed in naso-pharyngeal carcinomas. p63 protein is required for prostate development and, in mice, it is essential for limb and epidermal morphogenesis. The human p63 gene is mutated in children with the disease Ectrodactyly Ectodermal Dysplasia and Facial Clefts syndrome. In contrast to the p53 gene, the p63 gene is rarely mutated in human cancer. p63 protein is reported not to be expressed in prostate adenocarcinoma but altered expression is a frequent event in bladder carcinogenesis.

### Product Specific Information

Clone 7JUL is raised to a prokaryotic recombinant fusion protein corresponding to a region (aa319-410) common to six isoforms of the p63 molecule.

Also available as a liquid concentrate, refer to page 185.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting



Human tonsil: immunohistochemical staining for p63 protein using NCL-L-p63 in combination with BOND Polymer Refine Red detection system (DS9390). Note intense nuclear staining of tonsilar epithelial cells. Paraffin section.

## Pax-5

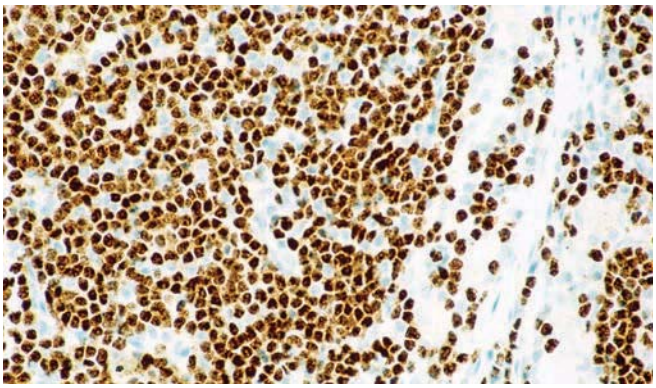
**Clone 1EW**
7 mL BOND ready-to-use PA0552 **P (HIER)**

### Antigen Background

Pax genes are a family of developmental control genes that encode nuclear transcription factors and have been implicated in the control of mammalian development.

PAX-5 is a B cell specific transcription factor, that is expressed in pro B cells, pre-B, mature B cells and subsequently in all stages of B cell development until the plasma cell stage in which it is downregulated.

Also available as a liquid concentrate, refer to page 187.



Lymphoma: immunohistochemical staining with BOND ready-to-use Pax-5 (1EW) using BOND Polymer Refine Detection.

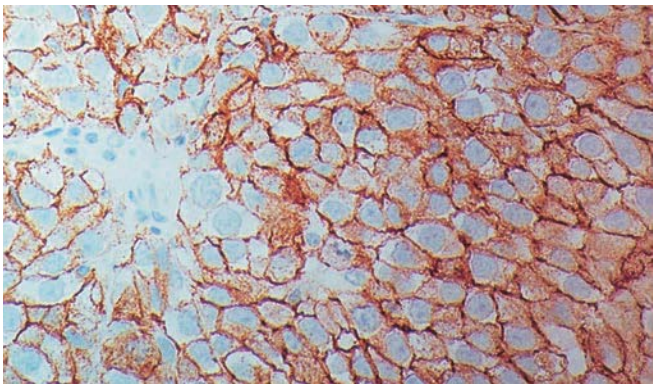
## Placental Alkaline Phosphatase

**Clone 8A9**
7 mL BOND ready-to-use PA0161 **P (HIER)**

### Antigen Background

Placental alkaline phos-phatase (PLAP) is a membrane-associated sialoglycoprotein enzyme normally present at high concentration in syncytiotrophoblasts within the placenta during the third trimester of gestation. PLAP is reported to be expressed only in normal term placenta, endocervix and fallopian tube and also in ovarian and proximal gastrointestinal tumors. PLAP expression is rare in malignant germ cell tumors. This is a distinct molecule from: A PLAP-like variant has been described which shares more than 85 percent homology with PLAP itself. PLAP-like enzyme is reported to be pre-dominantly found in normal fetal and neonatal testis, and in thymus. It is also commonly expressed in germ cell tumors and more recently described in seminomas.

Also available as a liquid concentrate, refer to page 189.



Seminoma: immunohistochemical staining with BOND ready-to-use Placental Alkaline Phosphatase (8A9) using BOND Polymer Refine Detection.

## Progesterone Receptor

**Clone 16**
7 mL BOND ready-to-use PA0312 **P (HIER)**

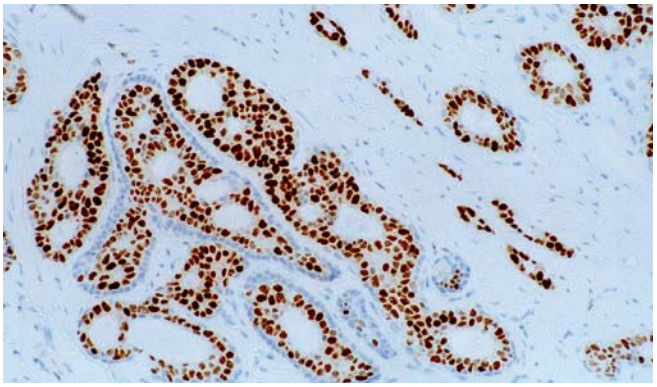
### Antigen Background

The human progesterone receptor (PR) is expressed as two isoforms, PRA (94 kD) and PRB (114 kD), which function as ligand-activated transcription factors. These two isoforms are transcribed from distinct estrogen receptor (ER)-inducible promoters within a single copy PR gene. The PRA form is a truncated version of the PRB form, lacking the first 164 N-terminal amino acids. In humans, PRA acts as a transdominant repressor of the transcriptional activity of PRB, glucocorticoid receptor, ER, androgen receptor and mineralocorticoid receptor. PRB functions mainly as a transcriptional activator. PRB is expressed strongly in endometrial glandular and stromal nuclei in the proliferative phase of the menstrual cycle and weakly during the secretory phase and early pregnancy.

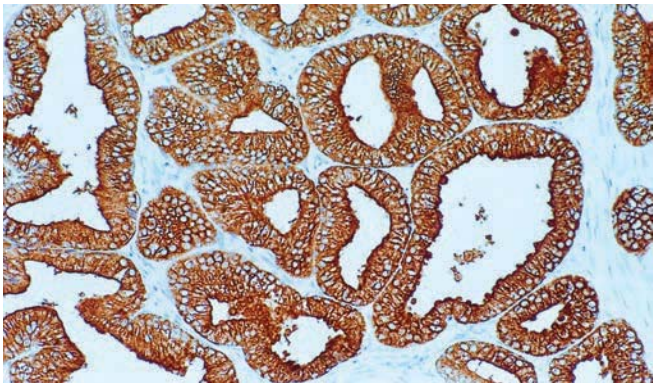
### Product Specific Information

Clone 16 is specific for a region of the N-terminus of the A form of PR. The precise epitope has not been mapped but it reacts with both A and B forms of PR by Western blot but only with the A form by immunohistochemistry. This suggests that the epitope is inaccessible in the native folded B form of the protein.

Also available as a liquid concentrate, refer to page 190.



Breast carcinoma: immunohistochemical staining with BOND ready-to-use Progesterone Receptor (16) using BOND Polymer Refine Detection.



Prostate adenocarcinoma: immunohistochemical staining with BOND ready-to-use Prostatic Acid Phosphatase (PASE/4LJ) using BOND Polymer Refine Detection.

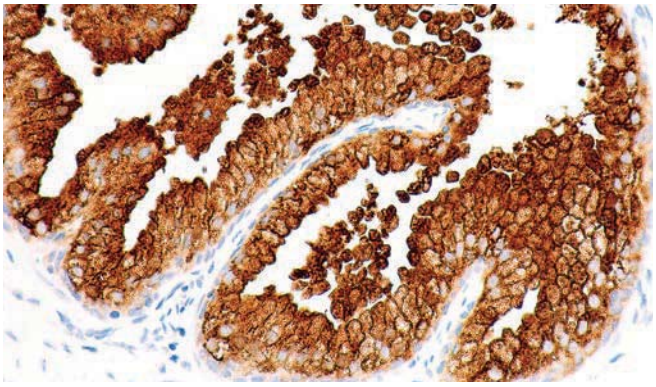
## Prostate Specific Antigen

**Clone 35H9**
7 mL BOND ready-to-use PA0431 **P (HIER)**

**Antigen Background**

Prostate specific antigen is a protein of the kallikrein family of protein kinases. Distinct from Prostatic Acid Phosphatase, it has been found to be immunologically identical and biologically similar to a protein isolated from the prostate gland.

Also available as a liquid concentrate, refer to page 192.



Prostate: immunohistochemical staining with BOND ready-to-use Prostate Specific Antigen (35H9) using BOND Polymer Refine Detection.

## Prostatic Acid Phosphatase

**Clone PASE/4LJ**
7 mL BOND ready-to-use PA0006 **P**

**Antigen Background**

Prostatic acid phosphatase (PAP) is an isoenzyme of acid phosphatase found in large amounts in the prostate and seminal fluid. The precise function of PAP is unknown, but it may act as a hydrolase to split phosphoryl choline in semen and also function as a transferase. Elevated serum levels of the enzyme are reported in metastatic prostatic carcinoma.

Also available as a liquid concentrate, refer to page 192.

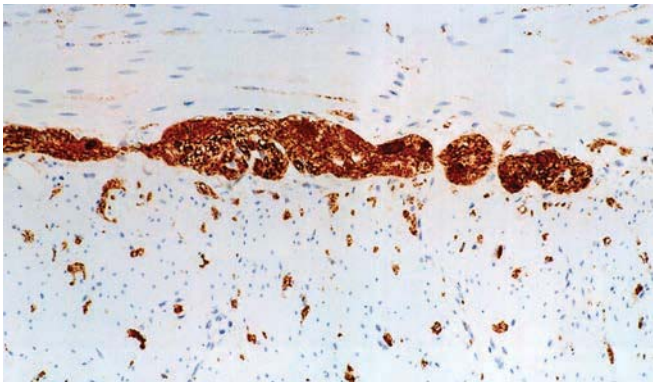
## Protein Gene Product 9.5

**Clone 10A1**
7 mL BOND ready-to-use PA0286 **P (HIER)**

**Antigen Background**

Protein gene product (PGP) 9.5 is a neuron specific protein, structurally and immunologically distinct from neuron specific enolase. PGP9.5 expression has been reported in neurons and nerve fibers at all levels of the central and peripheral nervous system, in many neuroendocrine cells, in segments of the renal tubules, in spermatogonia and Leydig cells of the testis, in ova and in some cells of both the pregnant and non-pregnant corpus luteum. PGP9.5 is known to be a member of the ubiquitin C-terminal hydroxylase family and is also concentrated within inclusion bodies suggesting that such structures may be metabolically active regions of the cells.

Also available as a liquid concentrate, refer to page 193.



Small bowel nerve fibers: immunohistochemical staining with BOND ready-to-use Protein Gene Product 9.5 (10A1) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

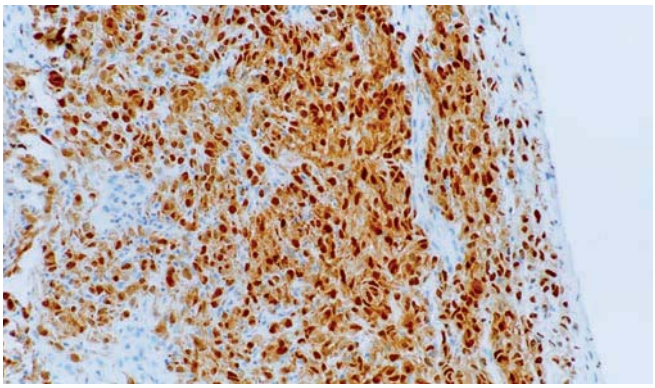
# S-100

**Polyclonal**
7 mL BOND ready-to-use PA0900 **P (Enzyme)**

**Antigen Background**

S-100A and S-100B proteins are two members of the S-100 family of proteins. S-100A is composed of an alpha and beta chain whereas S-100B is composed of two beta chains. S-100 protein is reported to be expressed in neuroectodermal tissue, including nerves and melanocytes. Langerhans cells in skin and interdigitating reticulum cells in the paracortex of lymph nodes are also reported to express S-100 protein. It is noteworthy that S-100 protein is highly soluble and may be eluted from frozen tissue during immunohistochemical procedures.

Also available as a liquid concentrate, refer to page 195.



Lung metastatic melanoma: immunohistochemical staining with BOND ready-to-use S-100 (Polyclonal) using BOND Polymer Refine Detection.

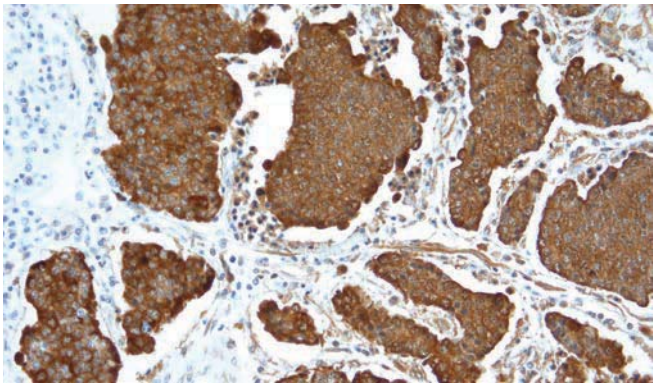
# Serotonin

**Polyclonal**
7 mL BOND ready-to-use PA0736 **P (HIER)**

**Antigen Background**

Serotonin (5-hydroxytryptamine, 5-HT) is reported to be a widely distributed neurotransmitter and hormone in the mammalian peripheral and central nervous system (CNS). Serotonin is formed by the decarboxylation of 5-hydroxy-tryptophan, its intermediate, which in turn is formed by hydroxylation of L-tryptophan by tryptophan hydroxylase. In the CNS, the action of serotonin is terminated by reuptake into the presynaptic terminal by specific serotonin transporters. Serotonin has been implicated in several neuropsychiatric disorders such as anxiety, depression and schizophrenia. The majority of serotonergic nerve terminals in the CNS originate in neuronal cell bodies of the Raph nuclei (dorsal, median), nucleus Raph obscurus and nucleus Raph pallidus in the brainstem which project to specific areas of the brain and spinal cord. Serotonin is thought to be an inhibitory neurotransmitter regulating a wide range of sensory, motor and cortical functions in the CNS. In the periphery, serotonin is reported to be present in neural and non-neural structures such as platelets, gastro-intestinal tract (myenteric plexus, enterochromaffin cells), lungs (neuroepithelial cells), thyroid gland and spleen.

Also available as a liquid concentrate, refer to page 196.



Carcinoid: immunohistochemical staining with BOND ready-to-use Serotonin (Polyclonal) using BOND Polymer Refine Detection.

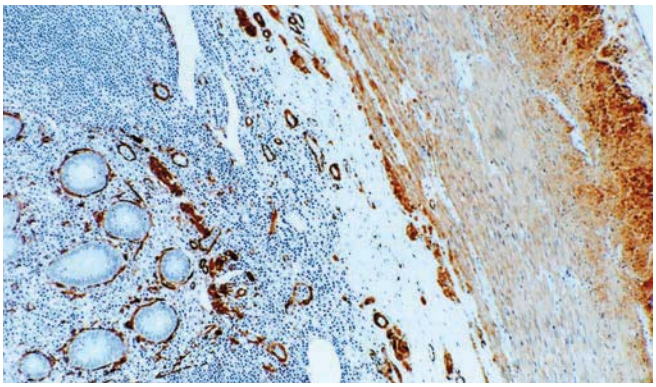
# Smooth Muscle Actin

**Clone αsm-1**
7 mL BOND ready-to-use PA0943 **P**

**Antigen Background**

Smooth muscle can be located in the vascular walls, intestinal muscularis mucosae, muscularis propria and in the stroma of many tissues. They have also been noted in the myoepithelial cells of various glands most notably the salivary and mammary glands and in neoplastic tissues such as leiomyomas and leiomyosarcomas.

Also available as a liquid concentrate, refer to page 95.



Appendix, smooth muscle: immunohistochemical staining with BOND ready-to-use Smooth Muscle Actin (αsm-1) using BOND Polymer Refine Detection.

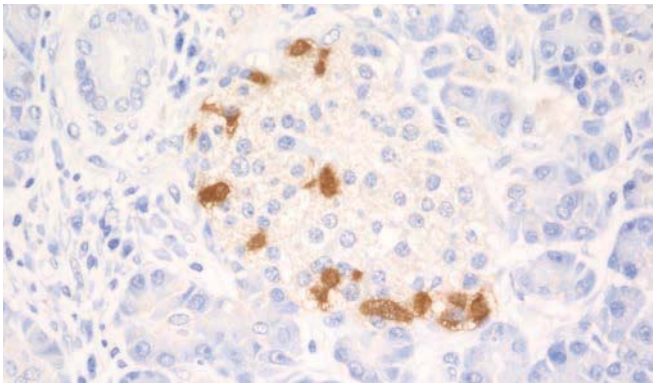
# Somatostatin

## Polyclonal

7 mL BOND ready-to-use PA0331 **P**

### Antigen Background

Somatostatin is a cyclic polypeptide hormone originally isolated from the hypothalamus and characterized by its ability to inhibit release of growth hormone from the pituitary gland. It exists in two forms, somatostatin-14, composed of 14 amino acids and somatostatin-28, a prohormone composed of 28 amino acids. In the digestive system, somatostatin has been identified in intrinsic nerves of the intestinal wall and in endocrine cells of the digestive mucosa and the pancreatic islets. The antrum, duodenum and pancreas have been reported to contain almost exclusively somatostatin-14, whereas the gastric body and the rest of the intestine contain 40 to 80 percent somatostatin-28.



Pancreas: immunohistochemical staining with BOND ready-to-use Somatostatin (Polyclonal) using BOND Polymer Refine Detection.

# Synaptophysin

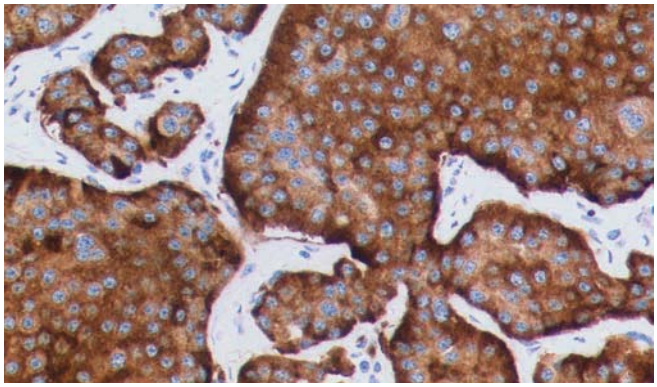
## Clone 27G12

7 mL BOND ready-to-use PA0299 **P (HIER)**

### Antigen Background

Synaptophysin is an integral membrane glycoprotein. It is reported to occur in presynaptic vesicles of neurons in brain, spinal cord, retina and in similar vesicles of the adrenal medulla as well as in neuromuscular junctions. Synaptophysin may be involved in synaptic vesicle formation and exocytosis and as such is reported to be expressed in a wide spectrum of neuro-endocrine tumors.

Also available as a liquid concentrate, refer to page 198.



Carcinoid: immunohistochemical staining with BOND ready-to-use Synaptophysin (27G12) using BOND Polymer Refine Detection. Note intense cytoplasmic staining of tumor cells.

# Tartrate-Resistant Acid Phosphatase (TRAP)

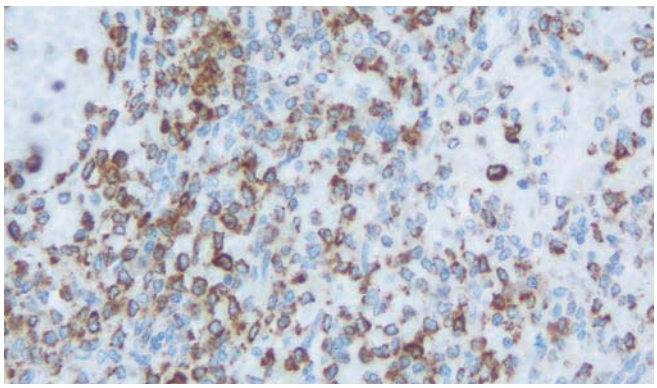
## Clone 26E5

7 mL BOND ready-to-use PA0093 **P (HIER)**

### Antigen Background

Tartrate-resistant acid phosphatase (TRAP) is a basic, iron-binding protein with high activity towards phosphoproteins, ATP and 4-nitrophenyl phosphate. This isoenzyme has been reported through different applications to be expressed in human alveolar macrophages, osteoclasts, spleen and liver. Expression of TRAP is reported to be increased in the spleen and monocytes of individuals with Gaucher's disease, Hodgkin's disease and the sera of individuals undergoing active bone turnover. Elevated levels are also reported to be associated with various B cell and T cell leukemias and lymphomas, decidual cells, syncytiotrophoblasts and some macrophages distributed throughout maternal and embryonic tissues.

Also available as a liquid concentrate, refer to page 198.



Hairy cell leukemia: immunohistochemical staining with BOND ready-to-use Tartrate-Resistant Acid Phosphatase (26E5) using BOND Polymer Refine Detection.

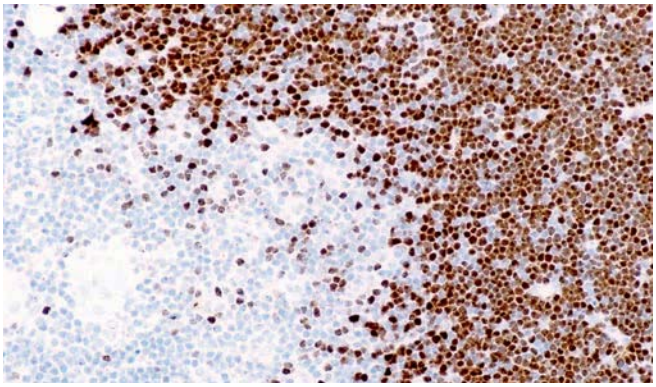
# Terminal Deoxynucleotidyl Transferase

**Clone SEN28**
7 mL BOND ready-to-use PA0339 **P (HIER)**

**Antigen Background**

Terminal Deoxynucleotidyl Transferase (TdT) is a DNA polymerase. It is reported to be expressed in primitive T and B lymphocytes of the normal thymus and bone marrow. TdT is reported to be expressed in leukemias and acute lymphoblastic lymphomas where early and precise differentiation is crucial.

Also available as a liquid concentrate, refer to page 199.



Thymus: immunohistochemical staining with BOND ready-to-use Terminal Deoxynucleotidyl Transferase (SEN28) using BOND Polymer Refine Detection.

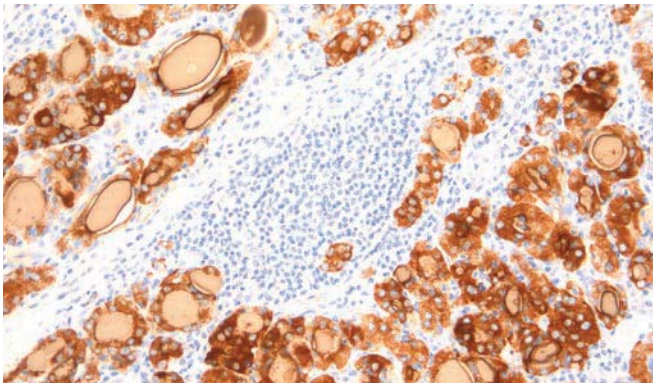
# Thyroglobulin

**Clone 1D4**
7 mL BOND ready-to-use PA0025 **P**

**Antigen Background**

A heavily glycosylated protein of 670 kD Thyroglobulin is composed of two identical subunits, synthesized by the follicular epithelial cells of the thyroid.

Also available as a liquid concentrate, refer to page 200.



Hashimoto's thyroiditis: immunohistochemical staining with BOND ready-to-use Thyroglobulin (1D4) using BOND Polymer Refine Detection.

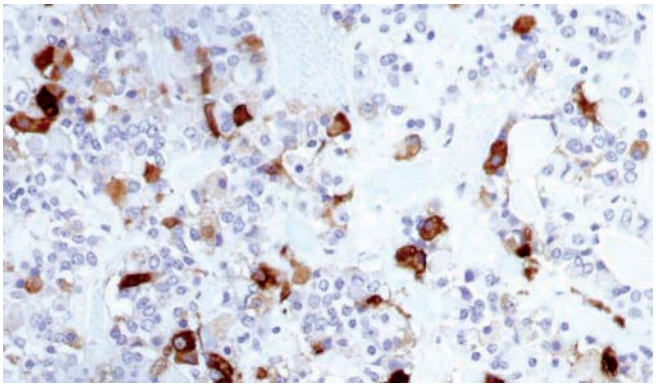
# Thyroid Stimulating Hormone

**Clone QB2/6**
7 mL BOND ready-to-use PA0776 **P (Enzyme)**

**Antigen Background**

Thyroid stimulating hormone (TSH) is a pituitary hormone of 28 kD which stimulates thyroid growth and production of thyroid hormones. TSH is reported to be expressed in thyrotrophic cells of the pituitary and pituitary adenomas.

Also available as a liquid concentrate, refer to page 200.



Pituitary gland: immunohistochemical staining with BOND ready-to-use Thyroid Stimulating Hormone (QB2/6) using BOND Polymer Refine Detection.

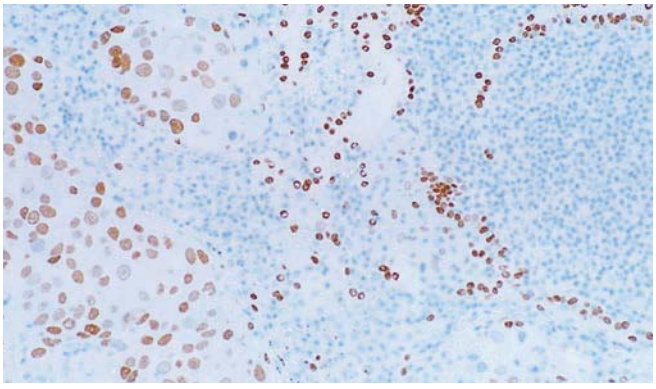
# Thyroid Transcription Factor-1

**Clone SPT24**
7 mL BOND ready-to-use PA0364 **P (HIER)**

**Antigen Background**

Thyroid Transcription Factor-1 (TTF-1) plays a role in regulating genes expressed in the thyroid, lung and brain. These include the genes encoding thyroglobulin, Clara cell secretory protein and surfactant proteins. Gene targeting studies have shown TTF-1 to be essential for the proper development of the thyroid and lungs; since abnormal expression may underline a number of congenital abnormalities.

Also available as a liquid concentrate, refer to page 201.



Lung tissue: immunohistochemical staining with BOND ready-to-use Thyroid Transcription Factor (SPT24) using BOND Polymer Refine Detection.

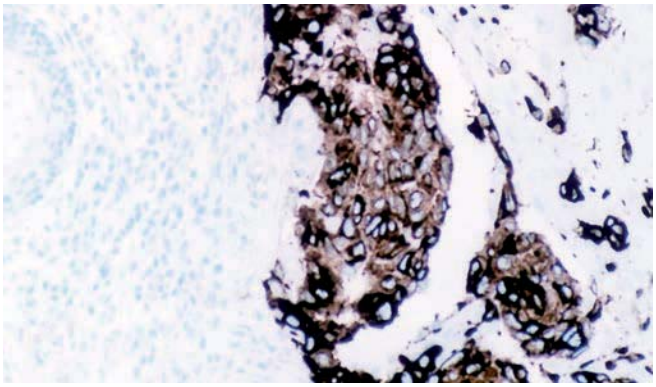
# Tyrosinase

**Clone T311**
7 mL BOND ready-to-use PA0322 **P (HIER)**

**Antigen Background**

The biosynthesis of melanin in melanocytes involves a family of enzymes, a key member of which is tyrosinase. Tyrosinase deficiency is associated with various forms of albinism and in particular oculocutaneous albinism. L-tyrosinase is the initial substrate for melanin biosynthesis and its conversion to dopaquinone is catalyzed by tyrosinase, whose expression is reported in melanocytes and melanomas. Tyrosinase expression in melanocytic lesions can be assessed using Tyrosinase (T311).

Also available as a liquid concentrate, refer to page 204.



Malignant melanoma: immunohistochemical staining with BOND ready-to-use Tyrosinase (T311) using BOND Polymer Refine Detection.

# Vimentin

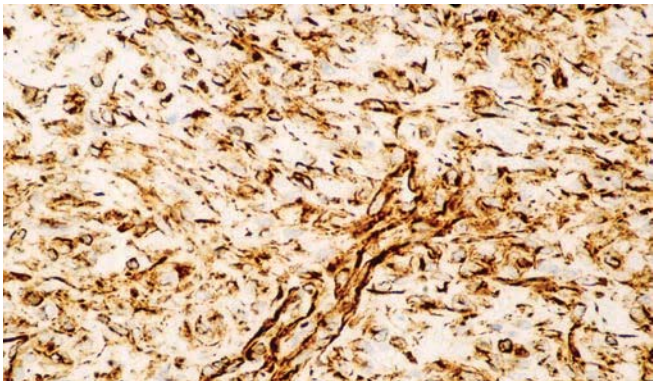
**Clone V9**
7 mL BOND ready-to-use PA0640 **P (HIER)** New!

**Clone SRL33**
7 mL BOND ready-to-use PA0033 **P (HIER)**

**Antigen Background**

Eukaryotic cells contain a number of types of cytoplasmic filamentous proteins, microtubule, microfilaments and intermediate-sized filaments (IF). Vimentin, a 57 kD protein that is an intermediate filament is reported to be expressed in most cells of mesenchymal origin, including fibroblasts, endothelial cells, smooth muscle, melanocytes as well as T and B lymphocytes.

Also available as a liquid concentrate, refer to page 207.



Rhabdomyosarcoma: immunohistochemical staining with BOND ready-to-use Vimentin (SRL33) using BOND Polymer Refine Detection.

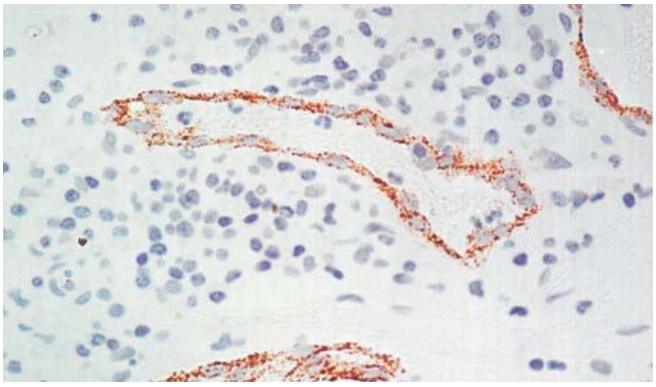
# von Willebrand Factor

**Clone 36B11**
7 mL BOND ready-to-use PA0400 **P (HIER)**

**Antigen Background**

Human von Willebrand factor (or factor VIII-related antigen) is a 270 kD multimeric plasma glycoprotein. It mediates platelet adhesion to injured vessel walls and serves as a carrier and stabilizer for coagulation factor VIII. The von Willebrand factor has functional binding domains to platelet glycoprotein Ib, glycoprotein Ib/IIIa, collagen and heparin. von Willebrand factor is synthesized by endothelial cells and is reported to be expressed in a number of tumors of vascular origin.

Also available as a liquid concentrate, refer to page 160.



Endothelium: immunohistochemical staining with BOND ready-to-use von Willebrand Factor (36B11) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

# Wilms' Tumor

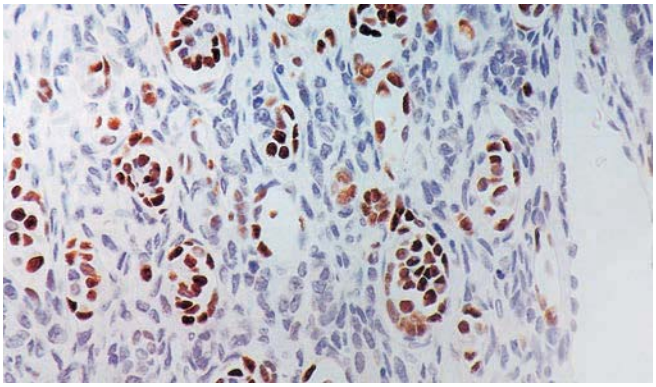
## Clone WT49

7 mL BOND ready-to-use PA0562 **P (HIER)**

### Antigen Background

Wilms' Tumor protein (WT1) has a role in transcriptional regulation and is expressed in the kidney and a subset of hematopoietic cells. Alteration of transcription factor function is a common mechanism in oncogenesis. The WT1 protein contains a DNA binding domain and any deletions or point mutations of the WT1 gene which destroy this activity result in the development of the childhood nephroblastoma Wilms' Tumor and Denys-Drash syndrome. The description of WT1 involvement in nephroblastoma is not clear.

Also available as a liquid concentrate, refer to page 208.



Wilms' Tumor: immunohistochemical staining with BOND ready-to-use Wilms' Tumor (WT49) using BOND Polymer Refine Detection.

# ZAP-70

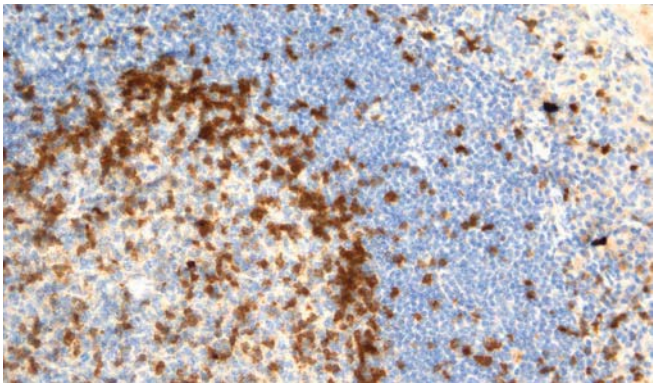
## Clone L453R

7 mL BOND ready-to-use PA0998 **P (HIER)**

### Antigen Background

ZAP-70 is a member of the syk family of proteins. It is expressed on T cells and NK cells and is required for the T cell receptor activation that triggers an immune response. CLL B cells that express the non-mutated immunoglobulin VH genes express levels of ZAP-70 protein that are comparable to those found in the blood T cells of healthy adults. Leukemic cells that express mutated IgVH genes generally do not express detectable levels of ZAP-70 protein and this is correlated with the high level expression of CD38.

Also available as a liquid concentrate, refer to page 208.



Tonsil: immunohistochemical staining with BOND ready-to-use ZAP-70 (L453R) using BOND Polymer Refine Detection.

## Anti-Biotin Antibody

7.5 mL BOND ready-to-use AR0584 **P**

**Components**

Anti-Biotin Antibody is a purified anti-biotin, IgG1 isotype. It is supplied ready-to-use.

**Background**

In situ hybridization (ISH) allows the detection and visualization of specific nucleic acids in tissue sections. ISH probes used for detection of DNA on the BOND contain a biotin label. The Anti-Biotin Antibody allows the linking of the probe with the detection reagents and consequently visualization of a chromogenic product by light microscopy.


Anti-Biotin Antibody.

## Anti-Fluorescein Antibody

3.75 mL AR0833 **P**
15 mL AR0222 **P**

**Components**

Anti-Fluorescein Antibody is a purified IgG fraction of a mouse monoclonal antibody. It is supplied ready-to-use.

**Background**

In situ hybridization (ISH) allows the detection and visualization of specific nucleic acids in tissues sections. ISH probes used for the detection of mRNA on BOND contain a fluorescein label. The Anti-Fluorescein Antibody allows linking of the oligonucleotide probe with the detection reagents, and consequently, visualization of a chromogenic product by light microscopy.

## BOND Hybridization Solution

100 mL AR9013

BOND Hybridization Solution is intended to be used for the dilution of individual In situ hybridization (ISH) probes for use on the automated BOND system.

## Stringency Wash

6.25 mL AR0633 **P**

**Components**

The Stringency Wash Solution is a formamide mixture used with the BOND DNA Probes. This solution reduces non-specific hybridization of DNA probes.

**Background**

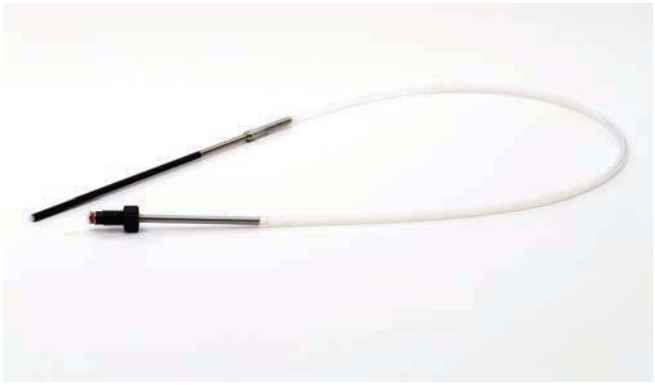
In situ hybridization (ISH) allows the detection and visualization of specific nucleic acids in tissue sections. The Stringency Wash Solution is intended for use with biotin conjugated DNA probes to reduce non-specific DNA hybridization in formalin-fixed, paraffin-embedded tissue using the automated BOND system.


Stringency Wash.

## BOND Aspirating Probe

1 Probe S21.0605

The BOND aspirating probe dispenses reagents onto the slides. Replacing the probe at specified intervals helps ensure continued high-quality staining.



BOND Aspirating Probe.

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Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

## BOND Aspirating Probe Cleaning System

15 Cleaning Cycles CS9100

The BOND Aspirating Probe Cleaning System contains reagents optimized to clean the aspirating probe of residual DAB. Sold in a standard reagent tray, the system is loaded onto BOND where a predefined cleaning protocol ensures maximum wash efficiency.

## BOND Mixing Stations

5 Pack S21.1971

BOND Mixing Stations are reusable inserts with six vials for mixing and catalyzing chromogens prior to slide application. Fresh chromogen promotes high quality staining. Replacing the mixing stations at recommended intervals ensures that the mixed chromogen does not become contaminated.

BOND Mixing Stations.

## BOND Covertile Cleaning Rack

1 Rack S21.4588 **New!**

The new BOND Covertile Cleaning Rack makes Covertile cleaning even easier. It is easy to load, securely locks the Covertiles in place, and sits either vertically or horizontally.

BOND Covertile Cleaning Rack.

## BOND Open Containers 7 mL

10 Pack, minimum 200 Tests/container OP79193

BOND Open 7 mL Containers allow the use of reagents from any source on the BOND system. Each container can be refilled until a total of 40 mL has been dispensed from it. They are ideal for reagents that are consumed intermittently and have a short shelf life.


BOND Open Containers 7 mL.

## BOND Open Containers 30 mL

10 Pack, minimum 200 Tests/container OP309700

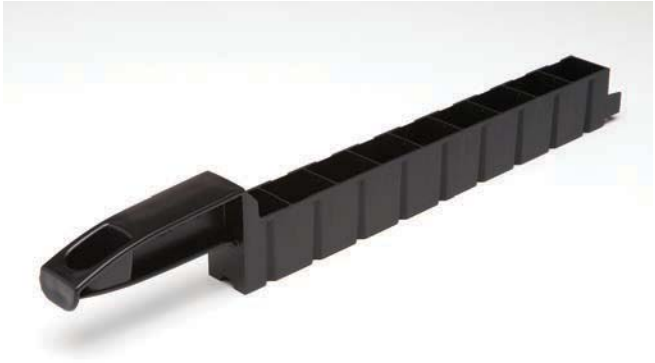
BOND Open 30 mL Containers allow the use of reagents from any source on the BOND system. Each container holds 30 mL and can be refilled until a total of 40 mL has been dispensed from it. They are ideal for high throughput reagents that are consumed on a daily basis and their use can minimize reagent preparation time.


BOND Open Containers 30 mL.

## BOND Reagent Tray

1 Tray S21.1003

Additional BOND Reagent Trays let laboratories setup reagents for upcoming runs while other reagent trays are in use. This reduces setup delays and improves laboratory workflow.



BOND Reagent Tray.

## BOND Slide Labeler Cleaning Pen

1 Pen S21.1913

The BOND Slide Labeler Cleaning Pen is used to clean the print head on the BOND Slide Labeler. Regular cleaning helps ensure labels are printed clearly and correctly.

BOND Slide Labeler Cleaning Pen.

## BOND Slide Label and Print Ribbon Kit

1 Set S21.4564.A

The BOND Slide Label and Print Ribbon Kit produces high-quality, solvent-resistant slide labels for use on the Leica BOND system. This assists in preserving the integrity of slide identification and patient data records on BOND slides. The BOND Universal Slide labels adhere to slides for easy and secure identification. The kit is sufficient for printing 3,000 slide labels.

BOND Slide Label and Print Ribbon Kit.

## BOND Slide Tray

1 Tray S21.4586 New!

This new slide tray offers keying cues to improve usability and Covertile placement. Additional BOND Slide Trays to allow laboratories to prepare slides while other trays are running. This reduces setup delays and improves laboratory workflow. This tray can be used with all BOND Covertiles, however for the full usability advantages the new Covertile (S21.4583 ) is required.

BOND Slide Tray.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

## BOND Titration Container Inserts

50 Pack OPT9719

BOND Titration Container Inserts are tubes that fit directly into the BOND Titration Containers. They enable safer use of up to 40 mL of reagent per titration container.

BOND Titration Container Inserts.

## BOND Syringe (for 8-Port Pump)

1 Syringe S21.1926

The BOND Syringe precisely measures reagent volumes to be dispensed onto the slides. The syringes must be replaced if problems are found during scheduled fluidics checks. This part is for Leica BOND-MAX instruments with a 8-Port valve.


BOND Syringe.

## BOND Syringe (for 9-Port Pump)

1 Syringe S21.2131

The BOND Syringe precisely measures reagent volumes to be dispensed onto the slides. The syringe must be replaced at regular intervals as prompted by the software or if problems are found during scheduled fluidics checks. This part is for Leica BOND-MAX instruments with a 9-Port valve.


BOND Syringe.

## BOND Titration Kit

10 Titration Containers and 50 Titration Container Inserts
OPT9049

The BOND Titration Kit contains BOND Titration Container Inserts and BOND Titration Containers. The kit lets users optimize primary antibody concentrates on the BOND system. The kits can be re-used for different antibodies and are designed with minimal dead volume to preserve reagent.


BOND Titration Kit.

## BOND Universal Covertile

100 Pack S21.2001

The BOND Universal Covertile is a patented technology that facilitates gentle, even reagent flow over tissue. It prevents reagent evaporation and minimizes waste generation. The Covertile is re-usable and can also be recycled once its staining life is over.

BOND Universal Covertile.

## BOND Universal Slide Label Covers

1 Roll S21.1985

The BOND Universal Slide Label Covers are clear protective labels that you can place over printed BOND Slide Labels to add an extra level of protection for the slide identification information.

BOND Universal Slide Label Covers.

## Leica Microsystems Plus Slides

20 Boxes x 72 slides/box S21.2113

Leica Microsystems Plus Slides are positively charged glass microscopic slides designed for use on the BOND system. They include defined margins to enable the accurate placement of tissue for staining in the 100 µL and the 150 µL dispense modes, which helps in maintaining the integrity of staining quality.


Leica Microsystems Plus Slides.

## Leica BOND-III Syringes

4 Syringes S21.4565

The Leica BOND-III syringes precisely measures reagent volumes to be dispensed onto the slides. The syringes must be replaced if problems are found during scheduled fluidics checks. This part is for all Leica BOND-III instruments and includes the four syringes required for each instrument.

Leica BOND-III Syringes.

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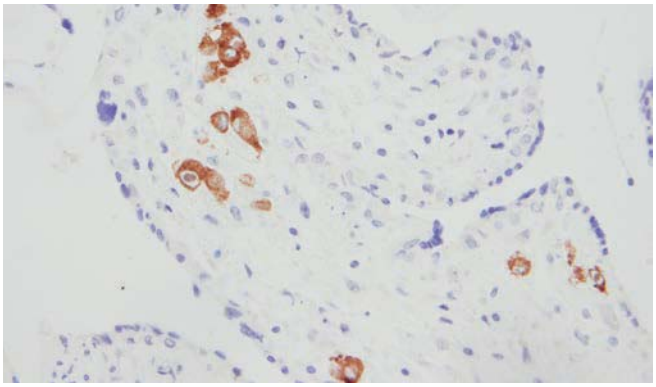
# BOND Ready-to-Use ISH Probes

## BOND CMV Probe

5.5 mL PB0614 P
For In Vitro Diagnostic Use

**Background**

CMV is a member of the Beta Herpes Virus family, transmitted via body fluids, and can establish primary infection, latent infection and subsequent viral reactivation. CMV is a common opportunistic pathogen, capable of causing serious disease in immunocompromised individuals such as AIDS patients, transplant patients and in neonates. Congenital CMV is a result of intrauterine infection and although the majority of children are asymptomatic, congenital CMV can result in sensorineural hearing loss, cognitive, motor and visual deficits and seizures.



Human placenta: in situ hybridization for cytomegalovirus mRNA using CMV Probe, Anti-Flourescein Antibody and Bond Polymer Refine Detection.

## BOND DNA Negative Control

6.25 mL PB0731 P
For In Vitro Diagnostic Use

**Background**

Negative control probes should be run on patient tissue to confirm the absence of background staining resulting from non-specific interactions that would influence the test result.

## BOND DNA Positive Control

6.25 mL PB0682 P
For In Vitro Diagnostic Use

**Background**

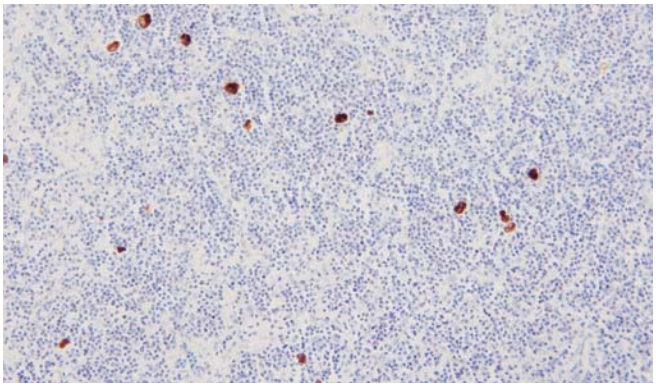
Positive control probes should be run on patient tissue to confirm that all reagents are working correctly and to provide information on the preservation of nucleic acids in the tissue as well as accessibility of nucleic acids to the probe.

## BOND EBER Probe

5.5 mL PB0589 P
For In Vitro Diagnostic Use

**Background**

Epstein-Barr Virus (EBV) is a member of the Gamma Herpes Virus family. EBV can establish both lytic infection as well as latent infection. Epstein Barr Virus encoded RNA is abundantly expressed in latent EBV infection and ISH is considered a sensitive method for the detection of latent EBV infection. Latent EBV infection is associated with several conditions including: Hodgkin's Lymphoma, B cell Non Hodgkin's Lymphoma, nasopharyngeal carcinoma, lymphoproliferative disorders and lymphoma in the immunosuppressed, including transplant and AIDS patients, gastric cancer and some T cell lymphomas.



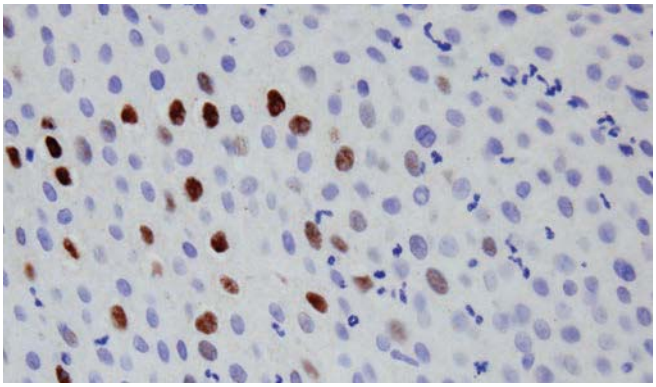
Hodgkin's lymphoma: in situ hybridization for Epstein-Barr virus (EBV) encoded mRNA using EBV Probe, Anti-Flourescein Antibody and Bond Polymer Refine Detection.

## HPV (subtypes 6, 11) Probe

6.25 mL BOND ready-to-use PB0780 P
For In Vitro Diagnostic Use

**Background**

HPV infections have been associated with a number of malignant and benign lesions, including genital warts, anogenital cancers and oral head and neck cancers. Most notable HPV subtypes have been associated with above 95 percent of cervical cancers. As a result, HPV subtypes are broadly classified as high or low risk, depending on the incidence they are associated with cervical malignant transformation (high risk) and benign lesion development (low risk). There are 12 HPV subtypes classified as low risk, including 6 and 11, which have a low association will cervical cancer progression.



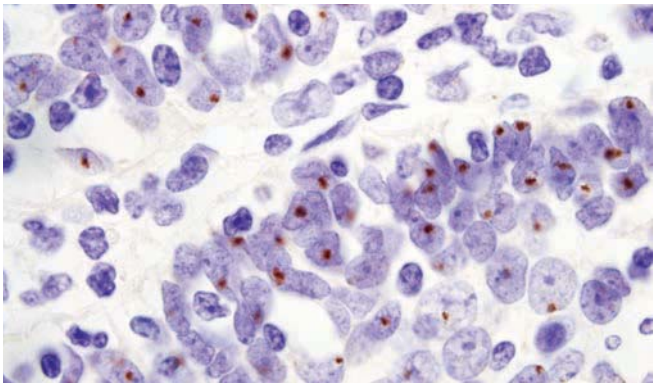
Cervical tissue (CIN1): in situ hybridization for HPV, subtype 6 and 11 DNA using HPV (6,11) Probe, Anti-Biotin Antibody, Stringency Wash and Bond Polymer Refine Detection.

## HPV (subtypes 16, 18, 31, 33, 51) Probe

6.25 mL BOND ready-to-use PB0829 **P**
For In Vitro Diagnostic Use

### Background

HPV infections have been associated with a number of malignant and benign lesions, including genital warts, anogenital cancers and oral head and neck cancers. Most notable HPV subtypes have been associated with above 95 percent of cervical cancer. As a result, HPV subtypes are broadly classified as high or low risk, depending on the incidence they are associated with cervical malignant transformation (high risk) and benign lesion development (low risk).There are 15 HPV subtypes classified as high risk, including 16, 18, 31, 33 and 51. HPV subtypes 16 and 18 are the most frequent subtypes associated with cervical carcinogenesis and are detected in up to 71 percent of cervical cancers.



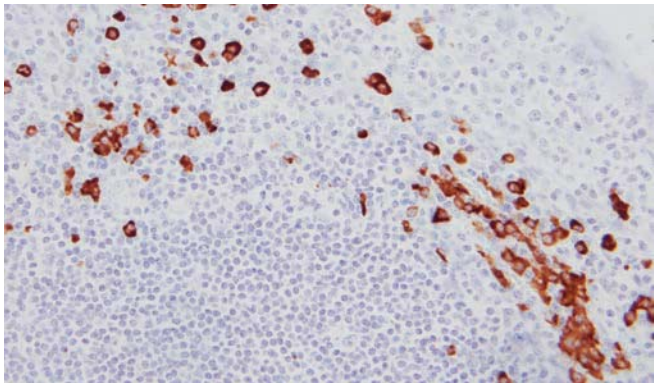
Cervical tissue, abnormal epithelia (CINII) stained with HPV (subtypes 16, 18, 31,33, 51) Probe Anti-Biotin Antibody, Stringency Wash and Bond Polymer Refine Detection.

## BOND Kappa Probe

5.5 mL PB0645 **P**
For In Vitro Diagnostic Use

### Background

Kappa Probe is used in conjunction with Lambda Probe for the detection of antibody producing B cells in formalin-fixed, paraffin-embedded tissue. B cell neoplasms are thought to arise from a single transformed cell (monoclonal), whereas reactive states result in proliferation of a number of B cells (polyclonal). Since immunoglobulins from the same B cell contain either Kappa or Lambda light chains, light chain restriction or monoclonality can be used to make the distinction between reactive and neoplastic B cell proliferations.



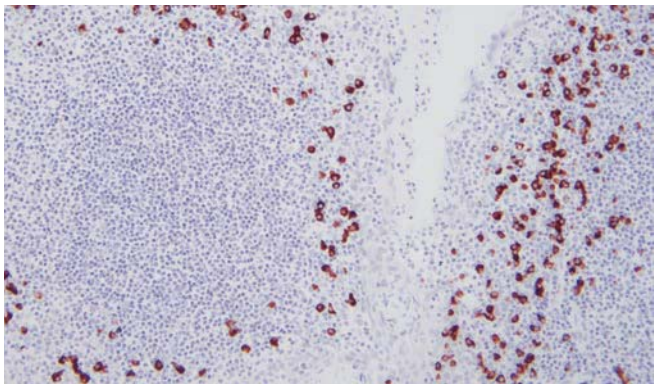
Human tonsil: in situ hybridization for kappa mRNA using Kappa Probe, Anti-Flourescein Antibody and Bond Polymer Refine Detection.

## BOND Lambda Probe

5.5 mL PB0669 **P**
For In Vitro Diagnostic Use

### Background

Ready-to-use fluorescein-conjugated oligonucleotide probe directed to Lambda light chain messenger RNA in formalin-fixed, paraffin-embedded tissue. Optimized for use with Bond Polymer Refine Detection (DS9800) and Anti-Fluorescein Antibody (AR0833/AR0222) on the BOND system.



Human Tonsil: in situ hybridization for lambda mRNA using Lambda Probe, Anti-Flourescein Antibody and Bond Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

## BOND RNA Negative Control Probe

5.5 mL PB0809 **P**

For In Vitro Diagnostic Use

### Background

The RNA Negative Control Probe is generated with a fluorescein label using the same procedures as applied to the other oligonucleotide probes that are used in the detection of RNA on BOND. Therefore, RNA Negative Control Probe is ideal as a negative control probe for RNA ISH on BOND.

---

## BOND RNA Positive Control Probe

5.5 mL PB0785 **P**

For In Vitro Diagnostic Use

### Background

RNA is very susceptible to degradation by RNases, therefore, the RNA Positive Control Probe is ideally used as a screening tool to detect the preservation of mRNA in cells.

Staining with the RNA Positive Control Probe should result in dark brown nuclear staining with some cytoplasmic staining, depending on the translational activity of the cell.

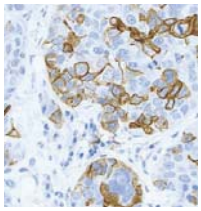
---

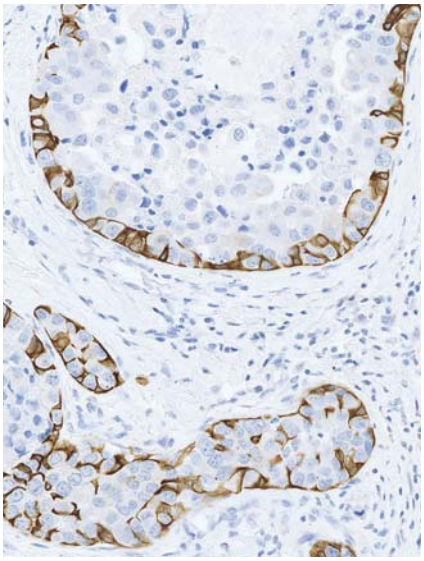
# Novocastra™ HD

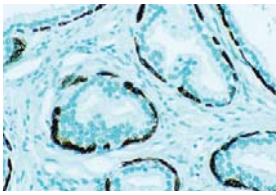
**Highly Definitive Antibodies**

# Antibodies you can trust, for results they can depend on

## Independently evaluated,* specifically selected

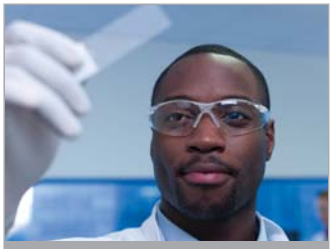






# Trust the 'HD' difference – Highly Definitive antibodies for diagnostic confidence.

Each antibody in the range has been independently evaluated* by external QA, in comparison with equivalent products from other vendors. The range represents the highest performing antibodies that Leica offers for the most commonly performed IHC tests.

**Quickly and confidently select the most important IHC antibodies for diagnosis.**

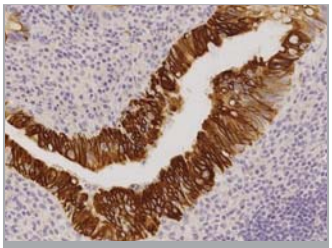
With an ever increasing choice of antibodies in the market, selecting antibodies that deliver the performance you demand is not always straightforward. Leica Biosystems introduces Novocastra HD – a menu of clinically important antibodies that you can trust.

**Improve efficiency and streamline validation, with antibodies optimized for workflow.**

Spanning 10 diagnostic pathologies and in a range of formats and sizes, Leica Biosystems offers a comprehensive menu of antibodies for the most commonly performed IHC tests and anatomical pathologies.

**Choose externally qualified* antibodies for BOND, for results you can depend on.**

The end to end solution provided by Ready-to-Use Novocastra HD, in combination with the BOND platform, reagents and detection, is fully validated and independently evaluated* by external QA, delivering results you can trust, for confidence in diagnosis.



**Choose clinical antibodies with broad application to streamline inventory.**

Within any specific pathology, each antibody has been independently tested* on a range of relevant tissues. Not only does it have demonstrable quality within that field of pathology, it also performs to a high standard across a range of relevant pathologies, meeting your laboratory need for product flexibility.

## SEE THE DIFFERENCE FOR YOURSELF

Don't just take our word for it, request your own antibody evaluation.
Visit **www.LeicaBiosystems.com/NovocastraHD**

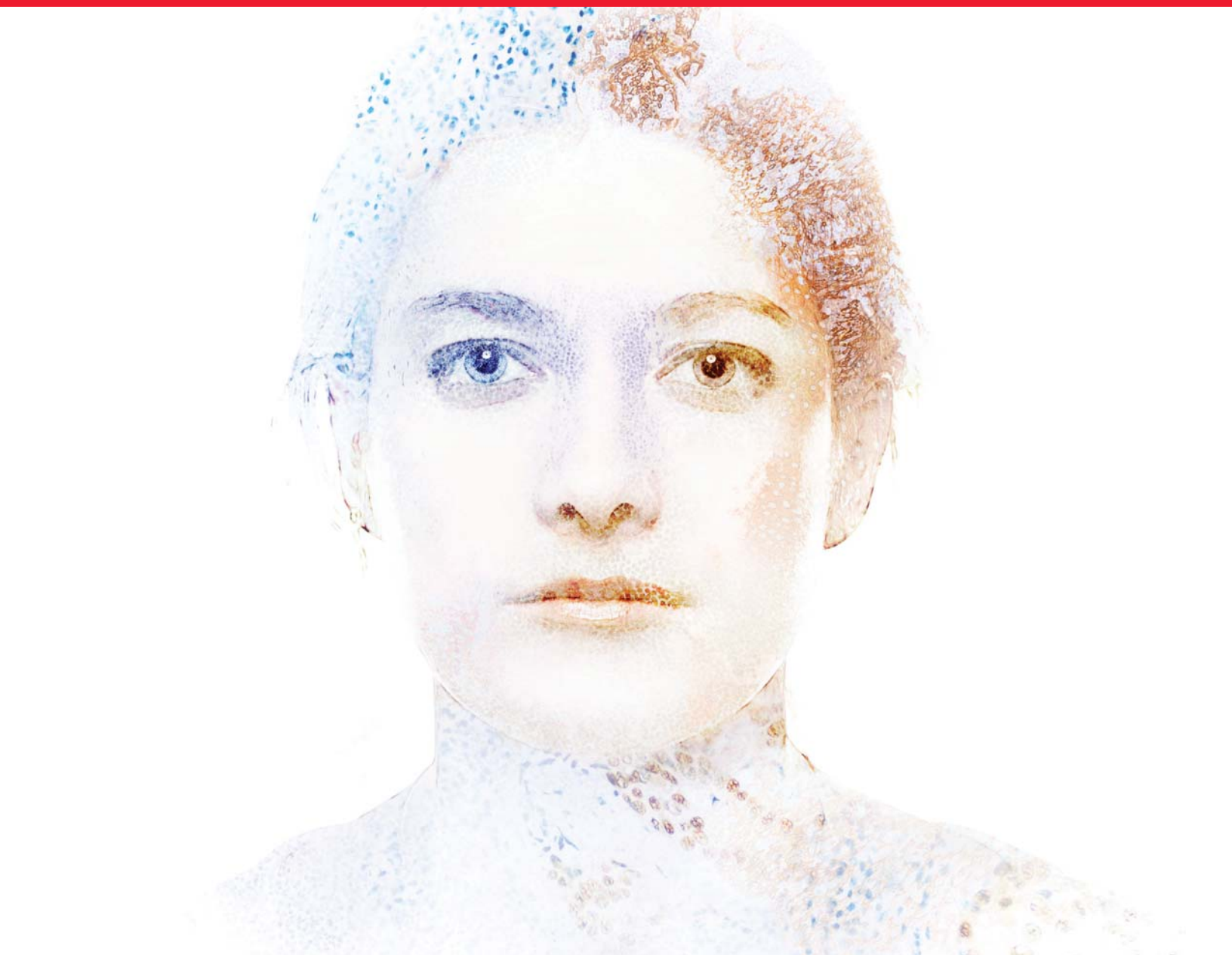
*Independent analysis commissioned by Leica Biosystems and conducted by NordiQC according to the manufacturers' instructions for use and on the corresponding staining platform.
Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

Novocastra™ HD

**Highly Definitive Antibodies**

# Diagnostic Confidence

## Supporting optimal patient care



# Deliver high quality, reliable staining for accurate diagnosis that supports optimal patient care.

Novocastra HD antibodies represent the highest level of performance from Leica Biosystems, for the most clinically relevant IHC antibodies. Optimized to deliver high-quality staining, for results you can trust.


**Pathologist qualified accuracy for diagnosis.**

An independent*, head-to-head assessment, by NordiQC, of Novocastra HD products vs. leading equivalents, evaluated and qualified each antibody regarding staining quality and application for diagnostic use. Notable advantages in staining performance were observed on several occasions, sometimes even for the same clone. This reinforces the need to use a fully validated product range for clinical diagnosis.

**Selecting antibodies has been made easier with Novocastra HD.**

When consolidating your testing on Leica BOND, or looking to bring new or replacement antibodies into service, Novocastra HD should be your first reference source. Evaluated for performance against other leading clones, Novocastra HD is a new trusted standard for antibodies that deliver high quality staining for your diagnostic service.

## Bcl-6 Oncoprotein

A comparison of Bcl-6 Ready-to-Use antibodies from leading manufacturers on human tonsil.




Leica BOND system, using BOND Ready-to-Use Bcl-6, demonstrates the highest quality staining when compared directly to Ready-to-Use antibodies from other leading manufacturers, on serially cut sections of human tonsil. Images supplied by NordiQC.

## Cytokeratin 5

A comparison of CK5 Ready-to-Use antibodies from leading manufacturers on human breast cancer, ductal carcinoma in situ.




Leica BOND system using BOND Ready-to-Use Cytokeratin 5 demonstrates the highest quality staining when compared directly to Ready-to-Use antibodies from other leading manufacturers on serially cut sections of human breast cancer; ductal carcinoma in situ. Images supplied by NordiQC.

*Independent analysis commissioned by Leica Biosystems and conducted by Nordi QC according to the manufacturers' instructions for use and on the corresponding staining platform.

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

Novocastra™ HD
Highly Definitive Antibodies

# Workflow Efficiency

## Improve workflow efficiency and streamline validation

# Choose from an expanded range of products to improve your laboratory efficiency.

Novocastra HD introduces a comprehensive range of formats and sizes from Leica Biosystems, making it easy for you to align the right products to your caseload and format preferences. The Novocastra HD range includes an extended range of liquid concentrates, and BOND Ready-to-Use products optimized for use on the fully-automated Leica BOND staining platforms.


**Reduce waste and become cost efficient with new liquid concentrates.**
Match product volume to workflow and minimize time, resource and money spent on validation of lot changes. In addition, for less commonly performed tests, use of 0.1 mL or 0.5 mL volumes helps ensure complete product use before its expiration date.

**Scale up to larger BOND Ready-to-Use and minimize validation.**
Many higher usage Ready-to-Use antibodies are now available in two sizes: 7 mL (46 tests) and 30 mL size (200 tests). 30 mL BOND Ready-to-Use reduce the need for frequent container changes and reduce the validation time, tissue and additional reagent expense.

| Benefits of concentrated liquid antibodies |
|---|
| Flexibility of use on various platforms[1] |
| Adaptable to a variety of detection systems[1] |
| Adjustable concentration to suit user's tissue[1] |
| Economical option that retains confidence in clone selection |

| Benefits of Ready-to-Use antibodies for Leica BOND |
|---|
| Optimized for staining performance on Leica BOND |
| Validated antibody concentrations |
| Plug and play |
| Standardized assay |
| Eliminate variability in antibody preparation |

## PUT NOVOCASTRA HD TO THE TEST.

Whatever your workflow needs, now or in the future, there's a Novocastra HD product that will work for you. Visit **www.LeicaBiosystems.com/NovocastraHD**

1. The performance of antibodies should be validated when used with automated platforms or manual staining systems other than stated on Instructions for Use.

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra™ HD - By Pathology

## Highly Definitive Antibodies

The Novocastra HD range continues to evolve across 10 diagnostic pathologies, delivering high quality reliable staining to support accurate diagnosis and optimal patient care. To be informed as new pathologies launch, contact your local Leica representative or visit: www.LeicaBiosystems.com/novocastraHD

All antibodies are independently benchmarked by external QA* vs leading equivalents. The range represents the highest performing antibodies that Leica offers for the most commonly performed IHC tests. Available as concentrates or Ready-to-Use antibodies for Bond to meet your workflow needs.

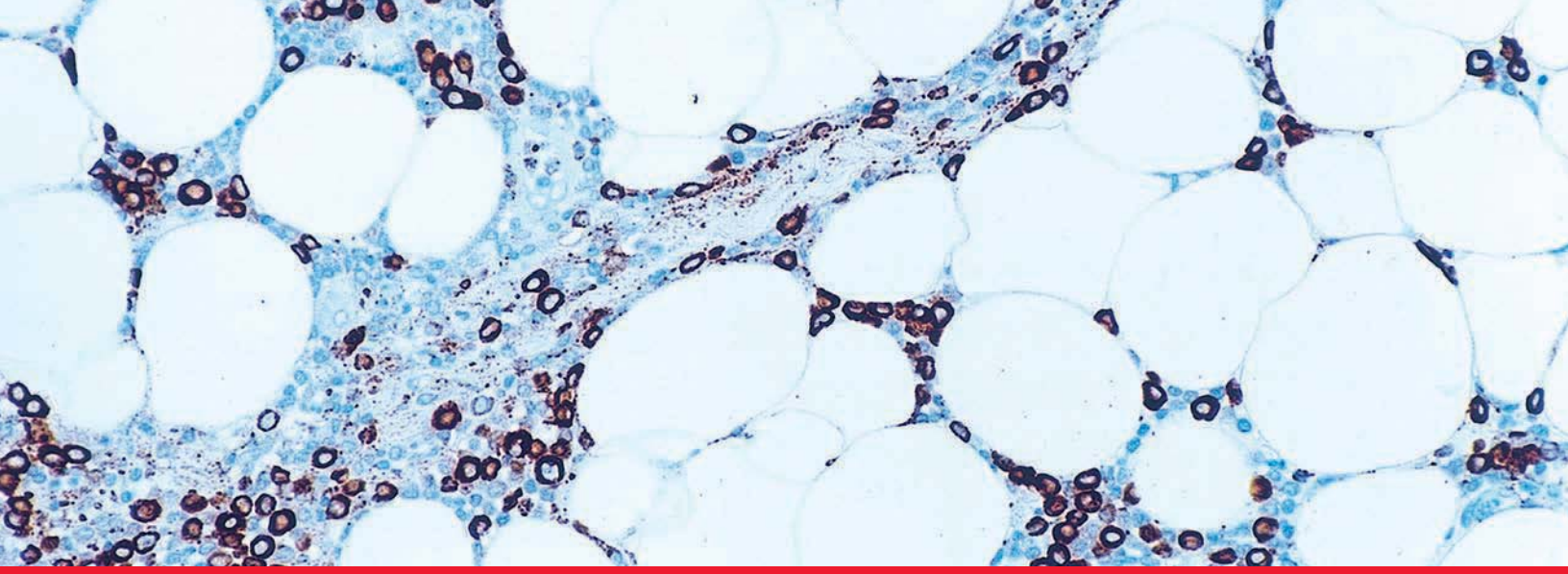
Use the table below to identify key pathologies and antibodies of interest. For additional information about each clone please refer to the page number highlighted.

| | | Br Breast Pathology | HN Head & Neck Pathology | De Dermatopathology | He Hematopathology | ST Soft Tissue Pathology | Ne Neuropathology | Ur Uropathology | Pu Pulmonary Pathology | Gy Gynepathology | Ga Gastrointestinal Pathology | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Antibody** | **Clone** | **Available Now** | **Available Now** | **Available Now** | **Available Now** | **Coming Soon** | **Coming Soon** | **Coming Soon** | **Coming Soon** | **Coming Soon** | **Coming Soon** | **Page** |
| Alpha Smooth Muscle Actin (SMA) | αsm-1 | | ✓ | | | ✓ | | ✓ | | ✓ | ✓ | 95 |
| Anaplastic Lymphoma Kinase | 5A4 | | | | ✓ | | | | | | | 93 |
| Bcl-2 Oncoprotein | Bcl-2/100/D5 | | | | ✓ | | | | | | | 98 |
| Bcl-6 Oncoprotein | LN22 | | | | ✓ | | | | | | | 99 |
| CA125 (Ovarian Cancer Antigen) | Ov185:1 | | | | | | | | ✓ | ✓ | ✓ | 101 |
| Calretinin | CAL6 | | | | | | | | ✓ | | | 103 |
| Carcinoembryonic Antigen (CD66e) | 12-140-10 | | | | | | | | ✓ | ✓ | ✓ | 104 |
| CD1a | MTB1 | | | | ✓ | | | | | | | 106 |
| CD3 | LN10 | | | ✓ | ✓ | | | | | | | 107 |
| CD4 | 4B12 | | | | ✓ | | | | | | | 107 |
| CD5 | 4C7 | | | | ✓ | | | | | | | 108 |
| CD7 | LP15 | | | | ✓ | | | | | | | 108 |
| CD8 | 4B11 | | | | ✓ | | | | | | | 108 |
| CD10 | 56C6 | | | | ✓ | ✓ | | ✓ | | ✓ | ✓ | 109 |
| CD11c | 5D11 | | | | ✓ | | | | | | | 109 |
| CD15 | MMA | | | | ✓ | | | | | | | Coming Soon |
| CD19 | BT51E | | | | ✓ | | | | | | | 111 |
| CD20 | L26 | | | | ✓ | | | | | | | 111 |
| CD23 | 1B12 | | | | ✓ | | | | | | | 112 |
| CD30 | 1G12 | | | | ✓ | | | | | | | 113 |
| CD31 | JC70A | | | ✓ | ✓ | ✓ | | | | | | Coming Soon |
| CD33 | PWS44 | | | | ✓ | | | | | | | 114 |
| CD34 (Endothelial Cell Marker) | QBEnd/10 | | | ✓ | | ✓ | | | | | | 114 |
| CD45 | X16/99 | | | | ✓ | | | | | | | 117 |
| CD56 (NCAM) | CD564 | | | | ✓ | | ✓ | | ✓ | | ✓ | 118 |
| CD68 | 514H12 | | | ✓ | ✓ | ✓ | | | | | | 119 |
| CD79a | JCB117 (NEW) | | | | ✓ | | | | | | | Coming Soon |
| CD99 | TBC | | | | | ✓ | | | | | | Coming Soon |
| CD117** (c-kit Oncoprotein) | EP10+ (NEW) | | | ✓ | ✓ | ✓ | | ✓ | | ✓ | | Coming Soon |
| CD138 (Syndecan 1) | MI15 | | | | ✓ | | | | ✓ | | ✓ | 123 |
| CD163 | 10D6 | | | | ✓ | | | | | | | 125 |
| CDX2 | AMT28 | | | | | | | | ✓ | | ✓ | 126 |
| Chromogranin A | 5H7 | | | | | | ✓ | | | | | 128 |
| Cyclin D1 | EP12+ (NEW) | | | | ✓ | | | | | | | Coming Soon |
| Cytokeratin 5 | XM26 | ✓ | | | | | | ✓ | ✓ | ✓ | | 133 |
| Cytokeratin 7 | RN7 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 134 |
| Cytokeratin 14 | LL002 | ✓ | ✓ | | | | | ✓ | | | | 135 |
| Cytokeratin 20 | Ks20.8 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 137 |
| Cytokeratin, Multi | AE1/AE3 | ✓ | | | | | | | | | | 174 |
| Desmin | DE-R-11 | | | | | ✓ | | | ✓ | | ✓ | 139 |
| DOG-1 | K9 | | | | | ✓ | | | | | ✓ | 140 |
| E-Cadherin | 36B5 | ✓ | | | | | | | ✓ | | | 141 |

| Antibody | Clone | Br Breast Pathology Available Now | HN Head & Neck Pathology Available Now | De Dermatopathology Available Now | He Hematopathology Available Now | ST Soft Tissue Pathology Coming Soon | Ne Neuropathology Coming Soon | Ur Uropathology Coming Soon | Pu Pulmonary Pathology Coming Soon | Gy Gynepathology Coming Soon | Ga Gastrointestinal Pathology Coming Soon | Page |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Epidermal Growth Factor Receptor | EGRF.113 | | | | | | | | ✓ | | ✓ | 142 |
| Epithelial-Related Antigen | MOC-31 | | | | | | | ✓ | ✓ | | | 143 |
| Estrogen Receptor (6F11) | 6F11 | ✓ | | | | | | | ✓ | ✓ | | 144 |
| Factor VIII related antigen (von Willebrand Factor) | 36B11 | | | ✓ | ✓ | ✓ | | | | | | 160 |
| Glial Fibrillary Acidic Protein | GA5 | | | | | | ✓ | | | | | 151 |
| Gross Cystic Disease Fluid Protein 15 | 23A3 | ✓ | | | | | | | | | | 153 |
| Helicobacter pylori | ULC3R | | | | | | | | | | ✓ | 154 |
| IgA | N1CLA | | | ✓ | ✓ | | | ✓ | | | | 161 |
| IgD | DRN1C | | | ✓ | ✓ | | | ✓ | | | | 161 |
| IgG | RWP49 | | | ✓ | ✓ | | | ✓ | | | | 162 |
| IgM | 8H6 | | | ✓ | ✓ | | | ✓ | | | | 162 |
| Kappa Light Chain | CH15 | | | ✓ | ✓ | | | | | | | 164 |
| Ki67 | MM1 | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | 164 |
| Lambda Light Chain | SHL53 | | | ✓ | ✓ | | | | | | | 165 |
| Melan A | A103 | | | ✓ | | ✓ | | ✓ | ✓ | | | 169 |
| Melanoma Marker (HMB45) | HMB45 | | | ✓ | | | | | | | | 157 |
| Mismatch Repair Protein (MLH1) | ES05 | | | | | | | | | ✓ | ✓ | 171 |
| Mismatch Repair Protein (MSH2) | 25D12 | | | | | | | | | ✓ | ✓ | 172 |
| Mismatch Repair Protein (MSH6) | PU29 | | | | | | | | | ✓ | ✓ | 172 |
| Mismatch Repair Protein (PMS2) | MOR4G | | | | | | | | | ✓ | ✓ | 172 |
| Multiple Myeloma Oncogene 1 (MUM-1) | EAU32 | | | | ✓ | | | | | | | 173 |
| Napsin A | IP64 | | | | | | | | ✓ | | | 178 |
| Neurofilament 200kD | N52.1.7 | | | | | ✓ | | | | | | 180 |
| Oct-3/4 | N1NK | | | | | | | | | ✓ | | 181 |
| p504S (AMACR)** | EPUM1 | | | | | | | ✓ | | | | 95 |
| p53 | DO-7 | ✓ | | | | | | | ✓ | ✓ | ✓ | 184 |
| p63** | 7JUL | ✓ | ✓ | | | | | ✓ | | | | 185 |
| Pax-5 | 1EW | | | | ✓ | | | | | | | 187 |
| Placental Alkaline Phosphatase (PLAP) | 8A9 | | | | | | | | | ✓ | | 189 |
| Progesterone Receptor | 16 | ✓ | | | | | | | | ✓ | | 190 |
| Prostate Specific Antigen | 35H9 | | | | | | | ✓ | | | | 192 |
| Renal Cell Carcinoma Marker | 66.4.C2 | | | | | | | ✓ | | | | 193 |
| S-100 | Polyclonal | | | ✓ | | ✓ | ✓ | | | | | 195 |
| Terminal Deoxynucleotidyl Transferase (TdT) | SEN28 | | | | ✓ | | | | | | | 199 |
| Thyroid Transcription Factor-1 | SPT24 | | | | | | | | ✓ | | | 201 |
| Vimentin | V9 | | ✓ | | | ✓ | | ✓ | ✓ | ✓ | ✓ | 207 |
| Wilms' Tumour | WT49 | | | | ✓ | ✓ | | ✓ | ✓ | ✓ | | 208 |

For further information on product availability and to be informed as new pathologies launch, contact your local Leica representative or visit: **www.LeicaBiosystems.com/novocastraHD**

*Independent analysis commissioned by Leica Biosystems and conducted by NordiQC according to the manufacturers' instructions for use and on the corresponding staining platform.
** Not available in the USA.
† CD117 (clone EP10) and Cyclin D1 (clone EP12) antibodies have been created by Epitomics Inc., using Epitomics' proprietary rabbit monoclonal antibody technology covered under Patent No.'s 5,675,063 and 7,402,409.



# Primary Antibodies

Create superior IHC slides with Novocastra antibodies, Compact Polymer detection systems and ancillary reagents. For quality, consistency and efficiency it's time to switch to Novocastra.

2

# Novocastra **Adenomatous Polyposis Coli Protein (APC)**

**Clone EMM43**
1 mL lyophilized NCL-APC **P**

See also APC (Adenomatous Polyposis Coli Protein) on page 97.

# Novocastra **Adenovirus**

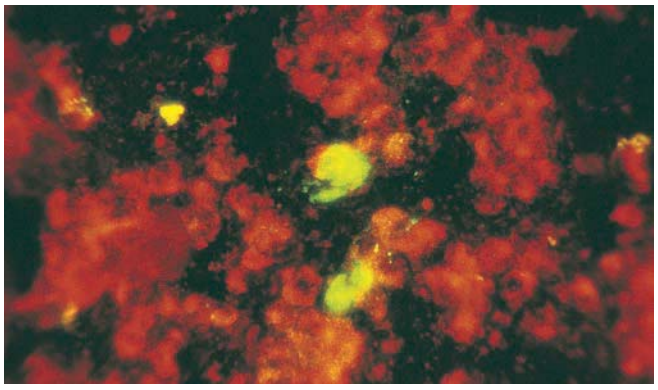
**Clone 10/5.1.2**
1 mL lyophilized NCL-ADENO **I**

### Antigen Background

The Adenoviridae are a family of double-stranded DNA viruses. They may cause a variety of infections involving respiratory, ocular, genito-urinary or enteric systems. Adenoviruses may cause life-threatening infections in transplant recipients, AIDS patients and immunocompromised patients.

### Product Specific Information

NCL-ADENO is a pan adenovirus specific reagent. Reactivity has been confirmed with adenovirus serotypes 1 to 7, 40 and 41 as primary isolates in tissue culture. NCL-ADENO does not cross-react with tissue culture isolates of respiratory syncytial virus, influenza virus types A and B, parainfluenza virus types 1, 2, 3 and 4b, herpes simplex virus types 1 and 2, varicella-zoster virus, cytomegalovirus, mumps virus, measles virus, echovirus 19, coxsac67e B4 virus, poliovirus types 1, 2 and 3 or negative tissue culture cells used in routine virus isolation.



Human nasopharyngeal secretion: immunofluorescence for Adenovirus using NCL-ADENO. Note intense staining of Adenovirus infected respiratory epithelial cells. Acetone-fixed cells.

# Novocastra **Akt (Phosphorylated)**

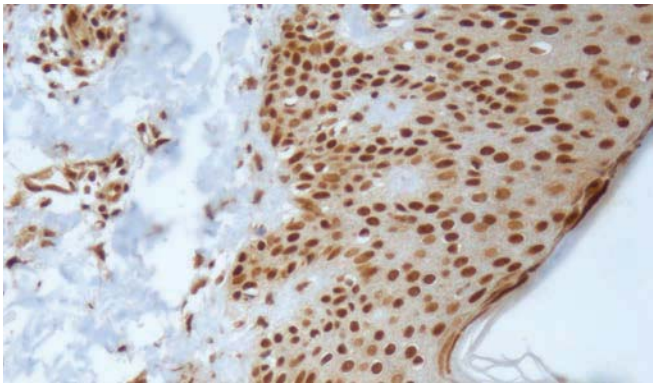
**Clone LP18**
1 mL, 0.1 mL liquid NCL-L-Akt-Phos **P (HIER) W**

### Antigen Background

Akt-1, also referred to as Protein Kinase B (PKB) or Rac alpha is a member of the Akt serin /threonine protein kinase family. It plays an important role in many biological responses including metabolism, cell survival and growth by phosphorylation and inactivating several targets including GSK 3 beta, caspase 9, BAD and the Forkhead transcription factor.

### Product Specific Information

NCL-L-Akt-Phos is not recommended for use with PBS, since the use of PBS-based wash buffers and possibly PBS-based antibody diluents gives increased background staining and decreased staining intensity. Proprietory reagents from Leica or TBS-based wash buffer and diluents are recommended.



Human skin: immunohistochemical staining for phosphorylated Akt using NCL-L-Akt-Phos. Note intense nuclear staining. Paraffin section.

# Novocastra **ALCAM (CD166)**

**Clone MOG/07**
1 mL, 0.1 mL lyophilized NCL-CD166 **P (HIER)**

See also CD166 (ALCAM) on page 125.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

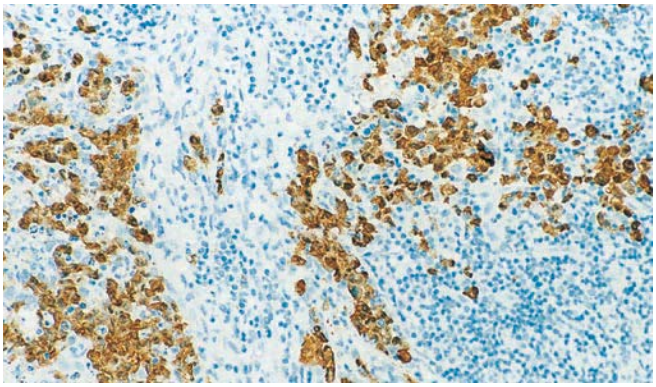
# Novocastra **ALK (Anaplastic Lymphoma Kinase) (CD246) (p80)**

**Clone 5A4**

1 mL, 0.5 mL, 0.1 mL liquid NCL-L-ALK **P (HIER)** New!
1 mL, 0.1 mL lyophilized NCL-ALK **P (HIER)**
7 mL BOND ready-to-use PA0306 **P (HIER)**

**Antigen Background**

Anaplastic large cell lymphoma (ALCL) is usually composed of large pleomorphic cells which are reported to express CD30 antigen and the epithelial membrane antigen (EMA). These tumor cells tend to occur in younger individuals and may be associated with cutaneous and extranodal involvement. A proportion of these cases contain a chromosomal translocation t(2;5) (p23; q35). This results in a hybrid gene encoding part of the nucleophosmin (NPM) gene joined to the cytoplasmic domain of the anaplastic lymphoma kinase (ALK) gene, giving rise to the protein, p80. Large cell lymphomas account for approximately 25 percent of all non-Hodgkin's lymphomas in children and young adults, of which one third carries the NPM-ALK gene translocation.



Human anaplastic lymphoma: immunohistochemical staining for anaplastic lymphoma kinase (p80) using NCL-ALK. Note cytoplasmic staining of large pleomorphic cells. Paraffin section.

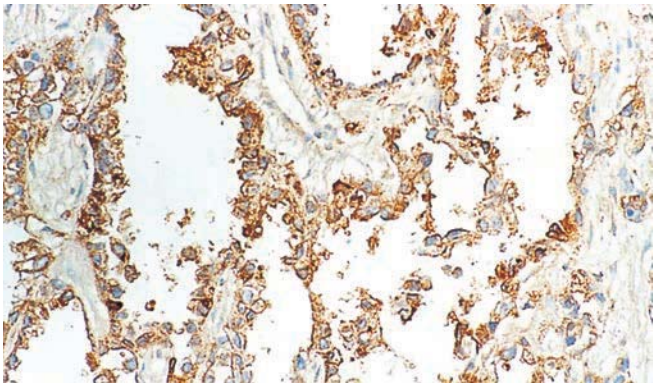
# Novocastra **Alpha-1-Antitrypsin**

**Polyclonal**

1 mL lyophilized NCL-A1Ap **F P (Enzyme) W**

**Antigen Background**

Alpha-1-antitrypsin is synthesized in the liver and is present in serum and tissue fluids where it acts as an inhibitor of proteases, particularly elastase. Its main function appears to be the neutralization of elastase released by neutrophils during an inflammatory response. Alpha-1-antitrypsin deficiency may result in uninhibited elastase-induced tissue destruction eg in the lung. Alpha-1-antitrypsin deficiency is associated with panacinar emphysema and liver disease. In the liver, alpha-1-antitrypsin deficiency may lead to neonatal hepatitis or an individual may present in later childhood or adulthood with cirrhosis.



Human egg yolk sac tumor: immunohistochemical staining for alpha-1-antitrypsin using NCL-A1Ap. Note cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **Alpha-Actinin**

**Clone RBC2/1B6**

1 mL lyophilized NCL-alpha-ACT **F W**

**Antigen Background**

Alpha-actinin is a rod-like cytoskeletal protein belonging to the same family as spectrin, dystrophin and utrophin. In skeletal muscle, alpha-actinin is located in the Z band/disc and cross-links with F-actin in this region. Muscle tissues show the presence of abundant threadlike particles, known as nemaline bodies, in the myofibers. Electron microscopy studies have shown that the nemaline rods have a lattice structure similar to that of the Z discs and the rods are thought to be lateral polymers of the Z discs.

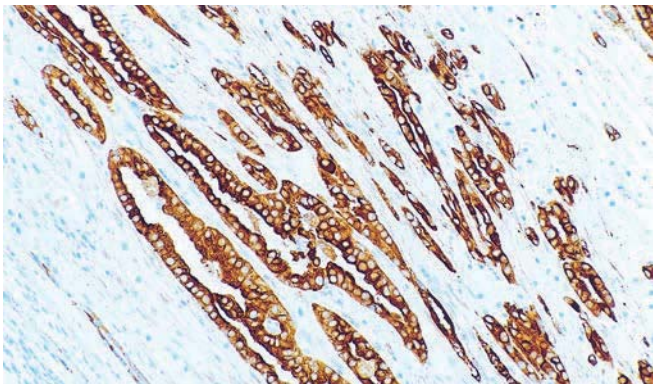
# Novocastra **Alpha B Crystallin**

## Clone G2JF

1 mL lyophilized NCL-ABCRYS-512 **F P (HIER) W**

### Antigen Background

Alpha B crystallin is a lens protein that has some homology with the small heat shock proteins. It is expressed in tissues such as skeletal muscle, cardiac muscle, smooth muscle, renal tubular epithelium, Schwann cells, glial cells, thyroid epithelium, colonic epithelium and stratified squamous epithelium. Alpha B crystallin is reported to be found in ubiquitinated intermediate filament inclusion bodies, such as Lewy bodies (neurofilaments), Rosenthal fibers (glial filaments) and Mallory bodies (cytokeratins). It is rarely found in neurofibrillary tangles. The role of Alpha B crystallin in inclusion bodies is unknown, but it may function as an accessory protein for intermediate filament aggregation.



Human renal carcinoma: immunohistochemical staining for alpha B crystallin using NCL-ABCrys-512. Note intense cytoplasmic staining of malignant cells. Paraffin section.

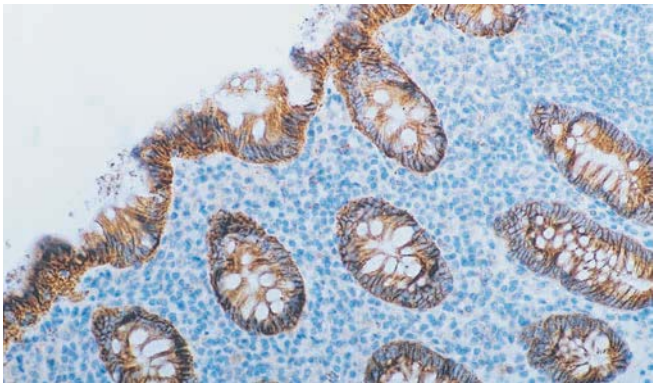
# Novocastra **Alpha-Catenin**

## Clone 25B1

1 mL lyophilized NCL-A-CAT **F P (HIER) W**

### Antigen Background

Alpha-catenin, which shows some homology with vinculin, appears to play a role in tumor invasion and metastasis through the dysfunction of E-cadherin. Research has indicated that normal epithelium of the esophagus, stomach and colon have been reported to express alpha-catenin strongly, without exception. However, in primary tumors of these tissues its expression is frequently reduced. It has been suggested that some human cancer cells may have impaired E-cadherin-mediated cell adhesiveness as a result of the downregulation of alpha-catenin expression. Abnormalities in the expression of alpha-catenin seem to associate with malignant cellular features and disease progression. Re-expression of these adhesion molecules by tumor cells after release from the primary site may be important and perhaps necessary for cells to adhere in remote organs.



Human appendix: immunohistochemical staining for alpha catenin using NCL-A-CAT. Note intense membrane staining of the mucosal epithelial cells. Paraffin section.

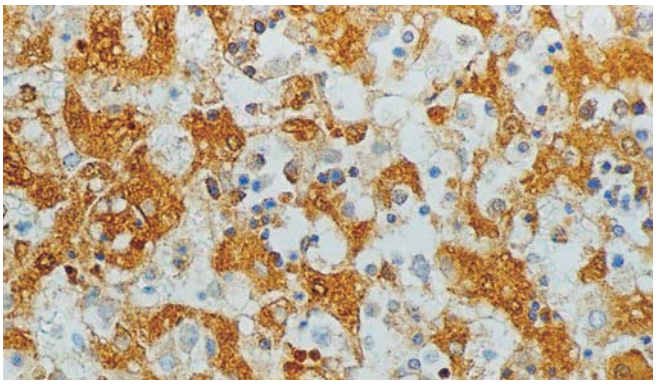
# Novocastra **Alpha Fetoprotein**

## Clone C3

1 mL, 0.1mL lyophilized NCL-AFP **F P**
7 mL BOND ready-to-use PA0963 **P**

### Antigen Background

Alpha fetoprotein (AFP) is an oncofetal antigen of 70 kD found in body fluids which if detected in high concentrations has clinical implications. AFP is expressed in fetal liver but is not present under normal circumstances in healthy adult tissues. It is reported to be expressed in a proportion of germ cell tumors, with high frequency in yolk sac tumors.



Human fetal liver: immunohistochemical staining for alpha fetoprotein using NCL-AFP. Note cytoplasmic staining of hepatocytes. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

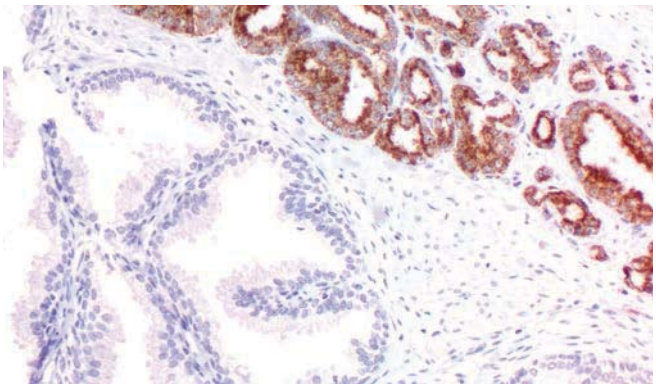
Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra **Alpha-Methylacyl-CoA Racemase (AMACR, p504s)**

**Clone EPUM1**
1 mL, 0.1 mL liquid NCL-L-AMACR **P (HIER)**

### Antigen Background

Alpha-methylacyl-CoA racemase (AMACR), also known as p504s, is a mitochondrial and peroxisomal enzyme that is involved in bile acid biosynthesis and beta-oxidation of branched-chain fatty acids. AMACR is essential in lipid metabolism, and is expressed in normal liver (hepatocytes), kidney (tubular epithelial cells) and gall bladder (epithelial cells). Expression has also been found in lung (bronchial epithelial cells) and colon (colonic surface epithelium). Expression is granular and cytoplasmic. AMACR expression can also be found in hepatocellular carcinoma and kidney carcinoma. Past studies have also shown that AMACR is expressed in various colon carcinomas (well, moderately and poorly differentiated) and over expressed in prostate carcinoma.



Human prostatic adenocarcinoma: immunohistochemical staining for alpha-methylacyl-CoA racemase (AMACR, p504S) using NCL-L-AMACR. Paraffin section.

# Novocastra **Alpha Smooth Muscle Actin (SMA)**

**Clone αsm-1**
1 mL lyophilized NCL-SMA **F P (Enzyme) W**
7 mL ready-to-use RTU-SMA **F P (Enzyme)**
7 mL BOND ready-to-use PA0943 **P**

### Antigen Background

Cytoplasmic actins are part of the microfilament system of cytoskeletal proteins. Smooth muscle actin is found in vascular walls, intestinal muscularis mucosae and muscularis propria and in the stroma of various tissues. It is also reported to be expressed in myofibroblasts and myo-epithelial cells and antibodies to SMA are reported to be a useful tool for the identification of leiomyomas, leiomyosarcomas and pleomorphic adenomas.

### Product Specific Information

Enzyme pretreatment may enhance staining in some cases.

# Novocastra **Alpha-Synuclein**

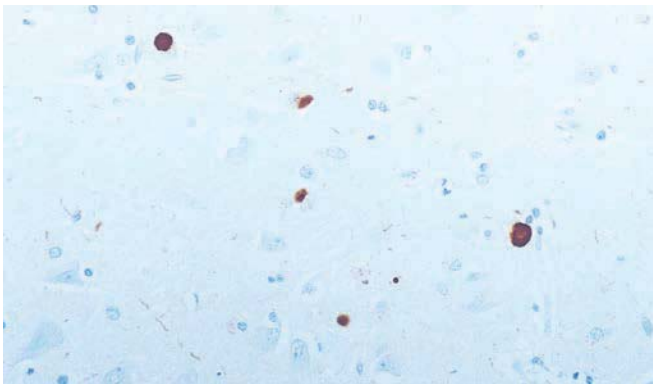
**Clone KM51**
1 mL lyophilized NCL-ASYN **P (HIER)**
1 mL liquid NCL-L-ASYN **P (HIER)**

### Antigen Background

Alpha-synuclein is a protein of 140 amino acids and a member of the synuclein family. It shares 61 percent sequence homology with beta-synuclein and is highly conserved between vertebrate species. It does not possess a signal sequence suggesting that it is an intracellular protein. All synucleins have an unusual organization based around the eleven residue repeating motif and an alpha-helical secondary structure resembling those found in the lipid-binding domain of exchangeable apolipoproteins, including Apo E. This homology suggests a direct interaction of alpha-synuclein with membranes consistent with its affinity for synaptosomes. The function of alpha-synuclein may be to carry a target protein to the inner membrane of nerve terminals or to the outer surface of synaptic vesicles. Western blot analyses of highly purified Lewy bodies from Lewy body dementia brain material has shown full-length, partially truncated and insoluble aggregates of alpha-synuclein. Alpha-synuclein may be implicated in the formation of Lewy bodies and the selective degeneration of neurons in sporadic Parkinson's disease and Lewy body dementia.

### Product Specific Information

Clone KM51 is specific for alpha-synuclein and unreactive with beta-synuclein. Pretreatment of tissue sections with 98 to 100 percent formic acid is also recommended.



Human brain, Lewy body dementia: immunohistochemical staining for alpha synuclein using NCL-L-ASYN. Note staining of alpha synuclein-containing Lewy bodies. Paraffin section.

# Novocastra **Amyloid P Protein**

**Clone B5**
1 mL lyophilized NCL-AMP **F P**

### Antigen Background

Amyloid consists mainly of rigid, non-branching protein fibrils, together with rod-like aggregates of a pentagonal shaped glycoprotein called amyloid P protein. Amyloid P protein, also known as P component, comprises 10 percent of amyloid tissue and is present in all but the central nervous system forms of amyloid. Amyloid P protein is a constituent of normal basement membranes and the microfibrillary elastic fiber network.

### Product Specific Information

NCL-AMP may be used for the identification of amyloid P protein in normal human tissue and in amyloid deposits. NCL-AMP is only suitable for paraffin-embedded material when the tissue has been fixed in 70 percent ethanol.

# Novocastra **Amyloid Precursor Protein**

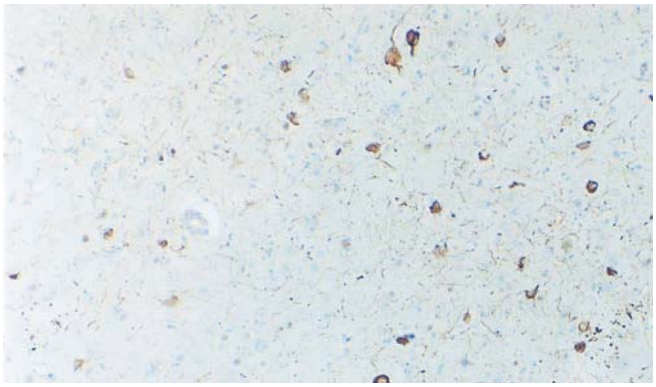
**Clone 40.10**
1 mL lyophilized NCL-APP **P (HIER)**

**Antigen Background**

Alzheimer's disease, the most common cause of dementia in the elderly, exists in both familial and sporadic forms. Genetic studies have identified three genes; beta-amyloid precursor protein (APP), Presenilin-1 and Presenilin-2 which, when mutated, can cause familial forms of Alzheimer's disease. APP and APP-like proteins are transmembrane glycoproteins with a similar modular domain structure.

**Product Specific Information**

NCL-APP has been raised to the extracellular portion of APP between the Kunitz protease inhibitor domain and the beta amyloid region. This region shows the least homology with the APP-like proteins. NCL-APP does not cross-react with APP-like proteins. NCL-APP reacts with large pyramidal cells as well as smaller neurons, astrocytes and microglia.



Human cortex, Alzheimer's disease: immunohistochemical staining of amyloid precursor protein using NCL-APP-228. Note intense staining of neurofibrillary tangles and senile plaques. Paraffin section.

# Novocastra **Anaplastic Lymphoma Kinase (ALK) (CD246) (p80)**

**Clone 5A4**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-ALK **P (HIER)** New!
1 mL, 0.1 mL lyophilized NCL-ALK **P (HIER)**
7 mL BOND ready-to-use PA0306 **P (HIER)**

See also ALK (Anaplastic Lymphoma Kinase) (CD246) (p80) on page 93.

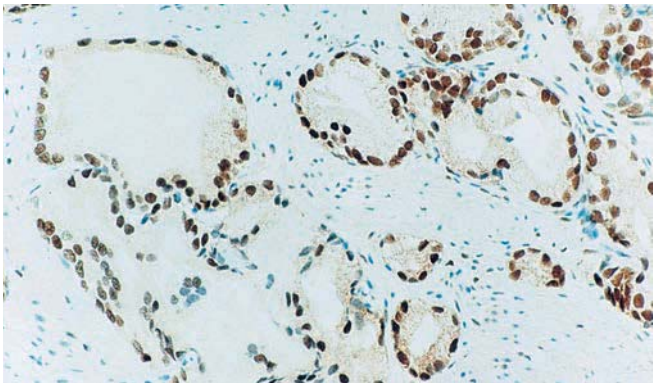
# Novocastra **Androgen Receptor**

**Clone AR27**
1 mL, 0.1 mL lyophilized NCL-AR-318 **F P (HIER)**

**Clone 2F12**
1 mL lyophilized NCL-AR-2F12 **F P (HIER)**
*Clone AR27 was developed to produce superior staining to clone 2F12 on paraffin sections.*

**Antigen Background**

Androgen Receptor is a member of the superfamily of ligand responsive transcription regulators. The androgen receptor functions in the nucleus where it is believed to act as a transcriptional regulator mediating the action of male sex hormones (androgens). The androgen receptor has wide distribution and can be demonstrated by immunohistochemistry in several tissues eg prostate, skin, and oral mucosa. Androgen receptor has been reported in a diverse range of human tumors eg osteosarcoma and in prostatic carcinoma androgen receptor expression may be of clinical relevance. Furthermore, mutation of the gene encoding androgen receptor has been reported in prostatic carcinoma.



Human prostatic adenocarcinoma: immunohistochemical staining for androgen receptor using NCL-AR-318. Note nuclear staining of tumor cells. Paraffin section.

# Novocastra **APAF (Apoptosis Protease Activating Factor 1)**

**Polyclonal**
1 mL lyophilized NCL-APAF1 **F P (HIER)**

**Antigen Background**

Apoptosis is one of a number of responses that may occur as a result of signal transduction pathways in the cell. One identified mechanism for initiating caspase activation requires the participation of mitochondria and involves a 130 kD protein known as apoptosis protease activating factor-1 (Apaf-1). Apaf-1 is a cytosolic protein that remains in a latent state until bound to cytochrome c (Apaf-2). Cytochrome c is commonly released from the mitochondria during apoptosis induced by many, but probably not all cell death stimuli. The resulting Apaf1/cytochrome c complex associates with the zymogen form of caspase-9 (Apaf-3) in the presence of dATP or ATP, promoting the autocatalytic activation of caspase-9. Once activated caspase-9 can then cleave and activate procaspase-3 directly, resulting in a cascade of additional caspase activation and apoptosis.

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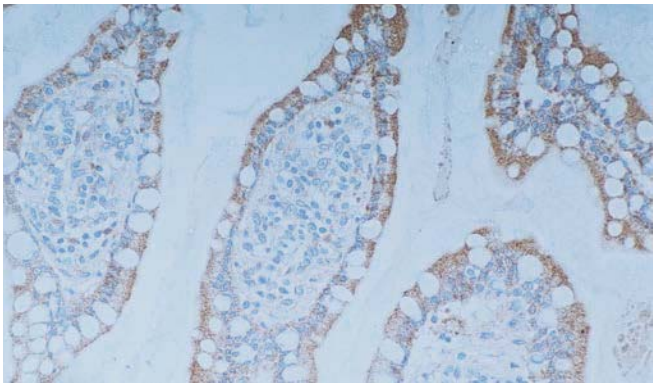
# Novocastra **APC (Adenomatous Polyposis Coli Protein)**

**Clone EMM43**
1 mL lyophilized NCL-APC **P**

**Antigen Background**

The human adenomatous polyposis coli (APC) gene at locus 5q21 encodes a protein of 2,843 amino acids. A precise role for APC in the regulation of the wnt/beta-cateninin signalling pathway has been clearly recognized. APC forms molecular complexes which are able to eliminate intra-cytoplasmic beta-catening, inducing its degradation. It is expressed in the cytoplasm of epithelial and mesenchymal cell types. In the epithelium of bladder, small and large intestine, esophagus, stomach and epidermis, APC expression is restricted to regions in which cell replication has ceased and terminal differentiation has been established. Expression has been reported in lung, kidney and mammary gland endothelial, myoepithelial and duct lining epithelial cells. Some tissues such as ovary, myometrium, thyroid, parathyroid and tonsil do not express the protein. Mutations of the APC gene have been linked to the development of sporadic colorectal tumors, as well as familial adenomatous polyposis and cancers of the pancreas, stomach and esophagus. APC mutations have also been observed at significantly high frequency in the advanced stages of breast cancer suggesting a biological role in carcinogenesis.



Human small intestine: immunohistochemical staining for adenomatous polyposis coli protein using NCL-APC. Note cytoplasmic staining of intestinal epithelial cells. Paraffin section.

# Novocastra **Apolipoprotein J (Clusterin)**

**Clone 7D1**
1 mL lyophilized NCL-CLUSTERIN **P (HIER)**

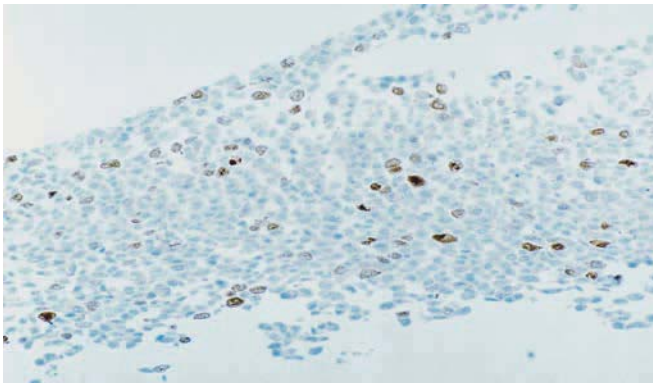
See also Clusterin (Apolipoprotein J) on page 129.

# Novocastra **Aurora Kinase 2**

**Clone JLM28**
1 mL liquid NCL-L-AK2 **P (HIER) W**

**Antigen Background**

Aurora Kinase 1 and 2 encode cell cycle-regulated serine/threonine kinases that are involved in microtubule spindle activities during mitosis and meiosis. Aurora Kinase 2, also known as STK15, BTAK, ARK1 and AIK, localizes to interphase and mitotic centrosomes and to the spindle poles. It is degraded rapidly after G2/M phase release in mammalian cells. Aurora Kinase 2 is reported to be expressed at high levels in testis and various proliferating cell lines, including HeLa cells. Aurora Kinase 2 is regulated by phosphorylation which is important both for its activity and stability. The inhibition of its activity leads to the formation of a monopolar spindle because its activity is necessary for centrosome separation. Aurora Kinase 2 overexpression leads to centrosome amplification, chromosome instability and transformation in mammalian cells. Overexpression of both active and inactive Aurora Kinase 2 can lead to polyploidy. This suggests that Aurora Kinase 2 can behave as a dominant negative mutant and inhibit other aurora kinases. When inactive kinase is expressed, however, the cells eventually die and do not become immortalized, unlike with the active kinase.



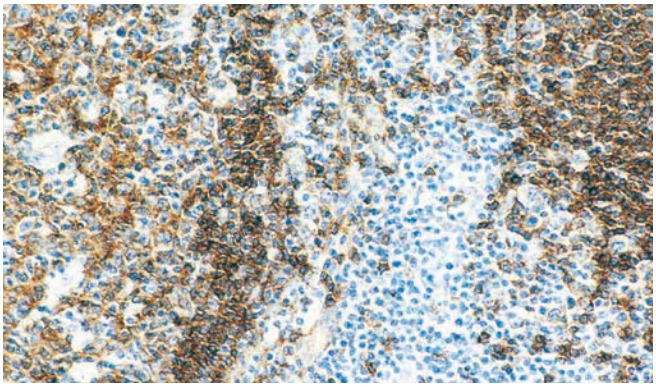
HeLa cell line: immunohistochemical staining for Aurora Kinase using NCL-L-AK2. Note nuclear staining of a proportion of cells. Paraffin section.

# Novocastra **B Cell Marker (MB2)**

**Clone MB2**
1 mL lyophilized NCL-MB2 **F P**

**Antigen Background**

MB2 is a pan B cell marker that is expressed in all B cells except mature plasma cells. It does not react with T cells. These include epidermis (but excludes the squamous cell layer), epithelia of breast, lung, pancreas, stomach, colon, bladder, fallopian tube and also hepatocytes and stromal cells of the ovary. MB2 has been reported to react with an uncharacterized cytoplasmic antigen found in both normal B cells and B cell lymphomas.



Human tonsil: immunohistochemical staining for B lymphocytes using NCL-MB2. Note intense cytoplasmic staining of normal B lymphocytes. Paraffin section.

# Novocastra **B Cell Specific Octamer Binding Protein-1 (BOB-1)**

**Clone TG14**
1 mL, 0.1 mL liquid NCL-L-BOB-1 **P (HIER)**
7 mL BOND ready-to-use PA0558 **P (HIER)**

**Antigen Background**

B cell specific octamer binding protein-1 (BOB-1), also known as OBF-1 and OCA-B, is a lymphocyte specific transcriptional coactivator protein. It interacts with OCT1 and OCT2 transcription factors and contributes to the transcriptional activity of octamer motifs. BOB-1 has been reported to be detectable in all B cell populations found in reactive lymphoid tissues. The strongest expression being found in germinal center B cells and plasma cells. The expression of BOB-1 in B cell tumors has been reported to be variable.

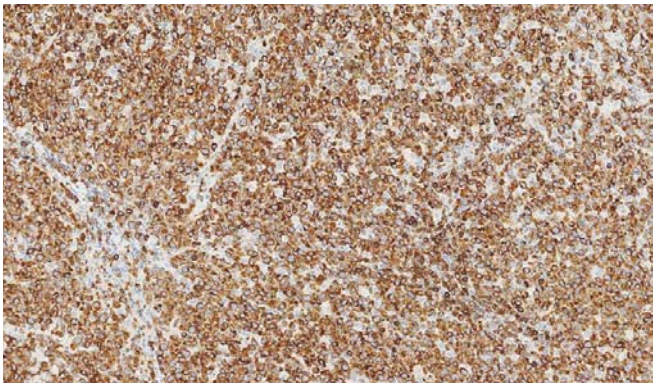
# Novocastra **Bcl-2 Oncoprotein**

**Clone 3.1**
1 mL, 0.1 mL lyophilized NCL-bcl-2-486 **P (HIER) W**

**Clone bcl-2/100/D5**
1 mL, 0.1 mL lyophilized NCL-bcl-2 **F P (HIER) W**
1 mL, 0.1 mL liquid NCL-L-bcl-2 **F P (HIER) W**
7 mL ready-to-use RTU-bcl-2 **F P (HIER)**
7 mL BOND ready-to-use PA0117 **P (HIER)**

**Antigen Background**

Bcl-2 is a member of a family of proteins that are involved in apoptosis. Bcl-2 is an integral inner mitochondrial membrane protein of 25 kD and has a wide tissue distribution. It is considered to act as an inhibitor of apoptosis. For this reason, bcl-2 expression is inhibited in germinal centers where apoptosis forms part of the B cell production pathway. In 90 percent of follicular lymphomas a translocation occurs which juxtaposes the bcl-2 gene at 18q21, to an immunoglobulin gene. This t(14;18) translocation can deregulate gene expression and bcl-2 over-expression can be demonstrated immuno-histochemically in the vast majority of follicular lymphomas.



Human follicular lymphoma: immunohistochemical staining for Bcl-2. Note moderate cytoplasmic staining reaction of neoplastic cells, while normal peripheral lymphocytes show a strong staining reaction. Paraffin section.

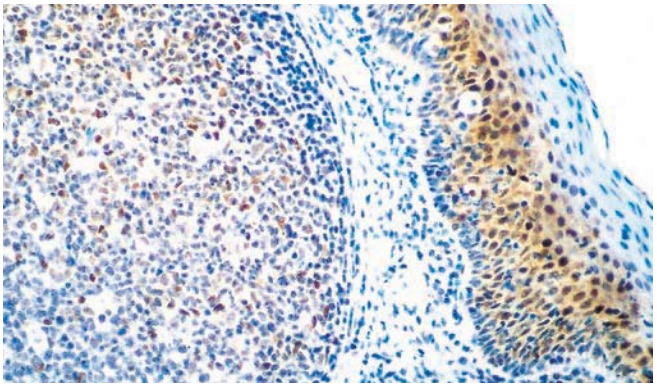
# Novocastra **Bcl-3 Oncoprotein**

**Clone 1E8**
1 mL lyophilized NCL-Bcl-3 **F P (HIER)**

**Antigen Background**

Bcl-3 was first identified as a putative proto-oncogene and was originally isolated through its involvement in the translocation event t(14;19) where it is highly expressed in a subset of chronic lymphocytic leukemias and other B cell neoplasms. The Bcl-3 gene product is also thought to play a role in the immune system through its interactions with the NF-kappaB family of transcription factors to enhance proliferation and to act as a transcription cofactor. More specifically, Bcl-3 oncoprotein appears to regulate the activity of homodimeric NF-kappaB p50 subunit and a closely-related homolog, p52, in a phosphorylation-dependent manner. Although to date, no immunohistochemistry data has been published, Bcl-3 mRNA is found in a number of tissues, including spleen and other lymphoid tissues.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting



Human tonsil: immunohistochemical staining for Bcl-3 oncoprotein using NCL-Bcl-3. Note nuclear staining of a proportion of follicular cells, parafollicular cells and mucosa. Paraffin section.

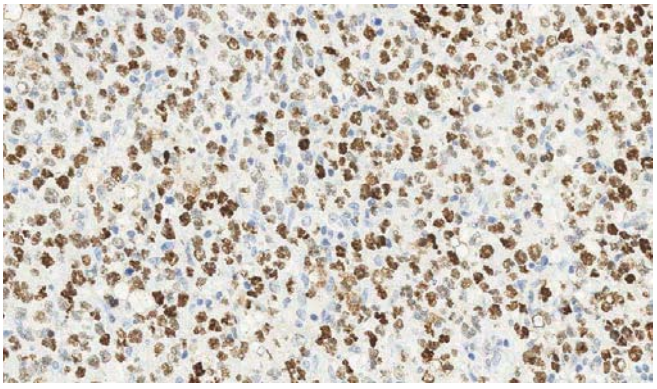
## Novocastra **Bcl-6 Oncoprotein**

**Clone LN22**
1 mL, 0.1 mL liquid NCL-L-Bcl-6-564 **P (HIER)**
7 mL BOND ready-to-use PA0204 **P (HIER)**

**Clone P1F6**
1 mL, 0.1 mL lyophilized NCL-Bcl-6 **F P (HIER)**
*Clone LN22 was developed to produce superior staining compared to clone P1F6 on paraffin sections.*

**Antigen Background**

Bcl-6 is a proto-oncogene that encodes a Kruppel-type zinc-finger protein of 95 kD and shares homology with other transcription factors. Bcl-6 protein is mainly expressed in normal germinal center B cells and related lymphomas. It has been shown that the Bcl-6 proto-oncogene is involved in chromosome rearrangements at 3q27 in non-Hodgkin's lymphomas and Bcl-6 rearrangements have also been detected in 33 to 45 percent of diffuse large B cell lymphomas. Immunohistochemistry has been reported to show the Bcl-6 gene product to be detectable in follicular lymphomas, diffuse large B cell lymphomas, Burkitt's lymphomas and in nodular, lymphocyte predominant Hodgkin's disease.



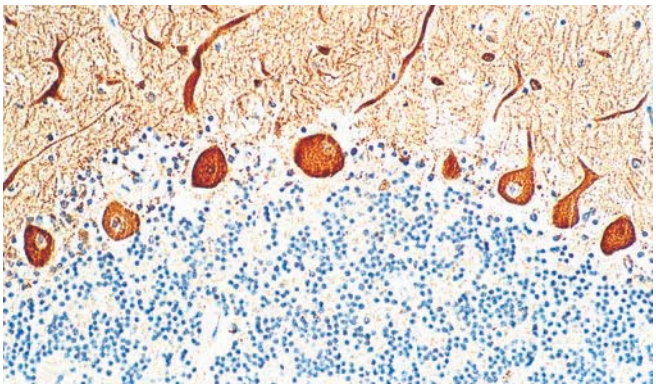
Human diffuse large B cell lymphoma: immunohistochemical staining for Bcl-6. Note nuclear staining of neoplastic cells. Paraffin section.

## Novocastra **Bcl-w**

**Clone 6C1**
1 mL lyophilized NCL-Bcl-w **P (HIER) W**

**Antigen Background**

Bcl-w belongs to the Bcl-2 family of proteins and promotes cell survival, whereas other members such as bak and bax are antagonists and promote apoptosis. The Bcl-w gene is highly conserved between mice and man. Bcl-w protein is reported to be found in a diverse range of tissues including cerebellum, hippocampus, colon, liver, heart, stomach, skeletal muscle, testis and placenta. It is also expressed in most myeloid and a few lymphoid cell lines including those of macrophage megakaryocytic and erythroid origin. It is not expressed on B and T cell lines. Bcl-w is apparently dispensable in normal development and function of most organs but is essential for spermatogenesis.



Human brain, normal adult cerebellum: immunohistochemical staining for Bcl-w protein using NCL-Bcl-w. Note intense cytoplasmic staining of Purkinje cells and their processes. Paraffin section.

## Novocastra **bcl-x**

**Clone NC1**
1 mL lyophilized NCL-bcl-x **F P**

**Antigen Background**

Bcl-x has homology with and is a member of the Bcl-2 family of proteins. Bcl-x can function as a regulator of cell death independently of bcl-2. Differential splicing of the bcl-x mRNA produces short and long variants known as bcl-$x_S$ and bcl-$x_L$. These variants have different functions. Bcl-x immunoreactivity has been demonstrated in many cell types and like bcl-2, has been localized to the cytosol associated with mitochondria. Bcl-x has been demonstrated to be immunohistochemically detected in plasma cells, activated lymphocytes in interfollicular areas and a small number of lymphocytes within germinal centers. It has also been reported in Reed Sternberg cells in about 86 percent of Hodgkin's disease cases. In normal tissues, bcl-x expression has been reported in cortical thymocytes, megakaryocytes, red blood cell precursors and some types of differentiating myeloid cells in bone marrow as well as spermatocytes and spermatids in the testes. It is also found in mammary epithelial cells, secretory and basal epithelial cells of the prostate, gastrointestinal epithelial cells and differentiated keratinocytes in the upper layers of the epidermis (but not in basal cells).

# Novocastra **Beta-2-Microglobulin**

**Polyclonal**

1 mL lyophilized NCL-B2Mp **P (Enzyme) O**

**Antigen Background**

Beta-2-microglobulin, a single polypeptide chain of molecular weight 11.6 kD, is present on the surface of most nucleated cells and its expression may be decreased or lost in malignancy. Beta-2-microglobulin is the major constituent of a subtype of secondary amyloidosis which is associated with long term hemodialysis. Clinical and pathological features of this disease have been characterized. Spontaneous fractures and destructive arthropathies (articular swelling and pain in an oligoarticular distribution, along with effusions in large joints) have been related to amyloid deposition. Amyloid has been implicated in most clinical complaints of beta-2-microglobulin-related amyloid arthropathy where it is found in synovial biopsies taken from the involved joints.

**Product Specific Information**

NCL-B2Mp is also effective in ELISA techniques.

# Novocastra **Beta Amyloid**

**Clone 6F/3D**

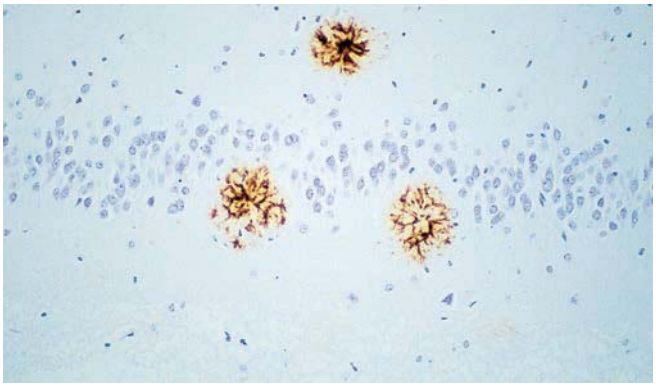
1 mL lyophilized NCL-B-Amyloid **F P**

**Antigen Background**

Beta amyloid is an extracellular filamentous protein deposit found in the brain. It is the major protein component of amyloid cores and neuritic plaques and is also found as a deposit in neurofibrillary tangles. In man, Alzheimer's disease is the most common cause of senile dementia and is characterized by abnormal filamentous protein deposits in the brain. Beta amyloid deposits are also detected in Lewy body dementia, Down's syndrome, amyloidosis (Dutch type) and in the Guam Parkinson-Dementia complex.

**Product Specific Information**

Pretreatment of tissue sections with 98 to 100 percent formic acid is recommended when using NCL-B-Amyloid.



Human brain, Alzheimer's disease: immunohistochemical staining for beta amyloid protein using NCL-B-Amyloid. Note intense staining of senile plaques. Paraffin section.

# Novocastra **Beta-Catenin**

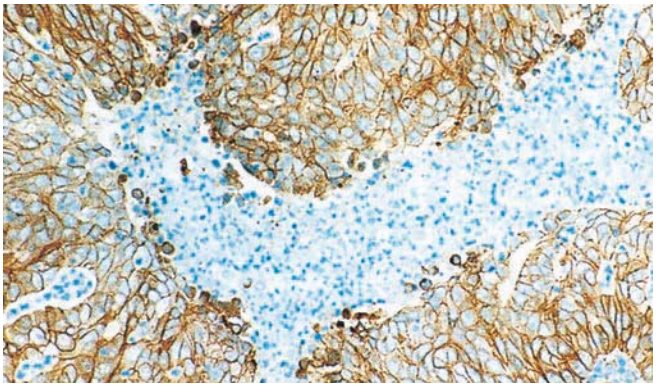
**Clone 17C2**

1 mL, 0.1 mL lyophilized NCL-B-CAT **F P (HIER) W**

7 mL BOND ready-to-use PA0083 **P (HIER)**

**Antigen Background**

The catenins, (alpha, beta and gamma) are cytoplasmic proteins which bind to the highly conserved tail of the E-cadherin molecule. Beta-catenin is a component of the adherens junction, a multiprotein complex which supports Ca2+ -dependent cell to cell contact which in itself is critical for adhesion, signal transmission and for anchoring the actin cytoskeleton. Beta-catenin's role is as a transcription effector of the wnt-signalling pathway. Immunohistochemistry is the best way to demonstrate nuclear expression of beta-catenin and wnt-pathway activation. This aberrant expression is observed in human tumorigenesis and especially in colorectal cancer.



Human endometrial adenocarcinoma: immunohistochemical staining for beta-catenin using NCL-B-CAT. Note membrane staining of tumor cells. Paraffin section.

# Novocastra **Beta-Dystroglycan**

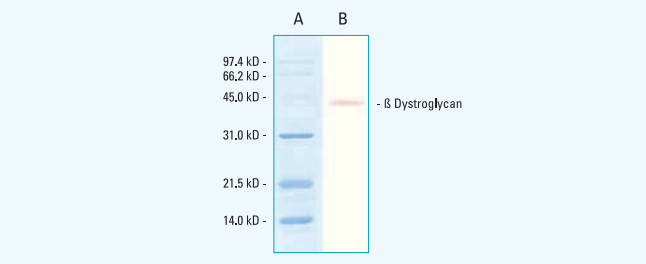
**Clone 43DAG1/8D5**

1 mL, 0.1 mL lyophilized NCL-b-DG **F W E**

**Antigen Background**

Dystrophin associated glycoproteins (DAGs) are a complex of at least seven proteins involved in the attachment of dystrophin to muscle membranes. The biological significance of this dystrophin/glycoprotein complex is not fully understood, but it appears to form an essential linkage between actin on the inside of the muscle fiber and muscle laminin in the basal lamina which surrounds the fiber. Beta-dystroglycan spans the muscle membrane and it has been suggested that it is the member of the complex which binds directly to dystrophin. Labeling of beta-dystroglycan may be reduced in some forms of muscular dystrophy where another component eg dystrophin or laminin, is directly affected. Labeling with an antibody to beta-spectrin to monitor membrane integrity, is an essential immunohistochemical control.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting




Western blot: detection of human beta-dystroglycan (43 kD) using NCL-b-DG. Lane A, molecular weight markers. Lane B, human skeletal muscle extract immunoblotted with NCL-b-DG.

## Novocastra **BL-CAM (CD22)**

**Clone FPC1**
1 mL, 0.1 mL lyophilized NCL-CD22-2 **P (HIER)**
7 mL BOND ready-to-use PA0249 **P (HIER)**

See also CD22 (BL-CAM) on page 112.

## Novocastra **Blood Coagulation Factor XIIIa (Factor XIIIa)**

**Clone E980.1**
1 mL lyophilized NCL-FXIIIa **P (HIER)**
1 mL liquid NCL-L-FXIIIA **P (HIER)** New!
7 mL BOND ready-to-use PA0449 **P (HIER)**

See also Factor XIIIa (Blood Coagulation Factor XIIIa) on page 147.

## Novocastra **BOB-1 (B Cell Specific Octamer Binding Protein-1)**

**Clone TG14**
1 mL, 0.1 mL liquid NCL-L-BOB-1 **P (HIER)**
7 mL BOND ready-to-use PA0558 **P (HIER)**

See also B Cell Specific Octamer Binding Protein-1 (BOB-1) on page 98.

## Novocastra **CA19-9 (Sialyl Lewis$^a$)**

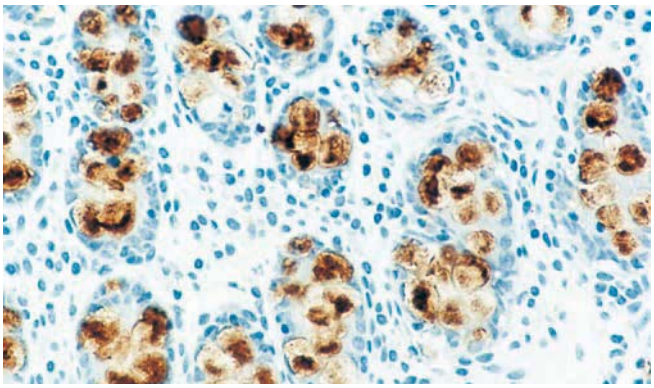
**Clone C241:5:1:4**
1 mL lyophilized NCL-CA19-9 **F P (HIER)**
1 mL liquid NCL-L-CA19-9 **F P (HIER)**
7 mL BOND ready-to-use PA0424 **P (HIER)**

### Antigen Background

CA19-9 is an epitope on the sialylated Lewis$^a$ carbohydrate structure. Sialylated Lewis$^a$ plays a role in cell adhesion by acting as a functional ligand for the inducible adhesion molecule E-selectin. CA19-9 and CA50 (carcinoma associated mucin antigen) are useful serum markers in the diagnosis and follow up of gastrointestinal and pancreatic cancers. In carcinoma of the pancreas, it is reported that the immunohistochemical expression of both CA19-9 and CA50 correlates with tumor differentiation where the strongest staining is observed in well differentiated tumors. These two markers are also reported in a number of benign lesions such as chronic pancreatitis.

### Product Specific Information

Clone C241:5:1:4 reacts specifically with Sialyl Lewis$^a$ - containing glycolipids, showing no crossreaction with Lewis$^a$, Lewis$^b$, or other structurally related molecules. The epitope recognized by NCL-L-CA19-9 is designated CA19-9 and is similar to CA50 (carcinoma associated mucin antigen).



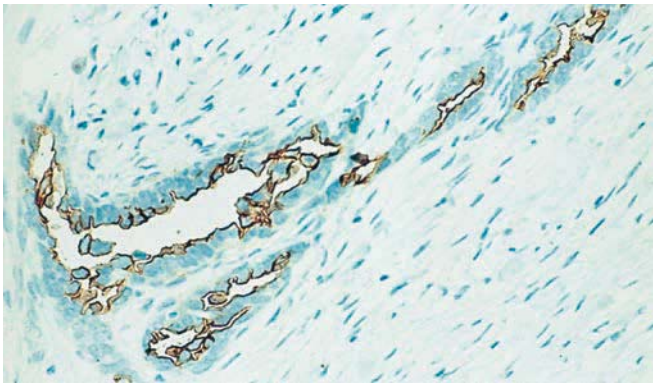
Normal human colon: immunohistochemical staining for Sialyl Lewis$^a$ antigen using NCL-L-CA19-9. Note extracellular-associated staining of colonic epithelial cells. Paraffin section.

## Novocastra **CA125 (Ovarian Cancer Antigen)**

**Clone Ov185:1**
1 mL lyophilized NCL-CA125 **F P (HIER)**
1 mL liquid NCL-L-CA125 **F P (HIER)**
7 mL ready-to-use RTU-CA125 **F P (HIER)**
7 mL BOND ready-to-use PA0539 **P (HIER)**

### Antigen Background

CA125 antigen is usually associated with ovarian epithelial malignancies. Serum assays are widely used to detect this protein in the monitoring of ovarian cancers. CA125 antigen may also be detected by immunohistochemistry and expression has been found in neoplasms such as seminal vesicle carcinoma and anaplastic lymphoma. CA125 antigen is not found exclusively in malignant tumors. CA125 is also known as MUC16.



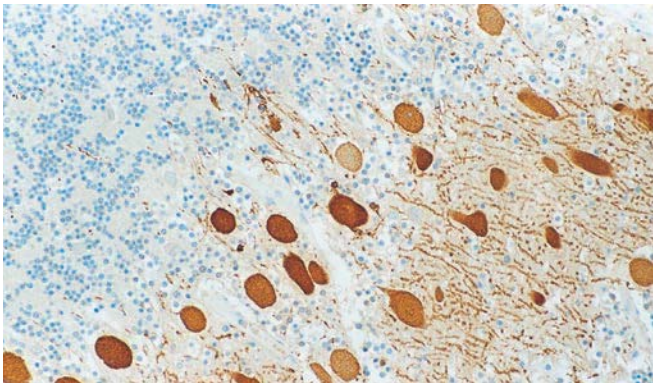
Papillary carcinoma of endometrium: immunohistochemical staining for ovarian cancer antigen using NCL-L-CA125. Note staining of the luminal surface of malignant endometrial cells. Paraffin section.

# Novocastra **Calbindin**

**Clone KR6**
1 mL lyophilized NCL-CALBINDIN **P (HIER)**

### Antigen Background

Calbindin is a calcium-binding protein belonging to the troponin C superfamily. It functions as a buffer of cytosolic calcium and is found in the brain, kidney, gut and pancreatic islets. In normal brain, calbindin (28 kD) has been identified in medium sized neurons of the neuropil of the matrix compartment of the striatum, the woolly fiber arrangements of the globus pallidus and the fiber structures of the pars reticula of the substantia nigra. The normal expression of calbindin is modified in patients with progressive supranuclear palsy, striatal degeneration and Huntingdon's disease (HD). In HD, alterations to the dendritic arbors and spiny striatal neurons may be visualized by immunohistochemistry for calbindin. In moderate grades of HD, proliferative changes have been found in these areas and in severe grades, degenerative changes have been noted. A proportion of dendritic cells within the light zone of germinal centers are also noted to be positive for calbindin.



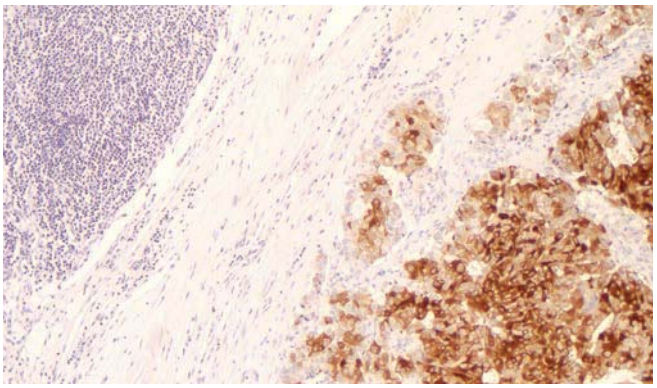
Human brain, cerebellum: immunohistochemical staining for calbindin using NCL-CALBINDIN. Note cytoplasmic staining of Purkinje cells and neuronal processes. Paraffin section.

# Novocastra **Calcitonin**

**Clone CL1948**
1 mL, 0.1 mL liquid NCL-L-CALCITONIN **P (Enzyme)**
**Polyclonal**
7 mL BOND ready-to-use PA0406 **P (Enzyme)**
0.5 mL lyophilized NCL-CALp **P (Enzyme)**

### Antigen Background

Calcitonin (CT) is a 32 amino acid peptide synthesized by the parafollicular C cells of the thyroid. It acts through its receptors to inhibit osteoclast mediated bone resorption, decrease calcium resorption by the kidney and decrease calcium absorption by the intestines. The action of calcitonin is therefore to cause a reduction in serum calcium, an effect opposite to that of parathyroid hormone. The calcitonin gene transcript also encodes the calcitonin gene-related peptide (CGRP), which is thought to be a potent vasodilator. The tissue specificity of the transcript produced depends on alternative splicing of the CT/CGRP gene transcript. In the parafollicular cells of the thyroid 95 percent of the CT/CGRP is processed and translated to produce CT, however, in neuronal cells 99 percent of the CT/CGRP RNA is translated into CGRP. The C cells of the thyroid give rise to an endocrine tumor, medullary thyroid carcinoma (MTC), which occurs in a sporadic (75 percent of cases) and hereditary form (25 percent of cases). Familial MTC is associated with C cell hyperplasia (CCH), whereas sporadic MTC is thought not to be. However, in the general population CCH is present in 20-30 percent of thyroid glands, either with normal histology, thyroiditis or follicular tumors.



Human medullary thyroid carcinoma: immunohistochemical staining for calcitonin using NCL-L- CALCITONIN. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

# Novocastra **Calpain**

**Clone Calp3c/11B3**
2.5 mL lyophilized NCL-CALP-11B3 **W**

**Clone Calp3c/12A2**
2.5 mL, 1 mL lyophilized NCL-CALP-12A2 **W**

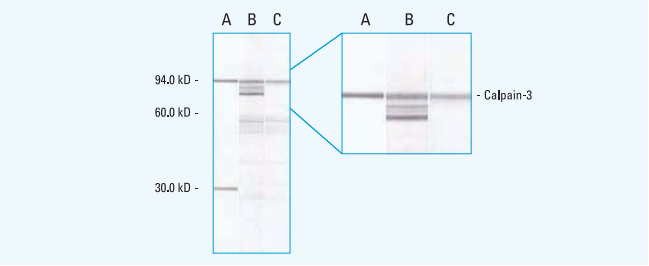
**Clone CALP3D/2C4**
2.5 mL lyophilized NCL-CALP-3D/2C4 **W**

### Antigen Background

At least seven forms of autosomal recessive muscular dystrophy (MD) have been included under the banner "limb girdle muscular dystrophy" (LGMD). These forms may be divided into two groups; those with abnormal expression of the dystrophin/glycoprotein complex and those in which labeling of the proteins in this complex is unaffected. Thus the sarcoglycanopathies (also known as LGMD types 2C, 2D, 2E and 2F) are caused by defects in the genes for gamma, alpha, beta and delta-sarcoglycan on chromosomes 13q12, 17q21, 4q12 and 5q33, respectively. Among the dystrophies in which expression of the sarcoglycans is normal, the gene responsible for LGMD2A has been identified as the chromosome 15q15-encoded muscle-specific calcium-activated neutral protease, calpain 3. Calpain 3 enzyme is only stable in human muscle when homogenized in treatment buffer immediately after harvest. (Anderson LVB et al. American Journal of Pathology. 153(4): 1169-1179 (1998)), and in homogenates containing SDS and is therefore well suited for analysis by Western blot.

### Product Specific Information

NCL-CALP-2C4 reacts with the full-size calpain 3 (94 kD) and an additional fragment (30 kD) in human skeletal muscle. NCL-CALP-12A2 reacts with full-size protein plus apparent degradation products at approximately 60 kD. Specificity of these antibodies has been confirmed by the loss of all these bands in samples with null gene mutations. NCL-CALP-11B3 reacts with calpain 3 bands at 94 and 60 kD, pre- and post-autolyzed forms of the ubiquitous calpains 1 and 2 (υ and m-calpain) staining a group of bands between 76 and 84 kD in human skeletal muscle (Anderson LVB et al. American Journal of Pathology. 153(4): 1169-1179, (1998)) Cross-reactivities in different animals and tissues are described (see reference).




Western blot: analysis of human skeletal muscle showing detection of the calpain family of proteins. Lane A, calpain 3 bands at 94 and 30 kD detected with NCL-CALP-2C4. Lane B, calpains 1, 2 and 3 detected with NCL-CALP-11B3. Lane C, calpain 3 bands at 94 and approximately 60 kD detected with NCL-CALP-12A2. Photograph supplied courtesy of Dr Louise V B Anderson.

# Novocastra **Calponin (Basic)**

**Clone 26A11**
1 mL, 0.1 mL lyophilized NCL-CALPONIN-B **F P (HIER) W**
7 mL BOND ready-to-use PA0416 **P (HIER)**

### Antigen Background

Basic calponin (calponin-h1) is a 34 kD protein which exhibits a high degree of homology to acidic and neutral calponins at its N-terminal region. It is an actin, tropomyosin and calmodulin binding protein thought to be involved in the regulation of smooth muscle contraction. The expression of basic calponin is reported to be restricted to smooth muscle cells and is a marker of the differentiated contractile phenotype of developing smooth muscle. Vascular smooth muscle cells convert to a synthetic dedifferentiated phenotype when this protein is lost and this is a key stage in both atherosclerosis and restenosis of coronary arteries after balloon angioplasty. It is thought that basic calponin exerts its effect via the cortical actin cytoskeleton and therefore influences proliferation, the transformed phenotype and the metastatic potential of tumor cells. Basic calponin mRNA is expressed in smooth muscle of prostate, bowel and aorta whereas neutral and acidic calponin mRNAs are expressed in non-smooth muscle tissues such as heart, placenta, lung, kidney, pancreas, spleen, testis and ovary as well as in smooth muscle-containing tissues.

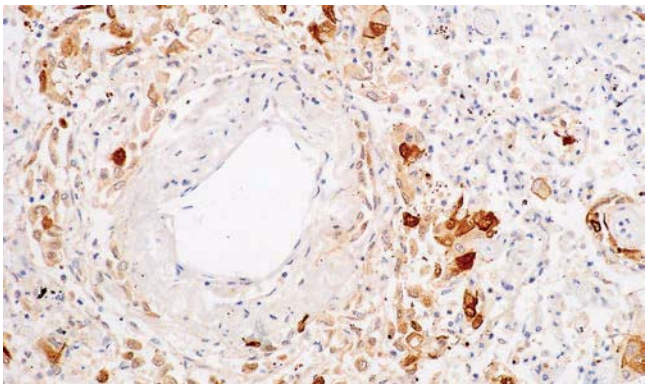
# Novocastra **Calretinin**

**Clone CAL6**
1 mL, 0.1 mL liquid NCL-L-CALRET-566 **P (HIER) W**
7 mL BOND ready-to-use PA0346 **P (HIER)**

**Clone 5A5**
1 mL, 0.1 mL lyophilized NCL-CALRETININ **P (HIER)**
1 mL liquid NCL-L-CALRETININ **P (HIER)**
7 mL ready-to-use RTU-CALRETININ **P (HIER)**

### Antigen Background

Calretinin is a calcium-binding protein of 29 kD that is a member of the family of so-called EF-hand proteins that also includes S-100 proteins. Calretinin is reported to be abundantly expressed in neurons. Outside the nervous system, calretinin is reported to be expressed in a range of cell types including mesothelial cells, steroid producing cell, (eg adrenal cortical cells, Leydig cells, ovarian theca interna cells as well as Sertoli cells, some neuroendocrine cells, eccrine sweat glands) and other cell types.



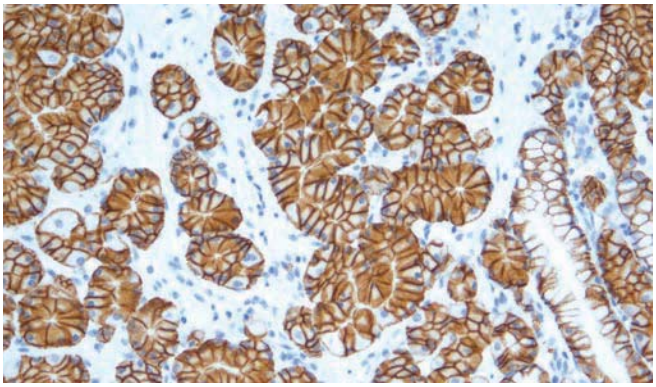
Human mesothelioma: immunohistochemical staining for calretinin using NCL-L-CALRET-566. Note cytoplasmic staining of malignant cells. Paraffin section.

## Novocastra **Carbonic Anhydrase IX**

**Clone TH22**
1 mL, 0.1 mL liquid NCL-L-CAIX **P (HIER) W**

**Antigen Background**

Carbonic anhydrase (CA) is an enzyme that assists rapid interconversion of carbon dioxide and water into carbonic acid, protons, and bicarbonate ions. Originally named MN/G250, carbonic anhydrase IX (CAIX) is a cell surface transmembrane protein, which is predominantly found in the gastrointestinal tract and gall bladder. The glandular regions of normal colon are reported to be negative, but in the case of adenocarcinoma, the glands are positive. CAIX is also reported to be expressed in common epithelial tumors such as carcinomas of the esophagus, lung, colon, kidney, cervix and non-small cell lung carcinoma. In breast carcinomas, CAIX expression has been reported to be associated with malignant tissue. Expression of CAIX is reported to be absent in normal kidney, chromophobe carcinomas or oncocytomas, however, it is specifically expressed in clear cell renal carcinomas.



Human stomach: immunohistochemical staining for carbonic anhydrase IX using NCL-L-CAIX. Note intense membrane and cytoplasmic staining of the mucus secreting cells of the deep glands. Paraffin section.

## Novocastra **Carboxypeptidase M**

**Clone 1C2**
1 mL lyophilized NCL-CPMm **F P (HIER)**

**Antigen Background**

Carboxypeptidase M is a membrane bound glycoprotein of 62 kD. It is an enzyme structurally, catalytically and immunologically distinct from pancreatic carboxy-peptidase A and B, human plasma carboxypeptidase N and carboxy-peptidase H. The functional role of carboxypeptidase M may be to inactivate or modulate peptide hormones at local tissue sites before or after their interaction with specific plasma membrane receptors. Carboxypeptidase M is found on the placental microvilli, a site at which materno-fetal exchange takes place. This site is rich in other peptidases whose function is to inactivate deleterious peptides before crossing this important barrier. Carboxypeptidase M is also found in peripheral nerves, at different concentrations in various regions of the brain, in alveolar type 1 epithelial cells and alveolar macrophages.

## Novocastra **Carcinoembryonic Antigen (CD66e)**

**Clone 12-140-10**
1 mL lyophilized NCL-CEA-2 **F P (Enzyme)**
1 mL liquid NCL-L-CEA-2 **F P (Enzyme)**
7 mL ready-to-use RTU-CEA-2 **F P (Enzyme)**

**Clone II-7**
7 mL BOND ready-to-use PA0004 **P (HIER)**

**Antigen Background**

Carcinoembryonic antigen (CEA) is a heterogeneous cell surface glycoprotein produced by cells of fetal colon. Low levels are also found on normal mucosal epithelia of the adult colon and a variety of other normal tissues. CEA is encoded by the CEA gene that is located on chromosome 19. It is a member of the CEA gene family, which in turn is a subfamily of the immunoglobulin superfamily. Cell adhesion properties are now well recognized for CEA. It is believed that the expression of this glycoprotein in conjunction with other known adhesion molecules will influence the cell-cell interaction.

## Novocastra **Caspase-3 (CPP32)**

**Clone JHM62**
1 mL, 0.1 mL lyophilized NCL-CPP32 **P (HIER) W**

See also CPP32 (Caspase-3) on page 131.

## Novocastra **Caspase-8**

**Clone 11B6**
1 mL lyophilized NCL-CASP-8 **F P (HIER)**

**Antigen Background**

The caspases represent a family of cysteine proteases that play important regulatory roles within the cell. Caspase-8, also called FLICE, has an N-terminal domain with sequence homology to the death effector domain of FADD that allows association of caspase-8 with the TNF/Fas family of receptors. This association with the cell surface death receptors has shown caspase-8 to be a proximal regulator of apoptosis. Caspase-8 is activated by association with the Fas/FADD death-inducing signalling complex to release two active subunits, p18 and p10, into the cytosol, where they activate other caspases amplifying the apoptotic signal.

**Product Specific Information**

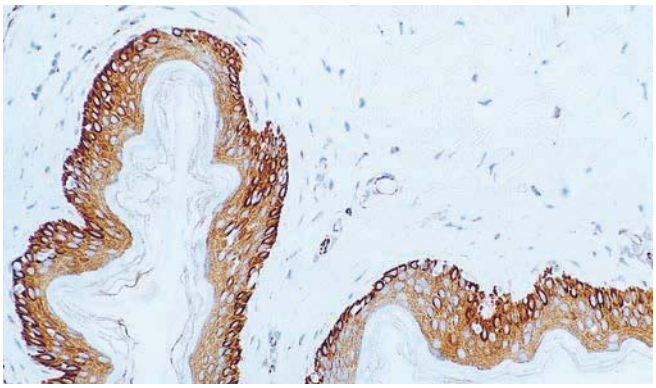
NCL-CASP-8 is raised to the p18 subunit found in caspases 8a, 8b and 8h.

# Novocastra **Cathepsin B**

**Clone CB131**
1 mL lyophilized NCL-CATH-B **P**

**Antigen Background**

Cathepsin B is one member of a family of proteolytic enzymes and is expressed in cytoplasmic lysosomes in different types of normal and neoplastic tissues. It is a cysteine protease and like most cathepsins is involved in cellular metabolism such as protein degradation. Immunohistochemical studies have detected expression in bowel mucosa, skin, prostate and thyroid. Staining for cathepsin B, in common with other cathepsins, may be so intense that it appears to be nuclear in some cells. A proportion of endothelial cells are positive in many tissues. This has been reported previously where it has been described as sprouting endothelial cells.

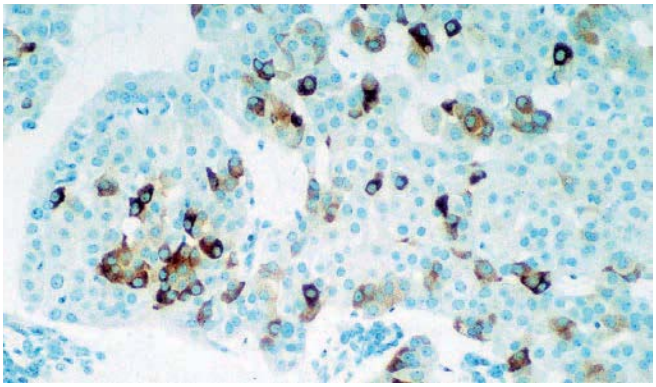


Human skin: immunohistochemical staining for cathepsin B using NCL-CATH-B. Note intense cytoplasmic staining of basal epithelium and reduced staining in suprabasal cells. Paraffin section.

# Novocastra **Cathepsin D**

**Clone C5**
1 mL, 0.1 mL lyophilized NCL-CDm **F P**

Cathepsins are members of the papain family of cysteine lysosomal proteases which are involved in a variety of physiological processes such as proenzyme activation, enzyme inactivation, antigen presentation, hormone maturation, tissue remodelling and bone matrix resorption. Cathepsin D is first produced in a precursor form, pro-cathepsin D (52 kD), and then processed in the cell to an intermediate form of 48 kD, then finally to the mature forms of 34 kD and 14 kD. It has been proposed that the presence of high levels of cathepsin D in breast cancer may signify a functional estrogen receptor apparatus.



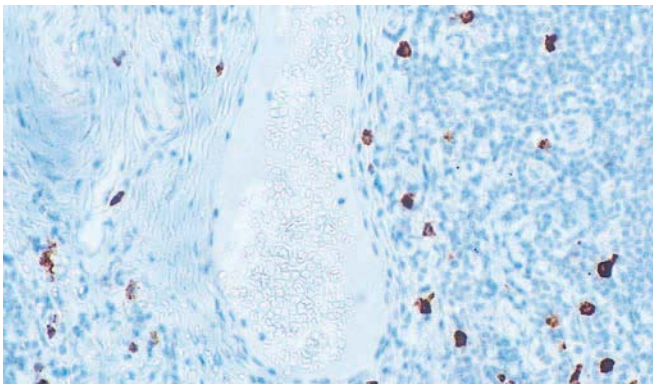
Human breast carcinoma: immunohistochemical staining for cathepsin D using NCL-CDm. Note granular cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **Cathepsin G**

**Clone 19C3**
1 mL lyophilized NCL-CATH-G **P (HIER) W**

**Antigen Background**

Cathepsin G expression in normal tissues is restricted to granulocytes, especially neutrophils. However, mononuclear phagocytes have been demonstrated to bind and internalize proteases from neutrophils. Cathepsin G is located in neutrophilic polymorphonuclear leukocytes which contain specialized azurophil granules together with two other serine proteases; elastase and hepsin. These three proteases may participate in the killing and digestion of engulfed pathogens and in connective tissue remodelling at sites of inflammation.



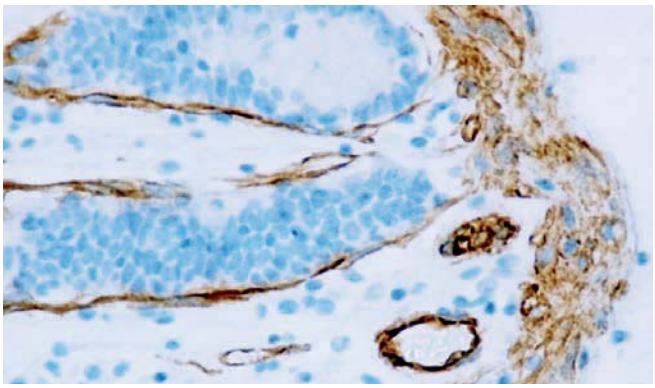
Human tonsil: immunohistochemical staining for cathepsin G using NCL-CATH-G. Note intense membrane staining of polymorphonuclear leukocytes. Paraffin section.

# Novocastra **Caveolin-1**

**Clone 4D6**
1 mL liquid NCL-L-Caveolin-1 **P (HIER)**

**Antigen Background**

Caveolin-1 is a major structural component of caveolae which are vesicular invaginations present on the plasma membrane of different cell types. It plays a regulatory role in several signalling pathways and is reported to be most abundantly expressed in terminally differentiated mesenchymal cells such as smooth muscle cells, adipocytes and endothelial cells. High levels are also reported in fibroblasts where a fine granular membranous and diffuse cytoplasmic staining pattern is described.



Normal human colon: immunohistochemical staining for caveolin-1 using NCL-L-Caveolin-1. Note cytoplasmic staining of smooth muscle and endothelium. Paraffin section.

# Novocastra **CD1a**

**Clone MTB1**
1 mL, 0.1 mL lyophilized NCL-CD1a-235 **F P (HIER)**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-CD1a-235 **F P (HIER)** New!
7 mL ready-to-use RTU-CD1a-235 **F P (HIER)**
7 mL BOND ready-to-use PA0235 **P (HIER)**

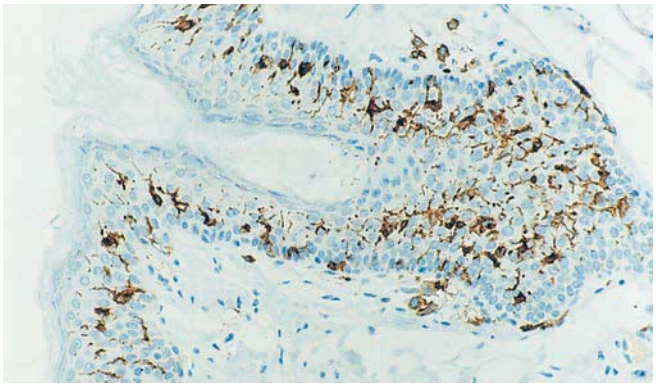
**Clone JPM30**
1 mL, 0.1 mL lyophilized NCL-CD1a-220 **F P (HIER)**

**Antigen Background**

CD1a is a protein of 43 to 49 kD expressed on dendritic cells and cortical thymocytes. CD1a antigen expression has been shown to be useful in differentiating Langerhans cells, powerful antigen presenting cells present in skin and epithelia, from interdigitating cells. Immunohistochemical studies for CD1a antigen have reported a reduction in epidermal Langerhans cells in graft versus host disease and the participation of CD1a antigen-positive dendritic cells in atherosclerotic lesion formation and asthmatic inflammation.

**Product Specific Information**

Clone MTB1 detects cortical thymocytes, Langerhans cells in epidermis, interdigitating cells of dermis and interdigitating cells of stratified squamous epithelium of tonsil. Clone MTB1 may also detect small focal groups of lymphocytes outside the germinal centers of tonsil indicating a cross-reaction with CD1b antigen. Clone JPM30 detects cortical thymocytes, Langerhans cells in epidermis, interdigitating cells of dermis, interdigitating cells of stratified squamous epithelium of tonsil but in addition it stains sweat gland ducts in the dermis and epithelial cells of small intestine indicative of cross-reactivity with CD1d antigen.



Normal human skin: immunohistochemical staining for CD1a antigen using NCL-CD1a-235. Note intense membrane staining of Langerhans cells. Paraffin section.

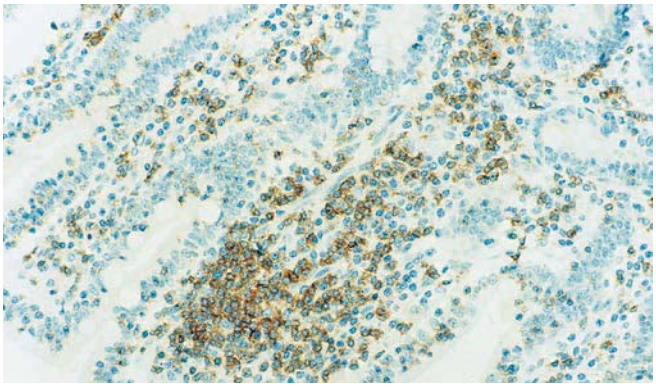
# Novocastra **CD2 (LFA-2)**

**Clone AB75**
1 mL, 0.1 mL lyophilized NCL-CD2-271 **P (HIER)**
1 mL liquid NCL-L-CD2-271 **P (HIER)**
7 mL ready-to-use RTU-CD2-271 **P (HIER)**

**Clone 11F11**
7 mL BOND ready-to-use PA0271 **P (HIER)**

**Antigen Background**

The CD2 antigen (LFA-2) is a monomeric 45 to 58 kD glycoprotein. It is an accessory molecule important in mediating the adhesion of activated T cells and thymocytes with antigen-presenting cells and target cells.



Human small intestine, T cell lymphoma: immunohistochemical staining for CD2 antigen (LFA-2) using NCL-CD2-271. Note intense membrane staining of T lymphocytes. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra **CD3**

## Clone LN10

1 mL, 0.1 mL liquid NCL-L-CD3-565 **P (HIER)**
7 mL BOND ready-to-use PA0553 **P (HIER)**

## Clone PS1

1 mL, 0.1 mL lyophilized NCL-CD3-PS1 **P (HIER) W**
1 mL liquid NCL-L-CD3-PS1 **P (HIER) W**
7 mL ready-to-use RTU-CD3-PS1 **P (HIER)**

## Clone UCHT1

1 mL lyophilized NCL-CD3 **F C**

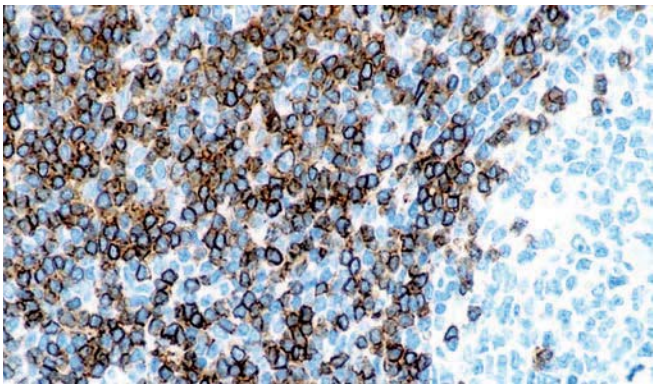
*Clone LN10 was developed to produce superior staining with PBS based buffers compared to clone PS1 on paraffin sections.*

### Antigen Background

The CD3 molecule consists of five different polypeptide chains with molecular weights ranging from 16 to 28 kD. The CD3 antigen is first detected in early thymocytes and its appearance probably represents one of the earliest signs of commitment to the T cell lineage.

### Product Specific Information

Clone PS1 is specific for the non-glycosylated epsilon chain of the human CD3 molecule (Chetty R and Gatter K. Journal of Pathology. 173: 303-307 (1994)). Clone LN10, our newest clone, is also specific for the non-glycosylated epsilon chain of the human CD3 molecule. Clones LN10, PS1, and UCHT1 recognize T cells in thymus, bone marrow, peripheral lymphoid tissue and blood and are all pan T cell markers.



Normal human tonsil: immunohistochemical staining for CD3 antigen using NCL-L-CD3-565. Note intense membrane staining of T lymphocytes. Paraffin section.

# Novocastra **CD4**

## Clone 4B12

1 mL, 0.1 mL lyophilized NCL-CD4-368 **F P (HIER) W**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-CD4-368 **F P (HIER)** New!
7 mL BOND ready-to-use PA0368 **P (HIER)**

## Clone 1F6

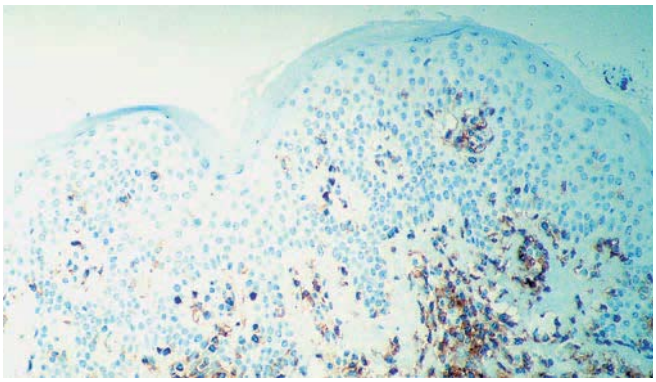
1 mL, 0.1 mL lyophilized NCL-CD4-1F6 **P (HIER) W**
1 mL liquid NCL-L-CD4-1F6 **P (HIER) W**
7 mL ready-to-use RTU-CD4-1F6 **P (HIER)**

*Clone 4B12 was developed to allow conventional protocol where endogenous peroxidase is blocked before primary antibody incubation to produce superior staining on paraffin sections.*

The CD4 molecule (T4) is a single chain transmembrane glycoprotein with a molecular weight of 59 kD. The CD4 antigen is expressed on a T cell subset (helper/inducer) representing 45 percent of peripheral blood lymphocytes and at a lower level on monocytes. Most cases of cutaneous T cell lymphoma, including mycosis fungoides, express the CD4 antigen and HTLV-1 associated adult T cell leukemia/lymphoma is also generally CD4 positive.

### Product Specific Information

Please note that the use of 1 percent or greater $H_2O_2$ to block endogenous peroxidase has a detrimental effect on the epitope recognized by clone 1F6. Therefore, it is recommended that endogenous peroxidase is blocked before retrieval with 0.5 percent $H_2O_2$ /methanol for 10 minutes, otherwise staining intensity may be reduced.



Human skin, mycosis fungoides: immunohistochemical staining for CD4 antigen using NCL-CD4-1F6. Note membrane staining of infiltrating T lymphocytes. Paraffin section.

# Novocastra **CD4 and CD8 Antibodies (duo pack)**

**Clone 1F6 and Clone 4B11**
2 × 0.5 mL lyophilized NCL-CD4/CD8d **P (HIER) W**
*For convenience, Leica Biosystems offer two antibodies in one pack.*

**Antigen Background**

Helper/inducer T cells (CD4 positive) and cytotoxic/suppressor T cells (CD8 positive) can be identified with the duo pack which supplies monoclonal antibodies to both CD4 and CD8 antigens.

**Product Specific Information**

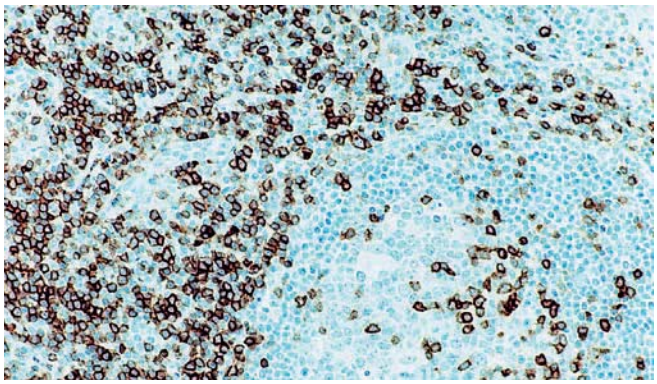
Please note that clone 1F6 requires 0.5 percent $H_2O_2$ /methanol treatment for 10 minutes BEFORE unmasking using EDTA to prevent any reduction in staining intensity. Please also note that the use of 1 percent or greater $H_2O_2$ to block endogenous peroxidase has a detrimental effect on the epitope recognized by clone 1F6.

# Novocastra **CD5**

**Clone 4C7**
1 mL, 0.1 mL lyophilized NCL-CD5-4C7 **P (HIER) W**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-CD5-4C7 **P (HIER) W** New!
7 mL ready-to-use RTU-CD5-4C7 **P (HIER)**
7 mL BOND ready-to-use PA0168 **P (HIER)**

**Antigen Background**

CD5 antigen is reported to be expressed on 95 percent of thymocytes and 72 percent of peripheral blood lymphocytes. In lymph nodes, the main reactivity is observed on T cells. CD5 antigen is also expressed by many T cell leukemias, lymphomas, activated T cells and on a subset of B cells located primarily in the mantle zones of normal lymph nodes. CD5 antigen expression is also reported in T cell acute lymphocytic leukemias (T-ALL), some B cell chronic lymphocytic leukemias (B-CLL) as well as B and T cell lymphomas.



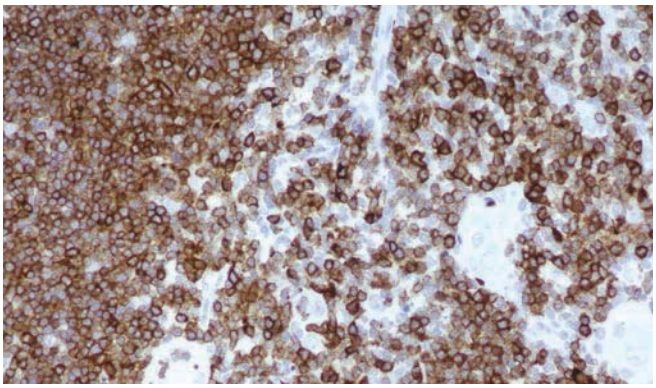
Human mantle cell lymphoma: immunohistochemical staining for CD5 antigen using NCL-CD5-4C7. Note intense membrane staining of tumor cells. Paraffin section.

# Novocastra **CD7**

**Clone LP15**
1 mL, 0.1 mL liquid NCL-L-CD7-580 **P (HIER)**
7 mL BOND ready-to-use PA0266 **P (HIER)**

**Antigen Background**

The CD7 molecule is a membrane-bound glycoprotein of 40 kD and is the earliest T cell specific antigen to be expressed in lymphocytes. CD7 antigen is also the only early marker to persist throughout differentiation. The function and role of the CD7 molecule has not yet been fully identified, although the activation of T cells with gamma/delta receptors has been proposed based on mAb-induced activation. CD7 antigen is reported to be found on the majority of peripheral blood T cells, most natural killer cells and thymocytes.



Human thymus: immunohistochemical staining for CD7 antigen using NCL-L-CD7-580. Note intense staining of cortical thymocytes. Paraffin section.

# Novocastra **CD8**

**Clone 1A5**
1 mL, 0.1 mL lyophilized NCL-CD8-295 **F P (HIER) W**
1 mL liquid NCL-L-CD8-295 **F P (HIER) W**
7 mL ready-to-use RTU-CD8-295 **F P (HIER)**

**Clone 4B11**
1 mL, 0.1 mL lyophilized NCL-CD8-4B11 **F P (HIER) W**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-CD8-4B11 **F P (HIER) W** New!
7 mL BOND ready-to-use PA0183 **P (HIER)**

**Antigen Background**

The CD8 molecule is composed of two chains and has a molecular weight of 32 kD. It is found on a T cell subset of normal cytotoxic/suppressor cells which make up approximately 20 to 35 percent of human peripheral blood lymphocytes. The CD8 antigen is reported to be detected on natural killer cells, 80 percent of thymocytes, on a subpopulation of 30 percent of peripheral blood null cells and 15 to 30 percent of bone marrow cells.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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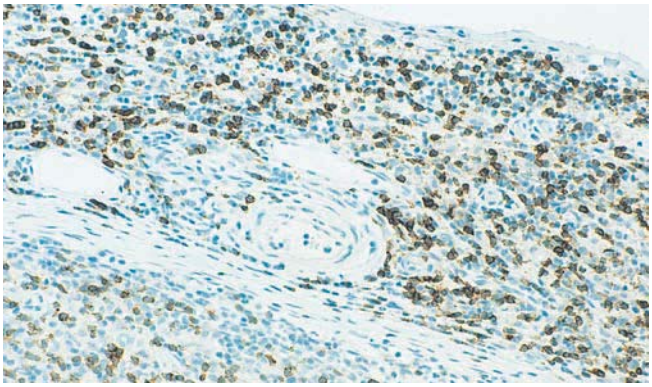


Large T cell immunoblastic lymphoma: immunohistochemical staining for CD8 antigen using NCL-CD8-295. Note intense membrane staining of T lymphocytes. Paraffin section.

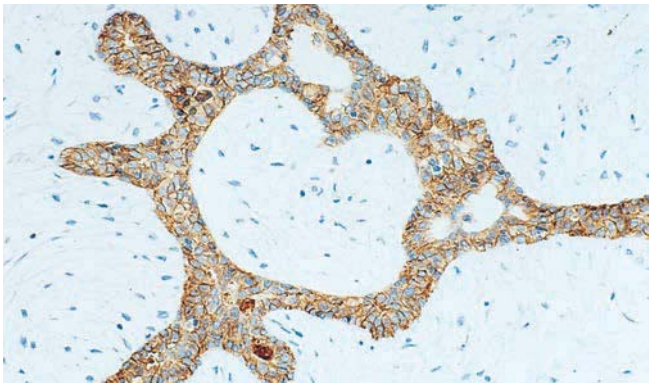
## Novocastra **CD9 (Motility-Related Protein-1)**

**Clone 72F6**

1 mL lyophilized NCL-CD9 **F P (HIER)**

**Antigen Background**

CD9 antigen is a 24 to 27 kD glycoprotein expressed on the surface of developing B lymphocytes, platelets, monocytes, eosinophils, basophils, stimulated T lymphocytes and by neurons and glial cells in the peripheral nervous system. It belongs to a family of membrane proteins termed tetraspanins which transverse the membrane four times. In pre-B cells and platelets, CD9 antigen regulates cell activation and aggregation possibly through an association with the integrin CD41/CD61 (GPIIb/GPIIIa). It also regulates cell motility in a variety of cell lines and appears to be an important regulator of Schwann cell behavior in the peripheral nervous system.



Human fibroadenoma: immunohistochemical staining for CD9 antigen using NCL-CD9. Note intense membrane staining of tumor cells. Paraffin section.

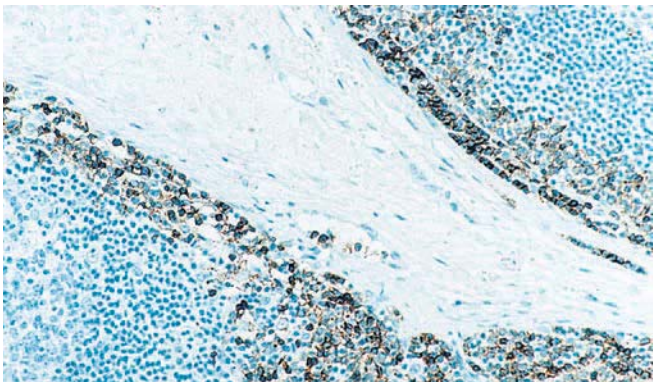
## Novocastra **CD10**

**Clone 56C6**

1 mL, 0.1 mL lyophilized NCL-CD10-270 **F P (HIER) W**
1 mL liquid NCL-L-CD10-270 **F P (HIER) W**
7 mL ready-to-use RTU-CD10-270 **F P (HIER)**
7 mL BOND ready-to-use PA0270 **P (HIER)**

**Antigen Background**

CD10 antigen, also called neprilysin, is a 100 kD cell surface metalloendopeptidase which inactivates a variety of biologically active peptides. It was initially identified as the common acute lymphoblastic leukemia antigen (CALLA) and was thought to be tumor-specific. Subsequent studies, however, have shown that CD10 antigen is expressed on the surface of a wide variety of normal and neoplastic cells. In other lymphoid malignancies, CD10 antigen is reported to be expressed on cells of lymphoblastic, Burkitt's and follicular lymphomas. CD10 antigen has been identified on the surface of normal early lymphoid progenitor cells, immature B cells within adult bone marrow and germinal center B cells within lymphoid tissue. It is also expressed in various non-lymphoid cells and tissues, such as breast myoepithelial cells, bile canaliculi, fibroblasts, with especially high expression on the brush border of kidney and gut epithelial cells. (G. McIntosh et al. American Journal of Pathology. 154(1): 77-82 (1999)).



Human lymphoblastic lymphoma: immunohistochemical staining for CD10 antigen using NCL-CD10-270. Note intense membrane staining of neoplastic lymphoid cells. Paraffin section.

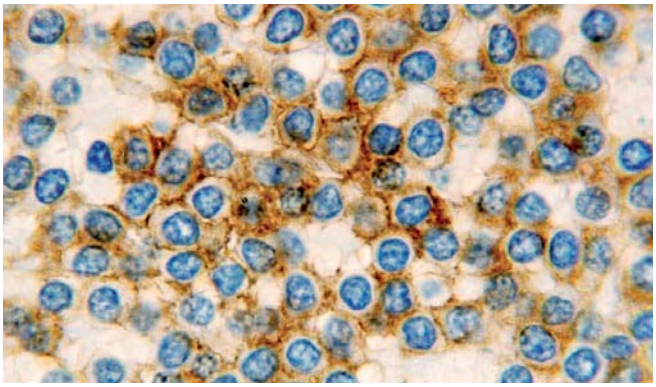
## Novocastra **CD11c**

**Clone 5D11**

1 mL, 0.1 mL liquid NCL-L-CD11c-563 **P (HIER)**
7 mL BOND ready-to-use PA0554 **P (HIER)**

**Antigen Background**

CD11c is a member of the leukocyte integrin family of adhesion proteins. It is reported to be expressed in normal tissues, mainly on myeloid cells eg in bone marrow myelocytes, premyelocytes, metamyelocytes, non-segmented and segmented neutrophils with high levels reported on tissue macrophages and monocytes and with lowest levels in granulocytes. It is also reported to be expressed on NK cells, activated T cells, lymphoid cell lines, including hairy cell leukemias and a proportion of interdigitating dendritic cells.



Human hairy cell leukemia: immunohistochemical staining for CD11c antigen using NCL-L-CD11c-563. Note membrane staining of malignant cells. Paraffin section.

## Novocastra **CD13**

**Clone 38C12**
1 mL, 0.1 mL lyophilized NCL-CD13-304 **P (HIER)**

**Antigen Background**

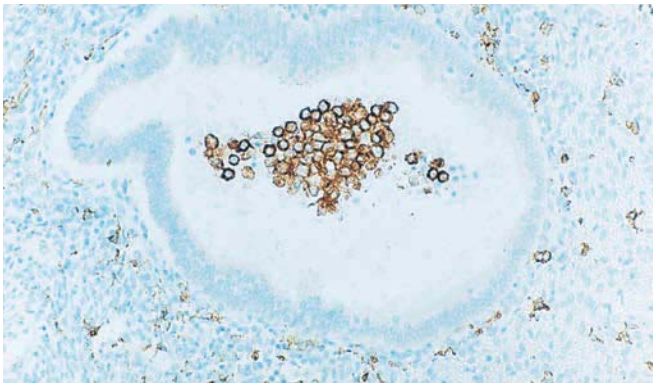
CD13 antigen, also known as aminopeptidase N, is a member of the type II integral membrane metalloproteases which also includes the leukocyte antigens CD10, CD26, CD73 and BP-1. CD13 antigen is a receptor for the coronaviruses which cause respiratory disease in humans and several animal species. The antigen functions as a zinc-binding metalloprotease which plays a role in cell surface antigen presentation by trimming the N-terminal amino acids from MHC class II-bound peptides. CD13 antigen is reported to be expressed on granulocytes, monocytes and their precursors, most acute myeloid leukemias and a smaller proportion of acute lymphoid leukemias. Non-hematopoietic cells which express CD13 antigen include epithelial cells, renal proximal tubules, intestinal brush border, endothelial cells, fibroblasts, brain cells, bone marrow, osteoclasts and cells lining the bile canaliculi.

## Novocastra **CD14**

**Clone 7**
1 mL, 0.1 mL lyophilized NCL-CD14-223 **P (HIER) W**
1 mL liquid NCL-L-CD14-223 **P (HIER) W**

**Antigen Background**

CD14 antigen is a glycosyl-phosphatidylinositol (GPI)-linked glycoprotein with a molecular weight of 55 kD. The CD14 antigen is reported to be expressed on cells of the myelomonocytic lineage including monocytes, macrophages and Langerhans cells. Low expression is also reported on neutrophils and on B cells. CD14 antigen is a receptor for bacterial lipopolysaccharide (LPS, endotoxin) and the lipopolysaccharide binding protein (LBP). LBP and CD14 antigen serve two physiological roles. These proteins act as opsonin and opsonic receptor, respectively, to promote the phagocytic uptake of bacteria or LPS-coated particles by macrophages.



Human uterus: immunohistochemical staining for CD14 antigen using NCL-CD14-223. Note membrane staining of macrophages within an endometrial gland and lymphocytes in the stroma. Paraffin section.

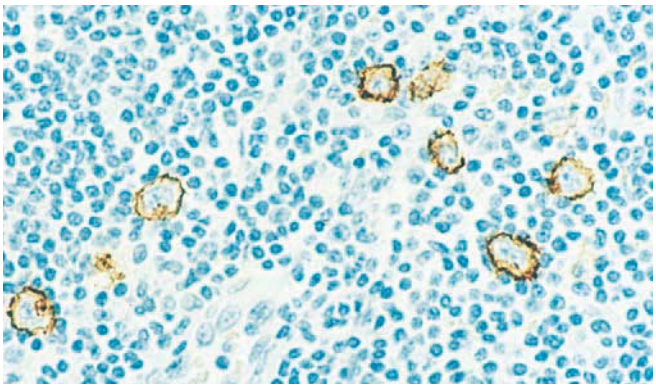
## Novocastra **CD15**

**Clone BY87**
1 mL, 0.1 mL lyophilized NCL-CD15 **F P (HIER/Enzyme)**
1 mL liquid NCL-L-CD15 **F P (HIER/Enzyme)**
7 mL ready-to-use RTU-CD15 **F P (HIER/Enzyme)**

**Clone Carb-1**
7 mL BOND ready-to-use PA0039 **P (HIER)**

**Antigen Background**

CD15 antigen, also known as X-hapten, is reported to be expressed on 90 percent of circulating human granulocytes, 30 to 60 percent of circulating monocytes and is absent from normal lymphocytes. The CD15 antigen is also expressed on Reed Sternberg cells of Hodgkin's disease and some leukemias.



Hodgkin's disease: immunohistochemical staining for CD15 antigen using NCL-CD15. Note membrane staining and characteristic staining of paranuclear hofs of Reed Sternberg cells. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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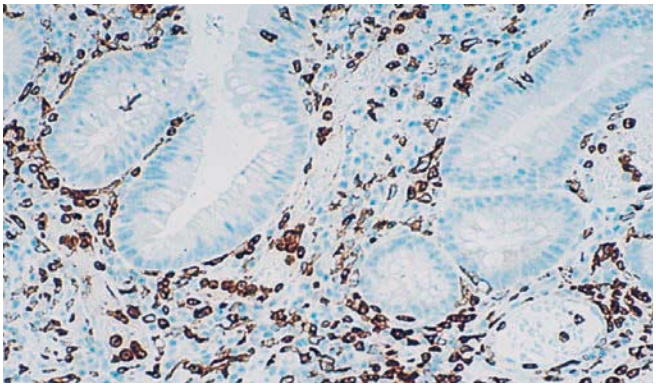
## Novocastra **CD16**

**Clone 2H7**
1 mL, 0.1 mL lyophilized NCL-CD16 **P (HIER)**

**Antigen Background**

CD16 antigen has a molecular weight of 50 to 70 kD and is a low affinity Fc receptor for complexed IgG, Fc/gamma RIII, expressed on natural killer (NK) cells, granulocytes, activated macrophages and a subset of T cells expressing alpha-beta or gamma-delta T cell antigen receptors. The CD16 antigen exists both as a glycosyl-phosphatidylinositol (GPI)-anchored protein in polymorphonuclear cells and as a transmembrane protein in NK cells.



Human colon, ulcerative colitis: immunohistochemical staining for CD16 antigen using NCL-CD16. Note intense membrane staining of infiltrating natural killer cells, granulocytes and activated macrophages. Paraffin section.

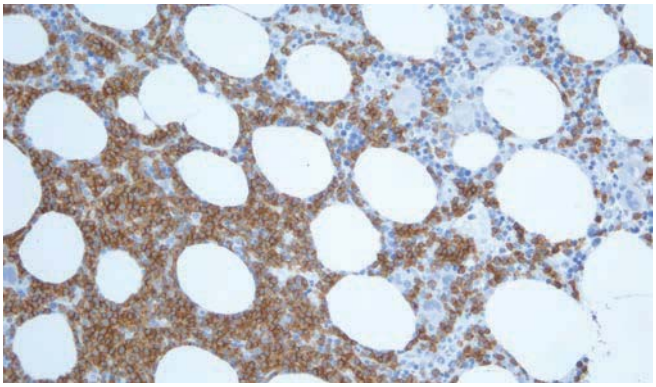
## Novocastra **CD19**

**Clone BT51E**
1 mL, 0.1 mL liquid NCL-L-CD19-163 **P (HIER) W** New!
7 mL BOND ready-to-use PA0843 **P (HIER)**

**Clone 4G7/2E**
1 mL lyophilized NCL-CD19-2 **F C**
*Clone BT51E was developed to be effective on formalin-fixed, paraffin-embedded tissue sections.*

**Antigen Background**

CD19 is a member of the immunoglobulin superfamily and has two Ig like domains. It is a single chain glycoprotein present on the surface of B lymphocytes and follicular dendritic cells of the hematopoietic system. CD19 is a crucial regulator in B cell development, activation and differentiation. On B cells, CD19 associates with CD21, CD81 and CD225 (Leu-13) forming a signal transduction complex. CD19 is expressed from the earliest recognizable B cell lineage stage, through development to B cell differentiation but is lost on maturation to plasma cells.



Human bone marrow: immunohistochemical staining for CD19 using NCL-L-CD19-163. Note membrane staining of B cells. Paraffin section.

## Novocastra **CD20**

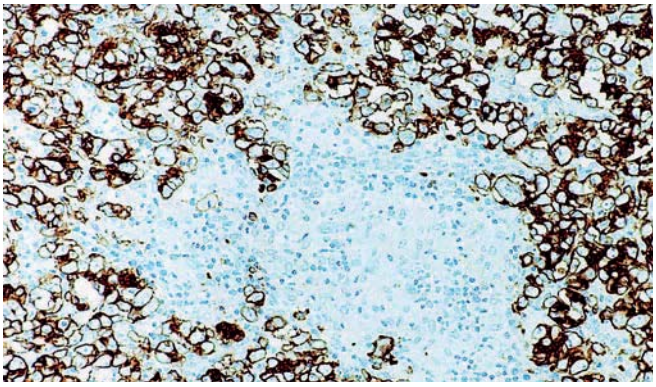
**Clone 7D1**
1 mL, 0.1 mL lyophilized NCL-CD20-7D1 **F P (HIER) W**

**Clone MJ1**
1 mL, 0.1 mL lyophilized NCL-CD20-MJ1 **F P (HIER)**
7 mL BOND ready-to-use PA0906 **P (HIER)**

**Clone L26**
1 mL lyophilized NCL-CD20-L26 **F P (HIER) W**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-CD20-L26 **F P (HIER) W** New!
7 mL ready-to-use RTU-CD20-L26 **F P (HIER)**

**Antigen Background**

The CD20 antigen is a non-glycosylated phosphoprotein of approximately 33 kD which is expressed on normal and malignant human B cells and is thought to act as a receptor during B cell activation and differentiation. CD20 antigen has been reported to be expressed on normal B cells from peripheral blood, lymph node, spleen, tonsil, bone marrow, acute leukemias and chronic lymphocytic leukemias.



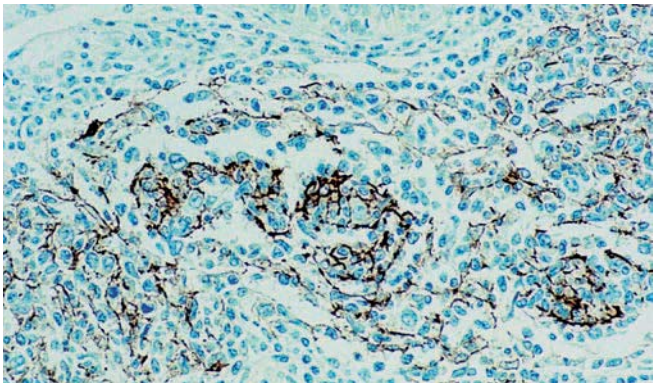
Human centroblastic lymphoma: immunohistochemical staining for CD20 antigen using NCL-CD20-7D1. Note intense membrane staining of B cells. Paraffin section.

# Novocastra **CD21**

**Clone 2G9**
1 mL, 0.1 mL lyophilized NCL-CD21-2G9 **F P (HIER)**
1 mL liquid NCL-L-CD21-2G9 **F P (HIER)**
7 mL BOND ready-to-use PA0171 **P (HIER)**

**Antigen Background**

CD21 antigen is a type I integral membrane glycoprotein of molecular weight 140 kD, which functions as the receptor for the C3d fragment of the third complement component. The CD21 molecule, present on mature B cells, is involved in transmitting growth-promoting signals to the interior of the B cell and acts as a receptor for Epstein-Barr virus. CD21 antigen is reported to be found in B cell chronic lymphocytic leukemias and in a subset of T cell acute lymphocytic leukemias but is absent on T lymphocytes, monocytes and granulocytes. CD21 antigen is also reported to be expressed in follicular dendritic cells and in follicular and mantle cell lymphomas, mature leukemias and lymphomas.



Human follicular lymphoma: immunohistochemical staining for CD21 antigen using NCL-CD21-2G9. Note intense membrane staining of follicular dendritic cells. Paraffin section.

# Novocastra **CD22 (BL-CAM)**

**Clone FPC1**
1 mL, 0.1 mL lyophilized NCL-CD22-2 **P (HIER)**
7 mL BOND ready-to-use PA0249 **P (HIER)**

**Antigen Background**

The CD22 antigen (BL-CAM) is a type 1 integral membrane glycoprotein with a molecular weight of 130 to 140 kD. It is a heterodimer of two independently expressed glycoprotein chains, present both on the membrane and in the cytoplasm of B lymphocytes. Expression of the CD22 antigen is reported to appear early in B cell lymphocyte differentiation at approximately the same stage as that of the CD19 antigen expression. Surface antigen expression is variable and may be lost upon differentiation. CD22 antigen is also reported to be strongly expressed on hairy cell leukemias. It is absent on peripheral blood T cells, T cell leukemias, granulocytes and monocytes.

# Novocastra **CD23**

**Clone 1B12**
1 mL, 0.1 mL lyophilized NCL-CD23-1B12 **F P (HIER)**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-CD23-1B12 **F P (HIER) C** New!
7 mL ready-to-use RTU-CD23-1B12 **F P (HIER)**
7 mL BOND ready-to-use PA0169 **P (HIER)**

**Antigen Background**

The CD23 molecule is the low affinity IgE receptor found on B cells. It is a membrane glycoprotein of 45 kD and is reported to be found on a sub-population of peripheral blood cells, B lymphocytes and on EBV-transformed B lymphoblastoid cell lines. Expression of CD23 antigen has been reported on monocytes and dendritic cells.

# Novocastra **CD25 (Interleukin-2 Receptor)**

**Clone 4C9**
1 mL, 0.1 mL lyophilized NCL-CD25-305 **P (HIER)**
7 mL BOND ready-to-use PA0305 **P**

See also Interleukin-2 Receptor (CD25) on page 163.

# Novocastra **CD27**

**Clone 137B4**
1 mL lyophilized NCL-CD27 **F P (HIER)**

**Antigen Background**

CD27 antigen, a member of the nerve growth factor/tumor necrosis factor receptor superfamily, is a type I transmembrane protein consisting of a disulphide-linked 120 kD dimer. CD27 antigen is reported to be expressed on mature thymocytes and on the majority of human peripheral blood T lymphocytes, on both CD4 positive and CD8 positive subsets. CD27 antigen is also expressed on activated B lymphocytes and a proportion of resting NK cells. Among CD4 positive cells, CD27 antigen is preferentially expressed on unprimed CD4 positive/CD45RA positive/CD45RO negative T lymphocytes while primed CD4 positive/CD45RA negative/CD45RO positive T lymphocytes express low levels of CD27.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

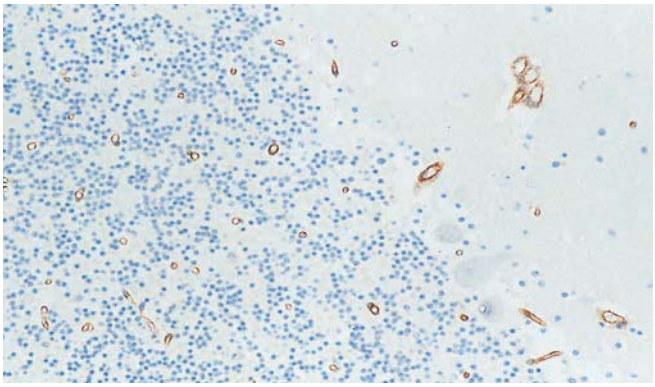
# Novocastra **CD29**

## Clone 7F10

1 mL, 0.1 mL lyophilized NCL-CD29 **P (HIER)**

### Antigen Background

The β1 integrins are a family of structurally-related heterodimeric molecules and are composed of a β1 subunit (CD29 antigen) which is associated with 1 of 6 known alpha subunits. These impart the specificity to each of the receptors and the VLA molecules which are designated according to their alpha chain eg VLA-1 is α1/β1, VLA-2 is α2/β1. The adhesive properties of CD29 heterodimers on T cells can be regulated by cell activation, possibly through interactions between the cytoplasmic domain of CD29 antigen and the cytoskeleton. CD29 antigen is reported to be expressed on most cells including all leukocytes, although only at low levels on granulocytes. On T cells, CD29 antigen is expressed at higher levels on memory cells than on naive cells. The co-expression of CD4 and CD29 antigens is found in helper/inducer subpopulation of CD4 lymphocytes. CD29 antigen is one of several additional molecules reported to be found on the cell membrane of hepatocytes in cases of cirrhosis, alcoholic hepatitis and hepatitis C. Reduced expression of CD29 antigen together with the β2 integrin, CD11b, has been reported on peripheral blood lymphocytes from Graves' disease patients.



Human brain, cerebellum: immunohistochemical staining for CD29 antigen using NCL-CD29. Note membrane staining of endothelial cells. Paraffin section.

# Novocastra **CD30**

## Clone JCM182

1 mL, 0.1 mL liquid NCL-L-CD30-591 **P (HIER) W**
7 mL BOND ready-to-use PA0790 **P (HIER)**

## Clone 1G12

1 mL, 0.1mL lyophilized NCL-CD30 **F P (HIER)**
1 mL liquid NCL-L-CD30 **F P (HIER)**
7 mL ready-to-use RTU-CD30 **F P (HIER)**
7 mL BOND ready-to-use PA0153 **P (HIER)**

## Clone 15B3

1 mL, 0.1 mL lyophilized NCL-CD30-365 **F P (HIER)**

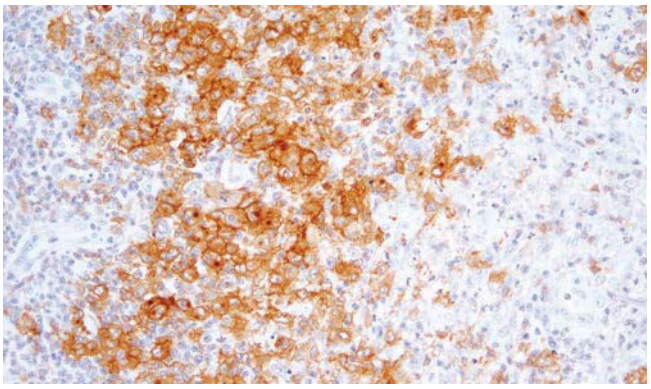
*Clone JCM182 was developed to be highly effective on formalin-fixed, paraffin-embedded tissue sections.*

### Antigen Background

The CD30 antigen is a single chain glycoprotein with a molecular weight of 120 kD. CD30 antigen is known to act as a receptor for a cytokine ligand, CD30L, and may also play a role in the regulation of cellular growth and transformation. CD30 antigen is reported to be expressed on the surface of multinucleated Reed Sternberg cells, mononuclear Hodgkin's cells and in the majority of anaplastic large cell lymphomas. The CD30 antigen is expressed in non-Hodgkin's lymphoma and virally transformed cells, eg EBV-transformed B cells.

### Product Specific Information

Using retrieval solutions other than that recommended for Clone JCM182 in the datasheet may increase background reactivity.



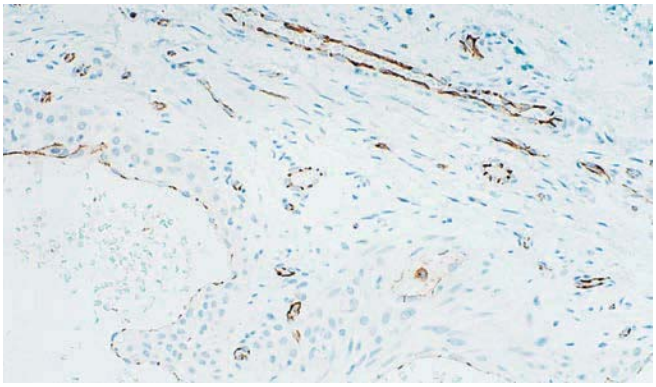
Hodgkin's lymphoma: immunohistochemical staining for CD30 antigen using NCL-L-CD30-591. Note membrane staining and characteristic staining of paranuclear hofs of Reed Sternberg cells. Paraffin section.

# Novocastra **CD31 (PECAM-1)**

**Clone 1A10**
1 mL, 0.1 mL lyophilized NCL-CD31-1A10 **P (HIER)**
7 mL BOND ready-to-use PA0250 **P (HIER)**

**Antigen Background**

CD31 antigen (PECAM-1) is a single chain transmembrane glycoprotein with a molecular weight of 130 to 140 kD. The CD31 molecule is expressed on the surface of platelets, monocytes, granulocytes, B cells and at the endothelial intracellular junction. The molecule has an extracellular domain that contains six Ig-like homology units of C2 subclass, typical of cell to cell adhesion molecules. This domain mediates endothelial cell to cell adhesion, plays a role in endothelial contact and may serve to stabilize the endothelial cell monolayer. The CD31 molecule also has a cytoplasmic domain with potential sites for phosphorylation after cellular activation. The properties of CD31 antigen suggest that it is involved in interactive events during angiogenesis, thrombosis and wound healing. Angiogenesis is essential for tumor growth and metastases.



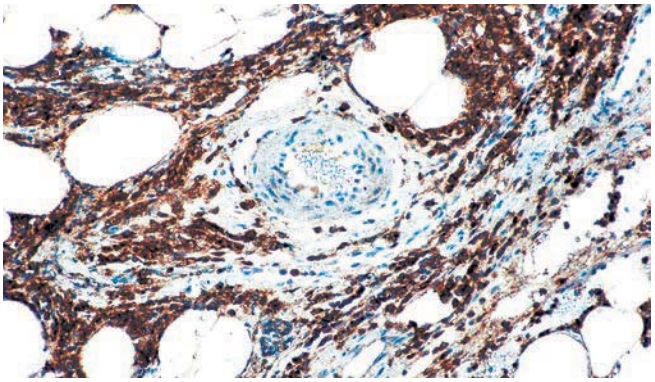
Human glomangioma: immunohistochemical staining for CD31 antigen (PECAM-1) using NCL-CD31-1A10. Note intense membrane staining of endothelial cells. Paraffin section.

# Novocastra **CD33**

**Clone PWS44**
1 mL, 0.1 mL liquid NCL-L-CD33 **P (HIER) W**
7 mL BOND ready-to-use PA0555 **P (HIER)**

**Antigen Background**

CD33 antigen is reported to appear on myelomonocytic precursor cells after CD34 antigen expression. It then continues to be expressed on both the myeloid and monocyte lineages, although it is reported to be absent on granulocytes. It has been reported that expression of CD33 is restricted to monocytes, premyelocytes, myeloid blasts, some acute undifferentiated leukemias and acute lymphoblastic leukemias.



Acute myeloid leukemia: immunohistochemical staining for CD33 antigen using NCL-L-CD33. Note intense cytoplasmic and membrane staining of malignant cells. Paraffin section.

# Novocastra **CD34 (Endothelial Cell Marker)**

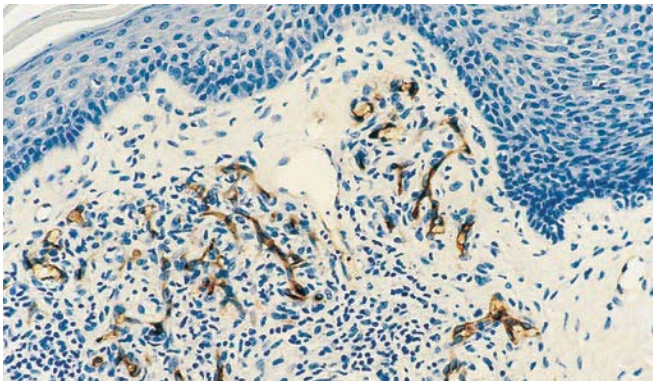
**Clone QBEnd/10**
1 mL, 0.1 mL lyophilized NCL-END **F P (Enzyme) C**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-END **F P (Enzyme) C** New!
7 mL ready-to-use RTU-END **F P (Enzyme)**
7 mL BOND ready-to-use PA0212 **P (HIER)**

**Antigen Background**

CD34 antigen is a single chain transmembrane glycoprotein with a molecular weight of 110 kD. The CD34 protein is selectively expressed on human lymphoid and myeloid haemapoietic progenitor cells. The CD34 protein is also expressed on vascular endothelium.

**Product Specific Information**

Enzyme digestion of paraffin sections is recommended with Clone QBEnd/10 in preference to heat induced epitope retrieval as it produces stronger staining and reduces background elastin staining.



Human tonsil: immunohistochemical staining for CD34 antigen using NCL-L-END. Note intense staining of neoplastic endothelial cells and absence of staining of stromal cells. Paraffin section.

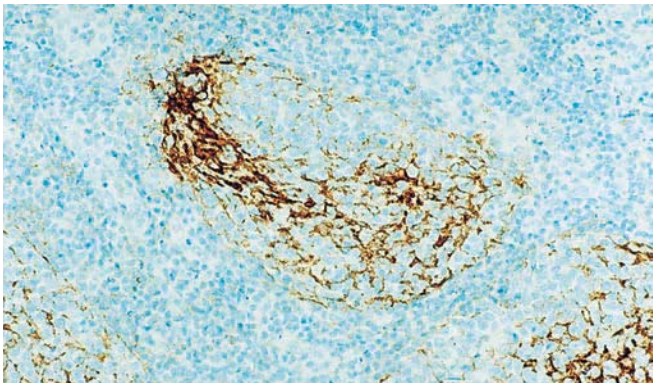
F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra **CD35**

**Clone RLB25**
1 mL, 0.1 mL lyophilized NCL-CD35 **F P (Enzyme)**

The CD35 antigen, also known as CR1 or C3b/C4b R, is a transmembrane protein of 160 to 250 kD which binds complement components C3b and C4b. It mediates phagocytosis by neutrophils and monocytes of particles coated with C3b or C4b. CD35 antigen has an inhibitory effect on complement activation by both the classical and alternative pathways. CD35 antigen is reported to be found on erythrocytes, B cells, a subset of T cells, monocytes, macrophages cultured in vitro, neutrophils, eosinophils, glomerular podocytes and follicular dendritic cells. Decreased levels of CD35 antigen has been reported on B cells in patients with HIV infection.



Normal human tonsil: immunohistochemical staining for CD35 antigen using NCL-CD35. Note intense membrane staining of follicular dendritic cells. Paraffin section.

# Novocastra **CD37**

**Clone CT1**
1 mL lyophilized NCL-CD37 **F P (HIER)**

**Antigen Background**

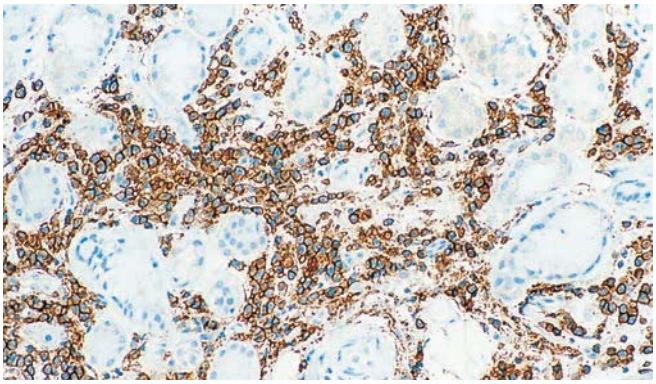
CD37 antigen is a member of the TM4 superfamily with a molecular weight of 40 to 52 kD. CD37 antigen was originally defined as an antigen of mature B lymphocytes where it is highly expressed. It is reported not to be expressed on pre-B cells or plasma cells and is expressed only at low level in T cells, neutrophils, monocytes and some myelomonocytic leukemia cells. NK cells, platelets and erythrocytes also do not express CD37 antigen. CD37 antigen on B cells associates non-covalently with MHC class II, CD19 and CD21 antigens and with other TM4 superfamily molecules CD53, CD81 and CD82.

# Novocastra **CD38**

**Clone SPC32**
1 mL, 0.1 mL lyophilized NCL-CD38-290 **F P (HIER)**
1 mL liquid NCL-L-CD38-290 **F P (HIER)**

**Antigen Background**

The CD38 molecule is a type II single transmembrane glycoprotein with a molecular weight of 46 kD. It is an ectoenzyme with the activities of ADP-ribosyl cyclase, cyclic ADP-ribose hydrolase, NAD glycohydrolase and is involved in both the formation and hydrolysis of cADPR, a second messenger that regulates the mobilization of intracellular $Ca^{2+}$ ions. Although the CD38 molecule was originally identified as a T lymphocyte differentiation antigen, it is reported to be expressed in a wide range of cells and tissues. CD38 antigen can deliver potent growth and differentiation signals to lymphoid and myeloid cells. It is found on immature cells of the B and T cell lineages but not on most mature resting peripheral lymphocytes. It is also present on thymocytes, pre-B cells, germinal center B cells, mitogen-activated T cells, Ig-secreting plasma cells, monocytes, NK cells, erythroid and myeloid progenitors in the bone marrow and brain cells. CD38 antigen has also been reported in neurofibrillary tangles, the pathological indicator of Alzheimer's disease that occurs in the neuronal perikarya and proximal dendrites.



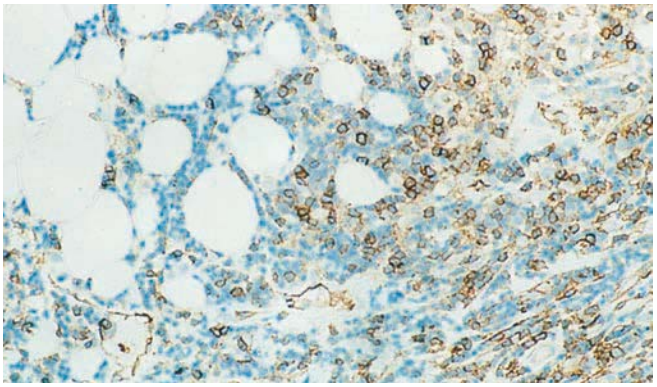
Chronically inflamed human bronchus: immunohistochemical staining for CD38 antigen using NCL-CD38-290. Note intense membrane staining of infiltrating activated T lymphocytes. Paraffin section.

# Novocastra **CD39**

**Clone 22A9**
1 mL lyophilized NCL-CD39 **P (HIER)**

**Antigen Background**

CD39 antigen is a transmembrane glycoprotein found on mature B lymphocytes, follicular dendritic cells, endothelial cells, activated T cells, NK cells and Langerhans cells. It is also known as E-type apyrase which hydrolyses extracellular ATP and ADP, a function important to homotypic adhesion and platelet aggression. CD39 antigen expressing cells may provide protection from the toxic effects of ATP leaked from damaged cells. CD39 antigen may enable tumor cells to reduce contact with T lymphocytes and escape immunological recognition.



Human lymph node, B cell lymphoma: immunohistochemical staining for CD39 antigen using NCL-CD39. Note intense membrane staining of tumor cells. Paraffin section.

## Novocastra **CD40**

**Clone 11E9**
1 mL, 0.1 mL lyophilized NCL-CD40 **P (HIER) W**

**Antigen Background**

The CD40 antigen is a single chain glycoprotein with a calculated molecular weight of 27 kD. It is known to be a member of the tumor necrosis factor/nerve growth factor superfamily and shows a significant homology to the Hodgkin's disease-associated antigen, CD30. The precise function of the CD40 antigen is unknown but it appears to be involved in the transduction of regulatory signals for cellular functions such as B cell proliferation and differentiation. It is also important in the prevention of apoptosis of germinal center B cells. The CD40 antigen is reported to be found on mature B cells except for plasma cells.

## Novocastra **CD42b (GPIb)**

**Clone MM2/174**
1 mL lyophilized NCL-CD42b **F P (HIER)**

**Antigen Background**

The CD42b glycoprotein, also known as GPIb, is a co-factor of ristocetin-induced aggregation and is involved in the binding of platelets to blood vessel walls. The CD42b antigen is reported to be expressed on platelets and on megakaryocytes in bone marrow and in megakaryoblastic leukemias. The absence of CD42b antigen on platelets is reported to be a possible indicator of Bernard-Soulier disease.

## Novocastra **CD43**

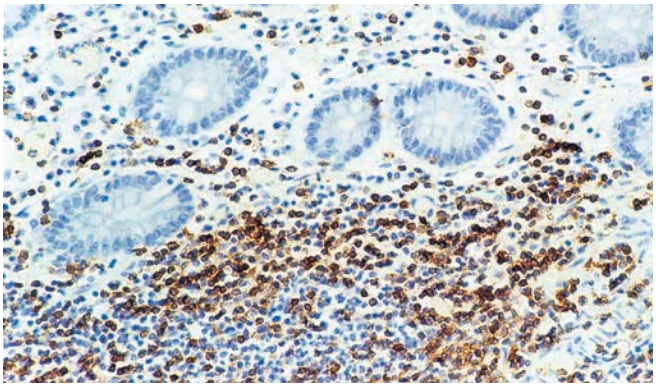
**Clone MT1**
1 mL lyophilized NCL-MT1 **F P (Enzyme) W**
1 mL liquid NCL-L-MT1 **F P (Enzyme) W**
7 mL ready-to-use RTU-MT1 **F P (Enzyme)**
7 mL BOND ready-to-use PA0938 **P (HIER)**

**Antigen Background**

The CD43 antigen is expressed on the membrane and in the cytoplasm of T cells and cells of myeloid lineage. The molecule itself exhibits molecular weight heterogeneity with bands of 90 to 140 kD observed on SDS-PAGE between different cell lines. Cells expressing the CD43 antigen are reported to include normal and neoplastic T cells. A small proportion of B cell chronic leukemias and centrocytic lymphomas are also reported to express CD43 antigen.

**Product Specific Information**

Enzyme pretreatment may enhance staining with clone MT1 in some cases.



Human mantle cell lymphoma: immunohistochemical staining for CD43 antigen using NCL-MT1. Note intense membrane staining of tumor cells. Paraffin section.

## Novocastra **CD44 (HCAM)**

**Clone DF1485**
1 mL, 0.1 mL lyophilized NCL-CD44-2 **F P (HIER) W**

**Antigen Background**

The CD44 antigen (H-CAM) is an 80 to 95 kD transmembrane glycoprotein with extensive O-linked glycosylation. The antigen is a cell surface receptor for hyaluronate, suggesting a role in the regulation of cell substrate interactions, as well as cell migration. CD44 antigen is reported to be expressed on T cells, B cells, monocytes, granulocytes, erythrocytes and weakly on platelets. Other CD44 antigen positive cell types are reported to include epithelial cells, glial cells, fibroblasts and myocytes. Increased expression of CD44 antigen is found on some carcinomas and it has been reported that transition of tumor cell lines from non-metastatic to metastatic may be associated with changes in the expression of CD44 antigen variants.

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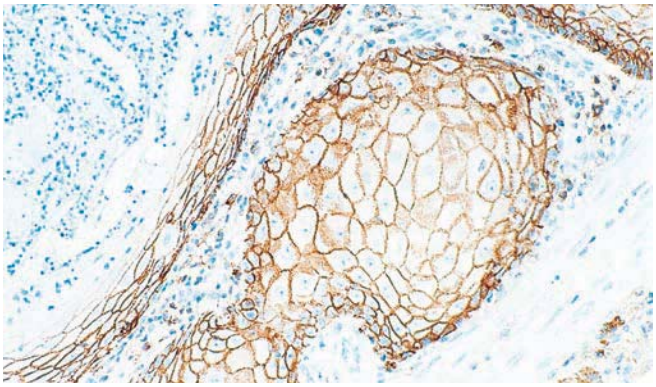


Human squamous cell carcinoma of breast: immunohistochemical staining for CD44 antigen (H-CAM) using NCL-CD44-2. Note intense membrane staining of tumor cells. Paraffin section.

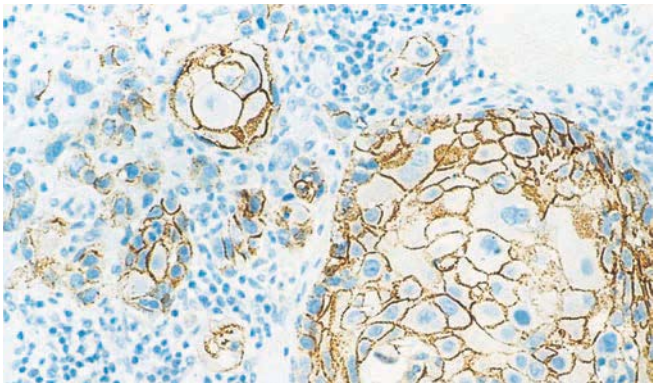
## Novocastra **CD44 Variant Antibodies**

**Clone VFF-327v3**
1 mL lyophilized CD44 variant 3 NCL-CD44v3 **F P (HIER) W**

**Clone VFF-7**
1 mL lyophilized NCL-CD44v6 **F P (HIER)**

**Antigen Background**

The CD44 molecule belongs to a family of cellular adhesion molecules found on a wide range of normal and malignant cells in epithelial, mesothelial and hemopoiesis tissues. CD44 is a single gene with 20 exons, of which 10 are normally expressed to encode the basic CD44 (H-CAM) molecule. The additional 10 exons (v1 to v10) are only expressed by alternative splicing of the nuclear RNA. The expression of specific cell adhesion molecule CD44 splice variants has been reported to be associated with metastasis in certain human malignancies.



Human squamous cell carcinoma, floor of the mouth: immunohistochemical staining for CD44 variant 3 using NCL-CD44v3. Note intense membrane staining of tumor cells. Paraffin section.

## Novocastra **CD45**

**Clone X16/99**
1 mL, 0.1 mL lyophilized NCL-LCA **F P (HIER) C**
1 mL, 0.1 mL, 0.5 mL liquid NCL-L-LCA **F P (HIER) C**
7 mL BOND ready-to-use PA0042 **P (HIER)**

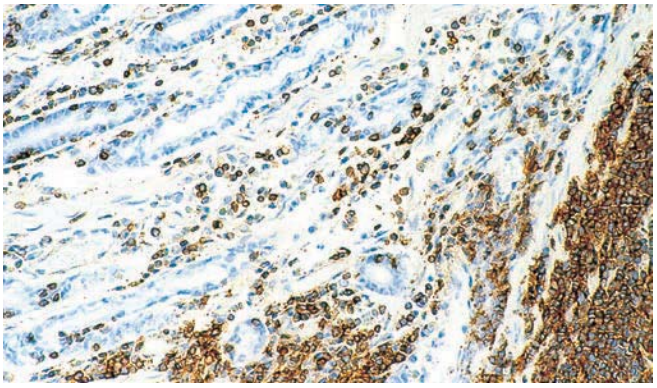
**Clone RP2/18, RP2/22**
1 mL lyophilized NCL-LCA-RP **F P**
1 mL liquid NCL-L-LCA-RP **F P**
7 mL ready-to-use RTU-LCA-RP **F P**

**Antigen Background**

The CD45 antigen (leukocyte common antigen) is a family of five or more high molecular weight glycoproteins present on the surface of the majority of the human leukocytes (including lymphocytes, monocytes and eosinophils) but absent from erythrocytes and platelets. Various isoforms of CD45 are generated by alternative splicing of three exons. Expression of CD45 is necessary for signalling through the T cell receptor.

**Product Specific Information**

NCL-LCA-RP is a cocktail of two antibodies, clone RP2/18 and RP2/22. The heat induced epitope retrieval (HIER) technique may enhance staining in some cases with NCL-LCA-RP, NCL-L-LCA-RP and RTU-LCA-RP.



Human stomach, B cell lymphoma: immunohistochemical staining for CD45 antigen using NCL-L-LCA-RP. Note intense membrane staining of tumor cells. Paraffin section.

## Novocastra **CD45RA**

**Clone B1**
1 mL lyophilized NCL-B1 **F P C**

**Antigen Background**

The CD45R subfamily comprises a restricted form of the leukocyte common antigen and is divided into four isoforms: CD45RA, CD45RB, CD45RC and CD45RO. The CD45RA molecule, a 220 kD isoform of CD45, is reported to be expressed on B cells, monocytes and a small proportion of T cells.

## Novocastra **CD45RO**

**Clone UCHL1**
1 mL, 0.1 mL lyophilized NCL-UCHL1 **F P (HIER) C**
1 mL liquid NCL-L-UCHL1 **F P (HIER) C**
7 mL ready-to-use RTU-UCHL1 **F P (HIER)**
7 mL BOND ready-to-use PA0146 **P (HIER)**

**Antigen Background**

The CD45RO molecule, a 180 kD isoform of CD45, is reported to be expressed on 48 percent of peripheral blood T lymphocytes, 37 percent of CD4 positive lymphocytes, 80 percent of thymocytes and on the majority of T cell malignancies. Monocytes and granulocytes show surface expression of the antigen whereas tissue macrophages exhibit cytoplasmic expression.

## Novocastra **CD54 (ICAM-1)**

**Clone 23G12**
1 mL lyophilized NCL-CD54-307 **P (HIER)**

See also ICAM-1 (CD54) on page 161.

## Novocastra **CD56 (NCAM)**

**Clone CD564**
1 mL, 0.1 mL lyophilized NCL-CD56-504 **P (HIER)**
1 mL, 0.1 mL liquid NCL-L-CD56-504 **P (HIER)** New!
7 mL BOND ready-to-use PA0191 **P (HIER)**

**Clone 1B6**
1 mL, 0.1 mL lyophilized NCL-CD56-1B6 **P (HIER) W**
1 mL liquid NCL-L-CD56-1B6 **P (HIER) W**
7 mL ready-to-use RTU-CD56-1B6 **P (HIER)**
*Clone CD564 was developed to produce superior staining on paraffin sections.*

The neural cell adhesion molecules are a family of closely-related cell surface glycoproteins thought to play a role in embryogenesis, development and contact-mediated interactions between neural cells. The CD56 antigen (NCAM) consists of four major isoforms generated by differential splicing of the RNA transcript from a single gene located on chromosome 5. The CD56 antigen is expressed on neurons, astrocytes, Schwann cells, NK cells and a subset of activated T lymphocytes.

## Novocastra **CD57**

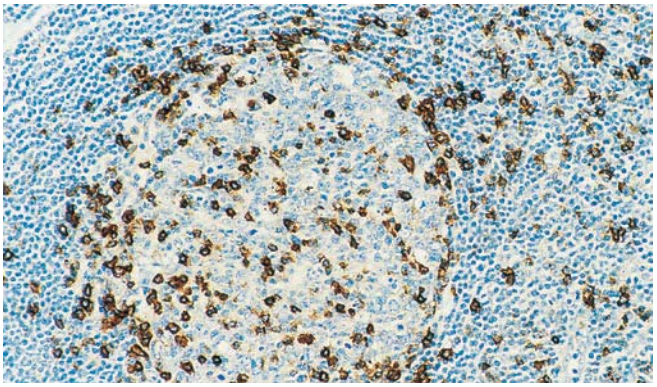
**Clone NK-1**
1 mL, 0.1 mL lyophilized NCL-NK1 **F P**
7 mL ready-to-use RTU-NK1 **F P**
7 mL BOND ready-to-use PA0443 **P (HIER)**

**Antigen Background**

The CD57 glycoprotein, also known as HNK-1, has a molecular weight of 110 kD. It is found on a subset of mononuclear cells with natural killer activity and on neuroectodermal cells expressing myelin-associated glycoprotein. Many cells which co-express CD57 and CD8 proteins are a subset of suppressor/cytotoxic T cells. These cells play a role in the rejection of grafts in acute graft versus host disease. The CD57 molecule is not expressed on erythrocytes or platelets.

**Product Specific Information**

Enzyme pretreatment may enhance staining in some cases.



Human lymph node: immunohistochemical staining for CD57 antigen using NCL-NK1. Note staining of CD57 positive T lymphocytes. Paraffin section.

## Novocastra **CD61 (GPIIIa)**

**Clone 2f2**
1 mL, 0.1 mL lyophilized NCL-CD61-308 **F P (HIER)**
7 mL BOND ready-to-use PA0308 **P (HIER)**

The CD61 antigen, also known as GPIIIa, is a glycoprotein of 105 kD found on platelets, monocytes, endothelial cells, smooth muscle cells, B cells, macrophages, mast cells and fibroblasts. CD61 antigen plays a role in platelet aggregation and also as a receptor for fibrinogen, fibronectin, von Willebrand factor and vitronectin. Individuals with Glanzmann's thrombasthenia are reported to express little or no CD61 antigen. CD61 antigen is also reported to be expressed in most cases of megakaryocytic leukemias.

## Novocastra **CD62E (E-Selectin)**

**Clone 16G4**
1 mL lyophilized NCL-CD62E-382 **P (HIER)**

See also E-Selectin (CD62E) on page 144.

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## Novocastra **CD62P (P-selectin)**

**Clone C34**
1 mL lyophilized NCL-CD62P-367 **P (HIER)**

See also P-selectin (CD62P) on page 193.

## Novocastra **CD63 (Melanoma Marker)**

**Clone NKI/C3**
1 mL, 0.1 mL lyophilized NCL-CD63 **F P**

**Antigen Background**

CD63 antigen is a member of the TM4 superfamily with its structure consisting of four transmembrane regions, short cytoplasmic N and C-termini and two extracellular regions. CD63 antigen is widely distributed on the surface and interior of both hematopoietic and non-hematopoietic cells such as most sweat glands, islets of Langerhans, pituitary, pancreas, peribronchial glands, Paneth cells and prostate glands. It is reported to be strongly expressed on monocytes, macrophages and activated platelets and weakly expressed on lymphocytes and granulocytes. CD63 antigen associates non-covalently with CD9, CD81 and the integrins VLA-3, VLA-4 and VLA-6. It is reported that CD63 antigen may play a role as a tumor suppressor gene as its expression in human melanoma cells reduces tumor spread and metastasis.

## Novocastra **CD66a (CEACAM1)**

**Clone 29H2**
1 mL lyophilized NCL-CD66a **P (HIER)**

The CD61 antigen, also known as GPIIIa, is a glycoprotein of 105 kD found on platelets, monocytes, endothelial cells, smooth muscle cells, B cells, macrophages, mast cells and fibroblasts. CD61 antigen plays a role in platelet aggregation and also as a receptor for fibrinogen, fibronectin, von Willebrand factor and vitronectin. Individuals with Glanzmann's thrombasthenia are reported to express little or no CD61 antigen. CD61 antigen is also reported to be expressed in most cases of megakaryocytic leukemias.

## Novocastra **CD66e (Carcinoembryonic Antigen)**

**Clone 12-140-10**
1 mL lyophilized NCL-CEA-2 **F P (Enzyme)**
1 mL liquid NCL-L-CEA-2 **F P (Enzyme)**
7 mL ready-to-use RTU-CEA-2 **F P (Enzyme)**

**Clone II-7**
7 mL BOND ready-to-use PA0004 **P (HIER)**

See also Carcinoembryonic Antigen (CD66e) on page 104.

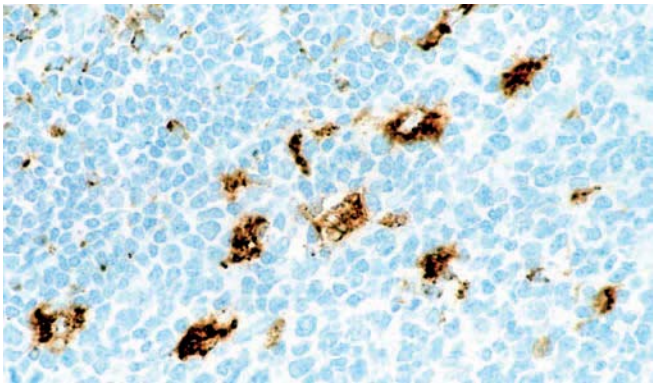
## Novocastra **CD68**

**Clone 514H12**
1 mL, 0.1mL lyophilized NCL-CD68 **F P (HIER)**
1 mL, 0.1 mL liquid NCL-L-CD68 **F P (HIER)** New!
7 mL ready-to-use RTU-CD68 **F P (HIER)**
7 mL BOND ready-to-use PA0273 **P (HIER)**

**Clone KP1**
1 mL lyophilized NCL-CD68-KP1 **F P (HIER)**

**Antigen Background**

The CD68 molecule is a 110 kD intracellular glycoprotein primarily reported to be associated with cytoplasmic granules and to a lesser extent the membranes of macrophages. Markers to CD68 antigen are the most frequently used for the identification of macrophages in immunohistochemistry. However, CD68 is also found in monocytes, neutrophils, basophils and large lymphocytes. The function of the CD68 molecule is not certain but these lysosomal membrane proteins are major components and may protect the membranes from attack by acid hydrolases. It is unclear if the surface associated CD68 protein is functionally significant or due to leakage from the lysosomes. CD68 protein expression has been demonstrated in stiumlated T cells and NK cells and non-hematopoietic tissues such as liver and renal tubules.



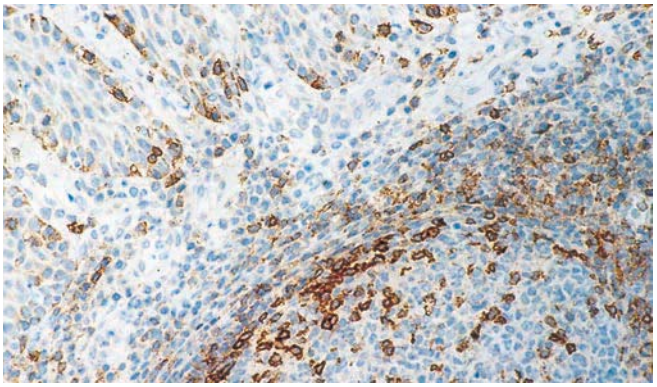
Human tonsil: immunohistochemical staining for CD68 antigen using NCL-CD68. Note intense cytoplasmic staining of macrophages. Paraffin section.

## Novocastra **CD69**

**Clone CH11**
1 mL lyophilized NCL-CD69 **P (HIER)**

**Antigen Background**

The CD69 molecule is a type II membrane glycoprotein expressed as a disulfide-linked homodimer. The human and mouse genes for CD69 are encoded within the NK gene complex on chromosomes 12 and 6, respectively. CD69 protein is expressed mainly on activated T and B lymphocytes.



Human tonsil: immunohistochemical staining for CD69 antigen using NCL-CD69. Note membrane staining of activated lymphocytes, NK cells and neutrophils. Paraffin section.

## Novocastra **CD71**

**Clone 10F11**
1 mL, 0.1 mL lyophilized NCL-CD71-309 **P (HIER)**

**Antigen Background**

The CD71 molecule is a type II membrane glycoprotein with a molecular weight of approximately 180 kD. It is known as the transferrin receptor and is composed of two disulfide bonded 90 kD subunits. The CD71 molecule plays a critical role in cell proliferation by controlling the supply of iron, an essential component for many metabolic pathways, through the binding and endocytosis of transferrin, the major iron-carrying protein. CD71 protein is reported to be expressed on activated B and T cells, macrophages, proliferating cells and metabolically active cells eg neurons.

## Novocastra **CD74**

**Clone LN-2**
1 mL lyophilized NCL-LN2 **F P (HIER)**

**Antigen Background**

The CD74 molecule has several isoforms (33, 35 and 41 kD) and is the invariant chain of HLA-DR. The expression of CD74 protein occurs before the pre-B cell stage and is lost before the plasma cell stage.

**Product Specific Information**

NCL-LN2 requires heat induced epitope retrieval (HIER) for formalin-fixed, paraffin-embedded material but for mercury (B5)-fixed, paraffin-embedded material, no pretreatment is required.

## Novocastra **CD75**

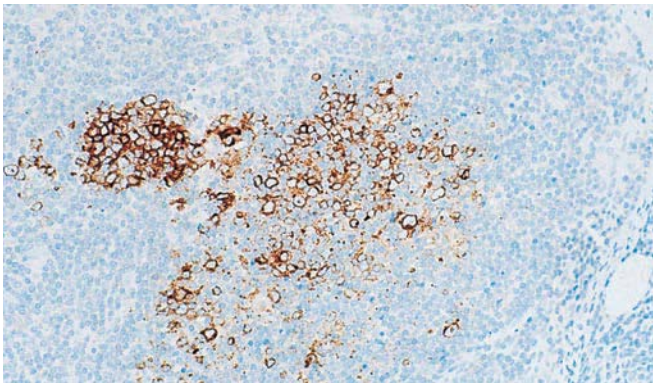
**Clone LN-1**
1 mL lyophilized NCL-LN1 **F P (HIER)**

**Antigen Background**

The CD75 protein has a molecular weight of approximately 53 kD and is a marker restricted to germinal centre B cells, a T cell subset and epithelial cells.

**Product Specific Information**

NCL-LN1 requires heat induced epitope retrieval (HIER) for formalin-fixed, paraffin-embedded material but for mercury (B5)-fixed, paraffin-embedded material, no pretreatment is required.



Human centroblastic lymphoma: immunohistochemical staining for CD75 antigen using NCL-LN1. Note intense membrane staining of B lymphocytes. Paraffin section.

## Novocastra **CD79a**

**Clone 11E3**
1 mL, 0.1 mL lyophilized NCL-CD79a-225 **F P (HIER)**
1 mL liquid NCL-L-CD79a-225 **F P (HIER) C**
7 mL BOND ready-to-use PA0192 **P (HIER)**

**Clone 11D10**
0.1 mL lyophilized NCL-CD79a-192 **F P (HIER) C**
1 mL liquid NCL-L-CD79a-192 **F P (HIER)**
7 mL ready-to-use RTU-CD79a-192 **F P (HIER)**
*Clone 11E3 was developed to produce superior staining on paraffin sections.*

**Antigen Background**

The CD79 complex is a disulfide-linked heterodimer which is non-covalently associated with membrane-bound immunoglobulins on B cells. This complex of polypeptides and immunoglobulin constitute the B cell antigen receptor. The two components of this complex are designated CD79a and CD79b. The CD79a antigen is reported to first appear at the pre-B cell stage, early in maturation, and persist until the plasma cell stage where it is found as an intracellular component. It is not present in myeloid or T cell lines.

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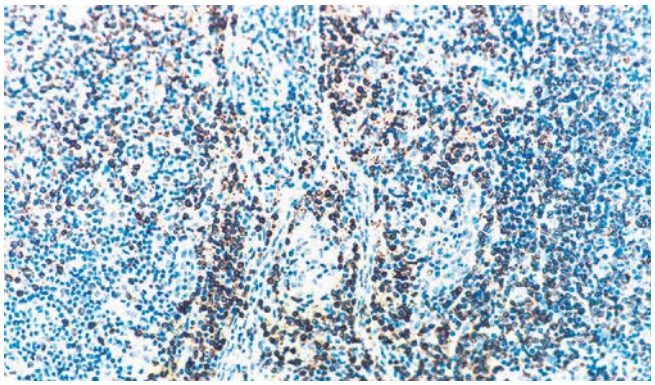


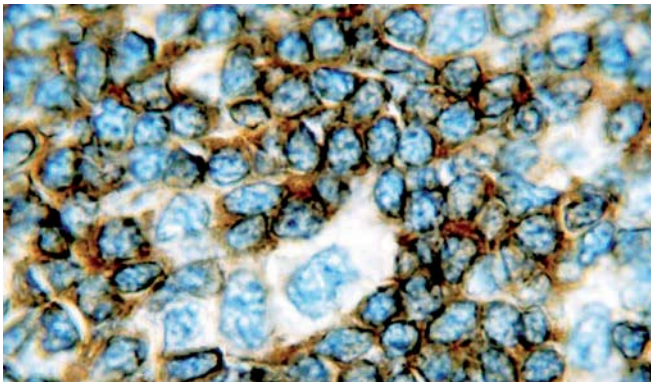
Human large cell lymphoma: immunohistochemical staining for CD79a antigen using NCL-CD79a-225. Note membrane staining of tumor cells. Paraffin section.

## Novocastra **CD79b**

**Clone JS01**
1 mL liquid NCL-L-CD79b **P (HIER)**

**Antigen Background**

CD79b, also known as B29 and Ig-β is thought to function in the cellular activation and signalling that occurs when surface immunoglobulin (Ig) on B cells binds antigen or becomes cross-linked by anti-Ig antibody. This function occurs with the formation of a membrane signalling complex that is associated with Ig at the surface of B cells. CD79b, together with CD79a, forms the B cell antigen receptor (mIg) complex.



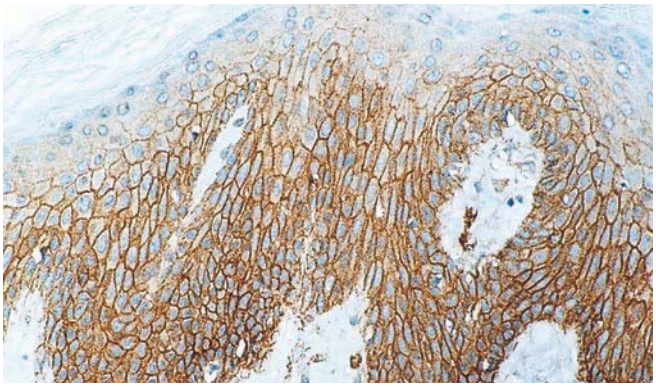
Human tonsil: immunohistochemical staining for CD79b using NCL-L-CD79b. Note intense membrane staining of B cells. Paraffin section.

## Novocastra **CD82**

**Clone 5B5**
1 mL lyophilized NCL-CD82 **P (HIER)**

**Antigen Background**

CD82 antigen, also known as KAI1 or C33 antigen, is a member of the TM4 superfamily. It is expressed in most cell types, including B and T cells, NK cells, monocytes, granulocytes and platelets but not in erythrocytes. Upon lymphocyte activation, CD82 antigen expression is reported to be strongly upregulated and, in vitro, it can transduce signals in B cells, T cells and monocytes. The expression of CD82 antigen is reported to suppress metastasis in tumor cells.



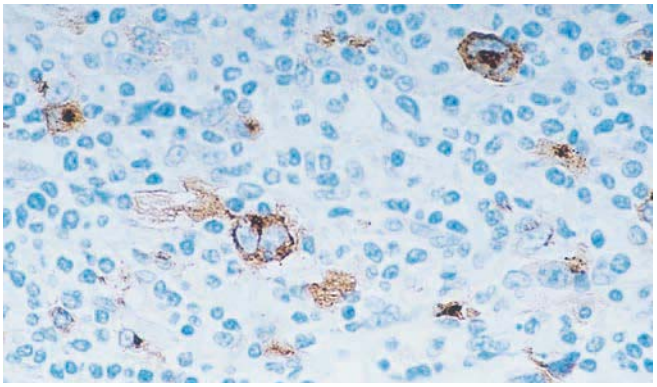
Human skin, squamous cell carcinoma: immunohistochemical staining for CD82 antigen using NCL-CD82. Note intense membrane staining of tumor cells. Paraffin section.

## Novocastra **CD83**

**Clone 1H4b**
1 mL lyophilized NCL-CD83 **P (HIER)**

**Antigen Background**

CD83 antigen, a member of the immunoglobulin superfamily, is reported to be expressed on mature and activated dendritic cells. These include Langerhans cells in the skin, peripheral blood dendritic cells and interdigitating reticulum cells within the T cell zones of lymphoid organs. In early human pregnancy, decidua is reported to contain immunostimulatory CD83 antigen positive dendritic cells. CD83 antigen is reported to be expressed in Hodgkin's disease and can be found to be expressed in most Reed Sternberg cells. In breast carcinoma, mature CD83 positive cells may be found in peripheral areas amongst T cells, which resembles dendritic/T cell clusters of secondary lymphoid organs. This is a characteristic of ongoing immune reactions where mature and activated dendritic cells are essential for the recruitment of activated tumor specific lymphocytes during carcinogenesis. Some germinal center B cells and activated peripheral lymphocytes also express CD83 antigen.



Hodgkin's disease, mixed cellularity type: immunohistochemical staining for CD83 antigen using NCL-CD83. Note membrane staining and characteristic paranuclear hofs of Reed Sternberg cells. Paraffin section.

## Novocastra **CD95 (Fas)**

**Clone GM30**
1 mL lyophilized NCL-FAS-310 **F P (HIER)**

See also Fas (CD95) on page 147.

## Novocastra **CD99**

**Clone PCB1**
1 mL, 0.1 mL liquid NCL-L-CD99-187 **P (HIER)**

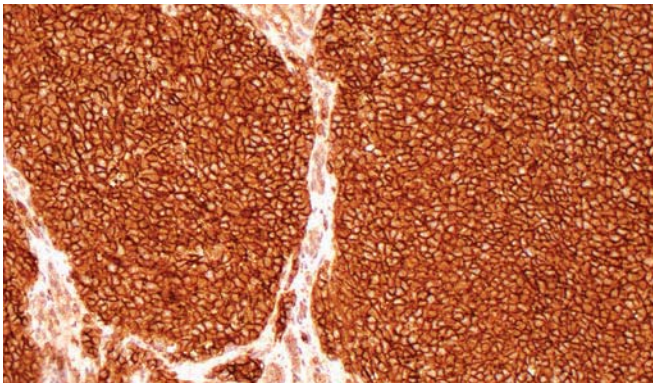
**Clone 12E7**
7 mL BOND ready-to-use PA0509 **P**

**Clone HO-36.1.1**
1 mL, 0.1 mL lyophilized NCL-CD99 **P (HIER)**

### Antigen Background

CD99 is a 32 kDa transmembrane glycoprotein, encoded by the MIC2 gene, which is located in the pseudoautosomal region of the human X and Y chromosomes. Recently, the MIC2 gene has been shown to encode two distinct proteins which are produced by alternative splicing of the CD99 gene transcript and are identified as bands of 30 and 32 kDa (p30/32).

Although its function is not fully understood, CD99 has been implicated in various cellular processes including homotypic aggregation of T cells, upregulation of T cell receptor and MHS molecules, apoptosis of immature thymocytes and leukocyte diapedesis. CD99 is reported to be expressed on most human tissues including cortical thymocytes, pancreatic islets cells, Leydig and Sertoli cells, virtually all hematopoietic cell types (except granulocytes), peripheral blood lymphocytes, granulose cells of the ovary, endothelial cells and basal/parabasal squamous epithelial cells. CD99 expression has been reported in a wide range of tumors, including Ewing's sarcoma and T cell lymphoma.



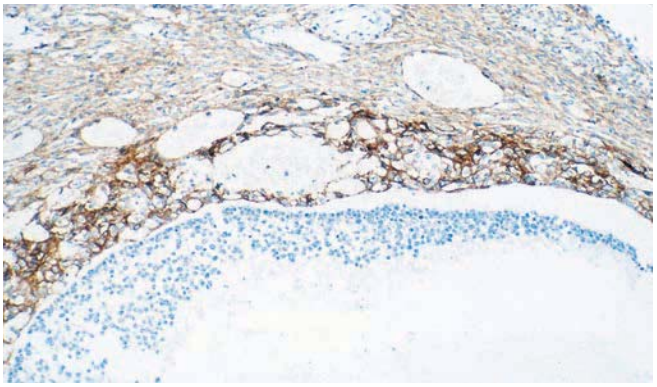
Human primitive neuroectodermal tumors: immunohistochemical staining for CD99 using NCL-L-CD99-187. Paraffin section.

## Novocastra **CD105 (Endoglin)**

**Clone 4G11**
1 mL, 0.1 mL lyophilized NCL-CD105 **P (HIER)**

### Antigen Background

CD105, also known as endoglin, is an endothelial homodimeric membrane glycoprotein containing the peptide sequence RGD which is a recognition motif for adhesion receptors of the integrin family. It has been proposed that endoglin is a TGF-beta receptor. CD105 antigen is reported to be expressed on endothelial cells of capillaries, arterioles and venules in a variety of tissues and at low levels on acute lymphoblastic and myelocytic leukemia cells. Endoglin expression may be of interest in the study of monocyte differentiation into macrophages, studies of cellular adhesion of circulating blood cells and in the lysis of CD105 positive cells in the presence of complement.



Normal human ovary: immunohistochemical staining for endoglin using NCL-CD105. Note membrane staining of cells in both the theca interna and theca externa. Paraffin section.

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## Novocastra **CD117 (c-kit Oncoprotein)**

**Clone T595**
1 mL, 0.1 mL lyophilized NCL-CD117 **P (HIER)**
1 mL liquid NCL-L-CD117 **P (HIER)**
7 mL ready-to-use RTU-CD117 **P (HIER)**

**Clone 57A5D8**
1 mL lyophilized NCL-cKIT **F**

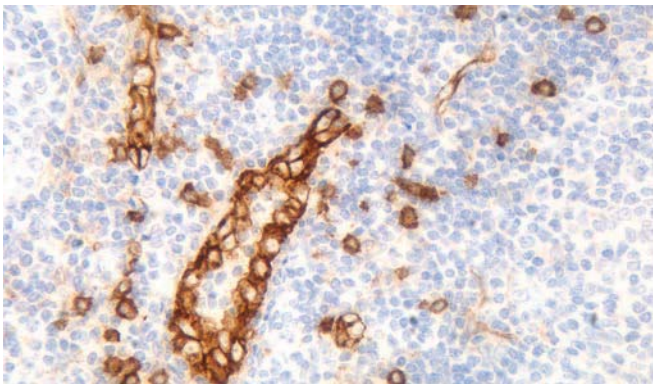
See also c-kit Oncoprotein (CD117) on page 128.

## Novocastra **CD123**

**Clone BR4MS**
1 mL, 0.1 mL liquid NCL-L-CD123 **P (HIER)**

**Antigen Background**

The CD123 antigen is also known as the alpha subunit of the human interleukin-3 receptor. It is a type I transmembrane glycoprotein and is a member of the cytokine receptor superfamily. CD123 forms a heterodimer with CD131 (the beta subunit of the interleukin-3 receptor) to form the interleukin-3 receptor, where the cytokine specificity is provided by the alpha subunit and the signal transduction function is provided by the beta subunit. The interleukin-3 receptor is reported to be expressed on monocytes, neutrophils, basophils, eosinophils, megakaryocytes, proliferation and differentiation of these cells. Outside the hematopoietic system CD123 is reported to be expressed in Leydig cells of the testis, some endothelial cells, and cells of the placenta and brain.



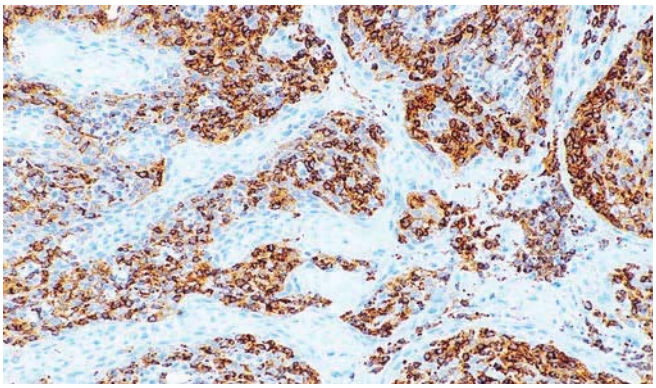
Human high venule endothelium and plasmacytoid dendritic cells: immunohistochemical staining for CD123 using NCL-L-CD123. Paraffin section.

## Novocastra **CD137**

**Clone S16**
1 mL lyophilized NCL-CD137 **P (HIER)**

**Antigen Background**

CD137 antigen, a member of the tumor necrosis factor receptor family, and its ligand are reported to be expressed on activated T lymphocytes and on antigen-presenting cells, respectively. This receptor/ligand system regulates the activation, proliferation and survival of T and B lymphocytes and monocytes through bidirectional signal transduction. Human CD137 antigen is reported to be expressed on activated B cells, Reed Sternberg cells and peripheral blood monocytes but is absent from resting T cells. In nonlymphoid cells, expression has been reported in blood vessel walls, on the endothelial layer and on vascular smooth muscle cells. Soluble forms of CD137 are reported at increased levels in sera of individuals with rheumatoid arthritis. The expression of soluble CD137 lags behind that of membrane bound CD137 by approximately 24 hours and it has been proposed that as activation of lymphocytes through membrane-bound CD137 delivers a potent stimulatory signal then soluble CD137 may provide a negative control mechanism for immune responses.



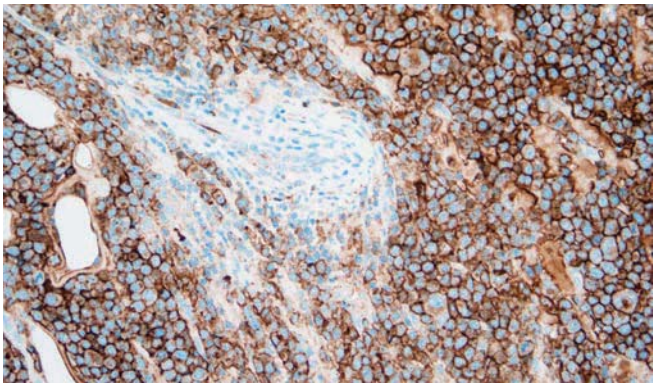
Human tonsil: immunohistochemical staining for CD137 antigen using NCL-CD137. Note intense membrane staining of activated lymphoid cells. Paraffin section.

## Novocastra **CD138 (Syndecan 1)**

**Clone MI15**
7 mL BOND ready-to-use PA0088 **P (HIER)**

**Antigen Background**

The CD138 molecule is a transmembrane heparan sulphate glycoprotein expressed at distinct stages of differentiation in normal lymphoid cells such as pre-B cells, immature B cells and Ig-producing plasma cells as well as being expressed in stratified and simple epithelia. The loss of CD138 expression from atypical cells is reported to be an early event during cervical carcinogenesis whereas CD138 antigen expression shows a close association with preserved epithelial morphology and differentiation, however, the major utility of CD138 as a marker in immunohistochemistry is the quantification of plasma cells.



Plasmacytoma: immunohistochemical staining with BOND ready-to-use CD138 (Synedcan-1) (MI15) using BOND Polymer Refine Detection.

## Novocastra **CD141 (Thrombomodulin)**

**Clone 15C8**

1 mL, 0.1 mL lyophilized NCL-CD141 **F P (HIER)**

See also Thrombomodulin (CD141) on page 200.

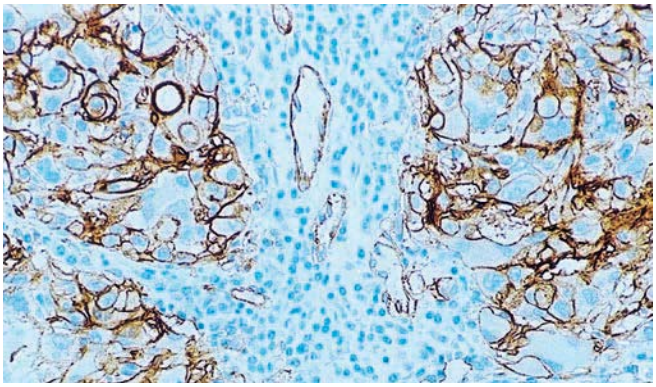
## Novocastra **CD146 (MCAM)**

**Clone N1238**

1 mL, 0.1 mL lyophilized NCL-CD146 **P (HIER) W**

### Antigen Background

CD146 protein is also known as the melanoma metastasis-associated surface molecule, MUC18, A32 antigen, S-Endo-1 and the melanoma cell adhesion molecule, MCAM or Mel-CAM. Originally, the CD146 molecule was defined as a marker of tumor progression and metastasis formation in human melanoma. More recently, it has been reported to be expressed on endothelial cells, smooth muscle and cerebellar cortex. Structurally, CD146 is an integral membrane glycoprotein of 113 kD with the characteristic V-V-C2-C2-C2 immunoglobulin-like domain structure. It shares considerable homology with chicken neural adhesion molecule, chicken gicerin, goldfish neurolin and is also closely related to the human blood group glycoprotein, lutheran. Although CD146 molecule functions as a cell adhesion molecule it interacts with an as yet uncharacterized ligand. CD146 can be induced on all T cells via PHA, recall antigen, superantigen and T cell receptor/CD3 stimulation. Furthermore reports suggest that the CD146 molecule is involved in the extravasation and homing of activated T cells. CD146 protein can promote tumor progression in human melanoma, possibly through enhanced interaction between melanoma cells and endothelial cells. In contrast, CD146 protein may act as a tumor suppressor in breast carcinoma with expression frequently lost in some cases.



Human malignant melanoma: immunohistochemical staining for CD146 antigen using NCL-CD146. Note membrane staining of metastatic melanocytes and endothelial cells. Paraffin section.

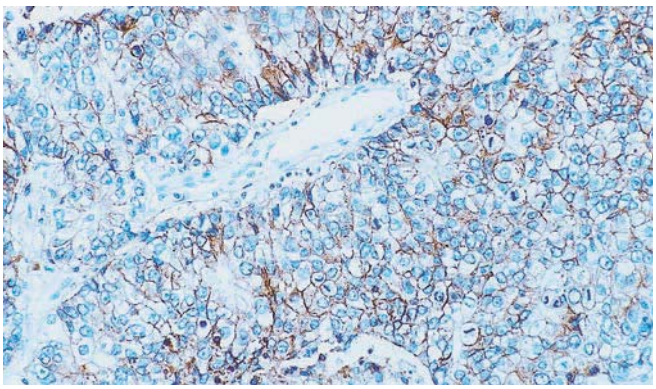
## Novocastra **CD147 (EMMPRIN)**

**Clone AB1843**

1 mL lyophilized NCL-CD147 **P (HIER)**

### Antigen Background

The human CD147 molecule is a transmembrane glycoprotein, also known as basigin, OK blood group, collagenase stimulatory factor, M6 antigen, neurothelin or extracellular matrix metalloproteinase inducer (EMMPRIN). It is thought to bind an unidentified ligand on fibroblasts which stimulates the production of collagenase and other extracellular matrix metalloproteinases enhancing tumor cell invasion and metastasis. The CD147 molecule is reported to have a broad expression pattern in both hematopoietic and nonhematopoietic tissues and is upregulated upon cell activation. Expression in adult skin is restricted to basal epithelial cells and eccrine glandular cells. In adult testes, expression is reported in the membrane of spermatocytes, older than zygotene, and also in round spermatids. CD147 antigen is also expressed in normal liver and is reported to be upregulated in Hepatitis C virus-induced cirrhosis. In the heart, expression is reported to be increased during myocardial ischemic injury following transplantation. In T cells, CD147 expression is reported to be dependent upon the state of differentiation. Thymocytes are more strongly positive than mature T cells and phytohemagglutinin (PHA)-activated T blasts also express increased levels of CD147. CD147 overexpression has been reported in neoplasms of the bladder, liver and lung.



Human lung adenocarcinoma: immunohistochemical staining for CD147 antigen using NCL-CD147. Note membrane staining of malignant cells. Paraffin section.

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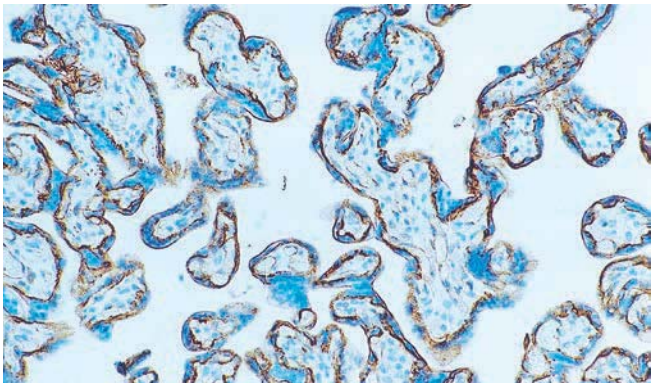
# Novocastra **CD151 (PETA-3)**

**Clone RLM30**
1 mL lyophilized NCL-CD151 **P (HIER)**

**Antigen Background**

The CD151 molecule, also known as PETA-3/SFA, is a member of the family of tetraspanin transmembrane proteins. Tetraspanins are characterized by one small and one large extracellular loop, a small cytoplasmic loop and short amino and carboxy-terminal domains. They act as linkers between extracellular integrin alpha chain domains and intracellular signalling molecules. They are involved in a wide range of cellular processes such as cell adhesion, motility, activation, proliferation, differentiation and cancer. The CD151 molecule has been reported to be expressed in basal cells of epidermis, epithelial cells, skeletal, smooth and cardiac muscle cells, schwann cells, platelets, megakaryocytes and endothelial cells. In the small intestine, CD151 is reported to be expressed by crypt and villous enterocytes but is not detectable on the brush border.



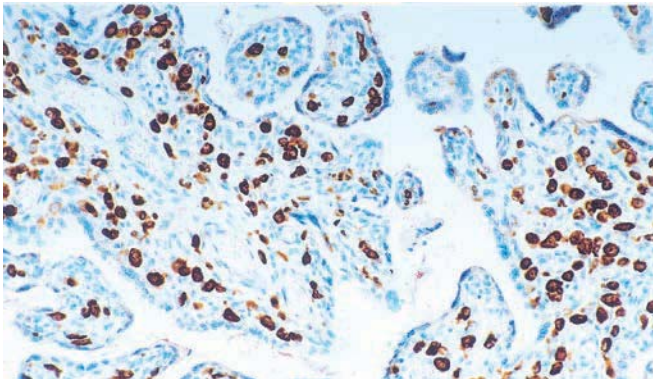
Human placenta: immunohistochemical staining for CD151 using NCL-CD151. Note intense staining of basement membrane and endothelium. Paraffin section.

# Novocastra **CD163**

**Clone 10D6**
1 mL, 0.1 mL lyophilized NCL-CD163 **P (HIER)**
1 mL, 0.1 mL liquid NCL-L-CD163 **P (HIER)** New!

**Antigen Background**

The CD163 molecule is a type I membrane protein also known as M130 antigen, Ber-Mac3, Ki-M8 or SM4. CD163 protein is restricted in its expression to the monocytic/macrophage lineage. It is reported to be present on all circulating monocytes and most tissue macrophages except those found in the mantle zone and germinal centers of lymphoid follicles, interdigitating reticulum cells and Langerhans cells. In addition, multi-nucleated cells within inflammatory lesions are reported not to express CD163 protein. The protein is upregulated by glucocorticoids and downregulated by the immunosuppressant cyclosporin A and by phorbol esters, while lipopolysaccharide, an inflammatory mediator, has no influence on expression. It has been proposed that a specific release mechanism of soluble CD163 antigen by human monocytes may play an important role in modulating inflammatory processes.



Human placenta: immunohistochemical staining for CD163 antigen using NCL-CD163. Note intense membrane and cytoplasmic staining of villous macrophages. Paraffin section.

# Novocastra **CD166 (ALCAM)**

**Clone MOG/07**
1 mL, 0.1 mL lyophilized NCL-CD166 **P (HIER)**

**Antigen Background**

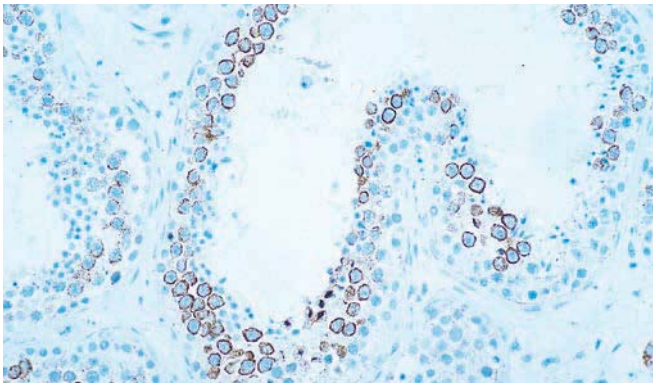
The human CD166 molecule, also known as activated leukocyte cell adhesion molecule (ALCAM), is a glycoprotein of 100 kD that functions as a ligand for the CD6 molecule. It is the human homolog of the chicken neural adhesion molecule, BEN/SC-1/DM-GRASP, the rat molecule, KG-CAM, and the fish protein, neurolin. The CD166 molecule is reported to be expressed by a subset of activated leukocytes. CD166/CD6 interactions may play a role in the binding of T and B cells to activated leukocytes as well as in interactions between cells of the nervous system involving neurite extension of the neurons. The CD166 molecule is also expressed in a number of other cell types including activated monocytes, epithelial cells, fibroblasts, neurons, melanoma cells and also in sweat and sebaceous glands. CD166 protein expression is reported to be upregulated in a cell line deriving from a metastasizing melanoma. It is also reported that CD166 protein may play a role in T cell development in the thymus.

# Novocastra **CD168 (RHAMM)**

**Clone 2D6**
1 mL lyophilized NCL-CD168 **F P (HIER)**

**Antigen Background**

The CD168 molecule, also known as RHAMM/IHABP (receptor for hyaluronic acid mediated motility/intracellular hyaluronic acid binding protein), is a ubiquitously expressed filamentous, cytoskeletal accessory protein. It is not, as originally reported, a cell surface receptor. However, in some cancers, it is reported that the expression of cell surface variants of CD168 is closely correlated with tumor progression. The CD168 molecule plays a role in cell signalling, migration and adhesion via interactions with hyaluronan, microtubules, actin, calmodulin and components of the extracellular regulated kinase (erk) signalling pathway. CD168 appears to have an important role in human sperm motility. In the brain, the CD168 molecule is reported to be expressed in the majority of neurons and in many oligodendrocytes where it has an effect on astrocyte motility, neurite migration and axonal growth. CD168 antigen is necessary for migration of smooth muscle cells after wound injury and it has been associated with adult wound fibroplasias.

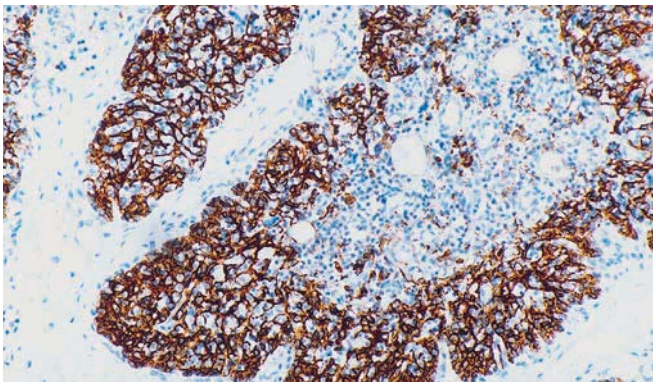


Normal human testis: immunohistochemical staining for CD168 antigen using NCL-CD168. Note membrane staining of spermatocytes in the seminiferous cells. Paraffin section.

## Novocastra **CD205 (DEC-205)**

**Clone 11A10**
1 mL liquid NCL-L-DEC205 **P (HIER)**

CD205 is a 205 kD integral membrane glycoprotein homologous to the macrophage mannose receptor and related receptors. It is a novel multilectin, endocytic receptor that can be used by dendritic cells and thymic epithelial cells to direct captured antigens from extracellular spaces to a specialized antigen processing compartment.



Human thymus: immunohistochemical staining for DEC-205 using NCL-L-DEC205. Note cytoplasmic and membrane staining of epithelial cells. Paraffin section.

## Novocastra **CD243 (P-glycoprotein)**

**Clone 5B12**
1 mL lyophilized NCL-PGLYm **F P (HIER)**

See also P-glycoprotein (CD243) on page 188.

## Novocastra **CD246 (Anaplastic Lymphoma Kinase) (ALK) (p80)**

**Clone 5A4**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-ALK **P (HIER)** New!
1 mL, 0.1 mL lyophilized NCL-ALK **P (HIER)**
7 mL BOND ready-to-use PA0306 **P (HIER)**

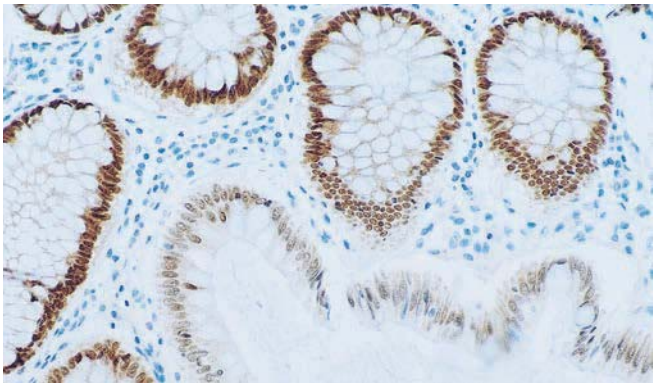
See also ALK (Anaplastic Lymphoma Kinase) (CD246) (p80) on page 93.

## Novocastra **CDX2**

**Clone AMT28**
1 mL, 0.1 mL lyophilized NCL-CDX2 **P (HIER)**
7 mL BOND ready-to-use PA0535 **P (HIER)**

**Antigen Background**

CDX2 is a caudal-type homeobox, intestine-specific transcription factor that is expressed early in intestinal development and may be involved in the regulation of proliferation and differentiation of intestinal epithelial cells. CDX2, as well as CDX1, is of particular interest as the intestine is the only organ that contains detectable levels of either gene product. This pattern of restricted expression is unusual for homeobox genes. Phosphorylation of the CDX2 activation domain can modulate its function and different spatial expression patterns in the intestinal epithelium. CDX2 is primarily expressed on the surface of the villus and in the crypts. In contrast to CDX1, intense CDX2 expression is reported to occur in all but the distal portions of the developing intestine. The loss of CDX2 has been reported to contribute towards the progression of some sporadic colorectal cancers. It has been reported that CDX2 may also be associated with carcinogenesis of the stomach as expression of CDX2 mRNA progressively decreases with the transition from well differentiated to poorly differentiated gastric cancer cell lines.



Human small intestine: immunohistochemical staining for CDX2 homeobox protein using NCL-CDX2. Note nuclear and cytoplasmic staining of epithelial cells. Paraffin section.

## Novocastra **CEACAM1 (CD66a)**

**Clone 29H2**
1 mL lyophilized NCL-CD66a **P (HIER)**

See also CD66a (CEACAM1) on page 119.

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## Novocastra **c-erbB-2 Oncoprotein (HER-2) Antibodies**

**Clone CB11**
1 mL, 0.1 mL lyophilized HER-2 (internal domain)
NCL-CB11 **F P C**
1 mL liquid HER-2 (internal domain)
NCL-L-CB11 **F P C**
7 mL ready-to-use HER-2 (internal domain) RTU-CB11 **F P**
60 Tests Leica Bond Oracle HER2 IHC System TA9145 **P**

**Clone 5A2**
1 mL lyophilized HER-2 (internal domain)
NCL-c-erbB-2-316 **F P**

**Clone 10A7**
1 mL, 0.1 mL lyophilized HER-2 (external domain)
NCL-CBE-356 **P W**
1 mL liquid HER-2 (external domain) NCL-L-CBE-356 **P W**
7 mL ready-to-use HER-2 (external domain) RTU-CBE-356 **P**

**Clone CBE1**
1 mL lyophilized HER-2 (external domain)
NCL-CBE1 **P (HIER)**

See also HER-2 (c-erbB-2 Oncoprotein) Antibodies on page 156.

## Novocastra **c-erbB-3 Oncoprotein**

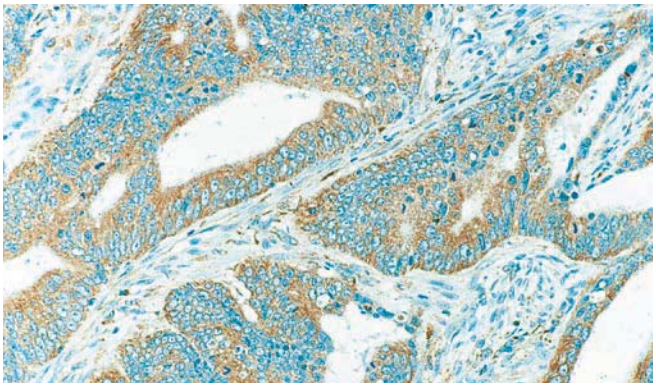
**Clone RTJ1**
1 mL lyophilized NCL-c-erbB-3 **F P (HIER) O**

**Antigen Background**

The c-erbB-3 oncoprotein is a member of the type 1 growth factor receptor family which also includes c-erbB-2 and epidermal growth factor receptor (EGFR). These receptors share a common overall structure consisting of an extracellular domain, a transmembrane region and a cytoplasmic domain.

**Product Specific Information**

NCL-c-erbB-3 recognizes an epitope in the cytoplasmic domain of the human c-erbB-3 oncoprotein and does not cross-react with c-erbB-2 or EGFR. NCL-c-erbB-3 may also be used in immunoprecipitation techniques.



Human rectal adenocarcinoma: immunohistochemical staining for c-erbB-3 oncoprotein using NCL-c-erbB-3. Note cytoplasmic staining characteristic in these tumors. In other tumor types, membrane staining is observed. Paraffin section.

## Novocastra **c-fos Oncoprotein**

**Clone CF2**
1 mL lyophilized NCL-FOS **F**

**Antigen Background**

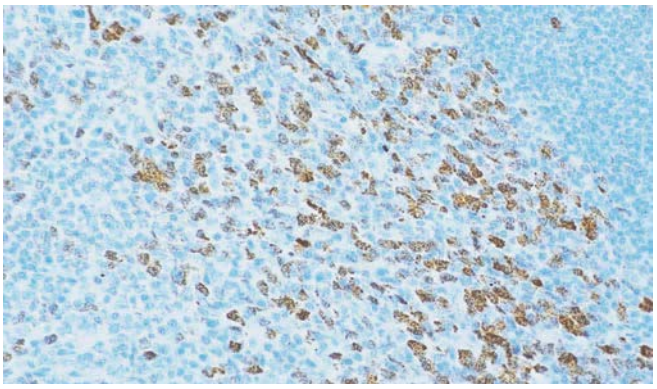
The c-fos proto-oncogene encodes a nuclear phosphoprotein and is a regulator of transcription, forming a complex with the c-jun proto-oncogene product. Expression of the c-fos gene is reported to be low in most adult tissues, however, high levels of expression have been detected in normal skin.

## Novocastra **Checkpoint Kinase 1**

**Clone DCS-310.1**
1 mL lyophilized NCL-Chk1 **P (HIER)**

**Antigen Background**

Checkpoint kinase 1 (Chk1) is an evolutionary conserved protein, which in its phosphorylated form regulates cell cycle progression in response to agents that block DNA replication. Eukaryotic cells which are exposed to ionizing radiation (IR) or other genotoxic stresses activate checkpoints to delay the progression of the cell cycle. Defects in the IR-induced S phase checkpoint causes radioresistant DNA synthesis, a phenomenon reported in cancer-prone individuals suffering from ataxia-telangiectasia. Both of the cell cycle kinases, Chk1 and Chk2, act upstream of p53 in DNA damage responses. It has been reported that Chk1 mutations have been implicated in the cause of some cancers of families with Li-Fraumeni syndrome.



Human tonsil: immunohistochemical staining for checkpoint kinase 1 using NCL-Chk1. Note nuclear staining of proliferating cells. Paraffin section.

# Novocastra **Choline Acetyltransferase**

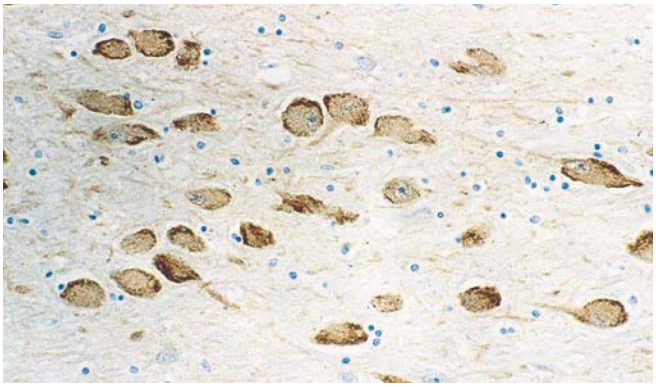
**Clone 38B12**
1 mL lyophilized NCL-ChAT **P (HIER)**

### Antigen Background

Choline acetyltransferase (ChAT) is a 68 kD enzyme which catalyzes the synthesis of acetylcholine (ACh) from choline and acetyl coenzyme A. The human ChAT gene encodes two proteins, the 68 kD ChAT enzyme and a 27 kD protein immunologically related and coexpressed with ChAT in cholinergic neurons of the central nervous system. The smaller protein may play a role in the regulation of ACh synthesis. ChAT is expressed in cholinergic neurons, the majority of the neurons in the nucleus basalis of Meynert, large neurons in the striatum (putamen and caudate nuclei), the majority of neurons in the pedunculopontine, hypoglossal, dorsal nucleus of vagus and subgroups of neurons in Roller's and the medial olivary accessory nuclei. Prominent staining is observed in ribonucleoprotein, distributed at the periphery of large neurons of the nucleus basalis of Meynert, the motor neurons in the hypoglossal and ambiguus nuclei.

### Product Specific Information

NCL-ChAT does not label axons in the insular cortex of the internal capsule non-cholinergic structures, endothelial cells or microglia.



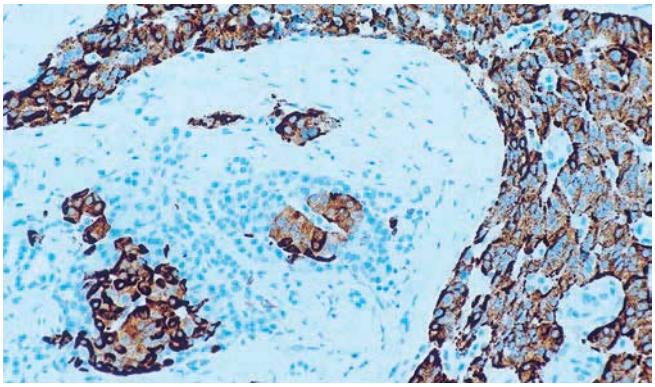
Human brain, basal ganglia: immunohistochemical staining for choline acetyltransferase using NCL-ChAT. Note cytoplasmic staining of neurons of the nucleus basalis of Meynert. Paraffin section.

# Novocastra **Chromogranin A**

**Clone 5H7**
1 mL, 0.1 mL lyophilized NCL-CHROM-430 **P (HIER)**
7 mL BOND ready-to-use PA0430 **P (HIER)**

### Antigen Background

Chromogranin A is a 68 kD acidic protein which is reported to be widely expressed in neural tissues and in secretory granules of human endocrine cells eg parathyroid gland, adrenal medulla, anterior pituitary gland, islet cells of the pancreas and C cells of the thyroid. Chromogranin A expression has been reported in neuroendocrine tumors such as pituitary adenomas, islet cell tumors, phaeochromocytomas, medullary thyroid carcinomas, Merkel cell tumors and carcinoids.



Human insulinoma: immunohistochemical staining for chromogranin A using NCL-CHROM-430. Note intense cytoplasmic staining of neoplastic islet cells. Paraffin section.

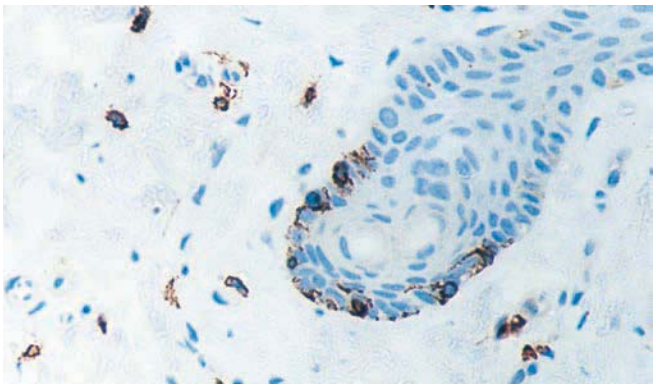
# Novocastra **c-kit Oncoprotein (CD117)**

**Clone T595**
1 mL, 0.1 mL lyophilized NCL-CD117 **P (HIER)**
1 mL liquid NCL-L-CD117 **P (HIER)**
7 mL ready-to-use RTU-CD117 **P (HIER)**

**Clone 57A5D8**
1 mL lyophilized NCL-cKIT **F**

### Antigen Background

The c-kit proto-oncogene encodes a transmembrane receptor with tyrosine kinase activity, c-kit (CD117), which is closely-related to the platelet-derived growth factor receptor family. c-kit plays a role during hematopoiesis, gametogenesis and melanogenesis. The expression of CD117 antigen is of particular interest in the study of gastrointestinal stromal tumors (GIST), small lung cell carcinomas and in melanomas.



Human skin: immunohistochemical staining for c-kit oncoprotein (CD117) using NCL-CD117. Note membrane staining of a proportion of melanocytes and mast cells. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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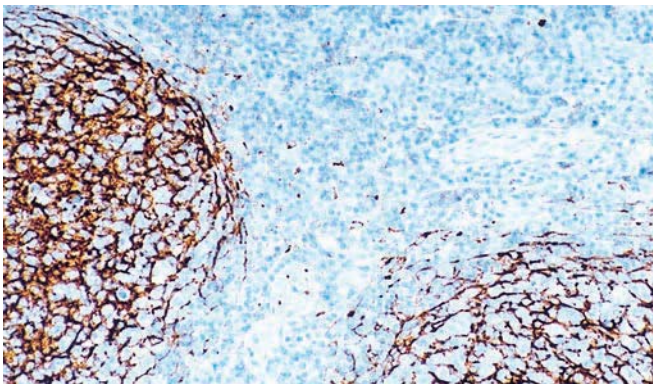
## Novocastra **Clusterin (Apolipoprotein J)**

**Clone 7D1**
1 mL lyophilized NCL-CLUSTERIN **P (HIER)**

**Antigen Background**

Clusterin is also known as apolipoprotein J, complement lysis inhibitor, gp80, glycoprotein III, SGP-2, SP 40, TRPM2 and T64. It is a ubiquitous, multi-functional protein of 80 kD comprising of two disulfide-linked subunits, alpha and beta. It is implicated in numerous biological processes including sperm maturation, lipid transport, regulation of the complement cascade, membrane recycling, cell death, immune regulation, cell adhesion and morphological transformation. In pathological conditions, it is an amyloid associated protein co-localizing with fibrillar deposits in systemic and localized amyloid disorders. In Alzheimer's disease, clusterin is reported to be present in amyloid plaques and cerebrovascular deposits. In breast cancers, clusterin expression is reported to be correlated with tumor size and, when upregulated, correlated inversely with apoptotic index. This suggested that clusterin expression was not a prerequisite to cellular death by apoptosis.



Human tonsil: immunohistochemical staining for clusterin (apolipoprotein J) using NCL-CLUSTERIN. Note intense membrane staining of follicular cells. Paraffin section.

## Novocastra **c-MET (Hepatocyte Growth Factor Receptor)**

**Clone 8F11**
1 mL, 0.1 mL lyophilized NCL-cMET **F P (HIER)**

**Antigen Background**

The c-MET gene encodes a transmembrane tyrosine kinase identified as the receptor for a polypeptide known as hepatocyte growth factor (HGF). HGF has been shown to exert a pleiotropic activity on several cell types mainly of epithelial origin. It is a powerful mitogen for hepatocytes and also stimulates the growth of other cell types including kidney tubular cells, keratinocytes and endothelial cells. Other cell types known to express c-MET include hepatocytes, microglial cells in white matter and astrocytes.

## Novocastra **c-myc Oncoprotein**

**Clone 9E11**
1 mL, 0.1 mL lyophilized NCL-cMYC **F P**

**Antigen Background**

The c-myc oncogene is the human cellular homolog of the avian v-myc gene found in several leukemogenic retroviruses. c-myc is a nuclear phospho-protein, which has DNA-binding activity and is implicated in the control of normal proliferation and differentiation. Expression of c-myc in untransformed cells is growth factor dependent and essential for progression through the cell cycle. c-myc is expressed during proliferation in a wide variety of adult tissues and at all stages of embryonic development.

**Product Specific Information**

Enzyme pretreatment may enhance staining in some cases.

## Novocastra **Collagen Type II**

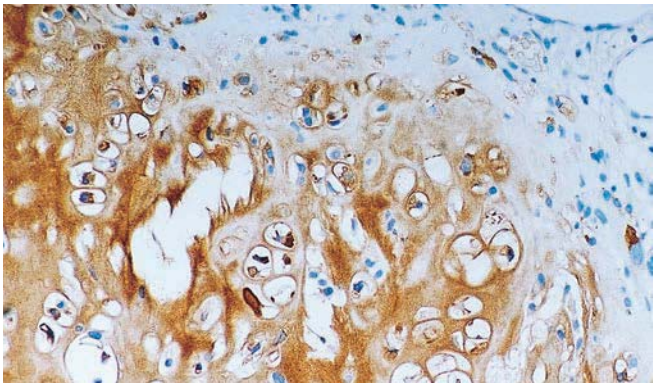
**Polyclonal**
1 mL lyophilized NCL-COLL-IIp **P (Enzyme)**

**Antigen Background**

Collagen type II is the structural protein predominantly found throughout the cartilage matrix and is also found in very small amounts in the eye. The fibrils formed by this protein are usually thinner and more delicate than collagen type I fibrils.

**Product Specific Information**

NCL-COLL-IIp reacts with type II collagen and does not cross-react with collagen types I, III, IV, V, VI, other human serum proteins or non-collagenous extracellular associated proteins.



Human chondrosarcoma: immunohistochemical staining for collagen type II using NCL-COLL-IIp. Note diffuse staining of chondroid tissue. Paraffin section.

# Novocastra **Collagen Type IV**

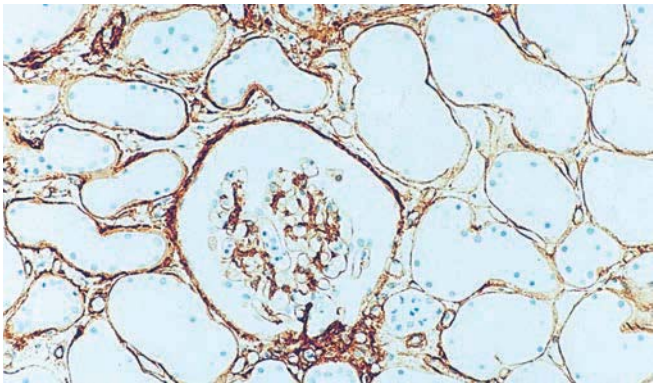
## Clone PHM-12

1 mL lyophilized NCL-COLL-IV **F P (HIER+Enzyme)**

In kidney, collagen IV is expressed in glomerular and tubular basement membranes and also mesangial cells and the matrix within glomeruli, the basal lamina of capillaries as well as basement membrane structures in many organs.

**Product Specific Information**

The heat induced epitope retrieval (HIER) technique followed immediately by 30 seconds of enzyme digestion produces optimal staining with this antibody. NCL-COLL-IV recognizes collagen type IV, which is a major constituent of basement membranes.



Normal human kidney: immunohistochemical staining for collagen type IV using NCL-COLL-IV. Note staining of tubular basement membranes, mesangial cells and the glomerular matrix. Paraffin section.

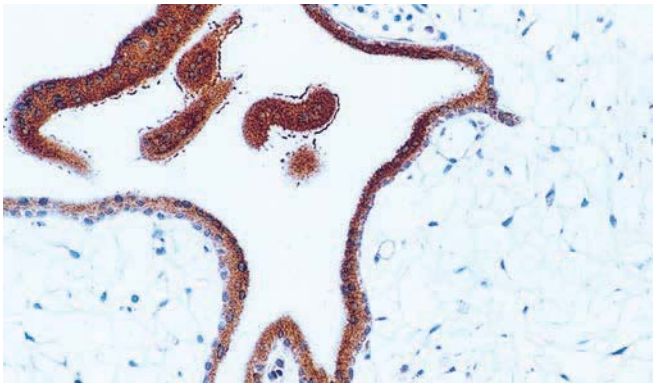
# Novocastra **Collagen Type VI (α3 Chain)**

## Clone 64C11

1 mL lyophilized NCL-COLL-VI **P (HIER)**

**Antigen Background**

Collagen type VI is a component of microfibrillar structures localized close to cells, nerves and blood vessels. It forms a filamentous network between collagen type I/III fibrils and basement membranes and also has a cell binding function. In addition to its structural role, collagen type VI may be involved in cell migration, differentiation and embryonic development. Collagen type VI localizes pericellularly and forms a flexible network that interweaves among collagen fibrils in the dermis of skin, as well as other loose connective tissues but is not present in the epidermal layer or basement membrane. In human skin wounds, collagen type VI is reported after a post-injury period of at least 3 days in a network associated with fibroblasts in the wound area. It is also found in the scar tissues of lesions of advanced wound age. In vascular subendothelium, von Willebrand Factor co-localizes with collagen type VI microfibrils and this complex may play a role in modulating the hemostatic response to vascular injury. In human ovarian follicles, collagen type VI is expressed in the theca cell layers during folliculogenesis but not in granulosa cell layers and plays a role in interactions between the theca cells and extracellular matrix. Immunohistochemical detection for collagen type VI has shown pericellular staining in perineural and Schwann cells within normal peripheral nerves and in the extracellular matrix of plexiform schwannoma, the stroma of pre-implantation endometrium and within the blood vessels of endometrium and decidua. Dysregulation of collagen type VI expression has been reported in lung fibrosis and superficial fibromatoses.



Normal human placenta: immunohistochemical staining for collagen type VI using NCL-COLL-VI. Note pericellular staining of cytotrophoblasts. Paraffin section

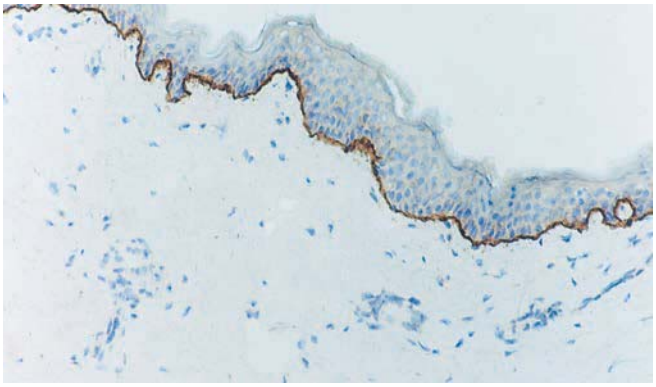
# Novocastra **Collagen Type VII**

## Clone LH7.2

1 mL lyophilized NCL-COLL-VII **F**

**Antigen Background**

Collagen type VII is a basement membrane component which is the major protein in the anchoring fibrils projecting from the lamina densa into the subjacent connective tissue. Collagen type VII has been reported to be detected in the basal lamina of stratified epithelia such as epidermis, oral, oesophageal and cervical epithelium and urothelium of the bladder. Those epithelia which are composed of different cell types eg sweat gland epithelium or breast epithelium which are made up of myoepithelial cells next to glandular cells, possess a type VII collagen-containing basement membrane. Basement membranes play an important role in tumor progression. In normal breast tissue, benign breast lesions and in situ malignancies, the basement membrane always surrounds ducts and tubules whereas in invasive breast carcinomas it is often absent.



Human skin: immunohistochemical staining for collagen type VII using NCL-COLL-VII. Note staining of the basal lamina of the stratified epithelium. Frozen section.

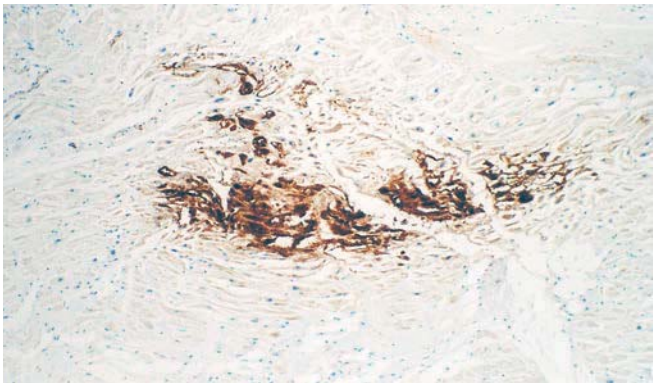
F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

## Novocastra **Complement Component C9**

**Clone 10A6**
1 mL lyophilized NCL-CCC9 **P (HIER)**

**Antigen Background**

Complement component C9 binds to the C5b-8 complex as the final protein of the membrane attack complex. After binding, it undergoes a conform-ational change and inserts itself into the cell membrane, forming transmembrane channels. Complement component C9 acts in a similar way to perforin, a pore forming protein found in cytotoxic T cells. Male and female reproductive tissues express and synthesize complement components, binding proteins and receptors, although the implications of this is unclear. The detection of complement component C9 has been reported in cases of acute myocardial damage at necropsy. Detection of myocardial infarction or diffuse damage can be unreliable with conventional methods of examination of the heart such as enzyme histochemistry or by the elaborate technique of quantification of contraction band necrosis.



Human myocardium: immunohistochemical staining for complement component C9 using NCL-CCC9. Note staining of partially necrotic myocardium and vessel walls. Paraffin section.

## Novocastra **CPP32 (Caspase-3)**

**Clone JHM62**
1 mL, 0.1 mL lyophilized NCL-CPP32 **P (HIER) W**

**Antigen Background**

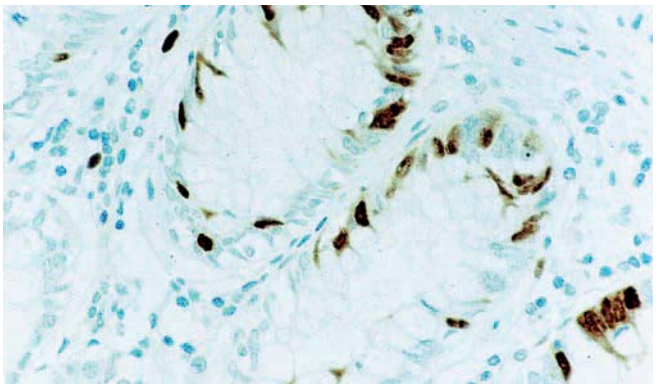
Cysteine protease protein (CPP)-32 is a member of the interleukin-1 beta-converting enzyme (ICE) family of mammalian proteases which specifically cleaves substrates at the C-terminal side of aspartic acid residues. Members of this family have been implicated in apoptosis and CPP32 (caspase-3) is thought to act as a control mediator of programmed cell death in mammalian cells. CPP32 is synthesized as an inactive 32 kD proenzyme and is processed during apoptosis to its active form which is responsible for the cleavage of poly (ADP-ribose) polymerase (PARP), actin and sterol regulatory element binding protein (SREBP). CPP32 is reported to be found in epithelial cells of skin, renal proximal tubules and collecting ducts, epithelioreticular cells of the thymus and bronchial, colonic and salivary duct epithelia. Chondrocytes, bone osteocytes, megakaryocytes, mature neutrophils of bone marrow and plasma cells of the tonsil, lymph node and bone marrow are also reported to express CPP32 antigen.

## Novocastra **Cyclin A**

**Clone 6E6**
1 mL lyophilized NCL-CYCLIN A **P (HIER) W C**

**Antigen Background**

Cyclins are proteins that vary in abundance and are associated with and activate cyclin dependent kinases (cdk) at different stages of the cell cycle. Cyclin A, more commonly defined as A2, a protein of 60 kD, binds independently to a cdc-related kinase, cdk2, in S to G2 phase and cdc2/cdk1 in G2 to M phase, leading to enzyme activation. Cyclin A is detectable in S phase, increasing during cell cycle progression to G2 phase and may prove useful as a marker of proliferation.



Normal human colon: immunohistochemical staining for Cyclin A using NCL-CYCLIN A. Note intense nuclear staining of a small proportion of crypt epithelial cells. Paraffin section.

## Novocastra **Cyclin B1**

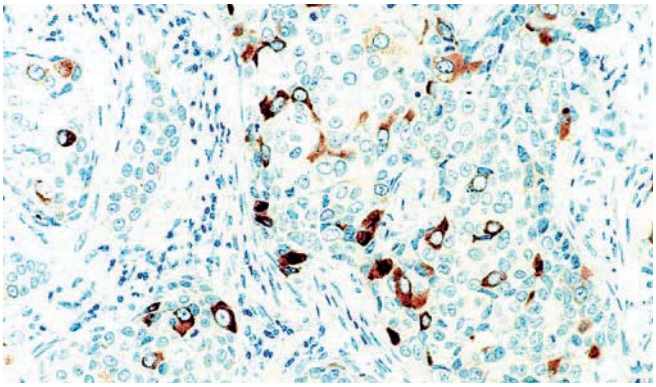
**Clone 7A9**
1 mL lyophilized NCL-CYCLIN B1 **P (HIER) W C**

**Antigen Background**

Cyclin B protein acts in a similar way to cyclin A, as regulatory subunits of p34/cdc2/cdk1 affecting the G2 to M phase transition. Cyclin B expression is, therefore, restricted to a specific short period of the cell cycle with cyclin B1 expression detected earlier and peaking in concentration before cyclin B2 expression. Cyclin B positive cells, indicated by cytoplasmic staining, in proliferating tissue are reported to represent a subset of Ki67 positive cells.

**Product Specific Information**

Please note that methacarn fixation produces optimal staining.



Human breast carcinoma: immunohistochemical staining for cyclin B1 using NCL-CYCLIN B1. Note cytoplasmic staining of tumor cells. Paraffin section.

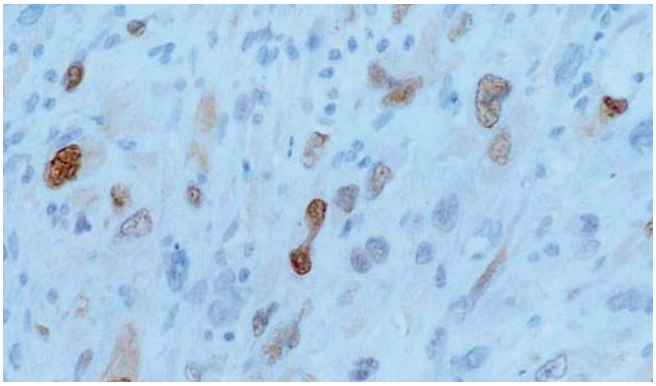
## Novocastra **Cyclin D1**

**Clone P2D11F11**
1 mL, 0.1 mL lyophilized NCL-CYCLIN D1-GM
**P (HIER/Enzyme) W**
1 mL liquid NCL-L-CYCLIN D1-GM **P (HIER/Enzyme) W**
7 mL ready-to-use RTU-CYCLIN D1-GM **P (HIER/Enzyme) W**

**Clone DCS-6**
1 mL lyophilized NCL-CYCLIN D1 **F P (HIER/Enzyme) W**

**Antigen Background**

The D-type cyclins are a family of proteins which function primarily by regulating the activity of cyclin dependent kinases in the G1 phase of the cell cycle. Cyclin D1, a protein of 36 kD, is also known as PRAD1 or bcl-1. Maximum expression of cyclin D1 occurs at a critical point in mid to late G1 phase of the cell cycle. The cyclin D1 gene, located on 11q13 has been reported to be overexpressed in mantle cell lymphomas due to the chromosomal translocation t(11;18).



Human breast carcinoma: immunohistochemical staining for cyclin D1 using NCL-CYCLIN D1-GM. Note nuclear staining of a proportion of tumor cells. Paraffin section.

## Novocastra **Cyclin D3**

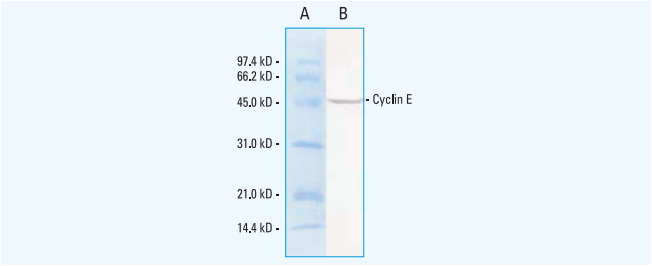
**Clone DCS-22**
1 mL lyophilized NCL-CYCLIN D3 **F P (HIER) W**

The 34 kD cyclin D3 protein shares 53 percent sequence homology with cyclin D1. Cyclin D3 expression is reported to be induced later than cyclin D1 in G1 phase of the cell cycle. When complexed with cyclin dependent kinases, cyclin D3 shows activity characteristic of other D-type cyclins. However, an increase in cyclin D3 expression with an absence of kinase activity has been observed in terminally differentiated, quiescent cells, suggesting an additional role for cyclin D3.

## Novocastra **Cyclin E**

**Clone 13A3**
1 mL, 0.1 mL lyophilized NCL-CYCLIN E **F P (HIER) W**

Cyclin E was identified as a protein which would complement cyclin mutations in yeast and mammalian cells. Overexpression of cyclin E shortens the length of the G1 phase, accelerating progression of the cell cycle into S phase. The activity of cyclin E is mediated through its activation of cyclin dependent kinase 2 (cdk2) protein and is modulated by the presence of cyclin dependent kinase inhibitors such as p16.




Western blot: detection of human cyclin E (50 kD) using NCL-CYCLIN E. Lane A, molecular weight markers. Lane B, thymidine blocked MDA-MB-157 cell line immunoblotted with NCL-CYCLIN E.

## Novocastra **Cyclooxygenase-2**

**Clone 4H12**
1 mL lyophilized NCL-COX-2 **P (HIER)**

**Antigen Background**

Cyclooxygenase-2 is a mitogen-inducible form of cyclooxygenase (prostaglandin-endoperoxide synthase) which is expressed in response to various inflammatory stimuli, including UV radiation and by T cell receptor triggering in peripheral blood. It is an inducer of angiogenesis and plays a role in normal keratinocyte differentiation. Immunohistochemical staining for cyclooxygenase-2 increases in the more differentiated, suprabasal keratinocytes of normal skin. Squamous cell carcinomas derived from differentiated epidermis express cyclooxygenase-2 whereas basal cell carcinomas are negative. In Crohn's disease and ulcerative colitis, cyclooxygenase-2 is strongly expressed in the upper crypts, surface epithelial cells and in the mononuclear cells of the lamina propria. In Alzheimer's disease, expression of cyclooxygenase-2 is reported to be upregulated in the frontal cortex regions.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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# Novocastra **Cytokeratin 1**

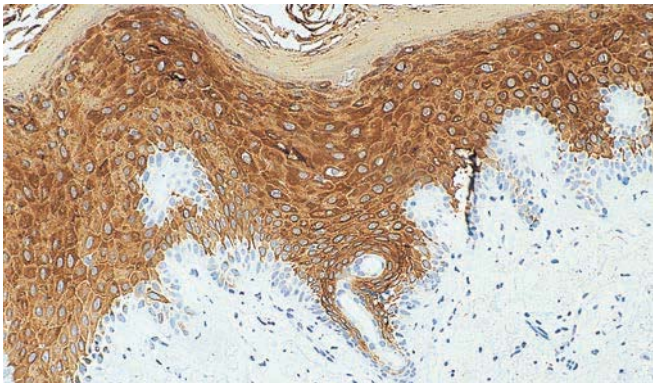
**Clone 34βB4**
0.5 mL lyophilized NCL-CK1 **F P (HIER)**

### Antigen Background

Intermediate filaments, distinctive cytoskeletal components present in virtually all mammalian cells are distinguished from other cytoskeletal structures such as microtubules and microfilaments on the basis of filament diameter and protein composition. Keratins are a complex class of intermediate filaments with molecular weights ranging from 40 to 70 kD. At least 20 different human cytokeratin peptides have been individually characterized and catalogued. Cytokeratin 1 has a molecular weight of 68 kD and is present in complex epithelium.

### Product Specific Information

NCL-CK1 reacts with squamous epithelium.



Human squamous cell carcinoma: immunohistochemical staining for cytokeratin 1 using NCL-CK1. Note intense cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **Cytokeratin 4**

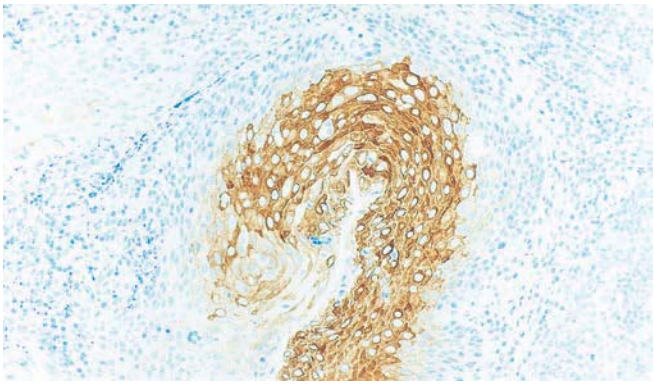
**Clone 6B10**
0.5 mL lyophilized NCL-CK4 **F P (HIER) W**

### Antigen Background

Cytokeratin 4 is a 59 kD cytokeratin intermediate filament protein. It is found in non-cornifying squamous epithelium such as that of the superficial and intermediate epithelial cells of the esophagus, ectocervix, tongue, vagina, larynx, pharynx, epiglottis, anus as well as the superficial cells of the cornea. Cytokeratin 4 is also reported to be expressed in the suprabasal cells of the urinary bladder transitional epithelium, in single cells and cell groups of sweat glands, prostatic ducts and in cylindrical, ciliated bronchial epithelial cells.

### Product Specific Information

NCL-CK4 is a chain-specific antibody. It is of particular use in the characterization of certain complex epithelia.



Human tonsil: immunohistochemical staining for cytokeratin 4 using NCL-CK4. Note cytoplasmic staining of mucosal epithelium. Paraffin section.

# Novocastra **Cytokeratin 5**

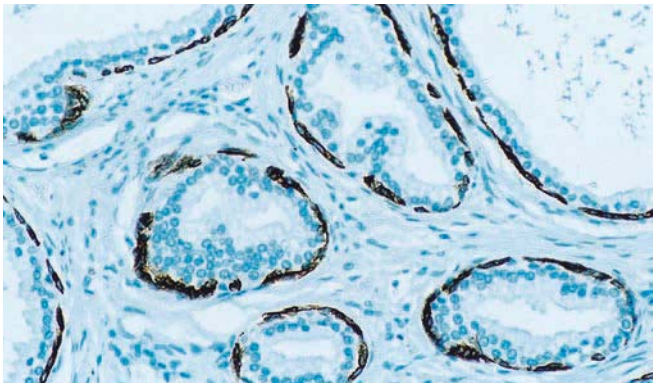
**Clone XM26**
1 mL, 0.1 mL lyophilized NCL-CK5 **F P (HIER) W**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-CK5 **F P (HIER) W** New!
7 mL ready-to-use RTU-CK5 **F P (HIER)**
7 mL BOND ready-to-use PA0468 **P (HIER)**

### Antigen Background

Cytokeratins are a large family of cytoskeletal proteins found in epithelial cells. They are coordinately synthesized in pairs so that at least one member of each family is expressed in each epithelial cell. Cytokeratins assemble into obligatory heteropolymers composed of type I (acidic) and type II (basic) polypeptides to form higher order tetramers and protofilaments. Basal cells of human epidermis express acidic keratin 14 and basic cytokeratin 5. Cytokeratin 5 is a 58 kD protein that is closely related to cytokeratin 6. They share similar tissue distribution and are found in various proportions in many non-keratinizing stratified squamous epithelia eg tongue mucosa, as well as in basal epithelia of trachea, basal cells of epidermis, hair follicles, sebaceous and sweat glands of skin, luminal cells of the mammary gland, basal cells of prostate, urothelium, vagina and endocervical mucosa. Cytokeratins 5 and 6 are also expressed in basal cell epitheliomas, squamous cell carcinomas of skin, tongue, epiglottis and of the rectal-anal region. Point mutations in the cytokeratin 5 gene at locus 12q11-q13 can cause various types of epidermolysis bullosa simplex. Cytokeratin 5 is also reported to be expressed in most epithelial and biphasic mesotheliomas.

### Product Specific Information

Clone XM26 is specific for the 58 kD intermediate filament protein known as cytokeratin 5. It is not cross-reactive with cytokeratin 6.



Human prostate: immunohistochemical staining for cytokeratin 5 using NCL-L-CK5. Note intense cytoplasmic staining of myoepithelial cells. Paraffin section.

# Novocastra **Cytokeratin 6**

## Clone LHK6B

1 mL lyophilized NCL-CK6 **F**

### Antigen Background

Cytokeratins are precisely regulated in tissue and little is known about the molecular mechanisms underlying this regulation. However, the expression pattern of cytokeratin 6 is known to be particularly complex. It is found in hair follicles, suprabasal cells of a variety of internal stratified epithelia, in epidermis, in both normal and hyperproliferative situations. Epidermal injury results in activation of keratinocytes which produce and respond to growth factors and cytokines and become migratory. Activated keratinocytes express a specific pair of cytokeratins, 6 and 16.

### Product Specific Information

NCL-CK6 reacts with the human cytokeratin intermediate filament protein (56 kD) identified as cytokeratin 6.

# Novocastra **Cytokeratin 7**

## Clone RN7

1 mL, 0.1 mL liquid NCL-L-CK7-560 **P (HIER)**
7 mL BOND ready-to-use PA0942 **P (HIER)**
30 mL BOND ready-to-use PA0138 **P (HIER)** New!

## Clone OV-TL 12/30

1 mL lyophilized NCL-CK7-OVTL **F P (HIER/Enzyme) W**
1 mL liquid NCL-L-CK7-OVTL **F P (HIER/Enzyme) W**
7 mL ready-to-use RTU-CK7-OVTL **F P (HIER/Enzyme)**

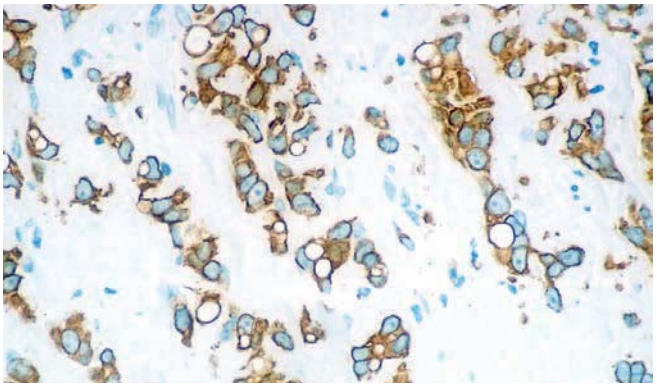
*Clone RN7 was developed to produce superior staining on paraffin sections.*

### Antigen Background

Cytokeratins are intermediate filament proteins present in epithelial cells. They are expressed in a tissue-specific manner in normal organs and the tumors that arise from them. Cytokeratin 7 belongs to the neutral basic type B subfamily of cytokeratins. Its distribution is confined to glandular and transitional epithelia. Cytokeratin 7 is reported to be expressed in abun-dance in cultured bronchial and mesothelial cells but only at lower levels in cultured epidermal cells. The predicted amino acid sequence of this keratin has revealed a striking difference between this keratin and the type II keratins expressed in epidermal cells. Cytokeratin 7 has been reported in adenocarcinomas of the lung, breast, endometrium, ovary, thyroid as well as in carcinomas of the bladder and chromophobe renal cell carcinoma. Cytokeratin 7 and Cytokeratin 20 expression have been reported to show characteristic patterns on primary and metastatic lung and colorectal adenocarcinomas.

### Product Specific Information

Where clone OV-TL 12/30 can produce unwanted staining of endothelial cells, clone RN7 does not stain these cell types. The choice of epitope retrieval, heat or enzyme, to provide the best result with clone OV-TL 12/30 should be determined by the user. Clones RN7 and OV-TL 12/30 react with the human cytokeratin intermediate filament protein (54 kD) identified as cytokeratin 7.



Infiltrating lobular carcinoma of breast: immunohistochemical staining for cytokeratin 7 antigen using NCL-L-CK7-560. Note intense membrane and cytoplasmic staining of malignant cells. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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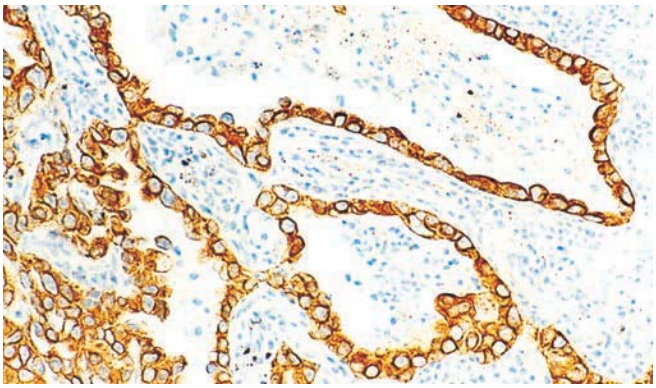
# Novocastra **Cytokeratin 8**

**Clone TS1**
1 mL lyophilized NCL-CK8-TS1 **F P (HIER)**
1 mL liquid NCL-L-CK8-TS1 **F P (HIER)**
7 mL ready-to-use RTU-CK8-TS1 **F P (HIER)**
7 mL BOND ready-to-use PA0567 **P (HIER)**

Cytokeratin 8, also known as tissue polypeptide antigen (TPA), together with cytokeratin 18, is one of the first cytokeratins expressed in the embryo and persists in adult tissues. Both cytokeratins, 8 and 18, are major components of all simple epithelia but not of stratified squamous epithelia. Cytokeratin 8, reported to be expressed in the adenocarcinomas of individuals, is also found to be present in their sera.

**Product Specific Information**

Clone TS1 reacts with human cytokeratin intermediate filament protein (52.5 kD) identified as cytokeratin 8.



Human pulmonary adenocarcinoma: immunohistochemical staining for cytokeratin 8 using RTU-CK8-TS1. Note cytoplasmic staining of malignant cells. Paraffin section.

# Novocastra **Cytokeratin 10**

**Clone LHP1**
1 mL lyophilized NCL-CK10 **F P (Enzyme)**

**Antigen Background**

Cytokeratin 10 is found in suprabasal layers of keratinizing stratified epithelia. It is also found in a variable number of cells in suprabasal layers of non-keratinizing stratified epithelia and is reported to be expressed in more differentiated areas of some squamous carcinomas. Cytokeratin 10 is found in various normal epithelia, including the anal canal, foot sole epidermis and epidermises of other locations.

**Product Specific Information**

NCL-CK10 reacts with the human cytokeratin intermediate filament protein (56.5 kD) identified as cytokeratin 10.

# Novocastra **Cytokeratin 13**

**Clone KS-1A3**
0.5 mL lyophilized NCL-CK13 **F P (HIER) W**

**Antigen Background**

Cytokeratin 13 is expressed as a major component of squamous, non-keratinised epithelium, transitional epithelium, pseudostratified epithelium and myoepithelium. It is reported to be expressed in carcinomas of the trachea, apocrine and eccrine sweat glands, salivary glands, reserve cells of endocervical glands, bladder, ectocervix, tongue, esophagus, anal canal and the basal layer of keratinised epidermis.

**Product Specific Information**

NCL-CK13 reacts with the acidic intermediate filament protein (54 kD) identified as cytokeratin 13.

# Novocastra **Cytokeratin 14**

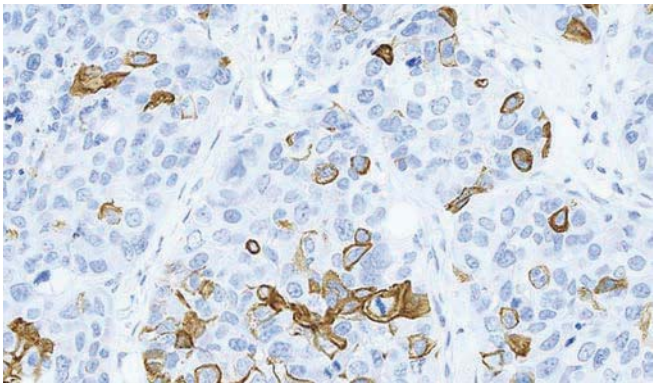
**Clone LL002**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-LL002 **F P (HIER)** New!
7 mL ready-to-use RTU-LL002 **F P (HIER)**
7 mL BOND ready-to-use PA0074 **P (HIER)** New!

**Antigen Background**

Cytokeratins 14 and 5 are useful to distinguish stratified epithelial cell types from simple epithelial cell types. Cytokeratin 14 has been reported to be expressed in neoplasms of squamous cell origin.

**Product Specific Information**

Clone LL002 reacts with the human cytokeratin intermediate filament protein (50 kD) identified as cytokeratin 14.



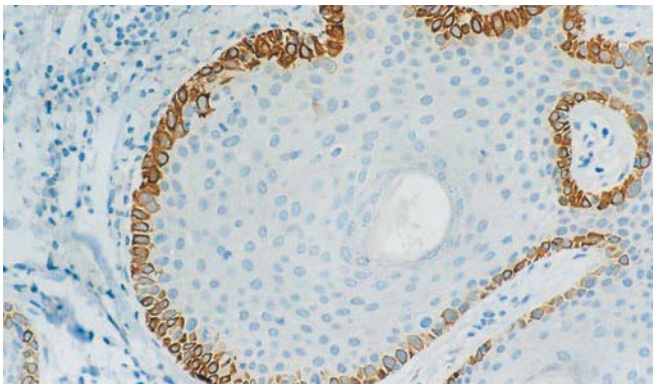
Human invasive breast cancer: immunohistochemical staining for cytokeratin 14 using NCL-L-CK14. Note intense membrane and cytoplasmic staining of a proportion of tumor cells. Paraffin section.

# Novocastra **Cytokeratin 15**

**Clone LHK15**
1 mL, 0.1 mL lyophilized NCL-CK15 **F P (HIER)**

**Antigen Background**

Cytokeratin 15 is a 52 kD intermediate filament protein expressed only in basal keratinocytes of stratified squamous epithelium, fetal epidermis and fetal nail. It is a type I keratin and does not appear to have a natural type II expression partner.



Normal human skin: immunohistochemical staining for cytokeratin 15 using NCL-CK15. Note intense cytoplasmic staining of basal cells and hair follicles. Paraffin section.

# Novocastra **Cytokeratin 16**

**Clone LL025**
1 mL lyophilized NCL-CK16 **F P (HIER)**

**Antigen Background**

Cytokeratins 16 and 6 are expressed where keratinocytes are undergoing rapid turnover in the suprabasal region. Cytokeratins 16 and 6 are reported to be found in various pathological states, including wound healing, psoriasis and certain carcinomas.

**Product Specific Information**

NCL-CK16 reacts with the human cytokeratin intermediate filament protein (48 kD) identified as cytokeratin 16.

# Novocastra **Cytokeratin 17**

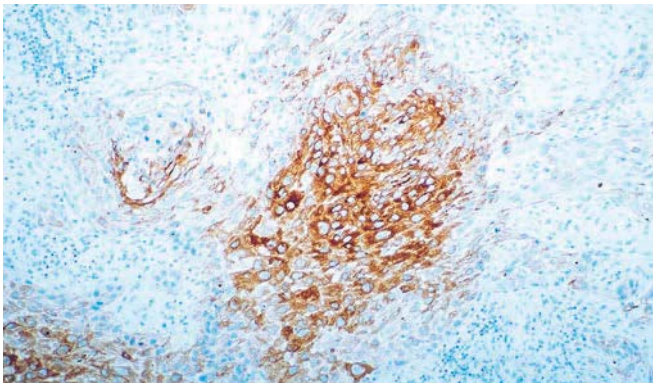
**Clone E3**
1 mL, 0.1 mL lyophilized NCL-CK17 **F P (HIER) W**
7 mL BOND ready-to-use PA0114 **P (HIER)**

**Antigen Background**

In normal tissues cytokeratin 17 is reported to be expressed in basal cells of complex epithelia eg basal cells of pseudostratified epithelium in the trachea, larynx, bronchi, myoepithelial cells in salivary glands and sweat glands. In neoplastic tissue, cytokeratin 17 is reported to be expressed in squamous cell carcinomas of the lung, cervix and oral cavity.

**Product Specific Information**

NCL-CK17 reacts with the human cytokeratin intermediate filament protein (46 kD) identified as cytokeratin 17.



Human squamous cell carcinoma, floor of the mouth: immunohistochemical staining for cytokeratin 17 using NCL-CK17. Note cytoplasmic staining of malignant cells. Paraffin section.

# Novocastra **Cytokeratin 18**

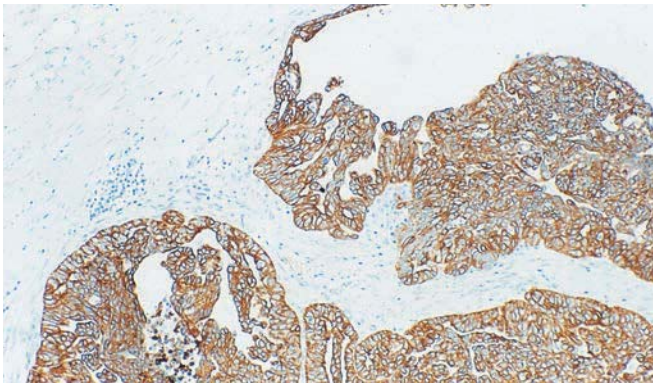
**Clone DC-10**
1 mL, 0.1 mL lyophilized NCL-CK18 **F P (HIER)**

**Antigen Background**

Cytokeratin 18 is normally co-expressed with cytokeratin 8 and is found in most simple ductal and glandular epithelia.

**Product Specific Information**

NCL-CK18 reacts with the acidic cytokeratin intermediate filament protein (45 kD) identified as cytokeratin 18. Cytokeratin 18 is reported not to be expressed in stratified squamous epithelium on most squamous cell carcinomas.



Human colonic adenocarcinoma: immunohistochemical staining for cytokeratin 18 using NCL-CK18. Note cytoplasmic staining of malignant epithelial cells. Paraffin section.

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## Novocastra **Cytokeratin 19**

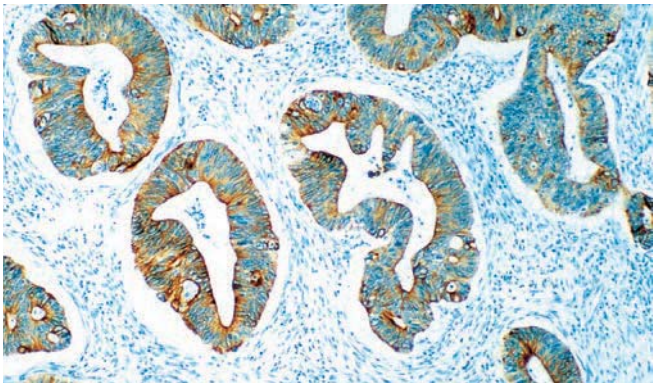
**Clone b170**
1 mL, 0.1 mL lyophilized NCL-CK19 **F P (Enzyme)**
7 mL BOND ready-to-use PA0799 **P (Enzyme)**

**Antigen Background**

The smallest human cytokeratin filament protein (40 kD) has been identified as cytokeratin 19 and has been reported to be expressed in a large number of epithelial cell types, including many ductal and glandular epithelia.

**Product Specific Information**

NCL-CK19 produces a complex heterogenous staining pattern in non-keratinizing squamous epithelia and hair follicles, with strong staining of the basal layer observed.



Human rectal adenocarcinoma: immunohistochemical staining for cytokeratin 19 using NCL-CK19. Note cytoplasmic staining of malignant epithelial cells. Paraffin section.

## Novocastra **Cytokeratin 20**

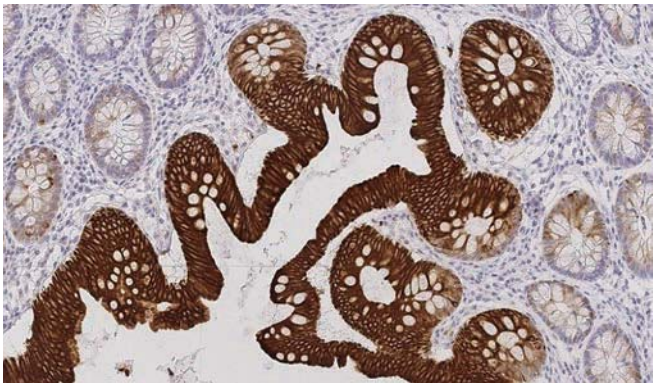
**Clone K$^{S}$20.8**
1 mL lyophilized NCL-CK20 **P (HIER/Enzyme) W**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-CK20 **P (HIER/Enzyme) W**
7 mL ready-to-use RTU-CK20 **P (HIER/Enzyme)**

**Clone PW31**
1 mL, 0.1 mL liquid NCL-L-CK20-561 **P (HIER)**
7 mL BOND ready-to-use PA0918 **P (HIER)**

**Clone CK205**
1 mL lyophilized NCL-CK20-543 **P (HIER)**

**Antigen Background**

Cytokeratin 20 has been demonstrated to be almost entirely confined to the gastric and intestinal epithelium, urothelium and Merkel cells of the skin. Cytokeratin 20 is less acidic than other type I cytokeratins and is of interest due to its restricted tissue expression. In normal tissue, cytokeratin 20 is expressed in intestinal epithelium, gastric foveolar epithelium, a number of endocrine cells in the upper portions of the pyloric glands, urothelium and Merkel cells in epidermis. In tumors it is reported, there is a marked difference in the expression of cytokeratin 20 within different carcinomas. Neoplasms expressing cytokeratin 20 are derived from normal epithelia which themselves expressed cytokeratin 20. Colorectal carcinomas consistently express cytokeratin 20, while gastric adenocarcinomas express cytokeratin 20 to a lesser degree. Adenocarcinomas of the gall bladder and bile duct, ductal cell adenocarcinomas of the pancreas, mucinous ovarian tumors, Merkel cell tumors and transitional cell carcinomas have also been reported to express cytokeratin 20.



Human colon: immunohistochemical staining for cytokeratin 20 using NCL-L-CK20. Note intense staining of epithelial cells with gradation of staining towards the base of the crypts. Paraffin section.

## Novocastra **Cytokeratin (5/6/18)**

**Clone LP34**
1 mL lyophilized NCL-LP34 **F P (Enzyme) C**
1 mL liquid NCL-L-LP34 **F P (Enzyme) C**
7 mL ready-to-use RTU-LP34 **F P (Enzyme)**

**Antigen Background**

Cytokeratins 5, 6 and 18 are reported to be expressed in a broad range of human epithelial tissues, from simple glandular epithelia to stratified squamous epithelia. These include epithelial cells that are ectodermal, mesodermal, or endodermal in origin. These cytokeratins have been reported to be expressed in tumor cells of epithelial origin and less commonly of mesothelial origin. Non-epithelial tumors such as lymphomas do not express these cytokeratins.

**Product Specific Information**

Clone LP34 reacts with human cytokeratin intermediate filament proteins 5, 6 and 18 on frozen tissue. The recognition of cytokeratin 18 on paraffin sections using clone LP34 may be variable.

## Novocastra **Cytokeratin (8/18)**

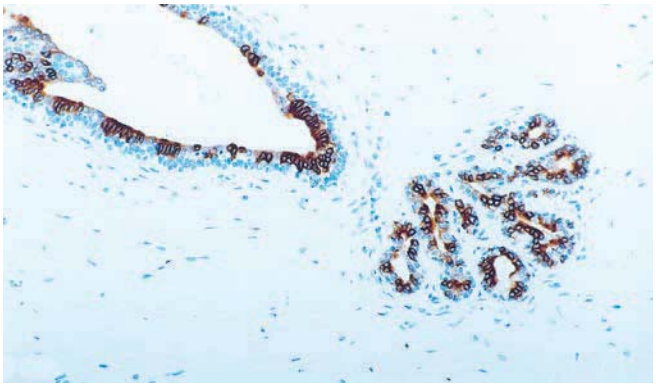
**Clone 5D3**
1 mL, 0.1 mL lyophilized NCL-5D3 **F P (Enzyme) C**
1 mL liquid NCL-L-5D3 **F P (Enzyme) C**
7 mL ready-to-use RTU-5D3 **F P (Enzyme)**
7 mL BOND ready-to-use PA0067 **P (HIER)**

**Antigen Background**

In normal tissues, cytokeratins 8 and 18 are reported to be expressed in all simple and glandular epithelium and in neoplastic tissues, they have been reported to be expressed in adenocarcinomas and most squamous cell carcinomas. These cytokeratins are absent from keratinizing squamous carcinomas.

**Product Specific Information**

Clone 5D3 reacts with human cytokeratin intermediate filament proteins of 52.5 kD and 45 kD, identified as cytokeratins 8 and 18, respectively. Clone 5D3 shares similar specificities to clone CAM5.2 (Angus B et al. Journal of Pathology. 153: 377-384 (1987)).



Human breast: immunohistochemical staining for cytokeratins 8 and 18 using NCL-L-5D3. Note intense cytoplasmic staining of ductal epithelial cells. Paraffin section.

## Novocastra **Cytokeratin, Multi**

**Clone AE1, Clone AE3 cocktail**
1 mL lyophilized NCL-AE1/AE3 **F P (HIER)**
1 mL liquid NCL-L-AE1/AE3 **F P (HIER)**
7 mL ready-to-use RTU-AE1/AE3 **F P (HIER)**
7 mL BOND ready-to-use PA0909 **P (Enzyme)**

See also Multi-Cytokeratin on page 174.

## Novocastra **Cytokeratin, Multi (1/5/10/14)**

**Clone 34βE12**
1 mL lyophilized NCL-CK34BE12 **F P (HIER) W**
7 mL ready-to-use RTU-CK34BE12 **F P (HIER)**
7 mL BOND ready-to-use PA0134 **P (Enzyme)**

See also Multi-Cytokeratin 1/5/10/14 on page 174.

## Novocastra **Cytokeratin, Multi (4/5/6/8/10/13/18)**

**Clone C-11**
1 mL lyophilized NCL-C11 **F P (HIER)**

See also Multi-Cytokeratin (4/5/6/8/10/13/18) on page 174.

## Novocastra **Cytokeratin, Multi (5/6/8/18)**

**Clone 5D3, Clone LP34 cocktail**
1 mL, 0.1 mL lyophilized NCL-CK5/6/8/18 **F P (Enzyme)**
1 mL liquid NCL-L-CK5/6/8/18 **F P (Enzyme)**
7 mL ready-to-use RTU-CK5/6/8/18 **F P (Enzyme)**

See also Multi-Cytokeratin (5/6/8/18) on page 174.

## Novocastra **Cytomegalovirus Antibodies**

**Clone 2, Clone 6 cocktail**
1 mL, 0.1 mL lyophilized Cytomegalovirus (pp65 antigen)
NCL-CMVpp65 **P (HIER) W I**

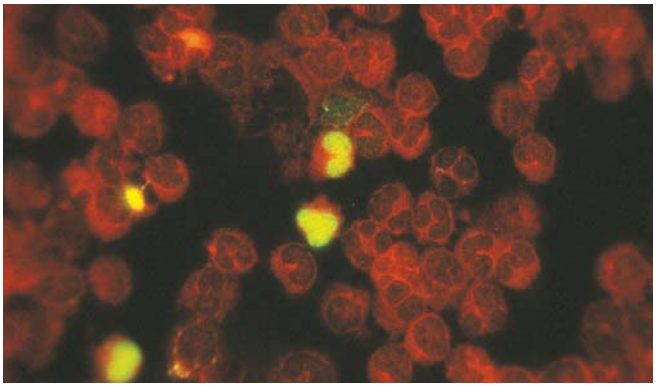
**Clone QB1/42**
1 mL lyophilized Cytomegalovirus (early antigen)
NCL-CMV-EA **F P (HIER)**

**Clone QB1/06**
1 mL lyophilized Cytomegalovirus (late antigen)
NCL-CMV-LA **F P (HIER)**

Cytomegalovirus (CMV) is an opportunistic pathogen infecting lung, kidney, gut and other organs in situations where an individual is immunologically immature, such as the fetus and neonate. Infection also occurs in immunosuppressed individuals eg transplant recipients, individuals undergoing chemotherapy and those with HIV infection. The typical course of an active CMV infection in the immunosuppressed individual is reported to be characterized by a period of pp65 antigenaemia which correlates with viral replication. This may be observed over some weeks and begins before the onset of clinical symptoms. Following the isolation of CMV strains in cell culture, early viral proteins are expressed in the cell nucleus, within 3 to 24 hours of infection. After 48 to 72 hours, a number of late viral proteins may be demonstrated in the nucleus and cytoplasm of infected cells.

**Product Specific Information**

NCL-CMVpp65 is a pool of 2 unique monoclonal antibodies suitable for the detection of the pp65 antigen in cytospin preparations.



Antigenaemia positive peripheral polymorphonuclear leukocytes: immunofluorescence for Cytomegalovirus pp65 antigen using NCL-CMVpp65. Note characteristic nuclear staining. Formalin/sucrose-fixed cytospin preparation.

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## Novocastra **DEC-205 (CD205)**

**Clone 11A10**
1 mL liquid NCL-L-DEC205 **P (HIER) P (HIER)**

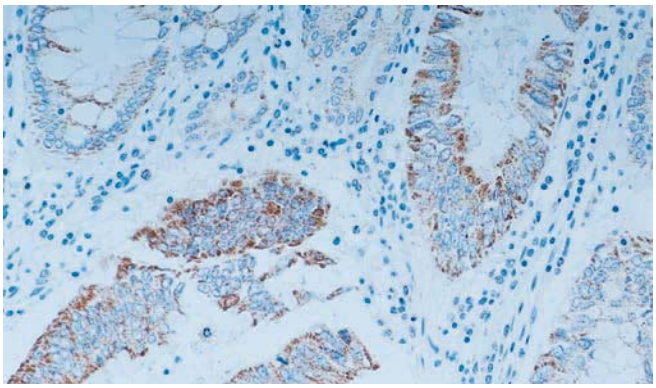
See also CD205 (DEC-205) on page 126.

## Novocastra **Deleted in Colorectal Cancer Protein**

**Clone DM51**
1 mL lyophilized NCL-DCC **P (HIER)**

**Antigen Background**

The deleted in colorectal cancer (DCC) gene located on chromosome 18 is a tumor suppressor gene that encodes a transmembrane protein structurally similar to NCAM. The highest reported expression of this protein can be found in axons of the central and peripheral nervous systems where it functions as a netrin receptor required for the guidance of the developing axons. The DCC gene is reported to be expressed in most epithelial tissues where the protein may participate in the regulation of cell to cell or cell to substratum interaction. In normal colon, DCC expression is restricted to the mucosa with intense granular cytoplasmic staining in the crypts, particularly in the goblet cells.



Human colonic adenocarcinoma: immunohistochemical staining for deleted in colorectal cancer protein using NCL-DCC. Note granular cytoplasmic staining of malignant epithelial cells. Paraffin section.

## Novocastra **Deleted in Pancreatic Cancer Locus 4 Protein**

**Clone JM56**
1 mL lyophilized NCL-DPC4 **P (HIER)**

**Antigen Background**

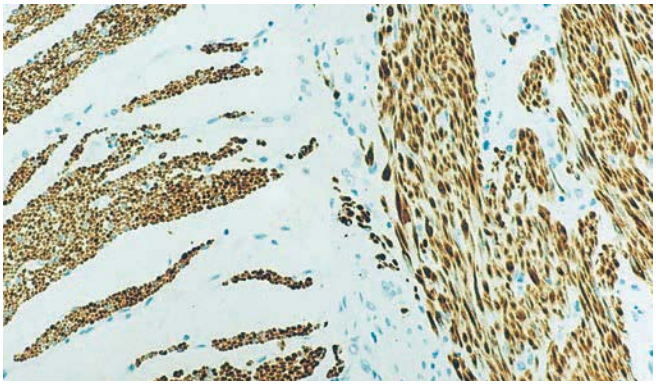
Deleted in pancreatic cancer locus 4 (DPC4) is a tumor suppressor gene reported to be frequently mutated or deleted in pancreatic and metastatic colon cancers. DPC4, also known as Smad4, acts as a cofactor that binds transforming growth factor-beta receptor-activated Smad2 and Smad3 generating transcriptional complexes which translocate to the nucleus to participate in sequence-specific DNA-binding and transcriptional activation. The expression of DPC4 protein has been reported to be a sensitive and specific marker for DPC4 gene alterations in pancreatic carcinomas. Loss of DPC4 expression occurs late in the neoplastic progression which leads to the development of infiltrating pancreatic cancer.

## Novocastra **Desmin**

**Clone DE-R-11**
1 mL, 0.1 mL lyophilized NCL-DES-DERII **F P (Enzyme) W**
1 mL liquid NCL-L-DES-DERII **F P (Enzyme) W**
7 mL ready-to-use RTU-DES-DERII **F P (Enzyme)**
7 mL BOND ready-to-use PA0032 **P (HIER)**

**Product Specific Information**

NCL-DES-DERII reacts with an 18 kD rod piece of the intermediate filament protein desmin (53 kD) in muscle cells. The antibody does not appear to recognize other intermediate filament proteins. In normal tissues, Clone DE-RII reacts with both striated (skeletal and cardiac) and smooth muscle cells. The labeling is confined to the Z bands in skeletal and cardiac muscle giving a characteristic striated appearance.



Normal human small intestine: immunohistochemical staining for desmin using NCL-DES-DERII. Note cytoplasmic staining of muscle cells in the muscularis externa. Paraffin section.

# Novocastra **DOG-1**

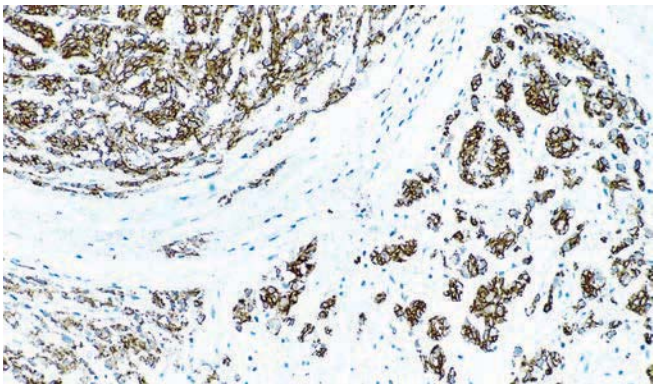
**Clone K9**
1 mL, 0.1 mL liquid NCL-L-DOG-1 **P (HIER)**
7 mL BOND ready-to-use PA0219 **P (HIER)**

**Antigen Background**

DOG-1, a 986 amino acid protein of unknown function, is expressed predominantly on the plasma membrane of gastrointestinal stromal tumors (GISTs) and is rarely expressed in other soft tissue tumors, which, due to appearance, can be confused with GISTs. Reactivity for DOG-1 has been suggested to aid in the identification of GISTs, including Platelet-Derived Growth Factor Receptor Alpha mutants that fail to express KIT antigen.

**Product Specific Information**

The use of PBS-based diluents may result in increased background staining.



Human gastrointestinal stromal tumor: immunohistochemical staining for DOG-1 using NCL-L-DOG-1. Note intense membrane and cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **Dysferlin**

**Clone Ham1/7B6**
1 mL, 0.1 mL lyophilized NCL-Hamlet **F P W**

**Clone Ham3/17B2**
1 mL lyophilized NCL-Hamlet-2 **F P (HIER) W**

**Antigen Background**

Dysferlin is the protein product of the 2p13 gene that is defective in individuals with Limb-Girdle Muscular Dystrophy type 2B (LGMD2B) and Miyoshi Myopathy (MM). Dysferlin is normally localized to the muscle plasma membrane. In individuals with LGMD2B and MM, immunoreactivity to dysferlin is reported to be severely reduced or lost, depending on the type of mutation. Individuals with other neuromuscular conditions demonstrate normal labeling patterns.

**Product Specific Information**

NCL-Hamlet may require heat induced epitope retrieval in some cases. labeling with an antibody to beta-spectrin, to monitor membrane integrity, is an essential immunohistochemical control.

# Novocastra **Dystrophin Antibodies**

**Clone Dy4/6D3**
2.5 mL, 1 mL lyophilized Dystrophin (Rod Domain)
NCL-DYS1 **F W E**

**Clone Dy8/6C5**
2.5 mL, 1 mL lyophilized Dystrophin (C-terminus)
NCL-DYS2 **F W E**

**Clone Dy10/12B2**
2.5 mL, 1 mL lyophilized Dystrophin (N-terminus)
NCL-DYS3 **F W E**

**Clone 13H6**
1 mL lyophilized Dystrophin (C-terminus)
NCL-DYSA **P (HIER)**

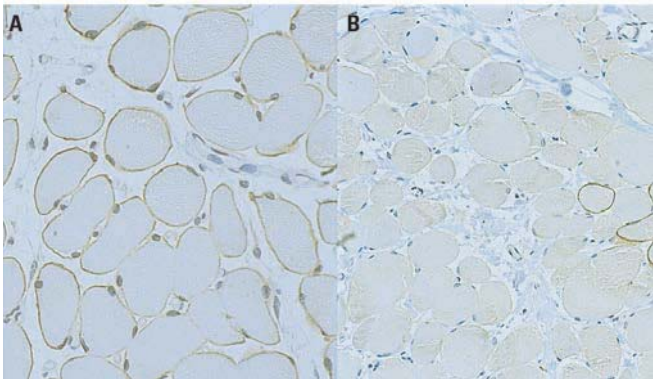
**Clone 34C5**
1 mL lyophilized Dystrophin (N-terminus)
NCL-DYSB **P (HIER)**

**Antigen Background**

Duchenne Muscular dystrophy (DMD) is the most severe of the muscular dystrophies resulting in progressive muscular wasting and death. Dystrophin is the 427 kD protein product of the DMD/BMD gene located on the X chromosome at position Xp2. Western blotting and immunohisto-chemistry are the two established methods for the detection of abnormalities of dystrophin expression in muscle samples.

**Product Specific Information**

NCL-DYS1, NCL-DYS2 and NCL-DYS3 map within amino acids 1181-1388, 3669-3685 and 321-494, respectively, on the dystrophin molecule. The immunolabeling patterns for NCL-DYS1, NCL-DYS2 and NCL-DYS3 are similar. NCL-DYSA is raised to a region of the dystrophin molecule, upstream from the C-terminal region and NCL-DYSB is raised to a region of the N-terminus of the dystrophin molecule. NCL-DYSA and NCL-DYSB will be of particular interest in the investigation of archived formalin-fixed, paraffin-embedded material. Labeling with an antibody to beta-spectrin, to monitor membrane integrity, is an essential immunohistochemical control.




Human skeletal muscle: immunohistochemical staining for dystrophin using NCL-DYSA. Note membrane staining of normal muscle fibers (A) and reduced and variable staining of muscle fibers in an individual with Duchenne and Becker muscular dystrophy (B). Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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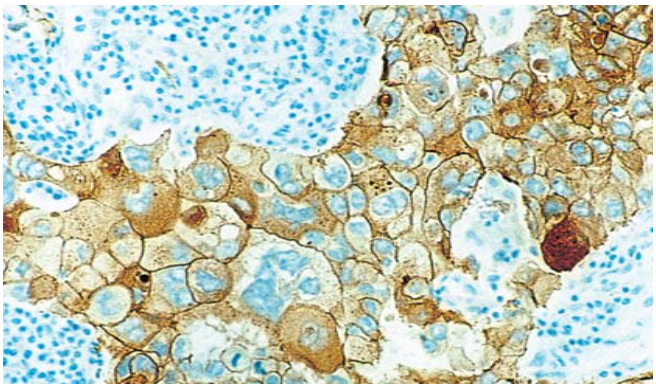
# Novocastra **E-Cadherin**

**Clone 36B5**
1 mL, 0.1 mL lyophilized NCL-E-Cad **P (HIER)**
1 mL liquid NCL-L-E-Cad **P (HIER)**
7 mL ready-to-use RTU-E-Cad **P (HIER)**
7 mL BOND ready-to-use PA0387 **P (HIER)**

**Antigen Background**

E-cadherin is a $Ca^{2+}$ -dependent, transmembrane cell adhesion molecule. It plays an important role in the growth, development and the intercellular adhesion of epithelial cells. Most tumors have an abnormal architecture and any subsequent loss of adhesiveness is thought to be an important step in the development of local invasion. E-cadherin may have a role in neoplastic progression, particularly as a suppressor of invasion. In prostate cancers, for example, the expression of E-cadherin is reported to be reduced or absent in comparison with its expression in normal prostate which is uniformly strong. Reduced expression or absence of E-cadherin in addition to alpha, beta and gamma-catenin in primary breast carcinomas has also been reported and these four proteins are associated with the development of metastases.



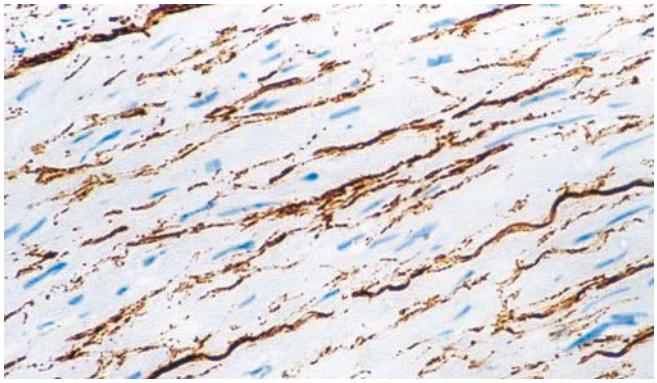
Human pulmonary adenocarcinoma: immunohistochemical staining for E-cadherin using NCL-L-E-Cad. Note intense cytoplasmic and membrane staining of tumor cells. Paraffin section.

# Novocastra **Elastin**

**Clone BA-4**
0.5 mL lyophilized NCL-ELASTIN **P (Enzyme)**

**Antigen Background**

Elastin is a polymeric protein found in connective tissue which imparts the property of elasticity to vertebrate elastic tissue. It is synthesized and secreted as a soluble, single-chain protein (tropoelastin) which undergoes a number of post-ribosomal modifications prior to its organization into an elastic fiber in the extracellular space. Once secreted, tropoelastin molecules are joined covalently via chemical modification and cross-linking of specific lysyl residues to form the mature insoluble elastin. Ultrastructurally, it is predominantly an amorphous material which may change its morphology with ageing and different disease states. The abnormal accumulation of elastic tissue in blood vessels is found in atherosclerosis and hypertension. Genetic defects in the elastin molecule are reported to lead to inherited diseases such as Marfan's syndrome, pseudoxanthoma elasticum and the Bushke-Ollendorf syndrome.



Human aorta: immunohistochemical staining for elastin using NCL-ELASTIN. Note extracellular staining within the arterial wall. Paraffin section.

# Novocastra **Emerin**

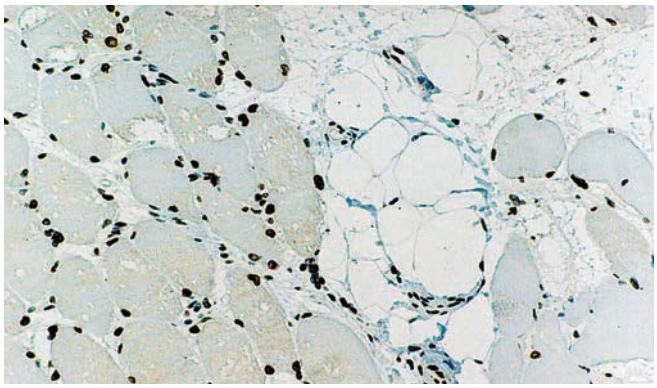
**Clone 4G5**
1 mL, 0.1 mL lyophilized NCL-EMERIN **F P (HIER) W**

**Antigen Background**

Emery-Dreifuss muscular dystrophy (EDMD) is a late onset X-linked recessive disorder characterized by slowly progressing contractures, wasting of skeletal muscle and cardiomyopathy usually presented as heart block. Contractures are seen in the elbows, Achilles tendons and postcervical muscles with humero-peroneal distribution early in the course of the disease. The STA gene, at Xq28 locus, encodes a serine-rich 34 kD protein, emerin, which is ubiquitous in tissues and is found in highest concentration in skeletal and cardiac muscle. Emerin is localized in the nuclear membrane of normal muscle cells and its deficiency plays a crucial part in the pathology of EDMD.

**Product Specific Information**

NCL-EMERIN is of use in the detection of the normal STA gene product.



Human skeletal muscle: immunohistochemical staining for emerin using NCL-EMERIN. Note perinuclear staining of all cell nuclei. Paraffin section.

## Novocastra **EMMPRIN (CD147)**

**Clone AB1843**
1 mL lyophilized NCL-CD147 **P (HIER)**

See also CD147 (EMMPRIN) on page 124.

## Novocastra **Endoglin (CD105)**

**Clone 4G11**
1 mL, 0.1 mL lyophilized NCL-CD105 **P (HIER)**

See also CD105 (Endoglin) on page 122.

## Novocastra **Endothelial Cell Marker (CD34)**

**Clone QBEnd/10**
1 mL, 0.1 mL lyophilized NCL-END **F P (Enzyme) C**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-END **F P (Enzyme) C** New!
7 mL ready-to-use RTU-END **F P (Enzyme)**
7 mL BOND ready-to-use PA0212 **P (HIER)**

See also CD34 (Endothelial Cell Marker) on page 114.

## Novocastra **Enterovirus**

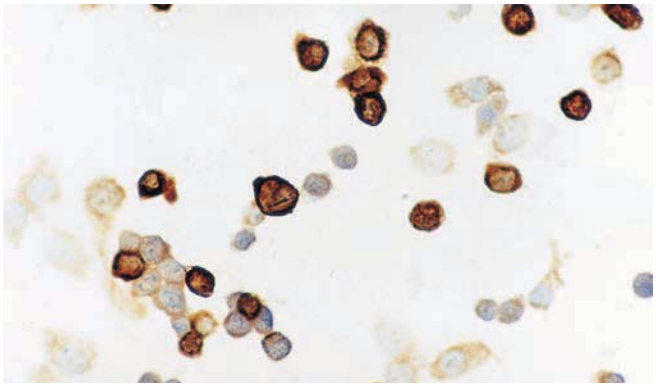
**Clone 5-D8/1**
1 mL lyophilized enterovirus (unconjugated) NCL-ENTERO **W I O**

### Antigen Background

Enteroviruses are a large family of viruses whose main site of infection is the alimentary tract. Dissemination via the bloodstream is the likely route of spread to the wide range of target organs susceptible to infection. Most enterovirus infections are subclinical in young children. However, they can cause a wide range of syndromes involving many of the body systems eg myocarditis, respiratory and neonatal diseases.

### Product Specific Information

NCL-ENTERO recognizes an epitope on the VP1 peptide, which is highly conserved within the Enterovirus group, except for Hepatitis A virus. The antibody reacts with most echovirus strains (except some strains of echovirus 22 and 23), Poliovirus and Enterovirus strains. No reaction is observed with tissue culture grown strains of Respiratory syncytial virus, Parainfluenza virus types 1, 2, 3 and 4b, Herpesvirus types 1 and 2, Influenza virus types A and B, Mumps virus, Measles virus, Varicella-zoster virus, Cytomegalovirus and negative tissue culture cells routinely used in virus isolation.



Coxsackie B4 virus infected BW HEp cells: immunocytochemical staining for Coxsackie B4 virus using NCL-ENTERO. Note strong cytoplasmic staining of infected cells. Acetone-fixed cells.

## Novocastra **Epidermal Growth Factor Receptor**

**Clone EGFR.25**
1 mL, 0.1 mL lyophilized (Cytoplasmic Domain) NCL-EGFR-384 **F P (HIER)**
1 mL liquid (Cytoplasmic Domain) NCL-L-EGFR-384 **F P (HIER)**
7 mL ready-to-use (Cytoplasmic Domain) RTU-EGFR-384 **F P (HIER)**

**Clone EGFR.113**
1 mL, 0.1 mL lyophilized (Extracellular Domain) NCL-EGFR **F P (HIER)**
1 mL liquid (Extracellular Domain) NCL-L-EGFR **F P (HIER)**

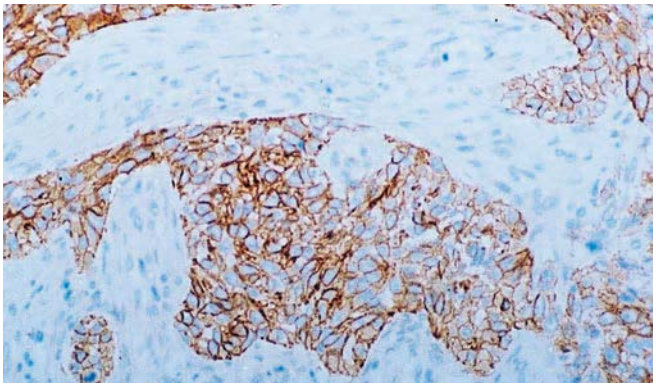
### Antigen Background

Epidermal growth factor receptor (EGFR) is a transmembrane protein receptor of 170 kD with tyrosine kinase activity. Increased levels of EGFR are reported to be linked with malignant transformation of squamous cells eg in squamous cell carcinoma of the lung, head, neck, skin, cervix and esophagus. EGFR may also play a role in the development and progression of hepatocellular carcinomas where recurrence rates are higher in EGFR-positive cases. This correlation has similarly been reported in colorectal cancers where EGFR, produced by tumor cells, plays an important role in the invasiveness and proliferation of colorectal cancers. The majority of published studies of EGFR expression in human breast cancer has similarly shown an association with EGFR expression where it is inversely related to estrogen receptor status.

### Product Specific Information

Clone EGFR.25 is raised to the cytoplasmic domain of the EGFR molecule whereas clone EGFR.113 is raised to the extracellular domain.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting



Human squamous cell carcinoma of breast: immunohistochemical staining for epidermal growth factor receptor using NCL-L-EGFR-384. Note intense membrane staining of tumor cells. Paraffin section.

## Novocastra **Epithelial Membrane Antigen**

**Clone GP1.4**
1 mL, 0.1 mL lyophilized NCL-EMA **F P**
1 mL liquid NCL-L-EMA **F P**
7 mL ready-to-use RTU-EMA **F P**
7 mL BOND ready-to-use PA0035 **P (HIER)**

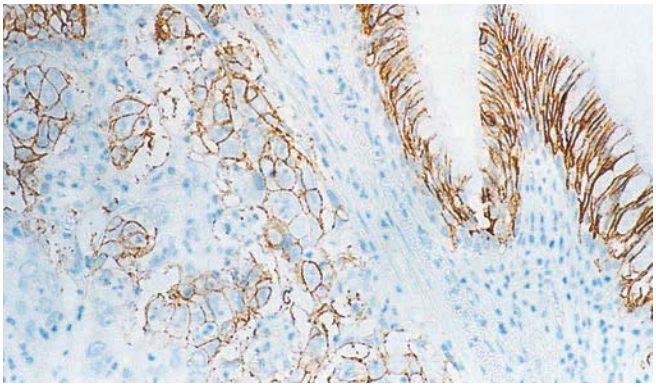
**Antigen Background**

Epithelial membrane antigen (EMA), also known as episialin, is reported to be expressed in a variety of normal and neoplastic epithelia. It has been reported that markers to CD45 (LCA) when used in conjunction with markers to EMA are useful in labelling cells of lymphoid origin whereas the combin-ation of anti-cytokeratin antibodies together with EMA is useful to characterize cells of epithelial origin. EMA is also notably described to be expressed in a subset of Hodgkin's lymphomas.

## Novocastra **Epithelial-Related Antigen**

**Clone MOC-31**
1 mL lyophilized NCL-MOC-31 **F P (HIER)**

NCL-MOC-31 reacts with an epithelial antigen of 40 kD present on most normal and malignant epithelia. MOC-31 is reported to be assigned to a group of antibodies known as SCLC-Cluster 2 which react with an epithelial antigen determined at the Second International Workshop on Small Cell Lung Cancer (SCLC) Antigens. A characteristic of this antibody has been reported (Edwards C and Oates J, Journal of Clinical Pathology. 48: 626-630 (1995)).



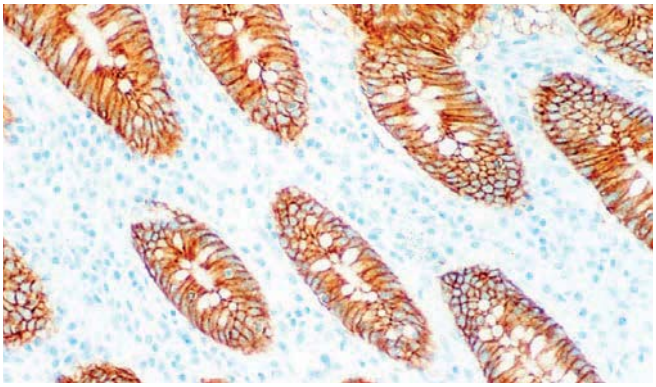
Human lung adenocarcinoma: immunohistochemical staining for epithelial-related antigen using NCL-MOC-31. Note membrane staining of tumor cells. Paraffin sections.

## Novocastra **Epithelial Specific Antigen**

**Clone VU-1D9**
1 mL lyophilized NCL-ESA **F P (Enzyme) W**
7 mL ready-to-use RTU-ESA **F P (Enzyme)**

**Antigen Background**

Epithelial specific antigen (ESA) is a 40 kD cell surface glycoprotein. It is reported to be expressed in the majority of human epithelial cells and is rarely expressed in mesothelial cells.



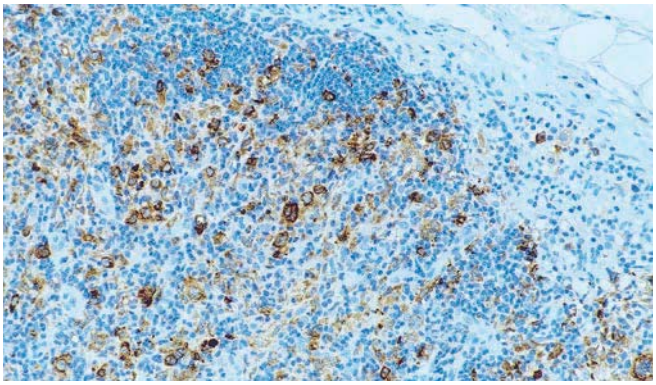
Human appendix: immunohistochemical staining for epithelial specific antigen using NCL-ESA. Note membrane staining of epithelial cells only. Paraffin section.

## Novocastra **Epstein-Barr virus-Induced Gene 3 Protein**

**Clone EL8**
1 mL lyophilized NCL-EBI-3 **F P (HIER)**

**Antigen Background**

Epstein-Barr virus (EBV)-associated Hodgkin's lymphoma (HL) and nasopharyngeal carcinoma (NPC) usually occurs in individuals without deficiencies in anti-viral immunity. Despite expressing viral proteins, both tumors are apparently able to escape EBV-specific immunity in vivo. EBI-3 is an EBV-induced cytokine homologous to the interleukin 12 p40 subunit which can heterodimerize with the interleukin 12 p35 subunit. Researchers have suggested that EBI-3 protein may function to antagonize interleukin 12 and to inhibit the development of a Th1 immune response. It has been reported that EBI-3 protein is strongly expressed in Hodgkin's Reed Sternberg (RS) cells. EBI-3 protein may be an additional component of the repertoire employed by Hodgkin's RS cells to inhibit and effect antitumor or anti-viral immune response.



Hodgkin's lymphoma: immunohistochemical staining for Epstein-Barr virus-induced gene 3 protein using NCL-EBI-3. Note cytoplasmic staining of infected cells. Paraffin section.

## Novocastra **Epstein-Barr virus (LMP-1)**

**Clone CS1, CS2, CS3, CS4 cocktail**
1 mL, 0.1 mL lyophilized NCL-EBV-CS1-4 **F P (Enzyme)**

**Antigen Background**

Epstein-Barr virus (EBV) is one of the eight known human herpes viruses and belongs to the Gammaherpes viriniae, the same subfamily as human herpesvirus type 8 (HHV-8). Herpes viruses have large double strand DNA genomes and are complex viruses often encoding over 35 proteins including enzymes involved in nucleic acid metabolism, DNA synthesis and protein processing in addition to viral structural proteins. These viruses are capable of entering a latent phase where the host shows no visible signs of infection and levels of infectious agent become very low. During latency, viral gene expression is restricted to only a few genes. Latent membrane protein (LMP-1) is a 60 kD protein encoded by the BNLF1 gene of EBV.

**Product Specific Information**

NCL-EBV-CS1-4 is a cocktail of four monoclonal antibodies; clones CS1, CS2, CS3 and CS4.

## Novocastra **Epstein-Barr virus (nuclear antigen 2)**

**Clone PE2**
1 mL, 0.1 mL lyophilized NCL-EBV-PE2 **F W**

**Antigen Background**

Epstein-Barr virus (EBV) nuclear antigen 2 (EBNA2) is an EBV-encoded nuclear protein of 82 kD. EBNA2 is essential for growth transformation of B lymphocytes and has been shown to modulate the activity of several viral and cellular promoters.

## Novocastra **E-Selectin (CD62E)**

**Clone 16G4**
1 mL lyophilized NCL-CD62E-382 **P (HIER)**

**Antigen Background**

Epstein-Barr virus (EBV) nuclear antigen 2 (EBNA2) is an EBV-encoded nuclear protein of 82 kD. EBNA2 is essential for growth transformation of B lymphocytes and has been shown to modulate the activity of several viral and cellular promoters.

## Novocastra **Estrogen Receptor**

**Clone 6F11**
2 mL, 1 mL, 0.1 mL lyophilized NCL-ER-6F11 **F P (HIER) W C**
2 mL, 1 mL, 0.1 mL liquid NCL-L-ER-6F11 **F P (HIER) W C**
7 mL ready-to-use RTU-ER-6F11 **F P (HIER) W**
7 mL BOND ready-to-use PA0151 **P (HIER)**

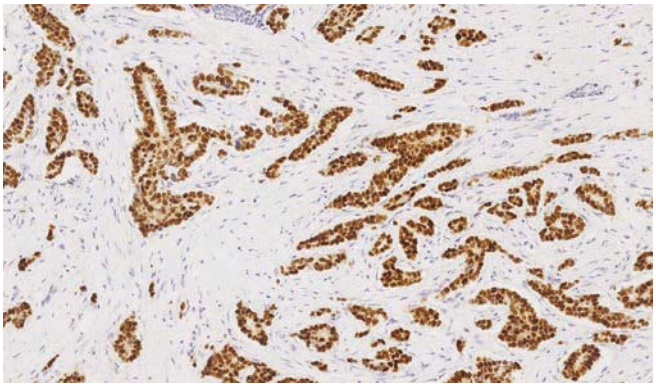
**Antigen Background**

Estrogen receptor (ER) content of breast cancer tissue is an important parameter in the prediction of prognosis and response to endocrine therapy. The introduction of highly specific monoclonal antibodies to ER has allowed the determination of receptor status of breast tumors to be carried out in routine histopathology laboratories.

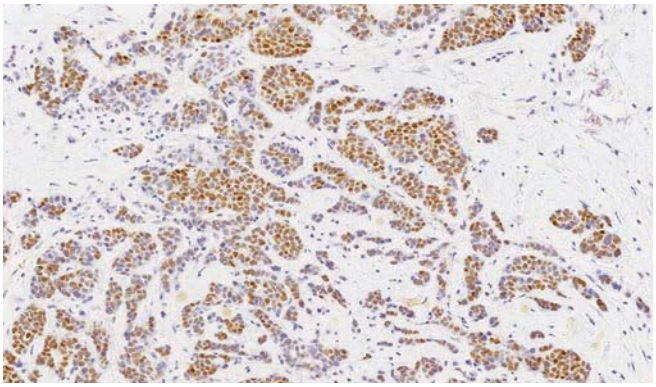
**Product Specific Information**

Clone 6F11 is raised to the full length alpha form of the estrogen receptor molecule present on human ER antigen, located in the nucleus of ER positive normal and neoplastic cells. Clone 6F11 has been extensively tested (Bevitt D J et al. Journal of Pathology. 183 : 228-232 (1997)). Further publications exist that discuss the sensitivity of clone 6F11 (Kauffman O et al. Modern Pathology 11(4):357-363 (1998)) and Kaplan P A et al. American Journal of Clinical Pathology 123: 276-280 (2005).

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting



A.



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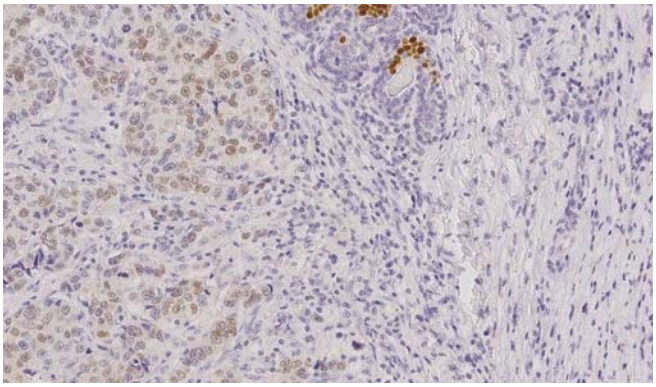


C.

Human breast ductal carcinoma in-situ, top to bottom, (A) high, (B) moderate and (C) low expressors of estrogen receptor: immunohistochemical staining for estrogen receptor using PA0151. High expressor: Intense nuclear staining in the majority of tumor cells (A) heterogeneous nuclear staining in approximately 50% of tumor cells (B) and weak heterogeneous nuclear staining of a proportion of tumor cells, with ductal cells staining strongly (C). Paraffin sections.

## Novocastra **Estrogen and Progesterone Receptor Antibodies (duo packs)**

**Clone 6F11 and Clone 16**

2 × 1 mL lyophilized NCL-ER/PGR-312d/1 **F P (HIER) W**

2 × 0.5 mL lyophilized NCL-ER/PGR-312d **F P (HIER) W**

**Product Specific Information**

For convenience, Leica Biosystems offer two antibodies in one pack.

## Novocastra **Estrogen Receptor (beta)**

**Clone EMR02**

1 mL lyophilized NCL-ER-beta **P (HIER) W**

**Antigen Background**

Estrogen Receptor alpha (ERα) and beta (ERβ) are the translated products of separate genes located on different chromosomes. Although both isoforms share a high degree of amino acid homology, the role of the conserved domains demonstrate specific functions. The A/B region, D domain and F domains are notably distinct in sequence. ERα is the highly characterized estrogen receptor cloned originally from a human breast cancer cell line with ERβ more recently identified in rodents and now in humans. ERβ is reported to be expressed as multiple isoforms. ERβ, unlike ERα, is widely expressed being found in normal adult tissues of ovary, fallopian tube, lung, kidney, brain, heart, prostate and testis.

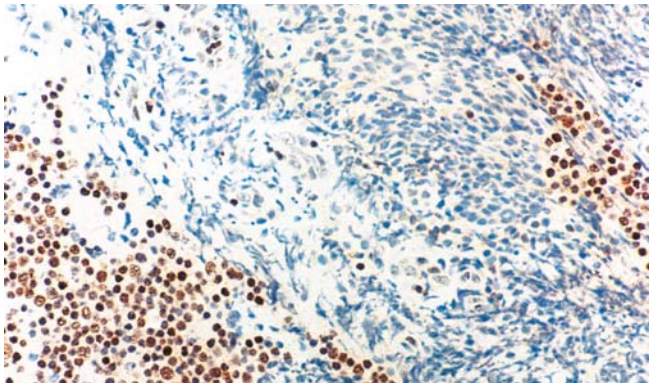
## Novocastra **Ets-1 Oncoprotein**

**Clone 1G11**

1 mL lyophilized NCL-ETS-1 **F P (HIER) W**

**Antigen Background**

The proto-oncogene c-Ets-1 is a transcription factor known to regulate expression of a number of genes involved in extracellular matrix remodelling. The processes of tumor invasion and metastasis are thought to depend on the increased proteolytic activity of the invading tumor cells that may involve matrix metalloproteinases, cathepsins B and D and plas-minogen activator in the metastatic cascade. Ets-1 interacts with the urokinase-type plasminogen activator gene enhancer and with the promoters of stromelysin-1 (MMP3) and collagenase-1 (MMP1) gene which may implicate it in this process. The Ets-1 proto-oncogene is also preferentially expressed in lymphoid cells, where it is essential for the maintenance of the normal pool of resting T and B cells. Ets-1 expression level and distribution are differentially controlled in resting, activated and apoptotic lymphocytes.



Human tonsil: immunohistochemical staining for Ets-1 oncoprotein using NCL-ETS-1. Note nuclear staining in a proportion of lymphocytes. Paraffin section.

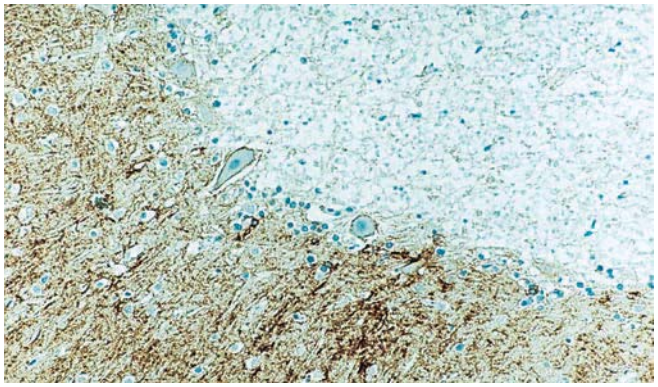
## Novocastra **Excitatory Amino Acid Transporter Antibodies**

**Clone 10D4**
1 mL lyophilized Excitatory Amino Acid Transporter 1 NCL-EAAT1 **F P (HIER)**

**Clone 1H8**
1 mL lyophilized Excitatory Amino Acid Transporter 2 NCL-EAAT2 **F P (HIER)**

**Antigen Background**

Human excitatory amino acid transporters (EAATs) are members of a family of high affinity sodium-dependent transporter molecules that regulate neurotransmitter concentrations at the excitatory glutamatergic synapses of the mammalian central nervous system. It is reported that these proteins are thought to reduce extracellular glutamate concentration, thereby modulating synaptic signalling to replenish glutamate levels and prevent glutamate induced excitotoxicity. A decrease in glutamate transporter activity has been associated with amyotrophic lateral sclerosis and excitotoxicity may be causal or exacerbating in neurodegenerative diseases, including cerebral ischemia and epilepsy. EAAT1 is reported to be prominently expressed in the cerebellum, frontal cortex, hippocampus and basal ganglia, is a potent antagonist and also appears to specifically block amino acid transport mediated by EAAT2.



Human brain, normal adult cerebellum: immunohistochemical staining for excitatory amino acid transporter 2 using NCL-EAAT2. Note intense membrane staining of glial cells. Paraffin section.

## Novocastra **EZH2 (Enhancer of Zeste Homolog 2 (Drosophila))**

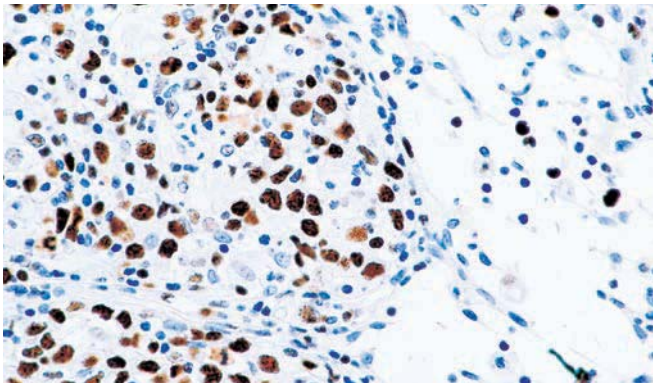
**Clone 6A10**
1 mL, 0.1 mL liquid NCL-L-EZH2 **P (HIER) W**

**Antigen Background**

Polycomb-group proteins (PcG) such as EZH2 (Enhancer of Zeste Homolog 2 (Drosophila)) form multimeric gene repressing complexes involved in axial patterning, hematopoiesis and cell cycle regulation. PcG proteins ensure correct embryonic development by expressing homeobox genes as well as contributing to the regulation of lymphopoiesis.

**Product Specific Information**

NCL-L-EZH2 stains optimally when used in TBS-based wash buffer and diluent systems.



Diffuse large B cell lymphoma: immunohistochemical staining for EZH2 antigen using NCL-L-EZH2. Note nuclear staining of malignant cells. Paraffin section.

## Novocastra **Factor VIII-Related Antigen (von Willebrand Factor)**

**Clone 36B11**
1 mL, 0.1 mL lyophilized NCL-vWF **F P (HIER)**
1 mL, 0.1 mL liquid NCL-L-vWF **F P (HIER)** New!
7 mL BOND ready-to-use PA0400 **F P (HIER)**

See also Human von Willebrand Factor (Factor VIII-related antigen) on page 160.

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Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra **Factor XIIIa (Blood Coagulation Factor XIIIa)**

**Clone E980.1**
1 mL lyophilized NCL-FXIIIa **P (HIER)**
1 mL liquid NCL-L-FXIIIA **P (HIER)** New!
7 mL BOND ready-to-use PA0449 **P (HIER)**

**Antigen Background**

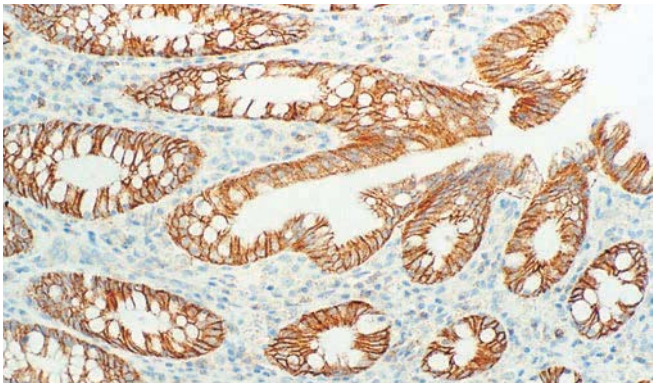
Factor XIIIa also known as fibrinoligase and fibrin-stabilizing factor, is the last enzyme generated in the blood coagulation cascade. It is a $Ca^{2+}$ - dependent transglutaminase or transamidating enzyme which forms intermolecular gamma-glutamyl-epsilon-lysine crosslinks between fibrin molecules resulting in the mechanical stabilization of the fibrin clot and its resistance to proteolysis. Factor XIIIa may also function to stabilize cell surface molecules and membranes. These $Ca^{2+}$ -dependent trans-glutaminases with thiol active centers are widespread in animal tissues and have been associated with cell proliferation, embryonic development and growth through the proliferation of mammary stroma and epithelial elements. Normal mammary stroma, like most collagenous connective tissue contains resident populations of CD34 positive dendritic interstitial cells and scattered factor XIIIa positive collagen-associated dendrophages. Factor XIIIa has been examined to determine its expression in normal and inflamed skin. Factor XIIIa positive cells in human skin represent a specific population of bone marrow dermal dendritic cells, distinct from Langerhans cells which share some features common to mononuclear phagocytes. In benign skin conditions such as inflammatory dermatoses eg atopic eczema and psoriasis, an increased number of factor XIIIa positive cells in the upper dermis, closely associated with lymphocytes, has been described.

# Novocastra **Fas (CD95)**

**Clone GM30**
1 mL lyophilized NCL-FAS-310 **F P (HIER)**

**Antigen Background**

Fas is a 48 kD transmembrane glycoprotein. It is a member of the nerve growth factor receptor/tumor necrosis factor superfamily. This cell surface molecule mediates receptor-triggered apoptosis (programmed cell death). During embryonic and postembryonic development, many cells die by means of apoptosis. This plays a major role in determining morphological and functional maturity in a variety of systems, including the formation of the neural network and clonal deletion of autoreactive T cells. Apoptosis is accompanied by condensation of the cytoplasm, loss of plasma membrane microvilli and extensive degradation of chromosomal DNA into oligomers of about 180 base pairs. The Fas antigen is reported to be expressed on the surface of various cell types, including activated T and B lymphocytes and T lymphoblastoid cell lines.



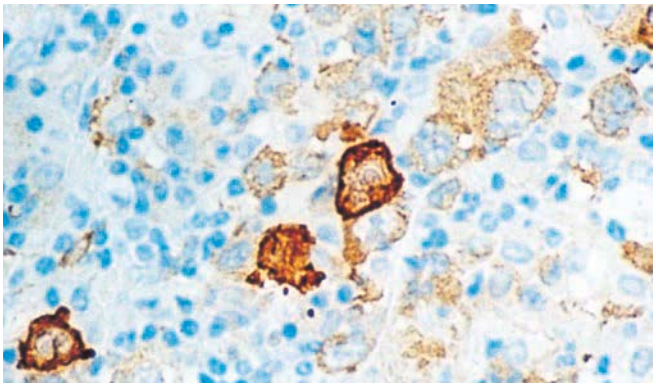
Human small intestine: immunohistochemical staining for Fas antigen (CD95) using NCL-FAS-310. Note membrane staining of absorptive epithelial cells. Paraffin section.

# Novocastra **Fascin**

**Clone IM20**
1 mL, 0.1 mL lyophilized NCL-FASCIN **P (HIER) W**
1 mL liquid NCL-L-FASCIN **P (HIER) W**
7 mL BOND ready-to-use PA0420 **P (HIER)**

**Antigen Background**

Human fascin is a 55 to 58 kD actin-bundling protein, whose actin binding ability is regulated by phosphorylation. In normal tissues the detection of fascin is reported to be predominantly restricted to dendritic cells and in the thymus has been observed only in medullary dendritic cells. In reactive nodes, interdigitating reticulum cells of T cell zones, cells in subcapsular areas, and cells of the reticular network express fascin. Variable expression is seen in follicular dendritic cells and endothelial cells. Lymphoid cells, myeloid cells and plasma cells do not express fascin. However, in cases of Hodgkin's disease, including nodular sclerosis, mixed cellularity lymphocyte depletion and unclassified cases, most or all Reed Sternberg cells are reported to be positive for fascin. Fascin expression may be induced by Epstein-Barr virus (EBV) infection of B cells with the possibility that viral induction of fascin in lymphoid or other cell types must also be considered in EBV-positive cases.



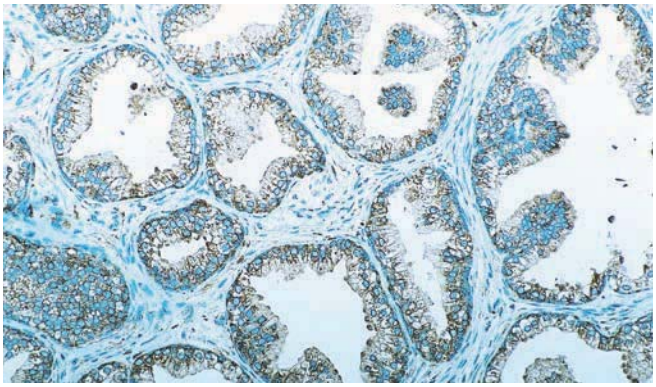
Human Hodgkin's lymphoma: immunohistochemical staining for fascin using NCL-L-FASCIN. Note intense cytoplasmic and membrane staining of a proportion of Reed Sternberg cells. Paraffin section.

# Novocastra **Fas Ligand**

**Clone 5D1**
1 mL lyophilized NCL-FAS-L **P (HIER) W**

**Antigen Background**

Fas ligand, a cell surface molecule belonging to the tumor necrosis factor family, binds to its receptor Fas, thus inducing apoptosis. Various cells express Fas, whereas Fas ligand is reported to be expressed predominantly on activated T cells. Fas and Fas ligand are involved in the downregulation of immune reactions as well as T cell-mediated cytotoxicity. It is known that tumor necrosis factor (TNF) works as a cachectin and mediates septic shock, so like TNF, Fas ligand may work as an agent that causes tissue damage. The Fas/Fas ligand system has been implicated both in maintaining immune privilege and also as a key regulator in spermatogenesis.



Human prostate: immunohistochemical staining for Fas ligand using NCL-FAS-L. Note membrane and cytoplasmic staining of glandular epithelial cells. Paraffin section.

# Novocastra **Feline Calicivirus (capsid protein)**

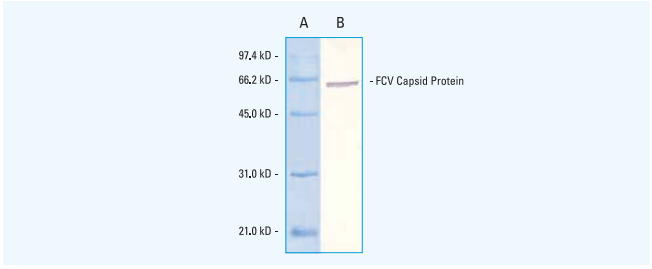
**Clone 1G9**
0.5 mL lyophilized NCL-1G9 **W**

**Antigen Background**

The Caliciviridae are a family of positive-stranded RNA viruses of unique morphology characterized by a series of cup-like depressions on the surface of the virus. Feline Calicivirus (FCV) is a ubiquitous pathogen of cats producing a variety of clinical symptoms, including oral ulceration, upper respiratory tract infection and polyarthritis. FCV has a genome of 7.7kb which encodes several proteins.

**Product Specific Information**

NCL-1G9 detects one of these, a capsid protein of 62 kD.




Western blot: detection of feline Calicivirus (FCV) capsid protein (62 kD) using NCL-1G9. Lane A, molecular weight markers. Lane B, CRFK cells infected with FCV immunoblotted with NCL-1G9.

# Novocastra **Fibronectin**

**Clone 568**
1 mL, 0.1 mL lyophilized NCL-FIB **F P**

**Antigen Background**

Fibronectins are glycoproteins composed of two 200 kD disulfide-linked subunits. They are found in basement membranes and in the extracellular connective tissue matrix. Fibronectins are bound to the surface of cells by members of a family of cellular adhesion molecules, the integrins. A number of fibronectin isotypes exists as a result of multiple splicing of mRNA, producing a glycoprotein of numerous domains and repeat sequences. These domains correlate with the binding of bacteria, cells, collagen, heparin and a variety of other macromolecules. Cellular fibronectin has been reported to be widely expressed in the stroma of many malignant tumors.

**Product Specific Information**

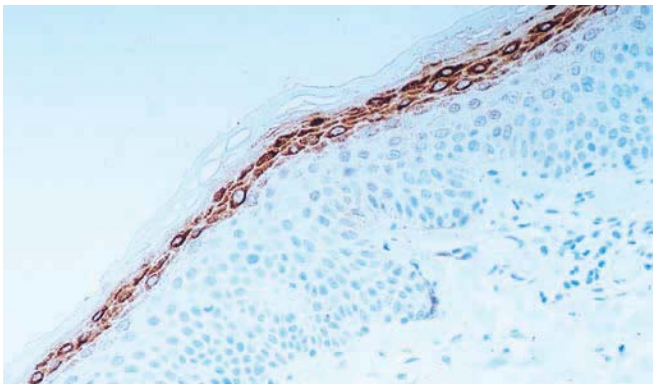
NCL-FIB is specific for the cell attachment domain of human fibronectin. Enzyme pretreatment may enhance staining in some cases.

# Novocastra **Filaggrin**

**Clone 15C10**
1 mL lyophilized NCL-FILAGGRIN **P (HIER)**

**Antigen Background**

Filaggrins are an important class of the intermediate filament-associated proteins which interact with keratin intermediate filaments (IFs) of terminally differentiating mammalian epidermis. A precursor molecule of filaggrin, profilaggrin, accumulates in the epidermis as keratohyalin granules which, in mouse, is phosphorylated and incapable of interaction with IFs. At the time of terminal differentiation, the precursor is proteolytically processed by excision of the linker to individual filaggrin molecules which are then able to interact with keratin IFs. Filaggrins exhibit wide species variations and their aberrant expression has been reported in a number of human keratinizing disorders such as parakeratosis, psoriasis and molluscum contagiosum. Filaggrin also appears to be a target molecule for rheumatoid arthritis-specific auto-antibodies in humans.



Normal human skin: immunohistochemical staining for filaggrin using NCL-FILAGGRIN. Note intense cytoplasmic staining of terminally differentiated keratinocytes. Paraffin section.

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Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra **Filamin**

## Clone PM6/317

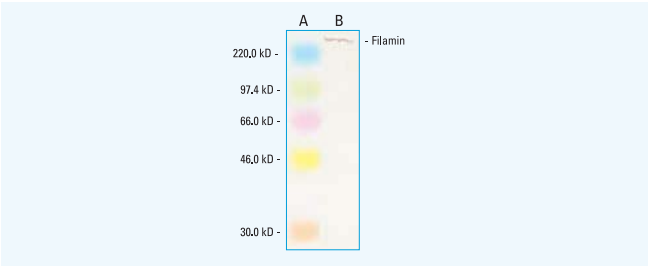
1 mL lyophilized NCL-FIL **F P (HIER) W**

### Antigen Background

Filamin functions as a crosslinking protein forming a flexible link between two actin filaments in muscle. It is composed of two identical polypeptide chains each joined to the other at one end, with an actin binding site at the other.

### Product Specific Information

NCL-FIL cross-reacts with rabbit, chicken, guinea pig and rat filamin.




Western blot: detection of filamin protein (250 kD) using NCL-FIL. Lane A, Rainbow™ molecular weight markers (Amersham Life Science). Lane B, MRC-5 cells immunoblotted with NCL-FIL.

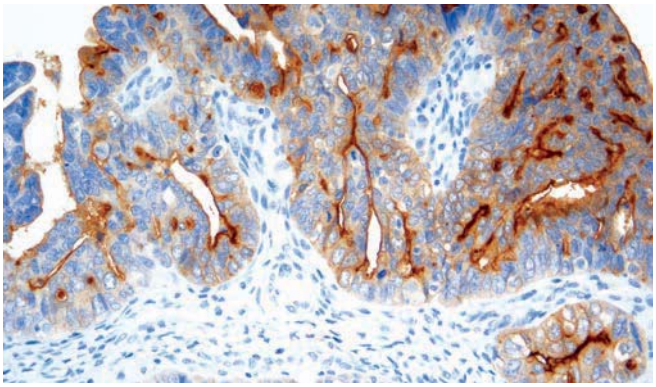
# Novocastra **Folate Receptor Alpha**

## Clone BN3.2

1 mL, 0.1 mL liquid NCL-L-FRalpha **P (HIER)**

### Antigen Background

Folate is a basic component of cell metabolism and DNA synthesis and repair. It is involved in essential one-carbon transfer reactions and is a vitamin required by both normal and tumor cells. Folate entry into cells is facilitated via two different systems: the reduced folate carrier, which utilizes a bidirectional anion-exchange mechanism, and the folate receptor system. Folate receptor alpha is a membrane–bound member of the folate receptor family, facilitating folate transport via a mechanism termed potocytosis where the receptor is internalized and then recycled back to the cell membrane. Staining patterns are both membrane and cytoplasmic due to this mechanism. Members of the folate receptor family share highly conserved sequences in the open reading frames, but differ in amino acids in the 5' untranslated regions and as a consequence can differ in function and tissue expression. Folate receptor alpha expression is reported to be highly restricted in normal tissues and only selectively overexpressed in a limited number of epithelial malignancies.



Ovarian tumor: immunohistochemical staining for Folate Receptor Alpha using NCL-L-FRalpha. Note intense cytoplasmic staining. Paraffin section.

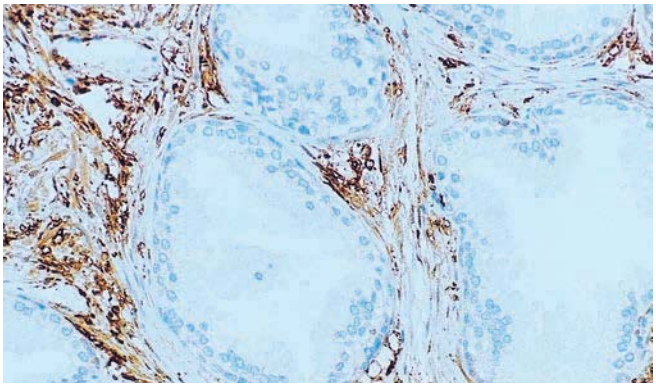
# Novocastra **Galectin-1**

## Clone 25C1

1 mL, 0.1 mL lyophilized NCL-GAL1 **P (HIER) W**

### Antigen Background

Galectin-1 is a member of the beta-galactoside-binding family and is a pleiotropic dimeric protein of 14 kD participating in a variety of normal and pathological processes, including cancer progression. Galectin-1 can affect the proliferation of normal and malignant cells. Inhibition of cell growth is observed in a lactose-dependent manner as lower concentrations of the lectin stimulate cell proliferation. Galectin-1 may also be implicated in the induction of apoptosis of activated T cells through the binding of exogenous galectin-1 to CD45 molecules present on the surface of lymphocytes. Galectin-1, reported to be present either at the surface of cancer cells or accumulated around these cells could act as an immunological shield to protect against a T cell immune response and provide an advantage for survival.



Normal human prostate: immunohistochemical staining for Galectin-1 using NCL-GAL1. Note staining in the stroma and cytoplasmic staining of fibroblasts. Paraffin section.

# Novocastra **Galectin-3**

**Clone 9C4**
1 mL, 0.1 mL lyophilized NCL-GAL3 **P (HIER) W**
7 mL BOND ready-to-use PA0238 **P (HIER)**

**Antigen Background**

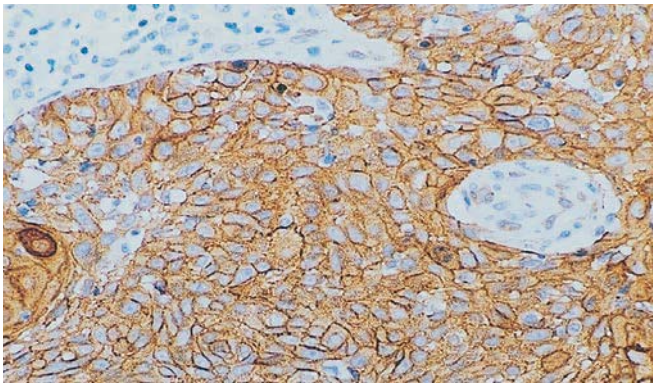
Galectin-3 is a member of the beta-galactosidase-binding lectin family. It is involved in several biological events including binding to the basement membrane glycoprotein laminin. Cell surface galectin-3 may be involved in homotypical cell adhesion and is downregulated in colon cancer as the disease progresses. This downregulation has also been examined in breast carcinoma with a similar correlation of expression reported. Downregulation of galectin-3 could be one of the many events that enable cancer cells to interact with laminin to facilitate invasion and metastasis and may indicate activation of the invasive phenotype in various tumor types.

# Novocastra **Gamma-Catenin**

**Clone 11B6**
1 mL lyophilized NCL-G-CAT **F P (HIER) W**

**Antigen Background**

Cell to cell adhesion is mediated by cadherins which form a complex with catenins. Gamma-catenin or plakoglobin, is a major cytoplasmic protein of 82kD that occurs in soluble and membrane-associated forms. E-cadherin plays a primary role in the maintenance of epithelial integrity where its decrease or loss of expression is reported to be strictly associated with neoplastic progression in a variety of human carcinomas.



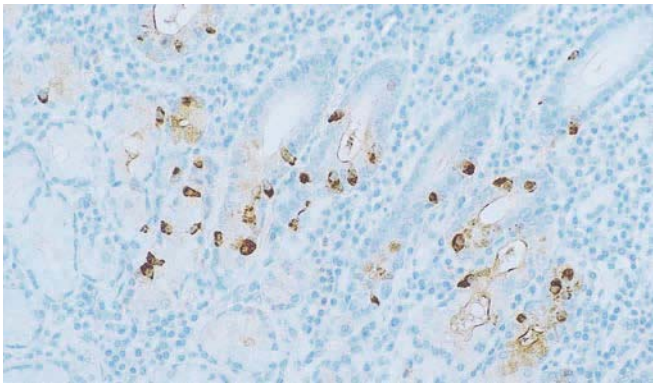
Human squamous cell carcinoma: immunohistochemical staining for gamma-catenin using NCL-G-CAT. Note intense membrane staining of malignant epidermal cells. Paraffin section.

# Novocastra **Gastrin**

**Polyclonal**
0.5 mL lyophilized NCL-GASp **F P**
7 mL BOND ready-to-use PA0681 **P**

**Antigen Background**

Gastrin, a polypeptide hormone, occurs naturally in three forms: gastrin-14, gastrin-17 and gastrin-34. Both primary and secondary G cell hyperplasia are reported to be characterized by clustering of the immunoreactive cells which sometimes project buds from the mucous glands.



Normal human stomach: immunohistochemical staining for gastrin using NCL-GASp. Note intense cytoplasmic staining of the gastric mucosa. Paraffin section.

# Novocastra **Geminin**

**Clone EM6**
1 mL liquid NCL-L-Geminin **P (HIER)**

**Antigen Background**

Geminin is a protein of 209 amino acids thought to be involved in the control of DNA replication via the interaction with Cdt1. Geminin is not found in the G1 phase of the cell cycle, but is first expressed in the G1 to S transition phase, with expression levels rising through the rest of the cell cycle and levels reaching a maximum during mitosis. It has been proposed that Geminin may be a tumor suppressor protein. Geminin is reported to be expressed in proliferating lymphocytes and epithelial cells eg germinal centers in tonsil as well as in colon, spermatocytes, seminiferous tubules of the testes, within the basal layers of the squamous epithelium of the skin and breast. Geminin is reported to be upregulated in cancers such as non-Hodgkin's lymphoma, B cell lymphoma, breast carcinoma and colon carcinoma.

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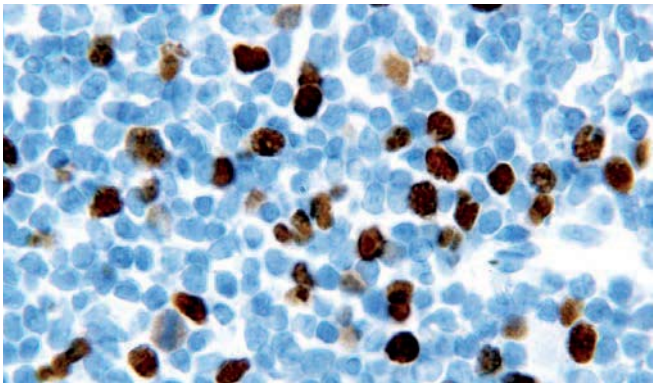


Human chronic lymphocytic leukemia: immunohistochemical staining for Geminin using NCL-L-Geminin. Note intense nuclear staining of proliferating neoplastic cells. Paraffin section.

## Novocastra ***Giardia intestinalis***

**Clone 9D5.3.1**
1 mL lyophilized NCL-GI **P (HIER)**

**Antigen Background**

Giardia intestinalis (formerly Giardia lamblia) is a flagellated protozoan, which infects humans via contaminated water supplies, causing illnesses ranging from acute severe bloody diarrhoea, through moderate enteritis, chronic diarrhoea with malabsorption, to asymptomatic excretion. The remarkable hardiness of the cyst form and the low numbers required to infect make the epidemiology uncertain, although water-based infections are the most common.

## Novocastra **Glial Fibrillary Acidic Protein**

**Clone GA5**
1 mL, 0.1 mL lyophilized NCL-GFAP-GA5 **F P**
7 mL BOND ready-to-use PA0026 **P (HIER)**

**Antigen Background**

Glial fibrillary acidic protein (GFAP) is an intermediate filament protein of 52 kD reported to be expressed in glial cells eg astrocytes and ependymal cells. In the peripheral nervous system, GFAP has been reported to be expressed in Schwann cells, enteric glial cells and satellite cells of human sensory ganglia and in neoplastic tissues GFAP has been reported to be expressed in astrocytomas and ependymomas.

**Product Specific Information**

When using NCL-GFAP-GA5 the heat induced epitope retrieval (HIER) technique may improve staining in some cases.

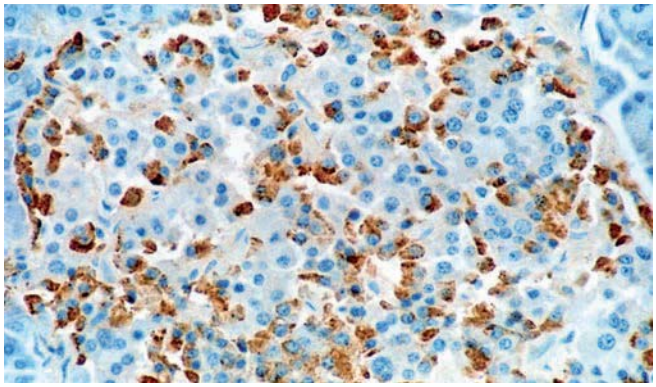
## Novocastra **Glucagon**

**Polyclonal**
0.5 mL lyophilized NCL-GLUCp **F P**

**Polyclonal**
7 mL BOND ready-to-use PA0594 **P (HIER)**

**Antigen Background**

Glucagon expression has been reported in the endocrine cells of the pancreatic islets and also in the mucosa of small and large intestine. Pancreatic glucagon, a peptide of 29 amino acids, has biological activities including glycogenolysis, lipolysis, gluconeogenesis and ketogenesis. These effects are all antagonistic to insulin action and, therefore, lead to increased blood sugar levels. The majority of glucagonomas are reported to arise from the pancreas and produce pancreatic glucagon. These tumors are found chiefly in the main body or tail of the pancreas.



Human pancreas: immunohistochemical staining for Glucagon using NCL-GLUCp. Note cytoplasmic staining in the endocrine cells of the islets. Paraffin section.

## Novocastra **Glucocorticoid Receptor**

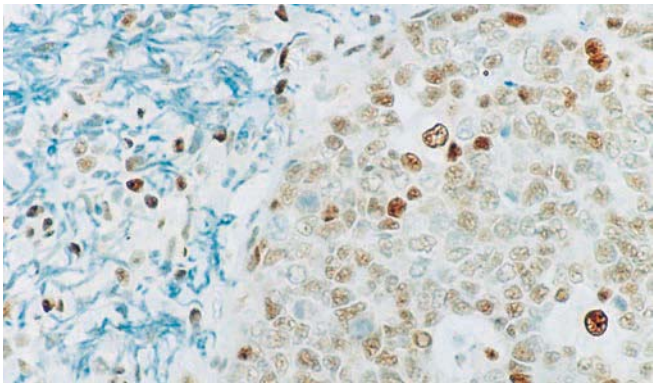
**Clone 4H2**
1 mL lyophilized NCL-GCR **P (HIER) W**

**Antigen Background**

The glucocorticoid receptor of molecular weight 90 kD has three main functional regions; the N-terminal modulating region, the DNA binding region and the C-terminal steroid binding region. The glucocorticoid receptor is reported to be widely distributed and expressed in many cultured cell lines eg CEM-C7. Glucocorticoid receptor is reported to be expressed in neoplastic cells of chronic lymphocytic leukemia (CLL). Two isoforms of glucocorticoid receptor exist; alpha and beta, with the alpha form usually the most abundant. The control of gene expression by glucocorticoids has been widely studied as a model for transcriptional regulation. Glucocorticoid receptors are reported to induce or repress the expression of genes in response to glucocorticoids, mediating such processes as cell growth, differentiation and apoptosis. Glucocorticoid receptors may also form a complex with heat shock protein 90 and in certain instances render the non-ligand bound receptor transcriptionally inactive.

**Product Specific Information**

NCL-GCR is raised to the N-terminal modulating region.



Human tonsil: immunohistochemical staining for glucocorticoid receptor using NCL-GCR. Note nuclear staining in a wide distribution of cell types. Paraffin section.

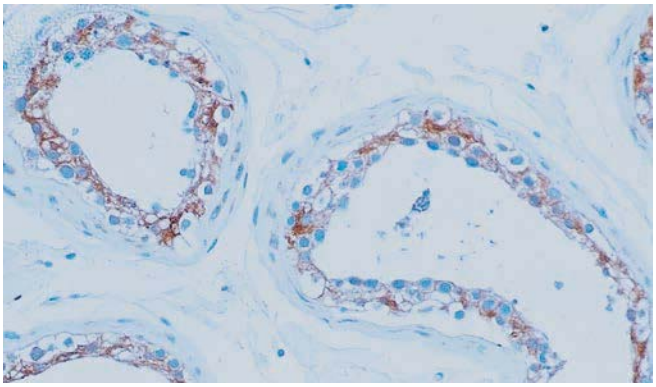
## Novocastra **Glutathione S-Transferase (GST) Antibodies**

**Clone 10H6**
1 mL lyophilized Glutathione S-Transferase (mu)
NCL-GSTmu-437 **P**

**Clone LW29**
1 mL lyophilized Glutathione S-Transferase (pi)
NCL-GSTpi-438 **F P**

**Antigen Background**

The glutathione S-transferases (GSTs) are a multigene family of isoenzymes which catalyze the conjugation of glutathione to electrophilic substrates. These enzymes are involved in the detoxification of both endogenous and exogenous electrophiles which can react with cellular components such as DNA. The modification of DNA by reactive compounds can initiate carcinogenesis and the GSTs are believed to play a role in neutralizing carcinogens. The cytosolic GST isoenzymes have been classified into four evolutionary classes; alpha, mu, pi and theta. These isoenzymes are reported to be singly or multi-expressed in a variety of normal tissues, including stomach, bowel, brain, heart, liver, pancreas, breast, kidney and skin at differing levels. In gastric cancers, the levels of GSTalpha and pi are reported to differ from normal gastric tissue with GSTalpha showing decreased levels and GSTpi increased levels. GSTmu is also known to play a role in detoxification of epoxides released from cigarette smoke.



Human testis: immunohistochemical staining for glutathione S-transferase mu using NCL-L-GSTpi-438. Note cytoplasmic staining of sertoli cells. Paraffin section.

## Novocastra **GPIb (CD42b)**

**Clone MM2/174**
1 mL lyophilized NCL-CD42b **F P (HIER)**

See also CD42b (GPIb) on page 116.

## Novocastra **GPIIIa (CD61)**

**Clone 2f2**
1 mL, 0.1 mL lyophilized NCL-CD61-308 **F P (HIER)**
7 mL BOND ready-to-use PA0308 **P (HIER)**

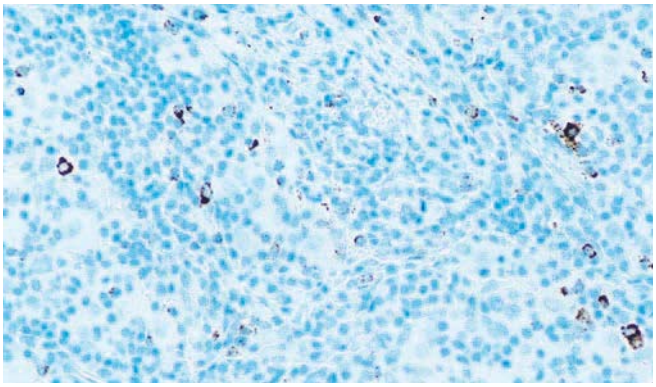
See also CD61 (GPIIIa) on page 118.

## Novocastra **Granzyme B**

**Clone 11F1**
1 mL, 0.1 mL lyophilized NCL-GRAN-B **P (HIER)**
1 mL liquid NCL-L-GRAN-B **P (HIER)**
7 mL ready-to-use RTU-GRAN-B **P (HIER)**
7 mL BOND ready-to-use PA0291 **P (HIER)**

**Antigen Background**

Granzymes are neutral serine proteases which are stored in specialized lytic granules of cytotoxic T lymphocytes (CTL) and in natural killer (NK) cells. These CTL and NK cells are heavily involved in the elimination of neoplastic and virally infected cells. Secretory granules containing perforin and granzymes are instrumental in undertaking cytolytic activity. Granzyme B is understood to enter a target cell through a perforin pore-formed channel to induce DNA fragmentation and apoptosis. Granzyme B has also been described in neoplastic CTL and NK cells.



Hodgkin's disease: immunohistochemical staining for granzyme B using NCL-L-GRAN-B. Note granular cytoplasmic staining in a number of Reed Sternberg cells. Paraffin section.

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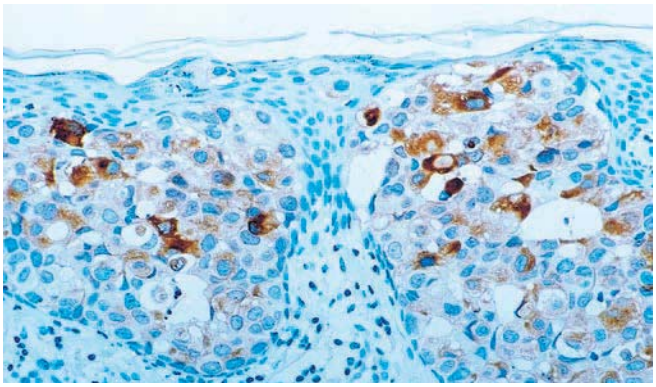
# Novocastra **Gross Cystic Disease Fluid Protein-15**

**Clone 23A3**
1 mL, 0.1 mL lyophilized NCL-GCDFP15 **P (HIER)**
1 mL, 0.1 mL liquid NCL-L-GCDFP15 **P (HIER)** New!
7 mL ready-to-use RTU-GCDFP15 **P (HIER)**
7 mL BOND ready-to-use PA0708 **P (HIER)** New!

**Antigen Background**

Gross cystic disease of the breast is a benign premenopausal disorder in which cysts are a predominant pathological lesion. These cysts appear to be formed from excessive apocrine cystic secretions. This fluid is composed of several glycoproteins including a unique 15 kD monomer protein, GCDFP15. It has been reported that cytosolic analysis of normal tissue from all major organs has demonstrated GCDFP15 in apocrine epithelia, lacrimal, ceruminous and Moll's glands and in numerous serous cells of the submandibular, tracheal, bronchial, sublingual and minor salivary glands. Cytosol from breast carcinoma lesions are reported to contain GCDFP15 at a wide range of concentrations. The concentration is reported to be highest in more differentiated carcinomas and GCDFP15 shows only a few positive individual epithelial cells within lobules and small ducts in normal breast. Expression has also been reported in fibroadenomas within areas of apocrine metaplasia.



Human breast, Paget's disease: immunohistochemical staining for gross cystic disease fluid protein (15 kD) using RTU-GCDFP15. Note variable cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **HCAM (CD44)**

**Clone DF1485**
1 mL, 0.1 mL lyophilized NCL-CD44-2 **F P (HIER) W**

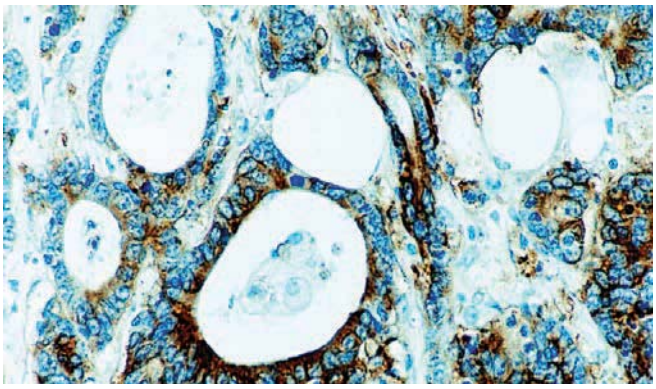
See also CD44 (HCAM) on page 116.

# Novocastra **Heat Shock Protein 27**

**Clone 2B4**
1 mL lyophilized NCL-HSP27 **F P W**

**Antigen Background**

Prokaryotes and eukaryotes express a variety of heat shock proteins (Hsps) in response to stress, including sublethal heat shock, exposure to heavy metals, hormones and viral infection. Hsp27 (27 kD) is the most common small Hsp found in man. In breast tissue, it is reported that expression of Hsp27 is taken as evidence of a functional estrogen receptor pathway.



Human breast carcinoma: immunohistochemical staining for Hsp27 using NCL-HSP27. Note intense cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **Heat Shock Protein 70**

**Clone 8B11**
1 mL lyophilized NCL-HSP70 **P (HIER)**

**Antigen Background**

The response of cells or organisms to stress, such as exposure to heat or chemicals, is associated with the induction of heat shock proteins. Heat shock protein 70 (Hsp70) is reported to have a protective role in ischemic disease, inflammation, infection and a potential role in antigen processing as well as a possible regulatory role in cytokine biosynthesis. Hsp70 exists in the cell in equilibrium between its free state, in the cytoplasm, and its bound state, protecting proteins in the nucleolus, perhaps either by helping refold some of the unfolded ribosomal proteins or by solubilizing the denatured ribosomal proteins to facilitate their turnover. During recovery from heat shock and as the nucleoli begin to return to their normal activities, most of the Hsp70 returns to the cytoplasm.

**Product Specific Information**

NCL-HSP70 is reactive with Hsp70 and heat shock cognate 70 (Hsc70) in man, mouse and rat.

# Novocastra **Heat Shock Protein 90**

## Clone JPB24

1 mL lyophilized NCL-HSP90 **P (HIER) W**

### Antigen Background

Heat shock proteins are highly conserved proteins in nearly all organisms and are induced by various kinds of stress, including non-physiological temperatures. Heat shock protein 90 (Hsp90) is associated with the folding of signal-transducing proteins such as steroid hormone receptors and protein kinases. Hsp90 forms several discrete subcomplexes, each containing distinct groups of co-chaperones that function in these folding pathways. Hsp90 has been reported to be expressed in epithelial cells, mononuclear cells, giant cells, nerve cells and endothelial cells of small vessels. Hsp90 expression has been reported to be correlated with sex steroid receptor status in endometrial carcinomas. In breast cancer, MHC class I expression is reported to correlate with nuclear localization of Hsp90.

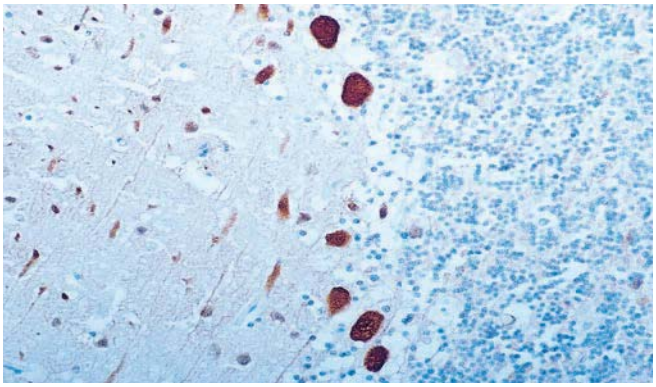
# Novocastra **Heat Shock Protein 105**

## Clone 58F12

1 mL lyophilized NCL-HSP105 **P (HIER) W**

### Antigen Background

Heat shock protein 105 (Hsp105) exists as two isoforms; alpha and beta which belong to the Hsp105/Hsp110 protein family. Hsp105 acts as both a chaperone to prevent thermal aggregation of proteins and as a regulator of mammalian cells. The Hsp105 isoforms are reported to be found in the cytoplasm but not in the nucleoli under non-stressed and stressed conditions. In rodents, Hsp105 isoforms are reported to be moderately expressed in the adrenal glands, spleen, liver and heart and both are markedly increased after heat shock. In the testis, Hsp105 is specifically localized in the cytoplasm of germ cells but may translocate to the nucleus after heat shock. The most abundant expression of Hsp105 occurs in the brain with nuclear and cytoplasmic expression in nearly all neurons, oligodendrocytes, microglia and astrocytes. Increased expression reported during embryogenesis suggests that Hsp105 may have an important role during mouse development.



Human brain, cerebellum: immunohistochemical staining for heat shock protein 105 using NCL-HSP105. Note intense cytoplasmic and nuclear staining of Purkinje cells and neuronal processes. Paraffin section.

# Novocastra ***Helicobacter pylori***

## Clone ULC3R

1 mL, 0.1 mL liquid NCL-L-Hpylori **P (Enzyme)**

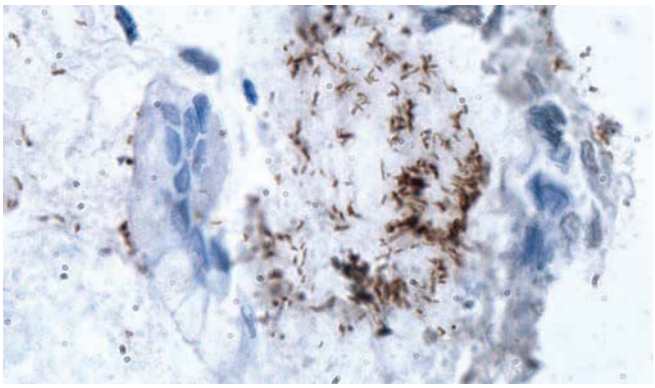
## Polyclonal

1 mL lyophilized NCL-HPp **P (Enzyme)**

Helicobacter pylori is a motile, helix–shaped Gram–negative, microaerophilic, bacterial pathogen which is capable of converting from a spiral form to a coccoid form to favor its survival. Almost 50 percent of the world's population, approaching 100 percent in some countries, are infected. There are numerous strains of Helicobacter pylori which can be grouped into two broad families, type I and type II, based on their expression of the hopQ allele. Type I and type II strains are reported to express VacA (vacuolating toxin) responsible for vacuolation of gastric epithelial cells and induction of apoptosis. Type I strains are reported to express CagA protein which is associated with deregulation of intercellular signalling pathways and initiation of pathogenesis (virulent strains) and are closely related to gastric diseases such as peptic ulceration, gastric ulceration, chronic gastritis, mucosa–associated lymphoid tissue (MALT) lymphoma and intestine type gastric adenocarcinomas. Type II strains are reported not to express CagA proteins. HopE is a 31 kD porin protein which is part of a family of 32 outer membrane proteins present in Helicobacter pylori bacteria. HopE is highly conserved in Helicobacter pylori strains, but not among other strains of the Helicobacter genus.

### Product Specific Information

Clone ULC3R, unlike polyclonal antibodies to Helicobacter pylori, does not cross-react with Campylobacter jejuni (a gastric bacterium which causes infective diarrhoea). Clone ULC3R also exhibits more defined staining of H. pylori bacteria than NCL-HPp. The antibody clone ULC3R, will be useful to identify and differentiate patients that need antibiotic eradication of the bacterium from those patients who are at a higher risk of developing clinical disease related to H. pylori infection.



Human stomach infected with H. pylori: immunohistochemical staining for H. pylori using NCL-L-Hpylori. Paraffin section.

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Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra **Hepatitis B virus Antibodies**

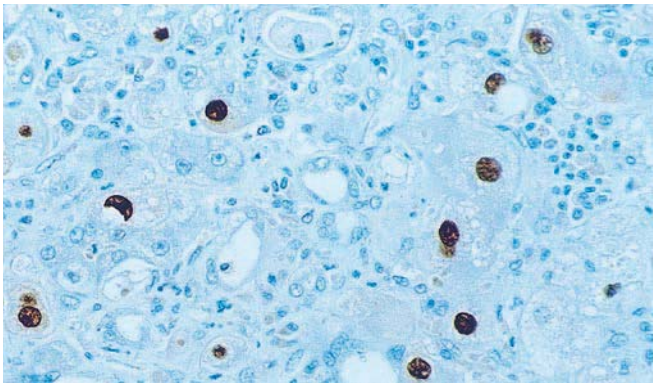
**Clone LF161**
1 mL, 0.1 mL lyophilized Hepatitis B virus (core antigen)
NCL-HBcAg-506 **P**

**Clone 1044/341**
1 mL lyophilized Hepatitis B virus (surface antigen)
NCL-HBsAg-2 **F P (Enzyme)**

Hepatitis B virus is one of an expanding list of hepatitis viruses. The complete infective virion is a 42nm particle (Dane particle). The infective virion consists of a core of double stranded DNA, a specific DNA polymerase and structural proteins surrounded by an outer envelope, Hepatitis B surface antigen (HBsAg). The nucleocapsid contains two serologically distinct antigens; core antigen and 'e' antigen. Core antigen is localized predominantly within the nucleus of infected hepatocytes, whereas 'e' antigen is found in the cytoplasm of infected hepatocytes. A significant proportion of carriers infected with the Hepatitis B virus may develop persistent infection, chronic hepatitis of various types, cirrhosis and possible primary hepatocellular carcinoma.

**Product Specific Information**

NCL-HBcAg-506 recognizes core antigen which is localized predominantly within the nucleus. NCL-HBsAg-2 reacts with surface antigen.



Human liver, hepatitis B positive: immunohistochemical staining for hepatitis B core antigen using NCL-HBcAg-506. Note intense nuclear staining of infected hepatocytes. Paraffin section.

# Novocastra **Hepatitis C virus (NS3)**

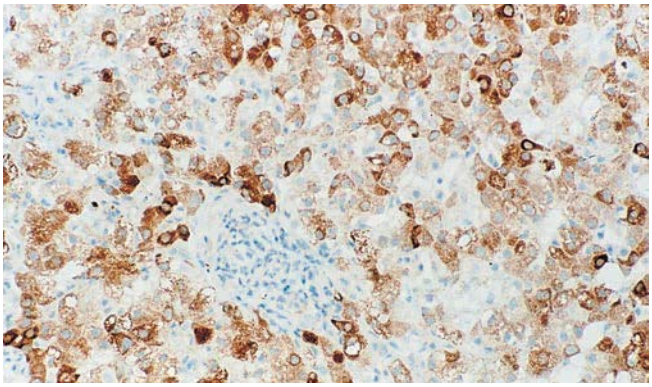
**Clone MMM33**
1 mL, 0.1 mL lyophilized NCL-HCV-NS3 **F P (HIER)**

**Antigen Background**

Hepatitis C virus (HCV) is the leading cause of blood-borne and community acquired non-A, non-B hepatitis. HCV infection has been estimated to affect about 3 percent of the population worldwide. Higher prevalence occurs in high-risk groups, which include individuals with a history of intravenous drug abuse and those multiply transfused before the introduction of mass screening of donated blood for viral antibodies. The virus persists in approximately 80 percent of those infected. Twenty percent of individuals with chronic infection progress to cirrhosis after an average of 20 years. Hepatocellular carcinoma is a significant risk in these, occurring in around 3 percent annually. Virus antigen has been reported in the cytoplasm of hepatocytes of infected individuals by immunohistochemistry although the sensitivity of detection of antigen has varied from study to study.

**Product Specific Information**

NCL-HCV-NS3 is a monoclonal antibody raised against a recombinant NS3 protein.



Acutely infected human liver: immunohistochemical staining for Hepatitis C virus (HCV) non-structural protein 3 using NCL-HCV-NS3. Note cytoplasmic staining of HCV-infected hepatocytes. Paraffin section.

# Novocastra **Hepatocyte Growth Factor Receptor (c-MET)**

**Clone 8F11**
1 mL, 0.1 mL lyophilized NCL-cMET **F P (HIER)**

See also c-MET (Hepatocyte Growth Factor Receptor) on page 129.

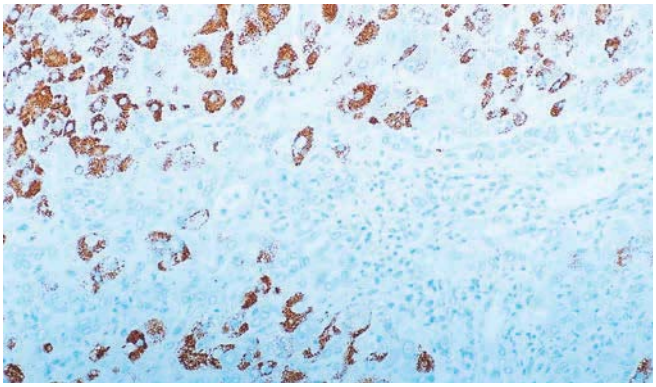
# Novocastra **Hepatocyte Specific Antigen**

**Clone OCH1E5**
1 mL, 0.1 mL lyophilized NCL-HSA **P**

Hepatoblastoma is reported to be the most common primary tumor of the liver in children. The distinction of hepatoblastoma, especially the embryonal type, from other small round cell tumors of childhood can sometimes be difficult. It is reported that the detection of specific hepatocyte antigens, alpha fetoprotein or carcinoembryonic antigen are expressed in normal and malignant fetal hepatocytes.

**Product Specific Information**

NCL-HSA recognizes an uncharacterized antigen present in both adult and fetal normal hepatocytes to produce a distinct granular cytoplasmic staining.



Human liver, hepatitis B positive: immunohistochemical staining for hepatocyte specific antigen using NCL-HSA. Note granular cytoplasmic staining in a proportion of hepatocytes. Paraffin section.

# Novocastra **HER-2 (c-erbB-2 Oncoprotein) Antibodies**

### Clone CB11
1 mL, 0.1 mL lyophilized HER-2 (internal domain) NCL-CB11 **F P C**
1 mL liquid HER-2 (internal domain) NCL-L-CB11 **F P C**
7 mL ready-to-use HER-2 (internal domain) RTU-CB11 **F P**
60 Tests Leica Bond Oracle HER2 IHC System TA9145 **P**

### Clone 5A2
1 mL lyophilized HER-2 (internal domain) NCL-c-erbB-2-316 **F P**

### Clone 10A7
1 mL, 0.1 mL lyophilized HER-2 (external domain) NCL-CBE-356 **P W**
1 mL liquid HER-2 (external domain) NCL-L-CBE-356 **P W**
7 mL ready-to-use HER-2 (external domain) RTU-CBE-356 **P**

### Clone CBE1
1 mL lyophilized HER-2 (external domain) NCL-CBE1 **P (HIER)**

**Antigen Background**

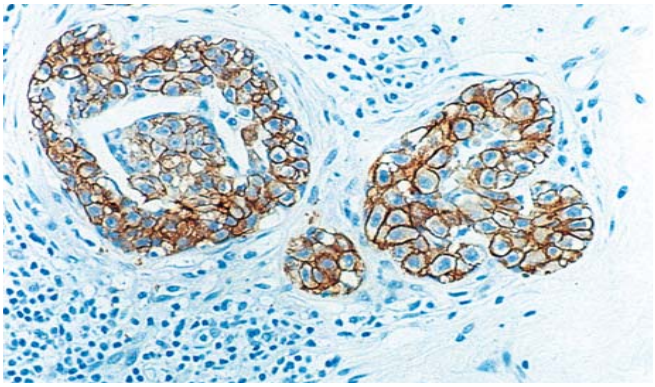
The c-erbB-2 oncoprotein is closely-related in structure to the epidermal growth factor receptor and is a member of a large family of cell surface growth factor receptors. c-erbB-2 oncoprotein is reported to be detectable in a proportion of breast and other adenocarcinomas as well as transitional cell carcinomas. c-erbB-2 oncoprotein is present in a wide variety of cell types in a range of normal human fetal and adult tissues, including breast, stomach and ovary.

**Product Specific Information**

Clones 5A2 and CB11 detect the internal domain of the c-erbB-2 oncoprotein. Clones 10A7 and CBE1 detect the external domain of the c-erbB-2 oncoprotein. NCL-CB11 is effective with no pretreatment on fixed, paraffin-embedded tissue but the use of the heat induced epitope retrieval (HIER) technique may enhance staining in some cases. To obtain optimal staining on frozen tissue, Carnoy's fixative is recommended.

For more information on the Oracle HER2 Bond IHC System see page 11.

Leica Bond Oracle HER2 IHC System, TA9145.



Human breast carcinoma: immunohistochemical staining for c-erbB-2 oncoprotein using NCL-CBE-356. Note intense membrane staining of tumor cells. Paraffin section.

# Novocastra **Herpes simplex virus Antibodies**

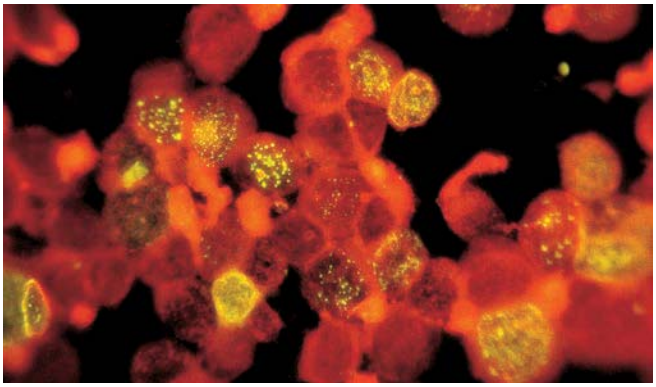
### Clone 20.7.1
1 mL lyophilized Herpes simplex virus (type 1)
NCL-HSV-1 **P (Enzyme) I**

### 12.3.4, Clone 1.1.1
1 mL lyophilized Herpes simplex virus (type 2)
NCL-HSV-2 **I**

Infection with Herpes simplex virus (HSV) is extremely common and pathogenesis can vary depending on a variety of factors. These include age, immune status of the individual, the antigenic type of infecting virus (HSV type 1 or 2) and the site of infection. Primary infections with HSV are generally asymptomatic but they tend to be more severe than recurrent productive disease.

**Product Specific Information**

NCL-HSV-1 is HSV type 1 specific and does not cross-react with tissue culture grown HSV type 2 strains. NCL-HSV-2 is HSV type 2 specific and does not cross-react with tissue culture grown strains of HSV type 1.



Herpes simplex virus type 1 (HSV1) infected HEp-2 cells: indirect immunofluorescence for HSV1 using NCL-HSV-1. Note intense staining of HSV1 infected HEp-2 cells only. Acetone-fixed cells.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

## Novocastra **HFSH (Beta2) (Human Follicle Stimulating Hormone)**

**Clone INN-hFSH-60**
1 mL lyophilized NCL-HFSH **F P (Enzyme)**
7 mL BOND ready-to-use PA0693 **P**

See also Human Follicle Stimulating Hormone (beta 2) (HFSH) on page 158.

## Novocastra **HGH (Human Growth Hormone)**

**Polyclonal**
0.25 mL lyophilized NCL-HGH **F P**
7 mL BOND ready-to-use PA0704 **P**

See also Human Growth Hormone (HGH) on page 158.

## Novocastra **HGM-45M1 (Human Gastric Mucin)**

**Clone 45M1**
1 mL lyophilized NCL-HGM-45M1 **F P (HIER)**

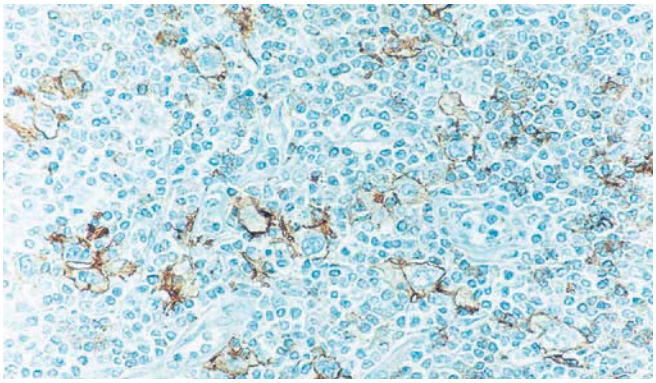
See also Human Gastric Mucin (HGM-45M1) on page 158.

## Novocastra **HLA Class II (DR) Antigen**

**Clone LN-3**
1 mL, 0.1 mL lyophilized NCL-LN3 **F P**

**Antigen Background**

HLA-DR is an MHC Class II antigen that maps to chromosome 6. It is a heterodimer composed of 2 non-covalently associated glycoproteins of about 35 kD (alpha, heavy) and 27 kD (beta, light). Both chains are comprised of two Ig-like domains and have transmembrane sequences and short cytoplasmic tails. It is reported to be expressed mainly on antigen-presenting cells (monocytes/macrophages and dendritic cells), B cells and some activated T cells. Expression has also been reported on thymic epithelial cells.



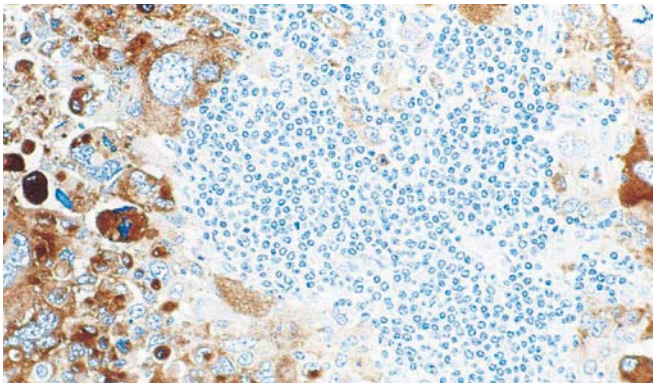
Human anaplastic lymphoma: immunohistochemical staining for HLA class II antigen using NCL-LN3. Note membrane staining of large cells. Paraffin section.

## Novocastra **HMB45 (Melanoma Marker)**

**Clone HMB45**
1 mL, 0.1 mL liquid NCL-L- HMB45 **F P (Enzyme)**
7 mL BOND ready-to-use PA0027 **P (Enzyme)**

**Product Specific Information**

The HMB45 antigen has also been identified in retinal pigment epithelium (RPE) but is reported to be reactive only with the transient prenatal and infantile RPE. No reaction is reported to be observed with intradermal nevi and normal adult melanocytes and non-melanocytic cells. Tumor cells of epithelial, lymphoid, glial and mesenchymal origin are reported to be negative. This clone is well described in the literature. It is indicated to label an intracytoplasmic antigen in the majority of melanomas and other tumors demonstrating melanoma/melanocytic differentiation. The clone is also reported to react with junctional and blue nevus cells. (Bacchi CE et al., A Review. Applied Immunohistochemistry. 4:73-85 (1996)).



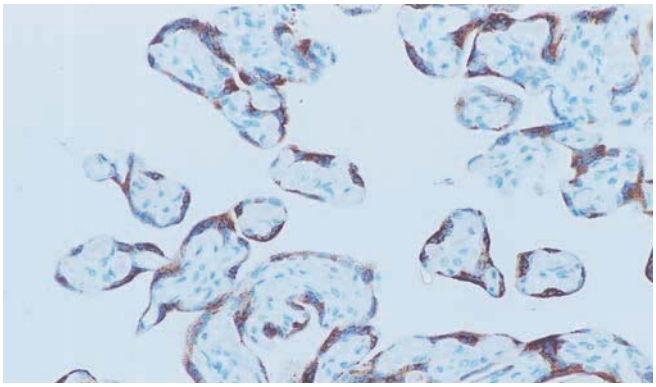
Human metastatic melanoma: immunohistochemical staining for melanoma cells using NCL-L-HMB45. Note cytoplasmic staining of malignant cells. Paraffin section

## Novocastra **Human Chorionic Gonadotrophin (alpha)**

**Clone 4E12**
1 mL lyophilized NCL-HCG-alpha **F P (HIER)**

**Antigen Background**

The human chorionic gonadotrophin alpha (hCGa) gene has now been identified as an estrogen receptor alpha (ERa) responsive gene in breast cancer cells. It encodes the common alpha subunit of the four secreted glycoprotein hormones, hCG, LH, FSH and TSH. The common alpha chain and the hormone-specific beta chains have molecular weights of 14 kD and 17 kD, respectively. hCGa is expressed as part of hCG in normal placenta and as part of LH, FSH and TSH in the pituitary gland. hCGa mRNA is reported to be detected in normal pregnant women and in the peripheral blood mononuclear cells of patients with trophoblastic disease.



Normal human placenta: immunohistochemical staining for human chorionic gonadotrophin alpha using NCL-HCG-alpha. Note cytoplasmic staining of syncytiotrophoblasts. Paraffin section.

## Novocastra **Human Chorionic Gonadotrophin (beta)**

**Polyclonal**

1 mL lyophilized NCL-HCGp **F P (Enzyme)**
7 mL BOND ready-to-use PA0014 **P (HIER)**

**Antigen Background**

Human chorionic gonadotrophin (hCG) is a glycoprotein hormone produced by trophoblastic cells of the placenta beginning 10 to 12 days after conception. Maintenance of the fetus in the first trimester of pregnancy requires the production of hCG, which binds to the corpus luteum of the ovary which is stimulated to produce progesterone which in turn maintains the secretory endometrium. hCG is composed of two subunits, alpha and beta. The alpha subunit of hCG is identical to the subunit of luteinising hormone, thyroid stimulating hormone and follicle stimulating hormone. The common alpha chain and the hormone-specific beta chains have molecular weights of 14 kD and 17 kD, respectively. The hCG beta-subunit is unique in the family of beta-containing glycoprotein hormones in that it contains an extension of 29 amino acids at its COOH end. It is believed that the C-terminal region of the HCG-beta subunit plays a role in the intracellular behavior of the heterodimer.

**Product Specific Information**

NCL-HCGp was raised to the isolated beta-chain of human chorionic gonadotrophin and reacts with placental trophoblasts. NCL-HCGp shows a slight cross-reaction with luteinising hormone and may, therefore, stain basophil cells in the pituitary.

## Novocastra **Human Follicle Stimulating Hormone (beta 2) (HFSH)**

**Clone INN-hFSH-60**

1 mL lyophilized NCL-HFSH **F P (Enzyme)**
7 mL BOND ready-to-use PA0693 **P**

**Antigen Background**

Follicle stimulating hormone (FSH) is a pituitary hormone of 35 kD which is involved in the maturation of ovarian follicles and estrogen secretion in females. In males, FSH stimulates the secretion of testosterone.

## Novocastra **Human Gastric Mucin (HGM-45M1)**

**Clone 45M1**

1 mL lyophilized NCL-HGM-45M1 **F P (HIER)**

**Antigen Background**

Many of the cancer associated antigens have been identified as mucin antigens. The expression of these antigens are associated with the earliest steps in mucin glycosylation which in turn is associated with several diseases. Human Gastric mucin is found on the surface of gastric epithelium of the normal gastrointestinal tract. The “gastric mucins” include Muc-1, Muc-5AC and Muc-6 glycoproteins.

**Product Specific Information**

NCL-HGM-45M1 recognizes the mucin epitope located in the peptide core of gastric mucin, fulfilling a similar function to the antibody, NCL-MUC-1-CORE. Thiol reduction (using 2-mercaptoethanol) completely destroys this epitope, which is partially lost following trypsin proteolysis but is stable upon periodate oxidation.

## Novocastra **Human Growth Hormone (HGH)**

**Polyclonal**

0.25 mL lyophilized NCL-HGH **F P**
7 mL BOND ready-to-use PA0704 **P**

Growth hormone (GH), somatotropin, is the primary hormone responsible for regulating overall body growth and is also important in organic metabolism. It is synthesized by acidophilic or somatotropic cells of the anterior pituitary gland. Human GH has a molecular weight of 22 kD. GH stimulates growth indirectly by promoting the liver's production of somatomedins, which act directly on bone and soft tissue to cause growth. GH exerts direct metabolic effects on the liver, adipose tissue and muscle. In general, growth hormone enhances protein synthesis, conserves carbohydrates and uses up fat stores.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

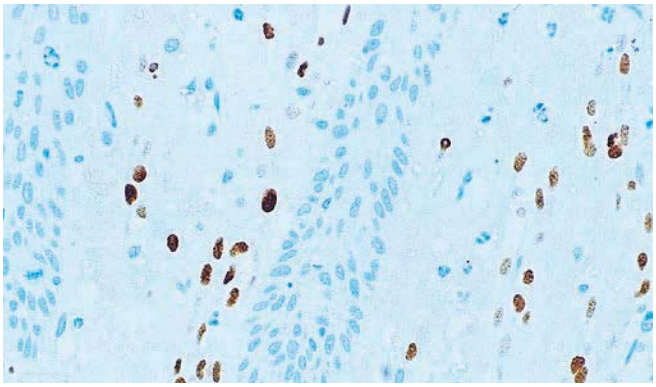
# Novocastra **Human Herpesvirus (type 8) (latent nuclear antigen)**

**Clone 13B10**

1 mL, 0.1 mL lyophilized NCL-HHV8-LNA **P (HIER) W**

**Antigen Background**

Human herpesvirus type 8 (HHV8), is the proposed etiological agent of Kaposi's sarcoma (KS). It is reported that HHV8 has been demonstrated in KS tissues by immunohistochemistry, in situ PCR and also in situ hybridization. HHV8 encodes a latent nuclear antigen (LNA) which is the product of the viral gene orf 73. LNA is capable of forming a complex with retinoblastoma susceptibility gene product which may be related to its oncogenic activity. HHV8 has been reported to be expressed in multicentric Castleman's disease (MCD) and in angioimmunoblastic lymphadenopathies. The localization of HHV8 in subcapsular spindle cell proliferations, which is where early intranodal KS begins, and endothelial cells in Castleman's disease may explain the link between intranodal KS and MCD. In MCD, HHV8 is reported to be expressed in mantle zone large immunoblastic B cells.



Human Kaposi's sarcoma: immunohistochemical staining for HHV8 latent nuclear antigen using NCL-HHV8-LNA. Note nuclear staining in a proportion of infected tumor cells. Paraffin section.

# Novocastra **Human Neutrophil Defensins (1/2/3)**

**Clone D21**

1 mL lyophilized NCL-DEFENSIN **P (HIER)**

**Antigen Background**

Defensins are antimicrobial agents which together with serprocidins, lysozyme, bacterecins, protegrins and indolicidin have been isolated from neutrophil and macrophage granules. Defensins are synthesized as 93 to 96 amino acid pre-propeptides. In fully differentiated phagocytes, virtually all of the cellular defensin exists as processed mature peptide. Neutrophil defensins are stored in azurophil granules which discharge their contents into microbe-containing phagosomes through the process of phagosome/granule fusion. Paneth cells of the small intestine are also reported to secrete defensins, as well as lysozyme into the crypt lumen which may limit local microbial proliferation and colonization. These peptides may also exert chemotactic and immunomodulating effects in host defence and inflammation. The three principle human neutrophil defensin peptides, HNP 1, 2 and 3, are reported to be unique to neutrophils and account for 99 percent of the defensin content in these cells. Activation of neutrophils leads to a rapid release of HNP which may also be measured in plasma and other body fluids in infection and inflammation.

Human tonsil: immunohistochemical staining for human neutrophil defensins using NCL-DEFENSIN. Note intense granular cytoplasmic and extracellular staining of neutrophils. Paraffin section.

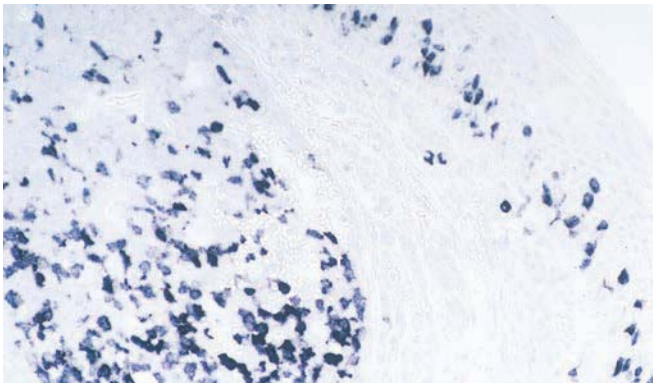
# Novocastra **Human Securin**

**Clone DCS-280.2**

1 mL lyophilized NCL-SECURIN **P (HIER)**

**Antigen Background**

Human securin (hsecurin), also known as pituitary tumor-transforming gene-1 (PTTG) product, is required for chromosomal stability in human cells. Abnormalities of chromosome number are reported to be amongst the most common genetic aberrations in cancer. The mechanisms for regulating mitotic chromosome transmission in mammalian cells are, therefore, of great interest. Human cells without an hsecurin gene lose chromosomes at a high rate. These losses have been linked to abnormal anaphases during which cells undergo repeated unsuccessful attempts to segregate their chromosomes. Therefore, human securin is essential for the maintenance of euploidy. The expression of hsecurin is reported to correlate with cell proliferation in a cell cycle-dependent manner in both normal tissues and in several tumor types. hsecurin specifically binds to Ku, the regulatory subunit of the DNA-dependent protein kinase. Ku and hsecurin associate both in vitro and in vivo. DNA double-strand breaks prevent Ku/hsecurin association showing that genome damaging events can result in the induction of pathways that activate DNA repair mechanisms and halt cell cycle progression. It has also been proposed that hsecurin connects DNA-damage response pathways with sister chromatid separation delaying mitosis while DNA repair occurs.



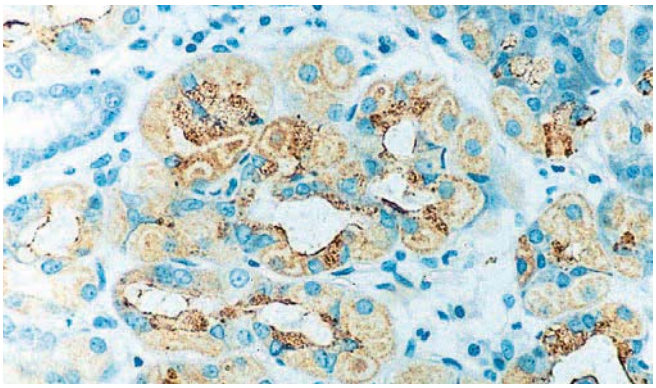
Human tonsil: immunohistochemical staining for human securin using NCL-SECURIN. Note nuclear staining of proliferating cells. Paraffin section, nickel DAB.

# Novocastra **Human Spasmolytic Polypeptide**

**Clone GE16C**
1 mL lyophilized NCL-HSP **P (HIER)**

**Antigen Background**

Human spasmolytic polypeptide (HSP) is a member of the trefoil peptide family which is reported to be expressed in discrete regions of the body, most notably the gastrointestinal tract. In the stomach, HSP is reported to be localized to foveolar and surface epithelium, pyloric glands and mucous neck cells.



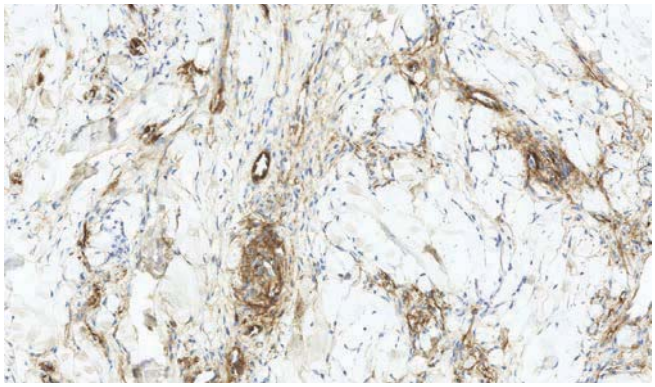
Normal human stomach: immunohistochemical staining of human spasmolytic polypeptide using NCL-HSP. Note cytoplasmic staining of cardiac glands. Paraffin section.

# Novocastra **Human von Willebrand Factor (Factor VIII-related antigen)**

**Clone 36B11**
1 mL, 0.1 mL lyophilized NCL-vWF **F P (HIER)**
1 mL, 0.1 mL liquid NCL-L-vWF **F P (HIER)** New!
7 mL BOND ready-to-use PA0400 **P (HIER)**

**Antigen Background**

Human von Willebrand factor (or factor VIII-related antigen) is a 270 kD multimeric plasma glycoprotein. It mediates platelet adhesion to injured vessel walls and serves as a carrier and stabilizer for coagulation factor VIII. The von Willebrand factor has functional binding domains to platelet glycoprotein Ib, glycoprotein Ib/IIIa, collagen and heparin. von Willebrand factor is synthesized by endothelial cells and is reported to be expressed in a number of tumors of vascular origin.



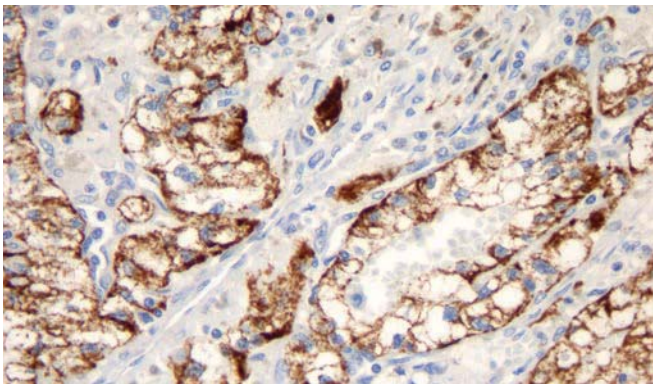
Human skin, Kaposi's Sarcoma: immunohistochemical staining for Factor VIII-Related Antigen (von Willebrand Factor) using NCL-L-vWF. Note moderate cytoplasmic staining in neoplastic cells and intense cytoplasmic staining of normal endothelial cells. Paraffin section.

# Novocastra **Hypoxia Inducible Gene 2 Protein**

**Clone HX34Y**
0.1 mL liquid NCL-L-HIG2 **P (HIER)**

**Antigen Background**

The gene encoding hypoxia-inducible gene 2 protein (HIG2) is one of the transcriptional targets for the activated beta-catenin/Tcf-4 complex and its product functions as an autocrine growth factor that enhances cell growth. This gene encodes a trans-membrane protein of 7 kD molecular weight that was found to be expressed exclusively in renal cell carcinomas (RCC) and fetal kidney. Reports indicate that ELISA analysis of clinical samples identified secretion of HIG2 protein into plasma of RCC patients even at an early stage of tumor development.



Human clear cell renal cell carcinoma: immunohistochemical staining for hypoxia inducible gene 2 protein using NCL-L-HIG2.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

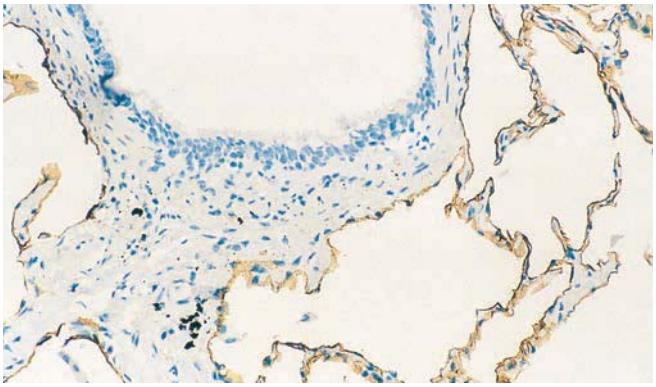
Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra **ICAM-1 (CD54)**

**Clone 23G12**
1 mL lyophilized NCL-CD54-307 **P (HIER)**

### Antigen Background

The CD54 (ICAM-1) is an integral membrane glycoprotein of 85 to 110 kD with seven potential N-linked glycosylation sites. The antigen is reported to be expressed on monocytes and endothelial cells. Expression of the CD54 glycoprotein can be induced or upregulated on many cell types including B and T lymphocytes, thymocytes, fibroblasts, keratinocytes and epithelial cells. The CD54 antigen is important in mediating immune and inflammatory responses. It mediates the adhesion of T cells with antigen-presenting cells and is involved in T cell to T cell and T cell to B cell interactions.



Human peripheral lung: immunohistochemical staining for CD54 antigen (ICAM-1) using NCL-CD54-307. Note membrane staining of epithelial cell surfaces of the air spaces. Paraffin section.

# Novocastra **Immunoglobulin A Antibodies**

**Clone N1CLA**
1 mL, 0.1 mL liquid NCL-L-IgA **P (HIER) W**

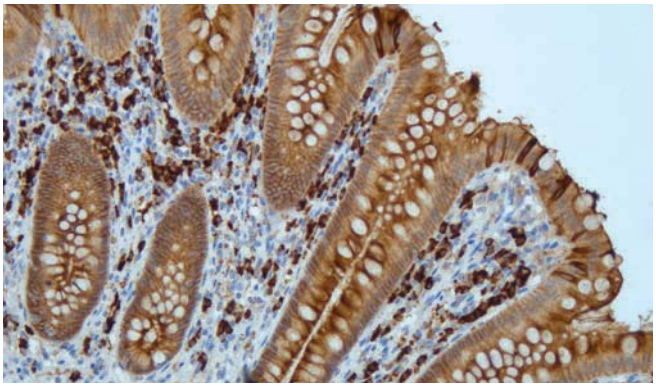
**Polyclonal**
1 mL lyophilized NCL-IgAp **P (Enzyme) W**

### Antigen Background

IgA is a member of the antibody class of the immunoglobulin superfamily. There are several classes and subclasses (isotypes) of antibody, the antibody isotype being defined by the immunoglobulin heavy chain present in the molecule. The basic structure of an immunoglobulin molecule consists of two identical heavy chains ($\gamma$, $\mu$, $\alpha$, $\delta$, $\epsilon$) and two identical light chains, either kappa or lambda. IgA contains the $\alpha$-chain and may be present in a serum or secretory form. In serum, 90 percent of IgA is monomeric, while in its secretory form it is the main immunoglobulin found in secretions including tears, saliva, intestinal and bronchial mucous, sweat, colostrum, and secretions from the prostate and respiratory epithelia, where it has the job of defending exposed external surfaces of the body against attack from micro organisms. Secretory IgA is synthesized locally by plasma cells and dimerized intracellularly with a cysteine-rich J-chain.

### Product Specific Information

Clone N1CLA was developed to produce reduced background staining that is associated with polyclonal antibodies on paraffin sections.



Human appendix: immunohistochemical staining for immunoglobulin A using NCL-L-IgA. Note intense staining of plasma cells and secreted immunoglobulin A. Paraffin section.

# Novocastra **Immunoglobulin D Antibodies**

**Clone DRN1C**
1 mL, 0.1 mL liquid NCL-L-IgD **P (HIER)**

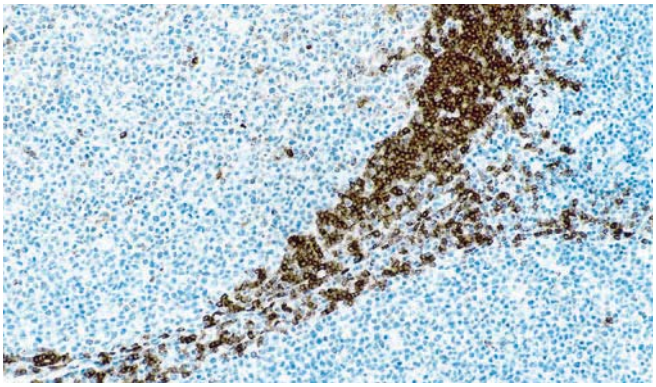
**Polyclonal**
1 mL lyophilized NCL-IgDp **P (Enzyme)**

### Antigen Background

IgD, together with IgM, are the major immunoglobulins expressed on the surface of B cells where it seems they may operate as mutually interacting antigen receptors for the control of lymphocyte activation and suppression. The greater susceptibility of IgD to proteolysis in combination with antigen could well be implicated in such a function.

### Product Specific Information

The use of PBS-based diluents may result in increased background staining. Clone DRN1C was developed to produce reduced background staining that is associated with polyclonal antibodies on paraffin sections.



Human tonsil: immunohistochemical staining for Immunoglobulin D using NCL-L-IgD. Note intense membrane staining of B cells. Paraffin section.

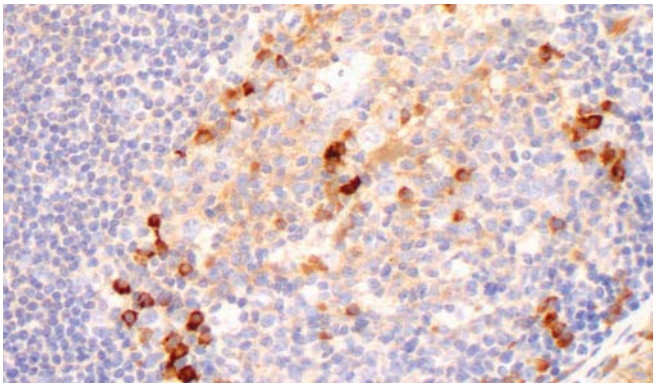
# Novocastra **Immunoglobulin G Antibodies**

**Clone RWP49**
1 mL, 0.1 mL liquid NCL-L-IgG **P (HIER)**

**Polyclonal**
1 mL lyophilized NCL-IgGp **P (Enzyme) W**

**Antigen Background**

The human immunoglobulins consist of two identical heavy chains (~50 kD) and two identical light chains, which are linked together by disulphide BONDs. The light chains can be either kappa or lambda. The five immunoglobulins IgA, IgD, IgE, IgG and IgM differ in their heavy chains, and IgA and IgM differ as they can occur in polymeric forms. The heavy chain of IgG is named the gamma-chain. In humans, IgG consists of four sub classes that differ only marginally in their amino acid composition. Antibodies to IgG have been reported to be useful in the identification of plasma cells, lymphoid cells containing IgG and classifying B cell derived neoplasms. The normal B cell population is polyclonal, expressing a range of different immunoglobulins. In contrast, the majority of B cell neoplasms are characterized by the proliferation of monoclonal cells expressing one type of light chain, whereas more than one type of heavy chain can be expressed by the same cell.



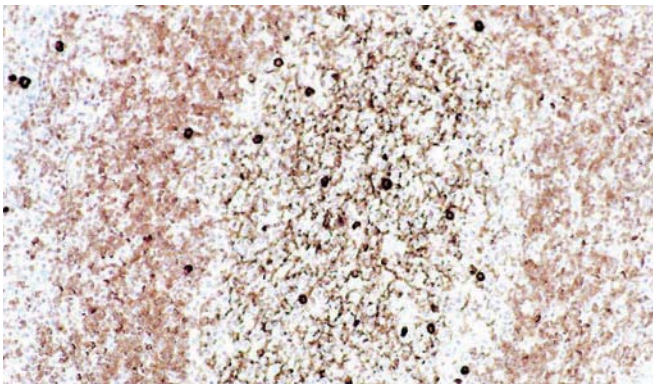
Human tonsil: immunohistochemical staining for Immunoglobulin G using NCL-L-IgG. Paraffin section.

# Novocastra **Immunoglobulin M Antibodies**

**Clone 8H6**
1 mL, 0.1 mL liquid NCL-L-IgM **P (HIER) W**

**Antigen Background**

IgM, together with IgD, is the major immunoglobulin expressed on the surface of B cells and normally constitutes about 10 per cent of serum immunoglobulin. IgM antibody is prominent in early immune responses to most antigens and predominates in certain antibody responses such as 'natural' blood group antibodies.



Human tonsil: immunohistochemical staining for immunoglobulin M using NCL-L-IgM. Note staining of follicular dendritic cells, mantle zone B cells and intense staining of plasma cells. Paraffin section.

# Novocastra **Inhibin (Alpha)**

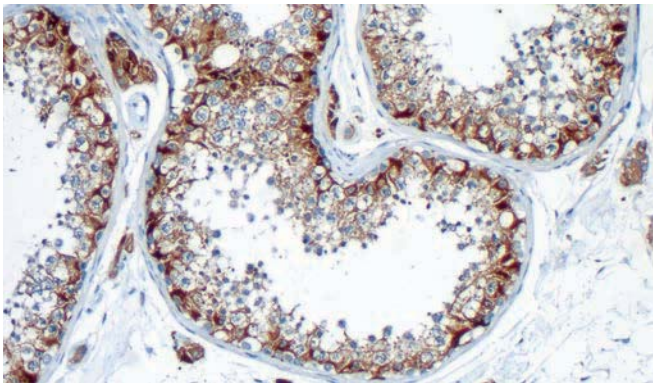
**Clone AMY82**
1 mL, 0.1 mL liquid NCL-L-InhibinA **P (HIER)**

**Clone R1**
7 mL BOND ready-to-use PA0110 **P (HIER)**

**Antigen Background**

Inhibins and activins are members of the transforming growth factor beta (TGF ) family of cytokines. Inhibins are heterodimers consisting of a common -subunit linked to either a A subunit ( - A, forming inhibin A) or a B subunit ( - B, forming inhibin B). Activins share the -subunit with the inhibins and may be homo or heterodimers of -subunits forming activin A ( A- A), activin AB ( A- B) or activin B ( B- B). The expression of the -subunit, and therefore of inhibins appears to be more restricted than that of the -subunit, and therefore of activins. Inhibins and activins play a role in the regulation of pituitary follicle stimulating hormone (FSH) secretion. The actions of inhibins and activins are thought to oppose one another, with inhibins suppressing FSH secretion and activins stimulating FSH secretion. Inhibins are secreted by granulosa cells in female follicles and Sertoli cells of the testis in the male. Inhibins are thought to have local regulatory roles in a variety of tissues, in addition to the ovary, including the brain, adrenal glands, bone marrow, fetus and placenta.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting



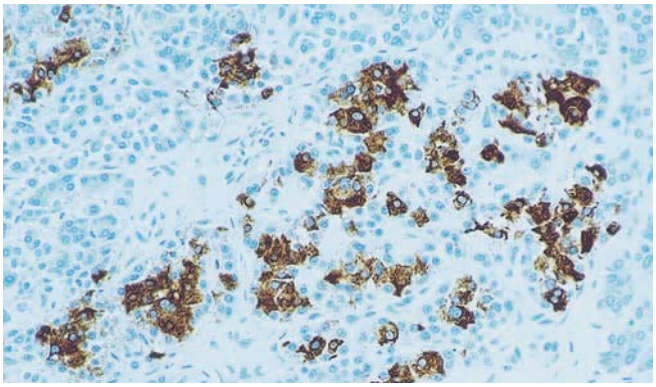
Human testis: immunohistochemical staining for Inhibin Alpha using NCL-L-InhibinA. Paraffin section.

## Novocastra **Insulin**

**Clone 2D11-H5**
1 mL, 0.1 mL lyophilized NCL-INSULIN **P**
7 mL BOND ready-to-use PA0620 **P**

**Antigen Background**

Insulin is a hormone secreted by the beta cells of the islets of Langerhans in the pancreas. It promotes glycogen storage, formation of triglycerides, and synthesis of protein and nucleic acids. Reports of immunocytochemical investigation reveal the presence of insulin in the cytoplasm of certain islet tumors. However, in some instances insulin-positive granules are sparse and form a margin against the cell membrane.



Human pancreas: immunohistochemical staining for insulin-containing cells using NCL-INSULIN. Note intense cytoplasmic staining of the beta cells of the islets of Langerhans and of the tumor cells (center). Paraffin section.

## Novocastra **Interleukin-2 Receptor (CD25)**

**Clone 4C9**
1 mL, 0.1 mL lyophilized NCL-CD25-305 **P (HIER)**
7 mL BOND ready-to-use PA0305 **P**

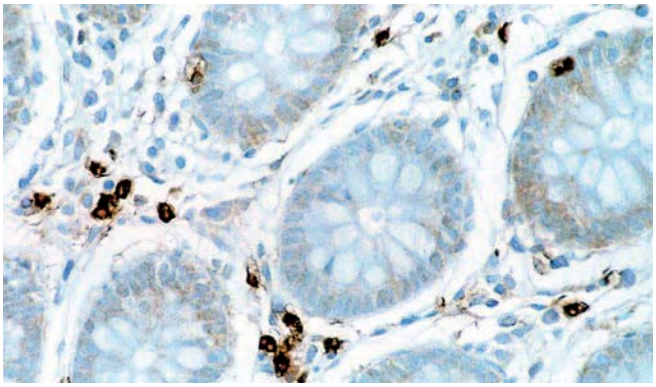
CD25 antigen, the alpha subunit of interleukin-2 receptor, is a single-chain glycoprotein with a molecular weight of 55 kD. Following the activation of T cells with antigen or mitogen in the presence of the monokine interleukin-1, interleukin-2 (IL-2) is rapidly synthesized and secreted. In response to this a subpopulation of T cells expresses high affinity receptors for IL-2. These cells proliferate, expanding the T cell population which is capable of mediating helper, suppressor and cytotoxic functions. IL-2 receptor is not exclusively found on T cells and is reported to be expressed on HTLV-transformed T and B cells, EBV-transformed B cells, myeloid precursors and oligodendrocytes. It is absent on thymocytes, resting T cells, non-activated B cells and null cells. IL-2 receptor expression is reported to be associated with inflammatory and malignant conditions, lymphoid neoplasia, auto-immune diseases and allograft rejection.

## Novocastra **Interleukin 6**

**Clone 10C12**
1 mL, 0.1 mL liquid NCL-L-IL6 **P W**

**Antigen Background**

IL-6 is a multifunctional cytokine that is secreted by both lymphoid and nonlymphoid cells. It plays a key role in immune responses, hematopoiesis and is an important cytokine in cell proliferation and differentiation. It may also play an important role as an autocrine growth factor in metastatic prostate cancer. IL-6 has been reported to play a role in secretion or release of pituitary hormone in pituitary hormone secreting cells and adenomas. In addition, IL-6 has been suggested to have a trophic effect in nerve cells and to have a direct pathogenic role in CNS disorders. There are an increasing number of reports that cytokines of the IL-6 family play an important regulatory role in heart physiology.



Human colon: immunohistochemical staining for Interleukin 6 using NCL-L-IL6. Note cytoplasmic staining of a proportion of lymphoid cells. Paraffin section.

# Novocastra **Involucrin**

**Clone SY5**
1 mL lyophilized NCL-INV **F P (Enzyme)**

**Antigen Background**

Involucrin is a precursor (120 kD) of the epidermal cornified envelope which becomes cross-linked during envelope assembly. Involucrin is expressed in a range of stratified squamous epithelia, including the cornea which lacks a distinct cornified layer and is expressed when differentiation is terminated. In normal dermis, involucrin is expressed in the upper cornified layer. However, in pathological conditions, involucrin expression is altered eg in psoriasis and other benign epidermal hyperplasias, where involucrin expression is found closer to the basal layer.

**Product Specific Information**

When using NCL-INV, enzyme pretreatment may enhance staining in some cases.

# Novocastra **Kappa Light Chain**

**Clone CH15**
1 mL, 0.1 mL liquid NCL-L-KAP-581 **P (HIER)**
7 mL BOND ready-to-use PA0606 **P (HIER)**

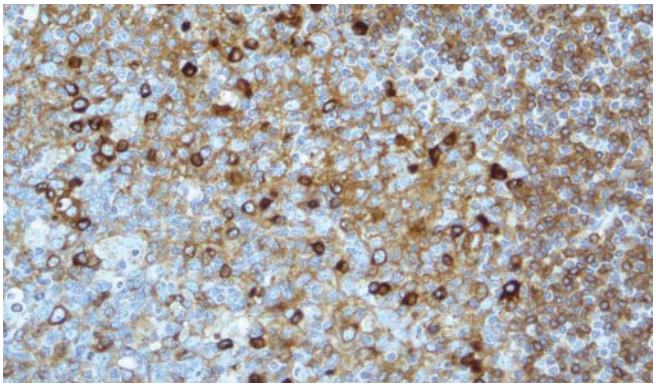
**Clone kp-53**
1 mL lyophilized NCL-KAP **F P W**

**Clone L1C1**
1 mL, 0.1 mL lyophilized NCL-KAP-L1C1 **F P (Enzyme)**

**Polyclonal**
1 mL lyophilized NCL-KAPP **P (Enzyme) W**

**Antigen Background**

Immunoglobulins are polypeptides and comprise five major classes; immunoglobulin G (IgG), IgA, IgM, IgD and IgE. Each immunoglobulin consists of two identical heavy (H) chains and two identical light (L) chains. These are also subdivided into sub classes eg IgG1. There are two classes of light chain; kappa and lambda. The ratio of kappa chains and light chains varies between Ig classes and sub classes, but is also species specific. In humans, approximately 60 percent of light chains are kappa. However, in any particular immunoglobulin molecule the light chain will be either kappa or lambda. B cells contain either kappa or lambda mRNA.



Tonsil: immunohistochemical staining for Kappa Light Chain using NCL-L-KAP-581. Note cytoplasmic staining of plasma cells. Paraffin section.

# Novocastra **Ki67 Antigen**

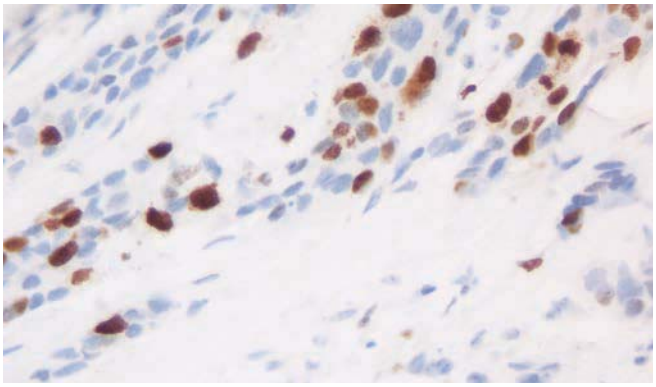
**Clone MM1**
1 mL, 0.1 mL lyophilized NCL-Ki67-MM1 **F P (HIER)**
1 mL, 0.1 mL liquid NCL-L-Ki67-MM1 **F P (HIER)** New!
7 mL ready-to-use RTU-Ki67-MM1 **F P (HIER)**
7 mL BOND ready-to-use PA0118 **P (HIER)**

**Clone K2**
1 mL liquid NCL-L-ACK02 **F P (HIER)**
7 mL BOND ready-to-use PA0230 **P (HIER)**

**Polyclonal**
0.2 mL lyophilized NCL-Ki67p **F P (HIER)**

**Antigen Background**

The Ki-67 antigen is a human nuclear protein, which is expressed in all active parts of the cell cycle (G1, S, G2 and mitosis), but absent in resting cells (G0). In contrast to many other cell cycle-associated proteins, the Ki67 antigen is consistently absent in quiescent cells and is not detectable during DNA repair processes. Thus, the presence of Ki67 antigen is strictly associated with the cell cycle and confined to the nucleus, suggesting an important role of this structure in the maintenance and/or regulation of the cell division cycle.



Breast invasive ductal carcinoma: immunohistochemical staining with BOND ready-to-use Ki67 (K2) using Bond Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

## Novocastra **Kip2 (p57 Protein)**

**Clone 25B2**
1 mL, 0.1 mL lyophilized NCL-p57 **P (HIER)**

**Antigen Background**

Cyclin dependent kinases are positive regulators of cell proliferation. p57 protein acts as a tumor suppressor to counter this. It is closely-related to other CDKIs such as p21 protein (CIP1) and p27 protein (Kip1) as they share a common structural N-terminal domain for binding to CDK/cyclin complexes and inhibiting their kinase activity. Human p57 protein is found on chromosome 11p15.5, a region which is reported to be a common site for loss of heterozygosity in certain sarcomas, Wilms' tumors and tumors associated with the Beckwith-Wiedemann syndrome. There is increasing interest in p57 as a marker in Gestational disease. Gestational trophoblastic disease refers to a spectrum of proliferative disorders of the placental trophoblast, with a wide range of histologic appearances and clinical behaviors. Recent developments in changes in the criteria for histologic diagnosis of these lesions due to earlier clinical diagnosis have been reviewed Hui P et al., Advantages in Anatomical Pathology. 12(3): 116-125 (2005) and the ability to make more accurate diagnoses due to the introduction of newer antibodies such as p57 is discussed.

## Novocastra **Lambda Light Chain**

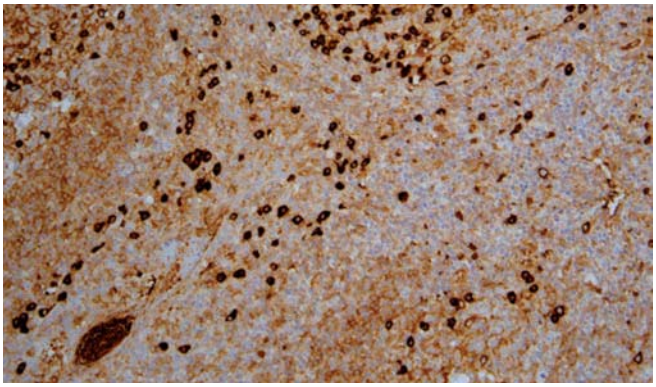
**Clone SHL53**
1 mL, 0.1 mL liquid NCL-L-LAM-578 **P (HIER)**
7 mL BOND ready-to-use PA0570 **P (HIER)**

**Polyclonal**
1 mL lyophilized NCL-LAMp **P (Enzyme) W**

**Clone HP-6054**
1 mL, 0.1 mL lyophilized NCL-LAM **F P W**

**Antigen Background**

The basic structure of an immunoglobulin molecule consists of two identical heavy chains, either , μ, , or , and two identical light chains, either kappa or lambda. Any heavy chain can associate with either light chain but on any immunoglobulin molecule both light chains are of the same type. The ratio of kappa and lambda light chains varies between Ig classes and subclasses. In a polyclonal population the ratio of kappa to lambda bearing B cells is approximately 2:1, with individual B cells thought to express kappa or lambda light chains, never both. The majority of kappa and lambda chains are bound to heavy chain immunoglobulin, however in normal individuals low levels of free light chain are present in serum. The occurrence of a mixture of kappa and lambda chain expressing cells suggests a polyclonal population and a reactive or nonneoplastic proliferation of B cells.



Tonsil: immunohistochemical staining with Lambda Light Chain using NCL-L-LAM-578. Note intense cytoplasmic staining of plasma cells. Paraffin section.

## Novocastra **Lamin A/C**

**Clone 636**
1 mL lyophilized NCL-LAM-A/C **F P (HIER) W**

**Antigen Background**

The nuclear lamina is a karyoskeletal structure composed of intermediate filament type proteins called lamins. It underlies the inner nuclear membrane and confers mechanical stability to the nuclear envelope. The human lamina consists of four major types of lamin, namely A, B1, B2 and C.

**Product Specific Information**

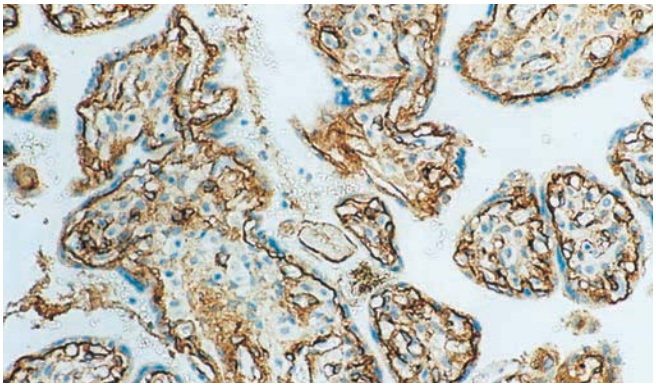
NCL-LAM-A/C reacts with lamins A and C in human, cow and pig tissues.

## Novocastra **Laminin**

**Clone LAM-89**
0.5 mL lyophilized NCL-LAMININ **F P (Enzyme)**

**Antigen Background**

Laminin is a large (850 kD) disulfide-bonded heterotrimer, cross-shaped, glycoprotein which is organized within the meshwork of basement membranes such as those associated with epithelia, surrounding blood vessels, nerves and underlying pial sheaths of the brain. It is reported to be expressed in the extracellular matrix in sites other than basement membranes during early stages of development and is localized to specific types of neurons in the central nervous system during both embryonic and adult development. Laminin interacts with receptors on cell surfaces, an interaction which results in changes in the behavior of cells such as attachment to a substrate, migration and neurite outgrowth during embryonic development and regeneration.



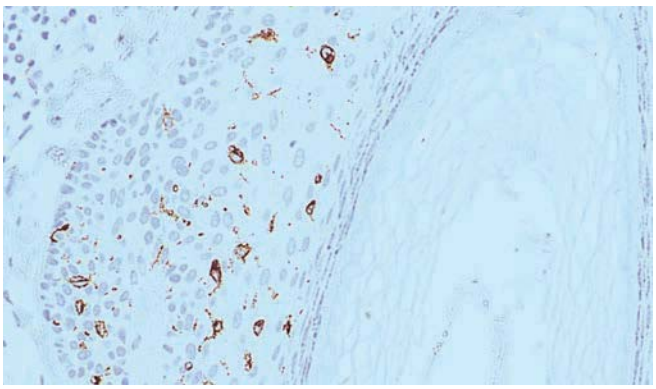
Human placenta: immunohistochemical staining for laminin using NCL-LAMININ. Note staining of basement membranes of blood vessels. Paraffin section.

## Novocastra **Langerin**

**Clone 12D6**
1 mL, 0.1 mL lyophilized NCL-LANGERIN **P (HIER)**

**Antigen Background**

Langerin is a type II transmembrane C-type lectin which has mannose-binding specificity. It is a 40 kD protein restricted to Langerhans cells that is involved in the internalization of cell surface material in these immature dendritic cells. Dendritic cells are antigen-presenting cells that are required for initiation of a specific T cell-driven immune response. These cells are found in nonlymphoid tissue as immature cells whose primary function is to capture antigen through specialized surface membrane endocytic structures or through macropinocytosis. The dendritic cells migrate to secondary lymphoid tissue and mature into efficient antigen presenting cells. A part of the maturation process includes the loss of adhesion receptors such as E-cadherin and the disappearance of Birbeck granules. Although Langerin is reported to be located on the cell surface, it can be rapidly internalized following ligand capture into Birbeck granules. In fact, Langerin is a potent inducer of membrane superimposition and zippering leading to Birbeck granule formation. In reports it has been suggested that the induction of Birbeck granules is a consequence of the antigen-capture function of Langerin allowing passage into these organelles and providing access to a non-classical antigen processing pathway.



Human basal cell carcinoma: immunohistochemical staining for langerin using NCL-LANGERIN. Note membrane and cytoplasmic staining of Langerhans cells within the tumor. Paraffin section.

## Novocastra **LFA-2 (CD2)**

**Clone AB75**
1 mL, 0.1 mL lyophilized NCL-CD2-271 **P (HIER)**
1 mL liquid NCL-L-CD2-271 **P (HIER)**
7 mL ready-to-use RTU-CD2-271 **P (HIER)**

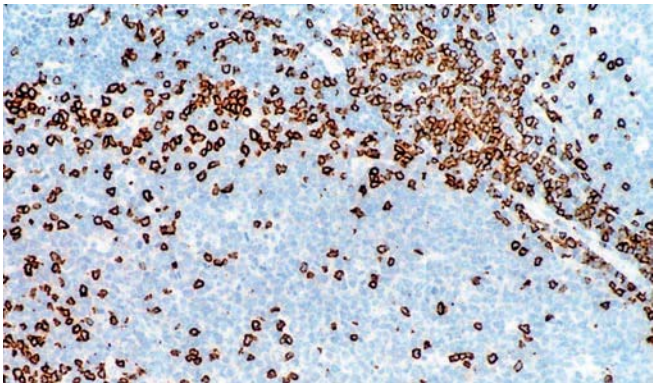
See also CD2 (LFA-2) on page 106.

## Novocastra **Linker for Activation of T Cells**

**Clone 3.8**
1 mL liquid NCL-L-LAT **F P (HIER)**

**Antigen Background**

Stimulation of the T cell antigen receptor (TCR) results in the activation of several protein tyrosine kinases (PTKs) associated with the TCR. These activated PTKs phosphorylated tyrosine residues on multiple protein substrates. This phosphorylation results in the activation of enzymes such as phospholipase C gamma or creates sites of binding for proteins involved in the activation cascade. Linker for activation of T cells (LAT) is an integral membrane protein (36 to 38 kD) which plays an important role in linking engagement of the TCR to the biochemical events of T cell activation. LAT is a substrate of activated ZAP-70 and Syk PTKs. It binds following tyrosine phosphorylation, Grb2, PLC-gamma1 and other critical signalling molecules recruiting them to the plasma membrane. This has the effect of enhancing the phosphorylation of tyrosine residues required for enzymatic activation and promoting the formation of protein complexes. LAT mRNA is found in NK cells and mast cells. LAT protein has been reported to be detected in thymus and peripheral lymphoid tissues such as T cell areas in lymph nodes and spleen. In the small intestine, intra-epithelial T cells also express LAT, and in bone marrow, LAT is expressed by T lymphocytes in interstitial spaces and also by platelets and megakaryocytes. LAT is reported not to be expressed in B cells, macrophages, plasma cells, monocytes, epithelial histiocytes and dendritic cells.



Human tonsil: immunohistochemical staining for LAT protein using NCL-L-LAT. Note intense membrane staining of T lymphocytes. Paraffin section.

## Novocastra **LMP-1 (Epstein-Barr virus)**

**Clone CS1, CS2, CS3, CS4 cocktail**
1 mL, 0.1 mL lyophilized NCL-EBV-CS1-4 **F P (Enzyme)**

See also Epstein-Barr virus (LMP-1) on page 144.

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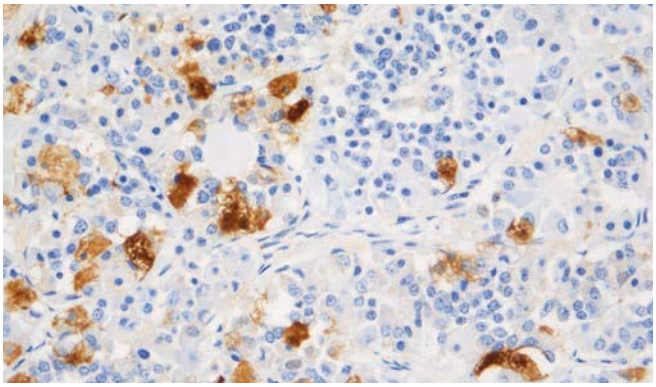
## Novocastra **Luteinizing Hormone**

**Clone C93**
7 mL BOND ready-to-use PA0655 **P**

**Antigen Background**

Luteinising hormone (LH) is a trophic hormone which modulates the secretory activity of other endocrine glands. It is produced by the anterior hypophysis of the pituitary gland. This glycoprotein hormone, like human follicle stimulating hormone and thyroid stimulating hormone, is composed of a common alpha-subunit and a specific beta-subunit which characterizes each of these hormones.



Pituitary: immunohistochemical staining with BOND ready-to-use Luteinizing Hormone (C93) using BOND Polymer Refine Detection.

## Novocastra **Lysozyme (Muramidase)**

**Polyclonal**
1 mL lyophilized NCL-MURAM **P (Enzyme) W**
7 mL BOND ready-to-use PA0391 **P (Enzyme)**

**Antigen Background**

Intracellular muramidase, also known as lysozyme, has been reported to be expressed in myeloid and monocytic cells, in leukocytes and in myelo-proliferative disorders. Muramidase is also reported to be expressed in poorly differentiated leukemic monoblasts.

## Novocastra **Macrophage Marker (MAC387)**

**Clone MAC387**
7 mL BOND ready-to-use PA0752 **P (HIER)**

**Antigen Background**

L1, a member of the S-100 family of proteins, is reported to be found on neutrophils, monocytes, certain reactive macrophages and squamous mucosal epithelia.

**Product Specific Information**

Clone MAC387 is reported to be specific for the leucocyte antigen L1.

## Novocastra **MAGE-1**

**Clone 6C1**
1 mL lyophilized NCL-MAGE-1 **P (HIER)**

**Antigen Background**

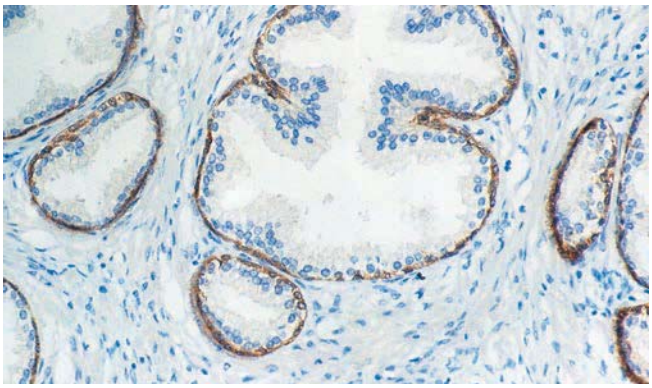
The human MAGE gene products are recognised by major histocompatability complex-restricted cytotoxic T lymphocytes. MAGE-1, also known as tumor rejection antigen, is a target for immunotherapy in patients with hepatocellular carcinoma (HCC). MAGE-1 is reported to be expressed in about 60 per cent of HCC cases. Other studies utilising reverse transcriptase-PCR and southern blot hybridisation techniques have reported MAGE genes to be expressed in malignant tumors and pre-cancerous lesions but not in benign tumors.

## Novocastra **Maspin**

**Clone EAW24**
1 mL lyophilized NCL-MASPIN **P (HIER)**

**Antigen Background**

Maspin, or mammary-specific serpin, is a tumor suppressor protein of 42 kD that belongs to the serine proteinase inhibitor (serpin) family. It is reported to be expressed in normal breast and prostatic epithelial cells but is downregulated in carcinomas derived from these cell types. The expression of maspin is controlled at the transcriptional level by a combination of elements including Ets, AP-1 and p53. The tumor suppressor activity of maspin may depend on its ability to inhibit angiogenesis. In breast myoepithelial cells, maspin is predominantly a soluble cytoplasmic protein which associates with secretory vesicles and is present at the cell surface. The loss of maspin in breast tumors is reported to be a progressive process and expression decreases with increasing malignancy of primary tumors and is absent from lymph node and distant metastases. In rats, maspin mRNA has been detected in mammary gland, vagina, bladder, thymus, small intestine, ventral prostate, seminal vesicles and thyroid, but is absent from heart, lung, liver, brain and kidney.



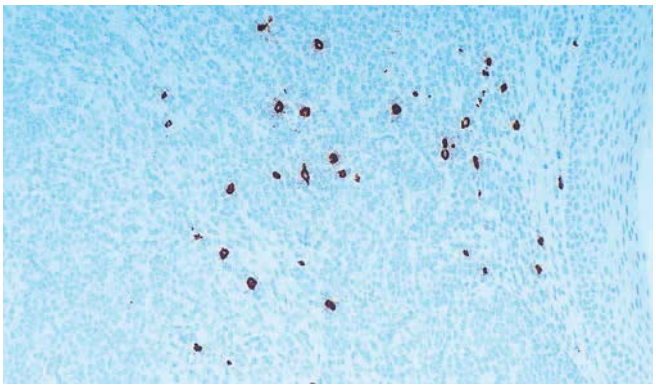
Human prostate: immunohistochemical staining for maspin using NCL-MASPIN. Note cytoplasmic and nuclear staining of normal glandular basal cells. Paraffin section.

# Novocastra **Mast Cell Chymase**

**Clone CC1**
1 mL lyophilized NCL-MCC **P (HIER)**

**Antigen Background**

Chymase is an enzyme found in human mast cells and acts as a mediator of inflammation and matrix remodelling. Mast cells are present in most human tissues and have themselves been implicated in angiogenesis, inflammation and fibrosis. Mast cells are not a single cell type but represent a highly heterogenous population. Subpopulations differ in their responsiveness to various secretagogues, their susceptibility to pharmacological control by anti-allergic drugs and also the extent to which they may be histologically stained using basic dyes. Mast cells may contain both chymase and tryptase in their secretory granules (MCTC) or tryptase only (MCT) without chymase. The MCTC population normally predominates at connective tissue sites and is also most abundant in skin, heart, gastrointestinal submucosa and respiratory submucosa tissues. The MCT cells are most numerous in mucosal tissues. Chymase, one of the major secretory products of MCTC cells, may alter cytokine bioavailability by activating the interleukin-1b (IL-1b) precursor, degrading IL-4 and liberating membrane-bound stem cell factor. It could also participate in matrix remodelling by activating procollagenase and control blood flow by generating angiotensin II. In animal models, chymase has also been shown to increase microvascular permeability and promote the accumulation of inflammatory cells.



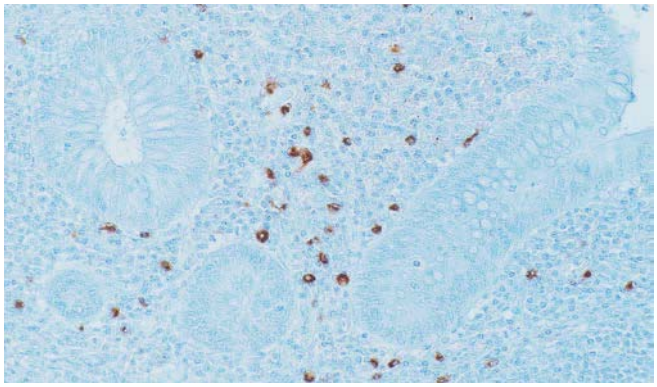
Human tonsil: immunohistochemical staining for mast cell chymase using NCL-MCC. Note intense cytoplasmic staining of mast cells. Paraffin section.

# Novocastra **Mast Cell Tryptase**

**Clone 10D11**
1 mL, 0.1 mL lyophilized NCL-MCTRYP-428 **P**
7 mL BOND ready-to-use PA0019 **P**

**Antigen Background**

Mast cells contain a number of preformed chemical mediators such as histamine, chymase, carboxypeptidase and proteolytic tryptase. A substantial quantity of tryptase is reported to be found in mast cells of skin and lung and suggests this enzyme plays a major role in mast cell mediated events. In vitro studies indicate tryptase can cleave C3 to form C3a anaphylatoxin, inactivate fibrinogen as a coaguable substrate for thrombin and activate latent collagenase. Models of allergenic disease in the skin, nose and lung have each indicated elevated tryptase levels. Human mast cell tryptase has been reported to be implicated as a mediator of inflammation. Mast cell degranulation in the gut causes mucus secretion, mucosal edema, increased gut permeability and may be responsible for some of the symptoms and signs of inflammatory bowel disease.



Human appendix: immunohistochemical staining for mast cell tryptase using NCL-L-MCTRYP-428. Note cytoplasmic staining of mast cells. Paraffin section.

# Novocastra **Matrix Metalloproteinase Antibodies**

**Clone 17B11**
1 mL, 0.1 mL lyophilized Matrix Metalloproteinase 2
NCL-MMP2-507 **P (HIER)**

**Clone 15W2**
1 mL, 0.1 mL lyophilized Matrix Metalloproteinase 9
NCL-MMP9-439 **F P**

**Clone 5E4**
1 mL lyophilized Matrix Metalloproteinase 10
NCL-MMP10 **P (HIER)**

**Antigen Background**

The matrix metalloproteinases (MMPs) are a family of zinc-containing enzymes, which are involved in the degradation of different components of the extracellular matrix and tissue remodelling. MMPs are expressed widely during growth and development. The MMPs have been classified into collagenases, gelatinases and stromelysins, based on the in vitro substrate specificity. More recently, several MMPs have been identified as membrane-type specific and matrilysin families. MMPs are multidomain proteins and are secreted as inactive precursors which are activated by cleavage of an N-terminal pro-peptide. The major natural inhibitors of MMPs are tissue inhibitors of matrix metalloproteinases (TIMPs) which complex with MMPs and are involved in regulating the activity and activation of individual MMPs. MMP2 (also known as gelatinase A) is able to initiate degradation of type IV collagen. MMP9 degrades collagen type IV, a major component of extracellular matrix. MMP9 is also reported to be expressed in normal kidney tubules, hepatocytes, spermatids, myocytes, stomach parietal cells, prostatic columnar epithelium and uterine cells. MMP10 is also known as stromelysin-2 and has a wide range of substrates including proteoglycan, laminin, fibronectin, collagen IV, collagen IX and the telopeptides of other collagens. However, some of the more recently identified MMPs, such as MMP19 - which cleaves aggrecan and cartilage oligomeric protein, and has several novel structural features, do not fall into these traditional groupings. MMP19 is reported to be expressed mainly in placenta, lung, pancreas, ovary, spleen, intestine, breast tissue, smooth muscle, capillary walls and the endothelial layers of large and medium sized blood vessels.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

## Novocastra **MB2 (B Cell Marker)**

**Clone MB2**
1 mL lyophilized NCL-MB2 **F P**

See also B Cell Marker (MB2) on page 98.

## Novocastra **MCAM (CD146)**

**Clone N1238**
1 mL, 0.1 mL lyophilized NCL-CD146 **P (HIER) W**

See also CD146 (MCAM) on page 124.

## Novocastra **MDM2 Protein**

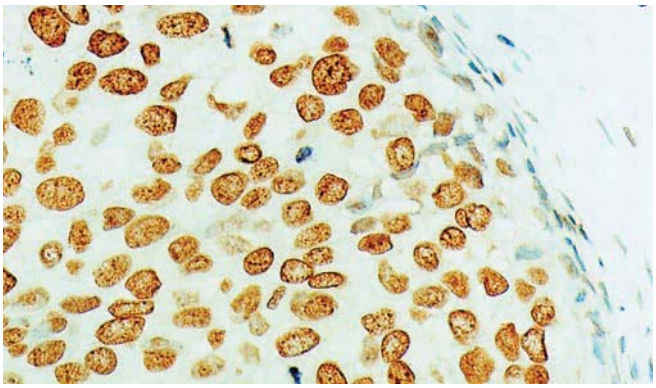
**Clone 1B10**
1 mL, 0.1 mL lyophilized NCL-MDM2 **F P (HIER)**

**Antigen Background**

The human phosphoprotein homolog of the murine double minute 2 (MDM2) gene, with a molecular weight of 90 kD (p90), forms a complex with both mutant and wild type p53 protein. The MDM2 gene product interacts with p53 protein inhibiting p53-mediated transactivation. Overexpression of MDM2 overcomes wild type p53 mediated suppression of transformed cell growth.

**Product Specific Information**

NCL-MDM2 reacts with the human homolog of MDM2.



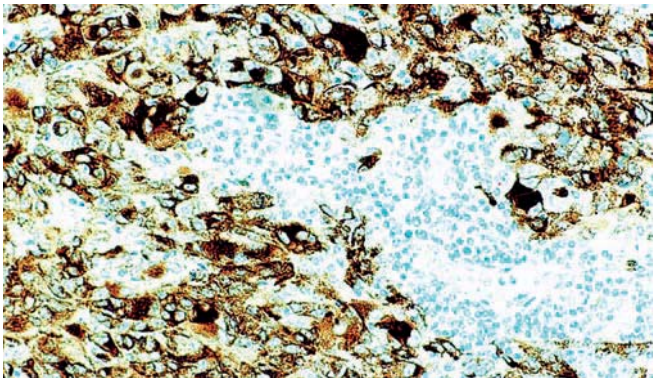
Human breast carcinoma: immunohistochemical staining for MDM2 protein using NCL-MDM2. Note nuclear staining of tumor cells. Paraffin sectiion.

## Novocastra **Melan A**

**Clone A103**
1 mL, 0.1 mL liquid NCL-L-MelanA **F P (HIER) W** New!
7 mL BOND ready-to-use PA0233 **P (HIER)**

**Antigen Background**

Melan A, a product of the MART-1 gene, is a melanocyte differentiation marker recognized by autologous cytotoxic T lymphocytes. Other melanoma-associated markers recognized by autologous cytotoxic T cells are reported to include MAGE-1, MAGE-3, tyrosinase, gp100, gp75, BAGE-1 and GAGE-1. The analysis of these different molecules and their expression in individual melanomas may be of help in the study of their particular molecular roles in melanocyte differentiation and tumorigenesis.



Human melanoma: immunohistochemical staining for melan A using NCL-L-MelanA. Note cytoplasmic staining of melanoma cells. Paraffin section.

## Novocastra **Melanoma Marker (CD63)**

**Clone NKI/C3**
1 mL, 0.1 mL lyophilized NCL-CD63 **F P**

See also CD63 (Melanoma Marker) on page 119.

## Novocastra **Melanoma Marker (HMB45)**

**Clone HMB45**
1 mL, 0.1 mL liquid NCL-HMB45 **F P (Enzyme)**
7 mL BOND ready-to-use PA0027 **P (Enzyme)**

See also HMB45 (Melanoma Marker) on page 157.

# Novocastra **Merosin Laminin Alpha 2 Chain**

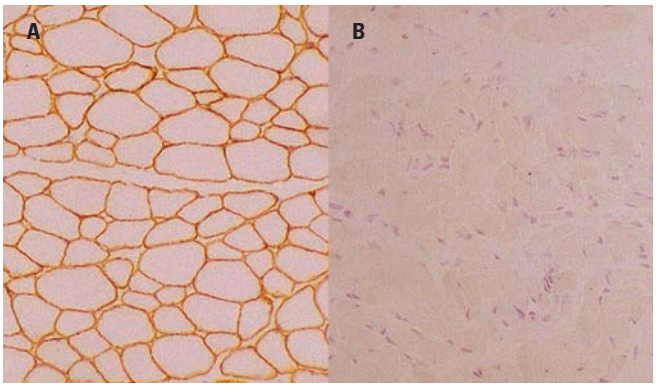
**Clone Mer3/22B2**
1 mL, 0.1mL lyophilized NCL-MEROSIN **F**

### Antigen Background

The dystrophin-glycoprotein complex is localized to the muscle membrane. Several members of this complex are reported to be implicated in muscular dystrophy. Dystrophin expression is altered in Duchenne and Becker muscular dystrophy and four types of limb girdle muscular dystrophy are caused by mutations in the genes for alpha, beta, gamma and delta-sarcoglycan. An extracellular member of this complex is alpha-dystroglycan and linked to this, in the extracellular matrix, is laminin. The muscle specific form of laminin, merosin, is composed of three chains: alpha 2, beta 1 and gamma 1. Mutations in the chromosome 6 encoded gene for the laminin alpha 2 chain of merosin are responsible for a form of congenital muscular dystrophy (CMD). Merosin negative CMD is characterized by a severe clinical phenotype and is associated with white matter changes on brain imaging.

### Product Specific Information

NCL-MEROSIN reacts with the 300 kD fragment of merosin (Sewry et al. Muscle and Nerve Supplement. 7, S109: (1998)) labeling with an antibody to beta-spectrin to monitor membrane integrity, is an essential immuno-histochemical control.



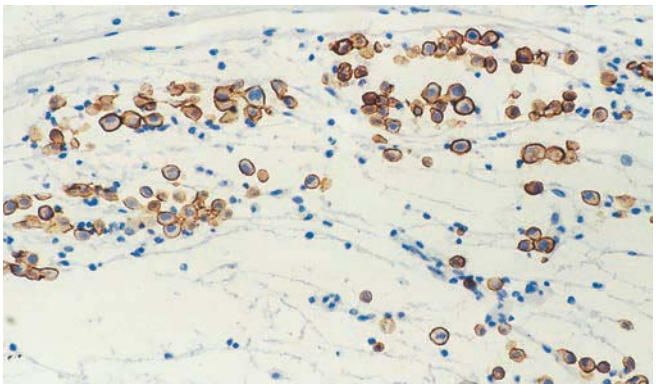

Human skeletal muscle: immunohistochemical staining for merosin using NCL-MEROSIN. Note membrane staining of normal muscle fibers (A) and absence of staining of muscle fibers in an individual with chromosome 6-linked congenital muscular dystrophy (B). Frozen sections. Photographs supplied courtesy of Dr Louise V B Anderson.

# Novocastra **Mesothelin**

**Clone 5B2**
1 mL, 0.1 mL lyophilized NCL-MESO **F P (HIER)**
1 mL liquid NCL-L-MESO **F P (HIER)**
7 mL ready-to-use RTU-MESO **F P (HIER)**
7 mL BOND ready-to-use PA0373 **P (HIER)**

### Antigen Background

Mesothelin is a glycosyl-phosphatidylinositol-linked (GPI) glycoprotein of 40 kD present on the surface of mesothelial cells, mesotheliomas, epithelial ovarian cancers and some squamous cell carcinomas. It is synthesized as a 69 kD precursor which is enzymatically processed into an N-terminal secreted form of 30 kD and the GPI-linked membrane-bound form of 40 kD. The secreted form is identical to the megakaryocyte potentiating factor, but it is the GPI-linked membrane-bound form which has generated interest. Mesothelin is abundantly expressed in the kidney and in occasional epithelial cells of the trachea, tonsil and fallopian tube. The function of mesothelin is unclear but it may have a role in cellular adhesion. Mesothelin is reported to be abundant in the normal mesothelial cells from which malignant mesotheliomas and ovarian cystadenocarcinomas are derived.



Human mesothelioma: immunohistochemical staining for mesothelin using NCL-MESO. Note intense membrane staining of tumor cells. Paraffin section.

# Novocastra **Microphthalmia Transcription Factor (MITF)**

**Clone 34CA5**
1 mL, 0.1 mL lyophilized NCL-MITF **F P (HIER)**
1 mL liquid NCL-L-MITF **F P (HIER)**

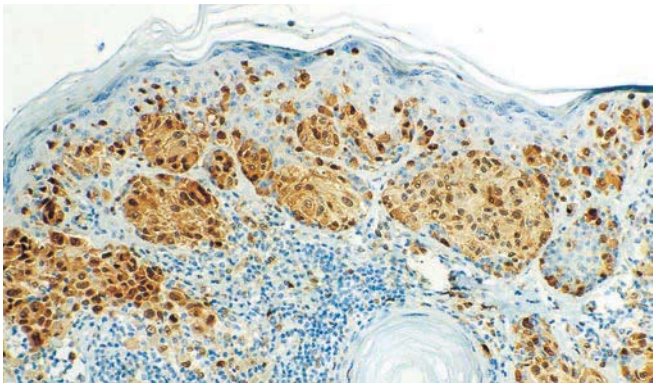
### Antigen Background

Microphthalmia transcription factor (MITF) gene product, a nuclear transcription factor of the basic-helix-loop-helix type, is thought to play a role in the regulation of genes encoding the enzymes necessary for melanogenesis. These include tyrosinase, TRP-1 and TRP-2. MITF is critical for the embryonic development and postnatal viability of melanocytes. The melanocyte-specific isoform of microphthalmia transcription factor MITF-M, is reported to be expressed in normal and malignant melanocytes. The other isoforms, MITF-A, MITF-C and MITF-H, differ structurally at the N-terminus from MITF-M.

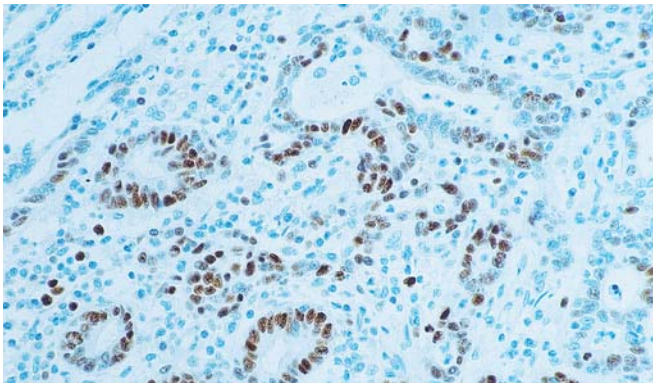
### Product Specific Information

Clone 34CA5 is reported to be reactive with the MITF-M isoform.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting



Human malignant melanoma: immunohistochemical staining for microphthalmia transcription factor using NCL-L-MITF. Note nuclear staining of melanoma cells. Paraffin section.



Human gastric carcinoma: immunohistochemical staining for minichromosome maintenance protein 3. Note intense nuclear staining of proliferating tumor cells. Paraffin section.

## Novocastra **Minichromosome Maintenance Protein Antibodies**

**Clone CRCT2.1**
1 mL lyophilized Minichromosome Maintenance Protein 2 NCL-MCM2 **P (HIER)**

**Clone MWS1927**
0.25 mL liquid Minichromosome Maintenance Protein 2 NCL-L-MCM2-597 **P (HIER)**

**Clone DCS-141.1**
1 mL lyophilized Minichromosome Maintenance Protein 7 NCL-MCM7 **P (HIER) W**

### Antigen Background

Minichromosome maintenance (MCM) proteins have been reported to play an essential part in eukaryotic DNA replication. Each of the MCM proteins have DNA-dependent ATPase motifs in their central domain which are conserved from yeast to mammals. Both ATPase activity and helicase activity, which displaces oligonucleotides annealed to single-stranded circular DNA, are associated with an MCM protein complex. Levels of MCM proteins generally increase in a variable manner as normal cells progress from G0 into G1/S phase of the cell cycle. In the G0 phase, MCM2 and MCM5 proteins are reported to be much less abundant than the MCM7 and MCM3 proteins. Therefore, MCM proteins are not present in stoichiometric amounts and only a proportion of the molecules actively participate in cell cycle regulation as part of MCM complexes. Oncoprotein E6 of the human papillomavirus (HPV), associated with cervical cancer (HPV-16 and -18), degrades the tumor suppressor protein p53, but also seems to have p53-independent transforming functions. E6 was reported to bind to the C-terminal region of the human MCM7 protein causing chromosomal abnormalities in human cells expressing E6 proteins of oncogenic HPVs.

### Product Specific Information

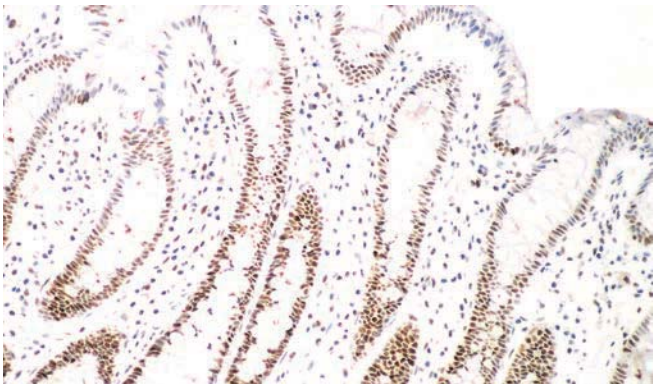
NCL-MCM2 and NCL-MCM7 are specific for minichromosome maintenance proteins 2 and 7, respectively.

## Novocastra **Mismatch Repair Protein (MLH1)**

**Clone ES05**
1 mL, 0.1 mL liquid NCL-L-MLH1 **P (HIER)**

### Antigen Background

MLH1, a mismatch repair protein involved in maintaining the integrity of genetic information, alongside MSH2, MSH6 and PMS2. During DNA replication, strand misalignment can occur resulting in alterations to microsatellite repeats, often referred to as microsatellite instability (MSI). These defects in DNA repair pathways have been linked to human carcinogenesis. Mutations in the MLH1 gene have been reported to be found in tumors with MSI, such as some forms of colon cancer eg Hereditary nonpolyposis colon cancer (HNPCC), a subset of sporadic carcinomas and breast cancer. Loss of expression of MLH1 has also been reported in acute lymphoblastic leukemia, endometrial carcinoma, gastric carcinoma and ovarian carcinoma.



Human small intestine: immunohistochemical staining for MLH1 protein using NCL-L-MLH1. Note gradient of staining through the maturing and differentiated epithelial cells of the villi and also in a proportion of the stromal cells. Paraffin section.

# Novocastra **Mismatch Repair Protein (MSH2)**

**Clone 25D12**
1 mL, 0.1 mL lyophilized NCL-MSH2 **P (HIER)**
7 mL BOND ready-to-use PA0048 **P (HIER)**

**Antigen Background**

Human mismatch repair protein 2 (MSH2) is involved in the initial recognition of mismatched nucleotides during the post replication mismatch repair process. Therefore, the loss of MSH2 function leads to the accumulation of replication errors, which in turn may be responsible for the multiple mutations required for multistage carcinogenesis. Mutations in mismatch repair genes have been linked to hereditary nonpolyposis colon cancer and to sporadic cancers which exhibit microsatellite instability. MSH2 is reported to be expressed in the nuclei of cells from a variety of tissues including thyroid, heart, smooth muscle and the germinal centers of lymphoid follicles. In ileum and colon, MSH2 expression has been reported in the crypts, the cells of which are undergoing rapid renewal. They are responsible for the continuous production of differentiated cells which migrate over 2 to 4 days before being sloughed into the lumen.

# Novocastra **Mismatch Repair Protein (MSH6)**

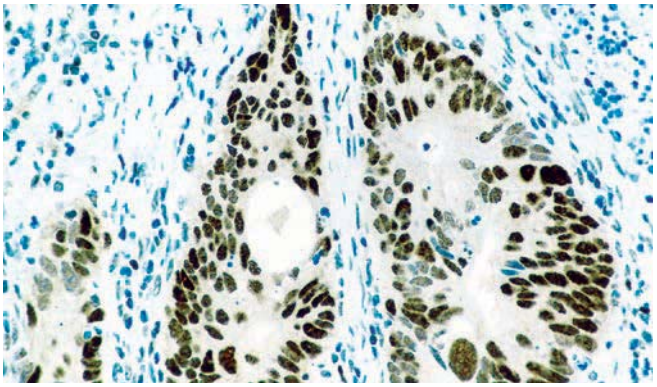
**Clone PU29**
1 mL, 0.1 mL liquid NCL-L-MSH6 **P (HIER)**

**Antigen Background**

MSH6 is a 160 kD protein which is involved in DNA mismatch repair (MMR) and recombination pathways, when heterodimerized with MSH2. Defects in mismatch repair systems can cause mutations and can cause DNA microsatellite sequences to become unstable. Microsatellite instability has been described in colorectal cancer, particularly in Hereditary Nonpolyposis Colorectal Cancer (HNPCC) where MSH6 expression, along with other MSH proteins, is disrupted. Immunohistochemical studies have reported that MSH6 is strongly expressed in the nucleus of cells in normal colonic epithelium, especially in crypts. Expression is also found in lymphocytes. Studies have also shown that MSH6 is expressed in gastric carcinomas and endometrial carcinomas. However, sometimes expression can be lost in some endometrial carcinomas and colonic carcinomas with microsatellite instability.

**Product Specific Information**

The use of PBS-based diluents may result in increased background staining.



Human colonic carcinoma: immunohistochemical staining for Mismatch Repair Protein 6 (MSH6) using NCL-L-MSH6. Note intense nuclear staining of a proportion of tumor cells. Paraffin section.

# Novocastra **Mismatch Repair Protein (PMS2)**

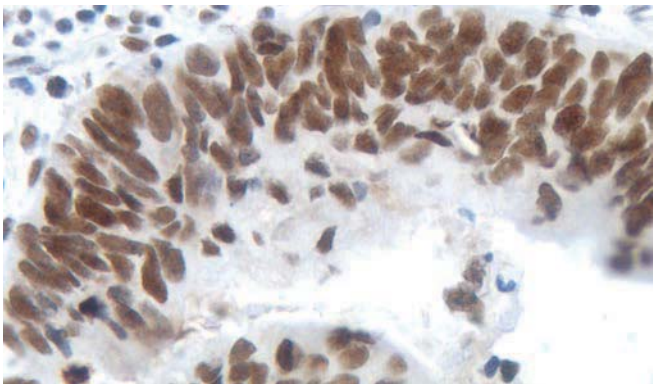
**Clone M0R4G**
1 mL, 0.1 mL liquid NCL-L-PMS2 **P (Enzyme) W**

**Antigen Background**

Postmeiotic segregation increased 2 (PMS2), also known as PMS1 protein homologue 2, is a DNA mismatch repair (MMR) protein. The PMS2 gene family members are found in clusters on chromosome 7. PMS2 is a 96 kDa mismatch repair protein closely related to MLH1, MLH3 and PMS1, which are homologs of the bacterial mutL gene. The PMS2 protein forms a heterodimer with the MLH1 protein which is then activated in the presence of ATP; this complex coordinates the binding of other proteins that repair DNA errors arising during cell preparation for cell division.

The loss of PMS2 expression in tumors can be helpful in identifying hMLH1 mutation carriers and identify their suitability for mutation analysis.

PMS2 gene defects account for a small but significant proportion of colorectal cancers and for a substantial proportion of tumors with microsatellite instability.



Human colonic carcinoma: immunohistochemical staining for PMS2 using NCL-L-PMS2. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

## Novocastra **Motility-Related Protein-1 (CD9)**

**Clone 72F6**
1 mL lyophilized NCL-CD9 **F P (HIER)**

See also CD9 (Motility-Related Protein-1) on page 109.

## Novocastra **Muc Glycoprotein Antibodies**

**Clone Ma552**
1 mL lyophilized muc-1 core glycoprotein
NCL-MUC-1-CORE **F P (HIER)**

**Clone Ma695**
1 mL lyophilized muc-1 glycoprotein
NCL-MUC-1 **F P (HIER)**

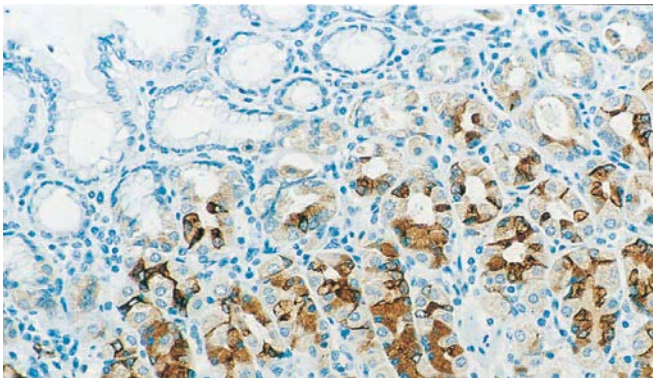
**Clone Ccp58**
1 mL, 0.1 mL lyophilized muc-2 glycoprotein
NCL-MUC-2 **F P (HIER)**

**Clone CLH2**
1 mL, 0.1 mL lyophilized muc-5AC glycoprotein
NCL-MUC-5AC **P (HIER)**

**Clone CLH5**
1 mL, 0.1 mL lyophilized muc-6 glycoprotein
NCL-MUC-6 **P (HIER)**

### Antigen Background

Mucins are heavily glycosylated proteins which constitute the major components of mucus covering the surface of epithelial tissues. Nine distinct epithelial mucin genes (Muc-1, 2, 3, 4, 5AC, 5B, 6, 7 and 8) have been identified. Various immunohistochemical and in situ hybridization studies have reported that these mucins are differentially expressed in epithelia with cell-type specificity. The normal gastric mucosa shows cell-type specific expression of Muc-1, Muc-5AC and Muc-6 glycoproteins. Muc-1 and Muc-5AC are found in superficial epithelium and Muc-6 glycoprotein in the deep glands. Muc-1 and Muc-5AC glycoproteins are reported to be expressed in many epithelia but Muc-6 glycoprotein is mainly expressed in gastric mucosa. In addition, Muc-2 glycoprotein is not expressed in normal gastric mucosa. In gastric cancer, alterations in mucin polypeptide expression have been reported, including the loss of expression of Muc-5AC glycoprotein, increased mucin heterogeneity, glycosylation changes and the expression of simple mucin-type carbohydrates.



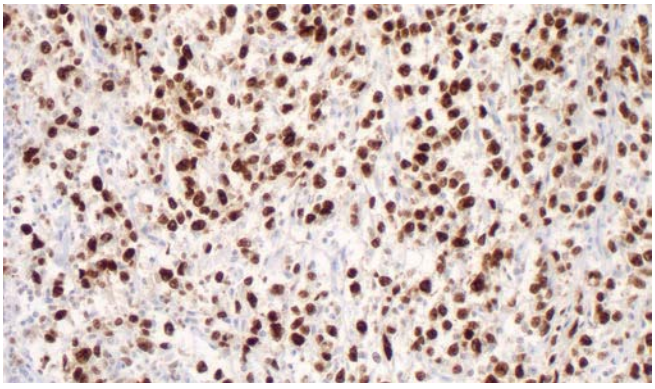
Normal human stomach: immunohistochemical staining for Muc-6 glycoprotein using NCL-MUC-6. Note cytoplasmic staining of mucus secreting cells of the deep glands. Paraffin section.

## Novocastra **Multiple Myeloma Oncogene 1 (MUM-1)**

**Clone EAU32**
1 mL, 0.1 mL liquid NCL-L-MUM1 **P (HIER)**
7 mL BOND ready-to-use PA0129 **P (HIER)**

### Antigen Background

The MUM-1 (multiple myeloma oncogene 1) gene was originally identified because of it's involvement in the t(6:14) translocation observed in multiple myeloma, which causes the juxtaposition of the MUM-1 gene to the Ig heavy chain locus. MUM-1 is expressed in late plasma cell directed stages of B cell differentiation and in activated T cells, suggesting that MUM-1 may serve as a marker for lympho-hemopoetic neoplasms derived from these cells. The morphologic spectrum of MUM-1 expressing cells has been found to range from that of a centrocyte to that of a plasmablast/plasma cell. Consequently the histogenic value of MUM-1 may be to provide a marker to aid in the identification of the transition from BCL-6 positive (germinal center B cells) to CD138 positive (immunoblasts and plasma cells).



Human diffuse large B cell lymphoma: immunohistochemical staining for multiple myeloma oncogene 1 (MUM-1) using NCL-L-MUM1. Paraffin section.

# Novocastra **Multi-Cytokeratin**

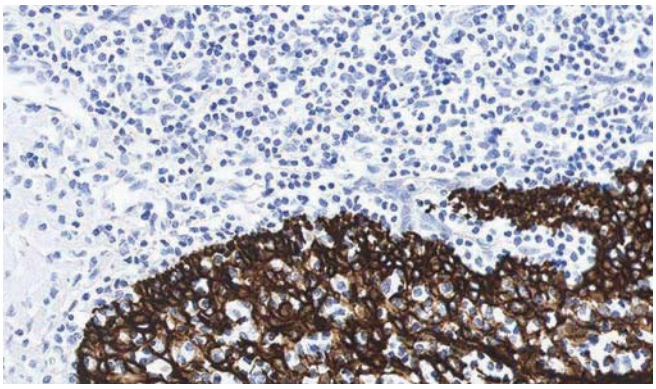
**Clone AE1, Clone AE3**
1 mL lyophilized NCL-AE1/AE3 **F P (HIER)**
1 mL liquid NCL-L-AE1/AE3 **F P (HIER)** New!
7 mL ready-to-use RTU-AE1/AE3 **F P (HIER)**
7 mL BOND ready-to-use PA0909 **P (Enzyme)**

**Antigen Background**

Keratins are a family of water insoluble proteins of 40 to 70 kD. These proteins form tonofilaments, a class of intermediate filament, in epidermis as well as in almost all other epithelia. The process of normal epidermal differentiation is characterized by a series of morphological and bio-chemical changes as cells progress from the germinative basal layer through the spinous and granular layers to the outer cornified layer. The 65 to 67 kD cytokeratins are reported to be present only above the basal layer, the 58 kD cytokeratin is reported to be expressed throughout the entire epidermis including the basal layer and the 56 kD cytokeratin is reported to be absent from the basal layer and is normally eliminated during stratum corneum formation. The 56 and 65 to 67 kD cytokeratins are reported to be characteristic of epidermal cells undergoing terminal differentiation and may be considered as molecular markers for keratinization.

**Product Specific Information**

Clones AE1 and AE3 are specific for the 56.5, 50, 50', 48 and 40 kD acidic cytokeratins as well as the 65 to 67, 64, 59, 58, 56 and 52 kD basic cytokeratins. The cocktail of clones AE1 and AE3 exhibit broad reactivity with two families of cytokeratin, acidic and basic.



Human tonsil: immunohistochemical staining for cytokeratins using NCL-L-AE1/AE3. Note intense cytoplasmic staining of tonsilar epithelial cells. Paraffin section.

# Novocastra **Multi-Cytokeratin 1/5/10/14**

**Clone 34βE12**
1 mL lyophilized NCL-CK34BE12 **F P (HIER) W**
7 mL ready-to-use RTU-CK34BE12 **F P (HIER)**
7 mL BOND ready-to-use PA0134 **P (Enzyme)**

**Antigen Background**

NCL-CK34βE12 reacts with human cytokeratin intermediate filament proteins 1, 5, 10 and 14. The antibody is reported to react with squamous epithelium and sweat ducts in normal skin, some pneumocytes, bronchial epithelium and mesothelium in normal lung and bile ducts in normal liver. It also reacts with ductal cells of the normal pancreas, some acinar and ductal cells of normal breast, some follicular epithelia of normal thyroid and some epithelia and mesothelium of the normal small and large bowel.

# Novocastra **Multi-Cytokeratin (4/5/6/8/10/13/18)**

**Clone C-11**
1 mL lyophilized NCL-C11 **F P (HIER)**

**Antigen Background**

Cytokeratins 4, 5, 6, 8, 10, 13 and 18 are differentially expressed between a variety of normal, reactive and neoplastic epithelia and also simple epithelium and both basal and suprabasal layers of cornifying and non-cornifying squamous epithelium.

**Product Specific Information**

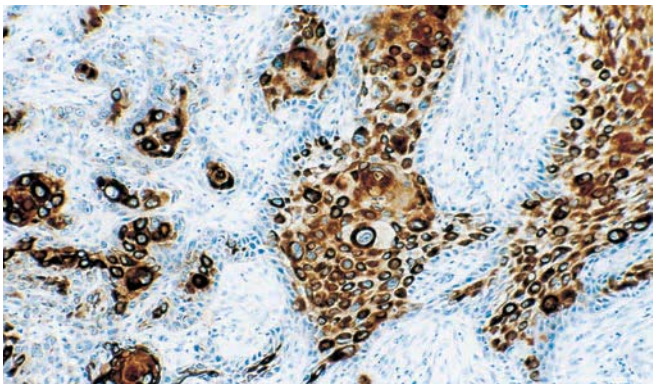
NCL-C11 is reported to react with human cytokeratins 4, 5, 6, 8, 10, 13 and 18.

# Novocastra **Multi-Cytokeratin (5/6/8/18)**

**Clone 5D3, Clone LP34**
1 mL, 0.1 mL lyophilized NCL-CK5/6/8/18 **F P (Enzyme)**
1 mL liquid NCL-L-CK5/6/8/18 **F P (Enzyme)**
7 mL ready-to-use RTU-CK5/6/8/18 **F P (Enzyme)**

**Product Specific Information**

NCL-CK5/6/8/18, NCL-L-CK5/6/8/18 and RTU-CK5/6/8/18 react with human cytokeratins 5, 6, 8 and 18. These products are cocktails of monoclonal antibodies designed to recognize cytokeratins reported to be expressed in almost all epithelial tissues.



Human squamous cell carcinoma of the floor of the mouth: immunohistochemical staining for cytokeratins using NCL-L-CK5/6/8/18. Note intense cytoplasmic staining of malignant cells. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra **Multidrug Resistance-Associated Protein Antibodies**

**Clone 33A6**
1 mL lyophilized Multidrug Resistance-associated Protein 1 NCL-MRP1 **P (HIER)**

**Clone DTX1**
1 mL lyophilized Multidrug Resistance-associated Protein 3 NCL-MRP3 **P (HIER)**

### Antigen Background

The human multidrug resistance-associated protein (MRP) gene family contains at least 6 members designated MRP1 to 6. MRP1 is a phosphoprotein of 1531 amino acids and is expressed in a variety of cell types. MRP1 mRNA has been demonstrated in lung, testis and peripheral blood mononuclear cells but was not detected in placenta, brain, salivary gland, liver, uterus and spleen. The protein has been expressed in the epithelium and glands of nasal respiratory mucosa. MRP3 is a 190 to 200 kD integral membrane protein which is an organic anion transporter effective in transporting chemotherapeutic drugs such as MTX, etoposide and teniposide. Northern blotting of various human tissues has indicated MRP3 to be expressed in liver, colon, pancreas and at lower levels in the kidney. MRP5 mRNA is reported to be expressed in almost all tissues, especially skeletal muscle and brain with lower expression observed in liver, adrenal gland, placenta, ovary and pancreas.

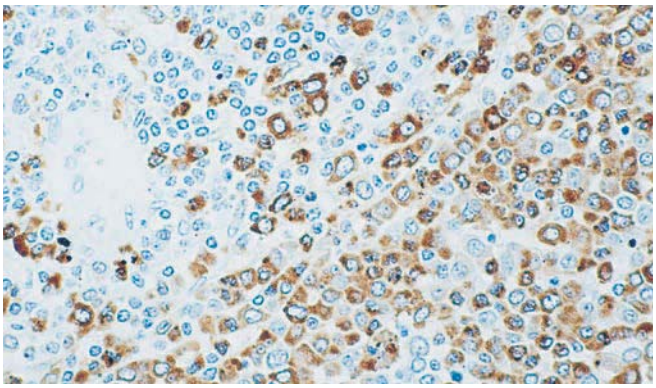
Human ovary: immunohistochemical staining for multidrug resistance-associated protein 1 using NCL-MRP1. Note cytoplasmic staining of granulosa and thecal cells. Paraffin section.

# Novocastra **Muramidase (Lysozyme)**

**Polyclonal**
1 mL lyophilized NCL-MURAM **P (Enzyme) W**
7 mL BOND ready-to-use PA0391 **P (HIER)**

Intracellular muramidase, also known as lysozyme, has been reported to be expressed in myeloid and monocytic cells, in leukocytes and in myelo-proliferative disorders. Muramidase is also reported to be expressed in poorly differentiated leukemic monoblasts.

See also Lysozyme (Muramidase) on page 167.



Human spleen, myeloid leukemia: immunohistochemical staining for muramidase (lysozyme) using NCL-MURAM. Note intense cytoplasmic staining of myeloid cells. Paraffin section.

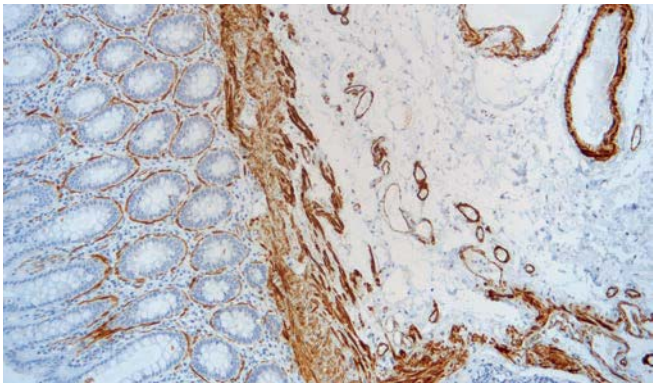
# Novocastra **Muscle Specific Actin**

**Clone SC28**
1 mL liquid NCL-L-MSA-594 **P W**

**Clone HHF35**
1 mL lyophilized NCL-MSA **F P W**
7 mL BOND ready-to-use PA0258 **P**

### Antigen Background

Muscle Specific Actin (MSA) is a highly conserved, ubiquitous protein found in muscle and some non-muscle cells. Actins can be divided into three subsets, alpha actins found in muscle tissue cells, beta and gamma actins found in non-muscle cells and a small subset of gamma actins also found in muscle tissue cells. In normal tissues, expression is found in striated fibers of skeletal muscle, smooth muscle in arteries, veins and pericytes of smaller arteries, muscle in bowel, myometrium of the uterus, prostatic stroma, capsule cells of liver, kidney, lymph node and spleen, the myoepithelial layers of mammary ducts and glands, eccrine sweat glands and salivary glands. Expression is not found in epithelial cells, lymphoid cells, macrophages, connective tissue and neuronal cells. In neoplastic tissues, expression can be found in soft tissue tumors with muscle differentiation e.g. leiomyomas, leiomyosarcomas and rhabdomyosarcomas of varying subtypes.Non-muscle sarcomas, carcinomas, melanomas and lymphomas do not express muscle specific actin.



Human leiomyosarcoma: immunohistochemical staining for muscle specific actin using NCL-L-MSA-594

## Novocastra **Myelin Basic Protein**

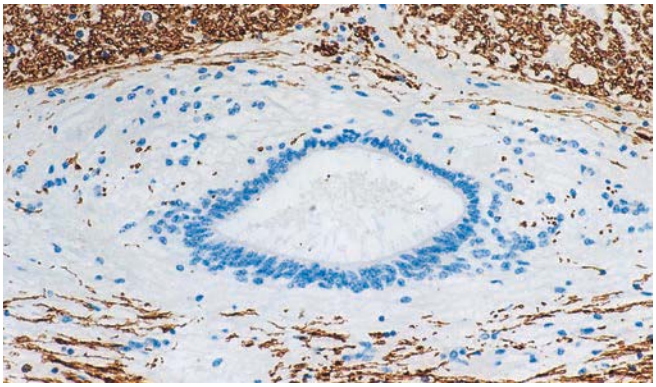
**Clone 7H11**
1 mL lyophilized NCL-MBP **P (HIER)**

**Antigen Background**

Myelin basic protein is reported to account for about 30 percent of the proteins in myelin found in the central nervous system. It can induce experimental allergic encephalomyelitis (EAE), a T-lymphocyte mediated disease due to delayed-type hypersensitivity; though each animal species appears to respond to a different fragment of the 170 amino acid polypeptide. Four different isoforms have been identified through cDNA cloning. All four of these variants are identical except for the insertion or deletion of two peptide fragments encoded by exons 2 and 5. Myelin basic protein is reported to be expressed in oligodendrocytes, myelin of white matter in the brain and spinal cord and in peripheral nerves, though it is expressed less abundantly in gray matter.

**Product Specific Information**

NCL-MBP was raised to guinea pig myelin basic protein and is reactive with human myelin basic protein.



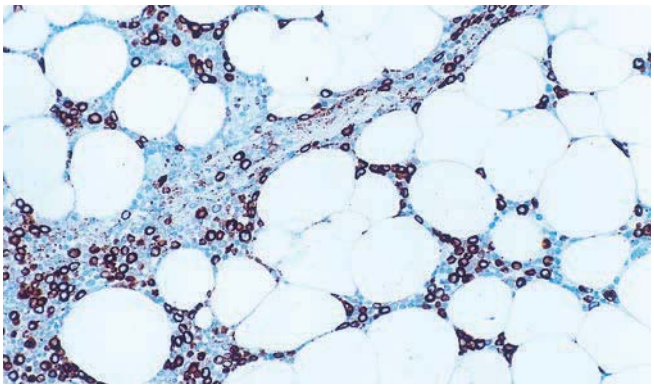
Human spinal cord, cervical: immunohistochemical staining for myelin basic protein using NCL-MBP. Note cytoplasmic staining of cells in white matter. Paraffin section.

## Novocastra **Myeloperoxidase**

**Clone 59A5**
1 mL. 0.1 mL lyophilized NCL-MYELO **P**
7 mL BOND ready-to-use PA0491 **P (HIER)**

**Antigen Background**

Myeloperoxidase is a lysosomal enzyme found in cells of the myeloid series which metabolises most of the hydrogen peroxide generated by activated phagocytes. It is a major constituent of azurophilic cytoplasmic granules that uses hydrogen peroxide to oxidize a variety of aromatic compounds and chloride ions to hypochlorous acid (HOCI), a strong oxidant. HOCI is the most bacteriocidal oxidant known to be produced by neutrophils. HOCI reacts with proteins to form cytotoxic chloramines. Myeloperoxidase is reported to be a major component in all myeloid cells, including mature granulocytes and is a superior marker to myeloperoxidase mRNA, whose level decreases with the maturation of the cell and is not detectable from the myelocyte stage onwards. Myeloperoxidase is reported to be expressed in neutrophil granulocytes and monocytes in blood, in precursors of granulocytes in the bone marrow and in Kupffer cells of the liver.



Human bone marrow, granulocytic sarcoma: immunohistochemical staining for myeloperoxidase using NCL-L-MYELO. Note intense cytoplasmic staining of malignant myeloid cells. Paraffin section.

## Novocastra **MyoD1 (Rhabdomyosarcoma Marker)**

**Clone 5.8A**
1 mL, 0.1 mL lyophilized NCL-MyoD1 **F P (HIER)**

**Antigen Background**

The murine MyoD1 gene encodes a phosphoprotein of 45 kD, the function of which may include the commitment, differentiation and maintenance of the myogenic lineage. MyoD1 is not expressed in normal adult tissue but is reported to be highly expressed in rhabdomyosarcomas.

**Product Specific Information**

NCL-L-MyoD1 recognizes an epitope near the C-terminus of the MyoD1 protein (amino acids 180 to 189)

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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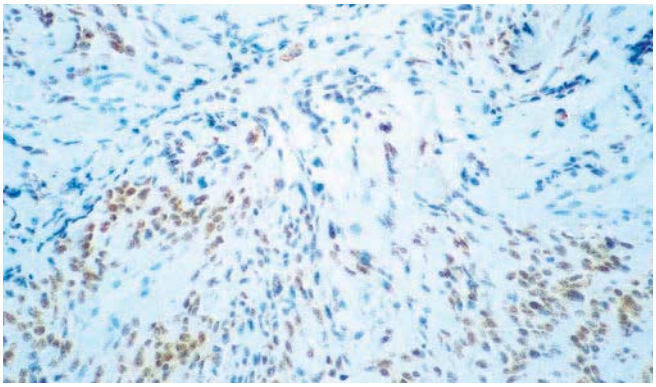


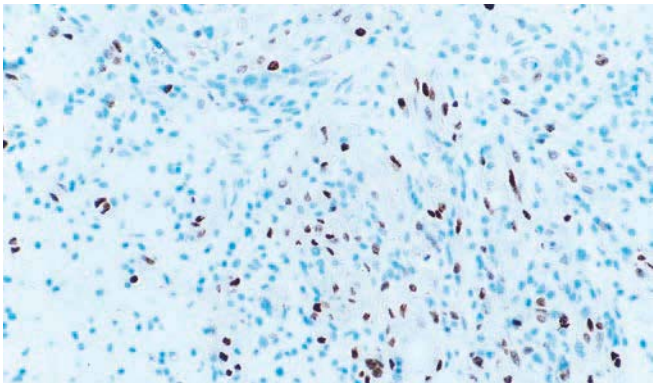
Human rhabdomyosarcoma: immunohistochemical staining for MyoD1 protein using NCL-MyoD1. Note staining of a proportion of tumor cell nuclei. Paraffin section.

## Novocastra **Myogenin (Myf-4)**

**Clone LO26**
1 mL, 0.1 mL lyophilized NCL-Myf-4 **P (HIER) W**
1 mL liquid NCL-L-Myf-4 **P (HIER) W**
7 mL BOND ready-to-use PA0226 **P (HIER)**

**Antigen Background**

Rhabdomyosarcomas are a class of myoblast-derived soft tissue sarcomas that usually express a number of muscle-specific genes and primarily affect children and young adults. Differentiation of myogenic cells is controlled by a set of regulatory genes including MyoD1, myogenin, Myf-5 and Myf-6. Myf-4 is the human homolog of myogenin. Its gene product, together with that of Myf-3, accumulates in the nucleus of differentiated cells.



Human rhabdomyosarcoma: immunohistochemical staining for Myf-4 protein using NCL-L-Myf-4. Note staining of a proportion of tumor cell nuclei. Paraffin section.

## Novocastra **Myoglobin**

**Clone MYO18**
1 mL, 0.1 mL lyophilized NCL-MYOGLOBIN **P W**
7 mL BOND ready-to-use PA0727 **P (HIER)**

Myoglobin is a cytoplasmic, single chain polypeptide of 153 amino acids that contains a single heme group. Myoglobin is reported to be expressed in skeletal and cardiac muscle but not in smooth muscle and functions as an oxygen transporting pigment.

## Novocastra **Myosin Heavy Chain Antibodies**

**Clone S131**
1 mL, 0.1 mL lyophilized Myosin Heavy Chain (smooth muscle) NCL-MHC-Sm **F P (HIER)**
7 mL BOND ready-to-use PA0493 **P (HIER)**

**Clone RNMy2/9D2**
1 mL, 0.1 mL lyophilized Myosin Heavy Chain (developmental) NCL-MHCd **F**

**Clone WB-MHCf**
1 mL, 0.1 mL lyophilized Myosin Heavy Chain (fast) NCL-MHCf **F**

**Clone WB-MHCn**
1 mL lyophilized Myosin Heavy Chain (neonatal) NCL-MHCn **F**

**Clone WB-MHCs**
1 mL, 0.1 mL lyophilized Myosin Heavy Chain (slow) NCL-MHCs **F**

**Antigen Background**

Myosin is a contractile muscle specific protein composed of two heavy and four light chains. The myosin heavy chain has many isoforms which are specific for different muscles or fiber types, some of which are developmentally regulated. Smooth muscle myosin heavy chain (SM-MHC) is a cytoplasmic structural protein that is a major component of the contractile apparatus in smooth muscle cells. It has been reported to be specific for smooth muscle development.

## Novocastra **Myotilin**

**Clone RSO34**
1 mL lyophilized NCL-MYOTILIN **F P (HIER)**

**Antigen Background**

The myotilin gene on chromosome 5q31 encodes a 498 amino acid polypeptide with a molecular weight of 57 kD. Myotilin is a structural protein of sarcomeric Z discs and sarcolemma in human skeletal and cardiac muscle. It is homologous to palladin and titin in the two C-terminal Ig-domains and also to palladin in its unique serine-rich N-terminal region. Myotilin interacts with alpha-actinin, actin and gamma-filamin. A missense mutation in the myotilin gene is associated with limb-girdle muscular dystrophy 1A (LGMD1A), an autosomal dominant disease characterized by proximal limb weakness. It is highly conserved between human and mouse with its expression being more widespread in the embryo than in the adult. Expression of myotilin has been reported in adult skeletal and cardiac muscle with variable expression reported in the peripheral nervous system, lung, liver and kidney.

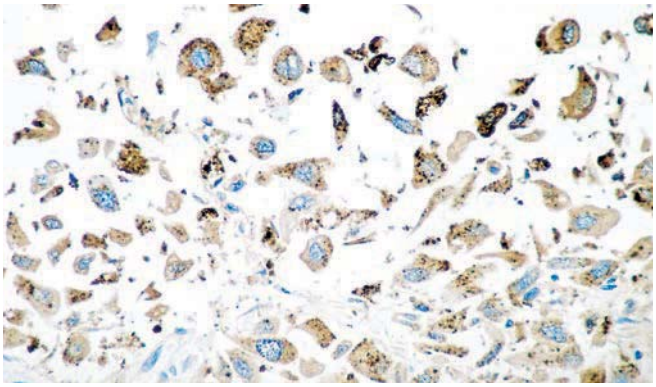
Human skeletal muscle: immunohistochemical staining for myotilin using NCL-MYOTILIN. Note intense staining of muscle fibers. Paraffin section.

## Novocastra **Napsin A**

**Clone IP64**
1 mL, 0.1 mL liquid NCL-L-NapsinA **P (HIER)**

**Antigen Background**

Napsin A has a specific function in normal alveolar epithelium and is proposed to play a role in the proteolytic processing of surfactant precursors. Napsin A is reported to be predominantly expressed in lamellar bodies of type II pneumocytes, secondary lysosomes of alveolar macro-phages, respiratory epithelium of terminal and respiratory bronchioles, plasma cells, within a subset of lymphocytes in normal lung as well as in epithelial cells of renal tubules in normal kidney and is weakly expressed in normal spleen. Past studies have also reported that Napsin A is expressed in the majority of primary lung adenocarcinomas.



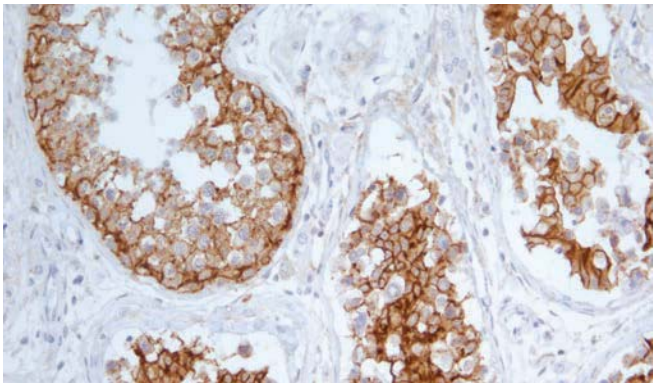
Human lung adenocarcinoma: immunohistochemical staining for napsin A using NCL-L-Napsin A. Note punctate cytoplasmic staining of malignant cells and infiltrating macrophages. Paraffin section.

## Novocastra **N-Cadherin**

**Clone IAR06**
1 mL, 0.1 mL liquid NCL-L-N-Cad **P (HIER)**

**Antigen Background**

N-Cadherin is a member of the cadherin family of calcium dependent cell adhesion molecules. The classical cadherins include the E, N, R, P and VE-Cadherins which are believed to be expressed in a tissue specific manner. The classical cadherins have a characteristic structure comprising an extra cellular calcium-binding domain, consisting of five repeats, a transmembrane domain and a highly conserved cytoplasmic domain, which mediates interactions with cytoskeletal components of the cell via interactions with intracellular proteins including the catenins. Cadherins play an important role in cell-cell adhesion, and are implicated in segregation and aggregation of tissues during development. N-Cadherin is reported to be expressed in various cell types including neural, myocardial and mesenchymal cells.



Human testes: immunohistochemical staining for N-Cadherin using NCL-L-N-Cad. Note cytoplasmic and membrane staining of sertoli cells. Paraffin section.

## Novocastra **NCAM (CD56)**

**Clone CD564**
1 mL, 0.1 mL lyophilized NCL-CD560 **P (HIER)**
1 mL, 0.1 mL liquid NCL-L-CD56-504 **P (HIER)** New!
7 mL BOND ready-to-use PA0191 **P (HIER)**

**Clone 1B6**
1 mL, 0.1 mL lyophilized NCL-CD56-1B6 **P (HIER) W**
1 mL liquid NCL-L-CD56-1B6 **P (HIER) W**
7 mL ready-to-use RTU-CD56-1B6 **P (HIER)**

See also CD56 (NCAM) on page 118.

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# Novocastra **Negative Control (Mouse)**

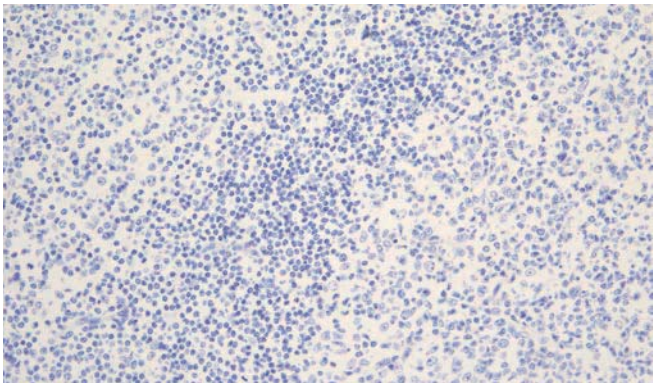
**Clone MOPC-21**
7 mL BOND ready-to-use PA0996 **P**

**Antigen Background**

In some tissues, non-specific binding may occur, especially in neoplastic or necrotic tissue.

**Product Specific Information**

The use of Negative (Mouse) antibody is recommended to aid in the identification of cells, tissues or tissue components, which may non-specifically bind mouse antibodies and will allow better interpretation of specific staining at the antigenic site.



Tonsil: immunohistochemical staining with BOND ready-to-use Negative (Mouse) using BOND Polymer Refine Detection.

# Novocastra **Negative Control (Rabbit)**

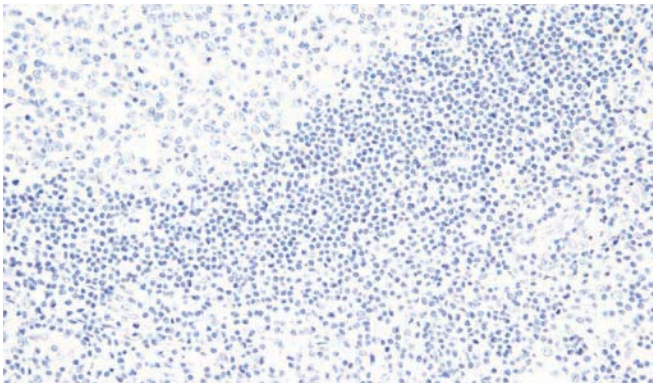
7 mL BOND ready-to-use PA0777 **P**

**Antigen Background**

In some tissues, non-specific binding may occur, especially in neoplastic or necrotic tissue.

**Product Specific Information**

The use of Negative (Rabbit) is recommended to aid in the identification of cells, tissues or tissue components, which may non-specifically bind rabbit antibodies and will allow better interpretation of specific staining at the antigenic site.



Tonsil: immunohistochemical staining with BOND ready-to-use Negative (Rabbit) using BOND Polymer Refine Detection.

# Novocastra **Nerve Growth Factor Receptor (gp75)**

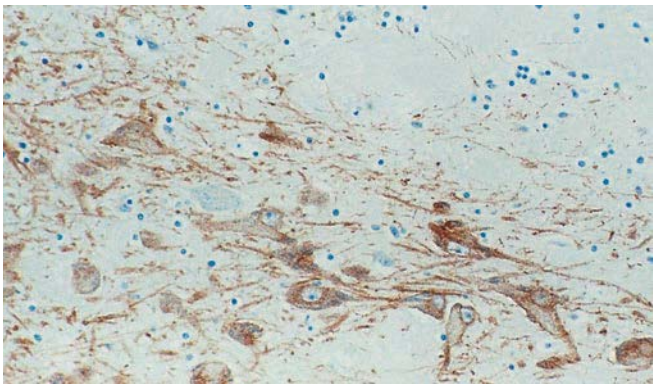
**Clone 7F10**
1 mL lyophilized NCL-NGFR **P (HIER)**

**Antigen Background**

Nerve growth factor receptor (NGFR) is a member of the nerve growth factor (NGF) tumor necrosis factor (TNF) superfamily of receptors. Nerve growth factor is important for the development, differentiation and survival of neurons and its action is mediated by the binding of two distinctive cell surface receptors; the high-affinity NGFR (TrkA ) and the low-affinity NGFR (gp75). The functional role of gp75 has not yet been fully elucidated. In vitro, unbound gp75 has been shown to promote neural cell death, whereas, binding of gp75 by NGF ligand or antibody has been shown to inhibit gp75-induced cell death. NGFR (gp75) is reported to be expressed in neuronal axons, Schwann cells and perineural cells of peripheral nerves and in non-neural cells that includes myoepithelial cells of breast, salivary and sweat glands, outer root sheath cells of hair follicles, adventitia of mature blood vessels and a lymphocyte subpopulation in the spleen and lymph node.

**Product Specific Information**

NCL-NGFR is raised to the gp75 low-affinity NGFR protein.



Human brain, nucleus of Meynert neurons in basal forebrain: immunohistochemical staining for nerve growth factor receptor (gp75) using NCL-NGFR. Note cytoplasmic and membrane staining of cholinergic neurons. Paraffin section.

# Novocastra **Neuroblastoma Marker**

**Clone NB84a**
1 mL lyophilized NCL-NB84 **F P C**

**Antigen Background**

Neuroblastoma is a complex malignant disease in children. This tumor of the sympathetic nervous system, derived from pathologically maturing neural crest progenitor cells, is unique among pediatric cancers because of spontaneous regressions and catecholamine excretions.

**Product Specific Information**

Enzyme pretreatment may enhance staining in some cases.

# Novocastra **Neurofilament Antibodies**

**Clone DA2**
1 mL lyophilized Neurofilament 68 kD
NCL-NF68-DA2 **F P (HIER)**

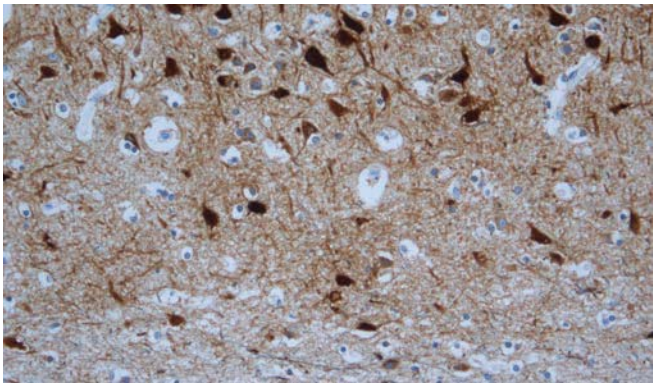
**Clone NR4**
1 mL lyophilized Neurofilament 68 kD
NCL-NF68 **F P (HIER)**

**Clone RT97**
1 mL lyophilized Neurofilament 200 kD
NCL-NF200 **F P**

**Clone N52.1.7**
1 mL lyophilized Neurofilament 200 kD
NCL-NF200-N52 **F P (HIER)**
7 mL BOND ready-to-use PA0371 **P (HIER)**

**Antigen Background**

Neurofilaments constitute the main structural elements of neuronal axons and dendrites. Neurofilaments are composed of three major subunits referred to as the neurofilament triplet, with molecular weights of 68 kD, 160 kD and 200 kD. Neurofilament subunits are reported to be present in neurons, neuronal processes, peripheral nerves and sympathetic ganglion cells. Within tumors, only neoplastic cells of neural origin or those exhibiting neuronal differentiation, have been reported to express neurofilaments.



Cerebrum: immunohistochemical staining with BOND ready-to-use Neurofilament (N52.1.7) using Bond Polymer Refine Detection.

# Novocastra **Neuron Specific Enolase**

**Clone 22C9**
1 mL lyophilized NCL-NSE-435 **P** W
7 mL BOND ready-to-use PA0435 **P (HIER)**

**Clone 5E2**
1 mL liquid NCL-L-NSE2 **F P W**
7 mL ready-to-use RTU-NSE2 **F P**

**Antigen Background**

Enolase is a glycolytic enzyme catalysing the reaction pathway between 2-phosphoglycerate and phosphoenol pyruvate. In mammals, enolase molecules are dimers composed of three distinct subunits ($\alpha$, $\beta$ and $\gamma$) whereas, in rats, five forms have been found. The $\alpha$ subunit and $\gamma$ subunit are of approximately 47 kD and 45 kD, respectively. The $\gamma\gamma$ and $\alpha\gamma$ enolases are located mainly in the nervous tissue and neuroendocrine cells.

**Product Specific Information**

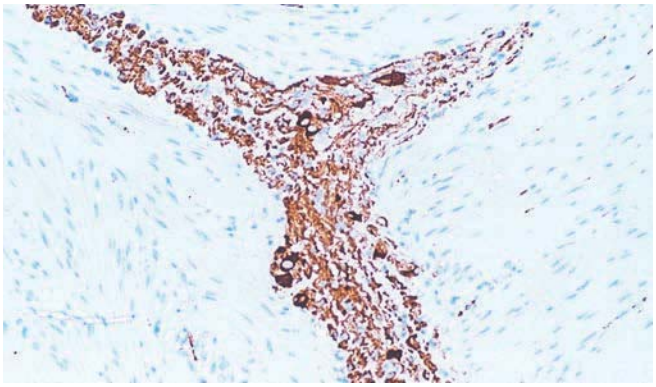
Clone 22C9 was developed to produce superior staining on paraffin sections.

Clone 22C9 reacts with the $\gamma$ subunit of the enolase isoenzyme. Clone 5E2 reacts with the 47 kD component of the gamma-gamma enolase isoenzyme.

# Novocastra **Nitric Oxide Synthase 1**

**Clone NOS-125**
1 mL lyophilized Nitric Oxide Synthase-1
NCL-NOS-1 **P (HIER)**

Human nitric oxide synthases are a family of enzymes responsible for the synthesis of nitric oxide from L-arginine and molecular oxygen. There are at least three nitric oxide synthases; NOS-1, also known as neuronal NOS or nNOS, NOS-2, which is referred to as inducible NOS or iNOS and NOS-3, also known as endothelial NOS or eNOS. As suggested by their nomenclature, these enzymes have different cellular distribution and are subjected to different regulatory mechanisms. NOS-3 is reported to be constitutively expressed and produces picomolar quantities of nitric oxide (NO) which play a role in signal transmission resulting in physiological effects. In the gastrointestinal tract, NO is reported to play a protective role where it has direct microbiocidal properties and acts as a first line of mucosal defence in the stomach. The function of NO in tumor development, promotion and progression is unclear. The effects may be both beneficial but also detrimental to those individuals with gastric cancer where it is reported that NO supports tumor progression through the creation of neovasculature.



Human small intestine: immunohistochemical staining for nitric oxide synthase-1 using NCL-NOS-1. Note cytoplasmic staining of enteric ganglia. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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## Novocastra **nm23 Protein**

**Clone 37.6**
1 mL lyophilized NCL-nm23 **F P W**

The nm23 gene was first identified by differential screening of mouse-derived melanoma cell lines of high and low metastatic potential. Two human homologs of the nm23 gene have been isolated and designated nm23-H1 and nm23-H2. The products of these genes have been identified as nucleoside diphosphate kinase A (NDPK-A) and nucleoside diphosphate kinase B (NDPK-B), respectively. nm23-H1 and nm23-H2 are metastasis-suppressor genes implicated in the control of the metastatic process of malignant cells.

**Product Specific Information**

NCL-nm23 reacts with H1 strongly and only weakly with the H2 homolog.

## Novocastra **NS3 (Hepatitis C virus)**

**Clone MMM33**
1 mL, 0.1 mL lyophilized NCL-HCV-NS3 **F P (HIER)**

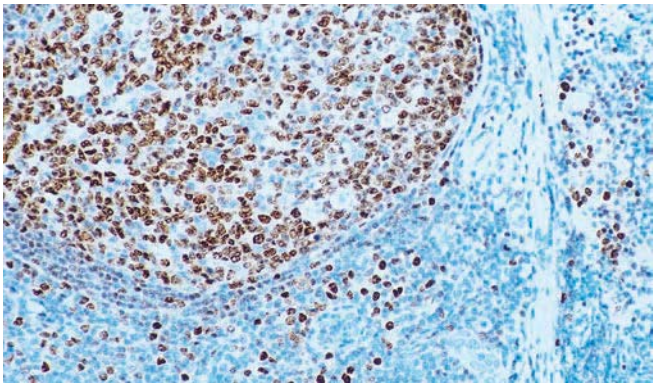
See also Hepatitis C virus (NS3) on page 155.

## Novocastra **OCT-2**

**Clone Oct-207**
1 mL, 0.1 mL lyophilized NCL-OCT2 **F P (HIER)**
7 mL BOND ready-to-use PA0532 **P (HIER)**

**Antigen Background**

Oct-2 is a transcription factor belonging to the POU homeo-domain family that binds to the Ig gene octamer sites regulating B cell specific genes. It is dependent on the activity of B cell restricted coactivators such as BOB.1/OBF.1. Oct-2 protein expression is not restricted to B cells, although expression levels are much higher in these cells. Reports indicate that germinal center B cells shows higher expression for Oct-2 and BOB.1/OBF.1. In addition, Oct-2 expression is reported to be significantly greater in germinal center derived lymphomas, although other B cell lymphomas also display high levels of expression. Reed Sternberg (RS) cells represent the malignant cells in classical Hodgkin's disease and are derived from germinal center B cells. In a number of these cases, cells do not express immunoglobulin due to the presence of crippling mutations within the Ig genes. As Ig gene expression in B cells also requires an interaction between octamer sites and the transactivating factors Oct-2 and BOB.1, the absence of both Oct-2 and BOB.1 expression represents a novel mechanism for immunoglobulin gene deregulation in RS cells.



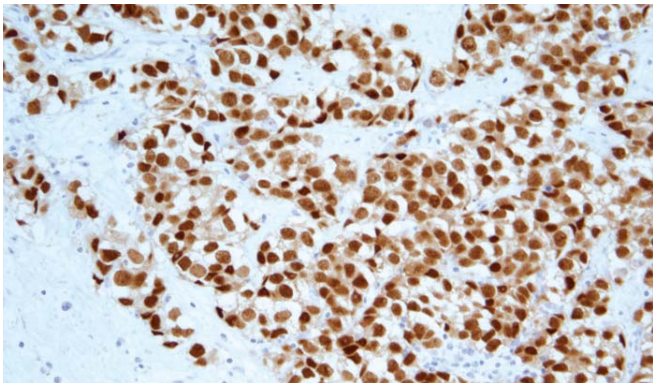
Human tonsil: immunohistochemical staining for Oct-2 gene product using NCL-OCT2. Note intense nuclear staining of mainly germinal center B cells. Paraffin section.

## Novocastra **Oct-3/4**

**Clone N1NK**
1 mL, 0.1 mL liquid NCL-L-Oct3/4 **P (HIER) W**
7 mL BOND ready-to-use PA0934 **P (HIER)**

**Antigen Background**

Oct3/4 is a member of the POU homeodomain family of transcription factors, which is expressed by embryonic stem cells and germ cells. A critical amount of Oct3/4 levels are associated with loss of pluripotency. Oct3/4 has been proposed as a useful marker for germ cell tumors which exhibit features of pluripotentiality, including seminoma/dysgerminoma and embryonal carcinoma, and establishing a germ cell origin for some metastatic tumors of uncertain primary tumor.



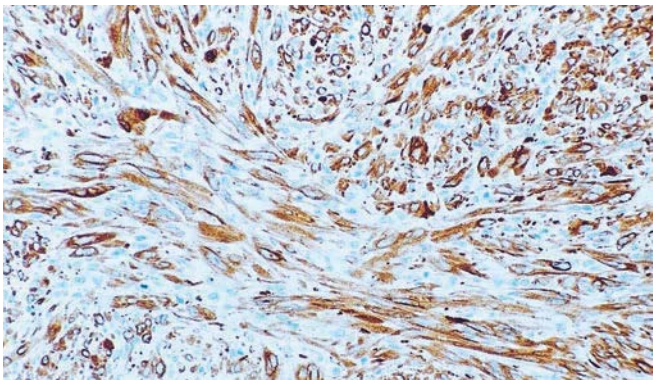
Human seminoma: immunohistochemical staining for Oct-3/4 transcription factor using NCL-L-Oct-3/4. Note intense staining of pluripotent tumor cells. Paraffin section.

# Novocastra **Osteonectin**

**Clone 15G12**
1 mL, 0.1 mL lyophilized NCL-O-NECTIN **P (HIER) W**

**Antigen Background**

Osteonectin (ON), also known as BM-40 or SPARC (secreted protein, acidic and rich in cysteine) is a multifunctional glycoprotein (32.5 kD) involved with tissue mineralization as well as extracellular matrix modelling. ON is the most abundant glycoprotein secreted by human osteoblasts in developing bone and odontoblasts of developing teeth. ON mRNA and protein have been reported to be expressed in non-mineralized tissues such as steroid-producing cells of the adrenal glands, suprabasal layers of the epidermis, glomeruli in the kidney, bronchi of the lung, megakaryocytes and large vessels. This organ-specific distribution of ON in non-mineralized tissues suggests a role during human development.



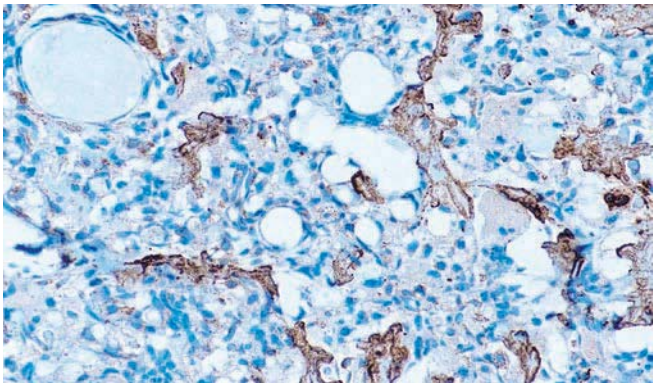
Human osteosarcoma: immunohistochemical staining for osteonectin using NCL-O-NECTIN. Note cytoplasmic staining of malignant cells. Paraffin section.

# Novocastra **Osteopontin**

**Clone OP3N**
1 mL, 0.1 mL lyophilized NCL-O-PONTIN **P (HIER)**

**Antigen Background**

Osteopontin is a 34 kD extracellular matrix protein with a cell binding domain. Other molecules which share this domain include fibronectin, vitronectin and a variety of other extracellular proteins that bind members of the integrin family of cell surface receptors. Osteopontin was originally identified as a major component of the non-collagenous organic bone matrix, however, it has subsequently been demonstrated in a wide range of normal adult tissues and body fluids. It is a multifunctional protein involved in bone mineralization, cell adhesion, cell migration, chronic inflammatory disease and transformation. Osteopontin is reported to be linked to tumorigenesis and metastasis in several experimental animal models and human cancers. In breast carcinomas, demonstrated by RT-PCR and in situ hybridization studies, expression was confined to tumor cells. It is also reported to be expressed in normal breast, including vascular endothelial cells, macrophages, myoepithelial cells, osteosarcomas but not in lymphoid tumors. Other studies using in situ hybridization have shown expression in the epithelium of gastrointestinal tract, gall bladder, pancreas, urinary and reproductive tracts, lung, salivary and sweat glands. Ganglion cells in the bowel also express osteopontin as do macrophages, T cells and NK cells upon activation. Expression of osteopontin in vascular smooth muscle and endothelium may be triggered by atherosclerosis, vascular calcification and by hypertension.



Human osteosarcoma: immunohistochemical staining for osteopontin using NCL-L-O-PONTIN. Note extracellular staining in close proximity to tumor cells. Paraffin section.

# Novocastra **Ovarian Cancer Antigen (CA125)**

**Clone Ov185:1**
1 mL lyophilized NCL-CA125 **F P (HIER)**
1 mL liquid NCL-L-CA125 **F P (HIER)**
7 mL ready-to-use RTU-CA125 **F P (HIER)**
7 mL BOND ready-to-use PA0539 **P**

See also CA125 (Ovarian Cancer Antigen) on page 101.

# Novocastra **p21 (WAF1 Protein)**

**Clone 4D10**
1 mL lyophilized NCL-WAF-1 **P (HIER)**
1 mL liquid NCL-L-WAF-1 **P (HIER)**

See also WAF1 Protein (p21, C1P1) on page 207.

# Novocastra **p27 Protein**

**Clone 1B4**
1 mL, 0.1 mL lyophilized NCL-p27 **P (HIER) W**

**Antigen Background**

p27 protein, also known as kinase inhibitory protein 1 (Kip1), binds to cyclin E/cdk2 complexes (but not to cdk2 alone) and is detected in purified extracts of growth-arrested cells. p27 protein constrains cell proliferation by setting the threshold level of cyclin E necessary to activate cdk2. The 27 kD protein is also present in proliferating cells but only in a sequestered form when it is unavailable to interact with cyclin E/cdk2 complexes. It is likely that cyclin D complexed with catalytically inactive cdk4 is sufficient to sequester p27 protein and titrate its function. The presence of bound p27 protein in proliferating cells suggests that its role may not be restricted to inducing cell cycle arrest but to also set the cyclin E threshold for execution of the G1 to S phase transition during each mitotic cycle.

# Novocastra **p53 Protein**

**Clone IMX25**

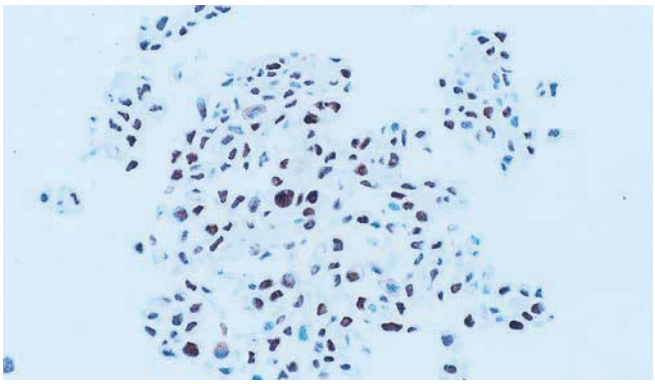
1 mL, 0.1 mL lyophilized NCL-p53-505 **P (HIER) W**

### Antigen Background

p53 protein plays a vital role in suppressing the development of cancer. The accumulation of p53 protein in response to DNA damage in vitro is well established and appears to induce growth arrest and apoptosis by the transcriptional regulation of other genes. In irradiated mice, p53 protein accumulates in splenocytes, thymocytes and osteocytes, though not in hepatocytes. Mouse T3T3 cells express high levels of phenotypically characteristic wild type p53 protein which carries two missense mutations. The range of antigenic sites in mouse p53 protein and human p53 protein is very similar.

### Product Specific Information

NCL-p53-505 is raised to the same recombinant mouse p53 protein as the polyclonal, NCL-p53-CM5p. It reacts with rat and mouse p53 protein.



Mouse T3T3 cells: immunohistochemical staining for p53 mouse protein using NCL-p53-505. Note intense nuclear staining of a proportion of T3T3 cells. Paraffin section.

# Novocastra **p53 Protein (BP53-12)**

**Clone BP53-12**

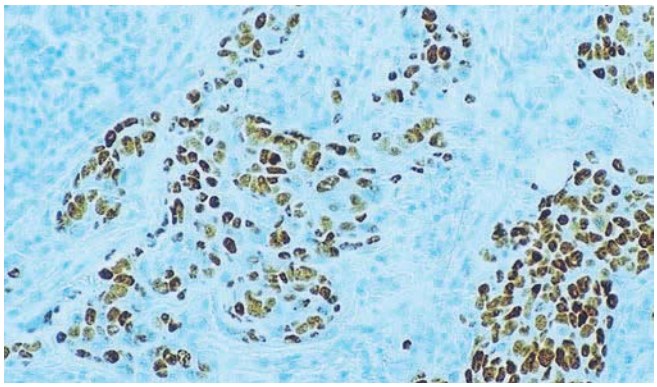
1 mL lyophilized NCL-p53-BP **F P W**

### Antigen Background

p53 protein plays a vital role in suppressing the development of cancer. The accumulation of p53 protein in response to DNA damage in vitro is well established and appears to induce growth arrest and apoptosis by the transcriptional regulation of other genes.

### Product Specific Information

Clone BP53-12 recognizes both wild type and mutant forms of human p53 protein under denaturing and non-denaturing conditions. The heat induced epitope retrieval technique may improve staining in some cases.



Human breast carcinoma: immunohistochemical staining for p53 protein using NCL-p53-BP. Note intense nuclear staining of tumor cells. Paraffin section.

# Novocastra **p53 Protein (1801)**

**Clone PAb 1801**

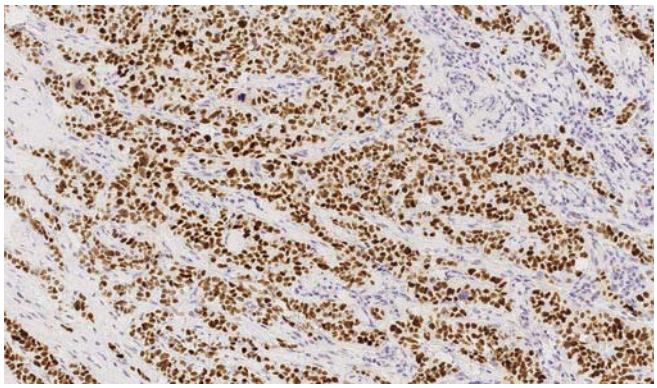
1 mL, 0.1 mL lyophilized NCL-p53-1801 **F P (HIER) W C**

### Antigen Background

The gene for p53 is located on chromosome 17p, a frequent site of allelic loss in many tumors. It has been reported that a high proportion of breast and colon carcinomas show immunostaining for p53 protein and expression of p53 protein.

### Product Specific Information

Clone PAb 1801 recognizes both wild type and mutant forms of human p53 protein under denaturing and non-denaturing conditions.



Human colonic adenocarcinoma: immunohistochemical staining for p53 protein using NCL-p53-1801. Note intense nuclear staining of tumor cells. Paraffin section.

# Novocastra **p53 Protein (CM1)**

**Polyclonal**

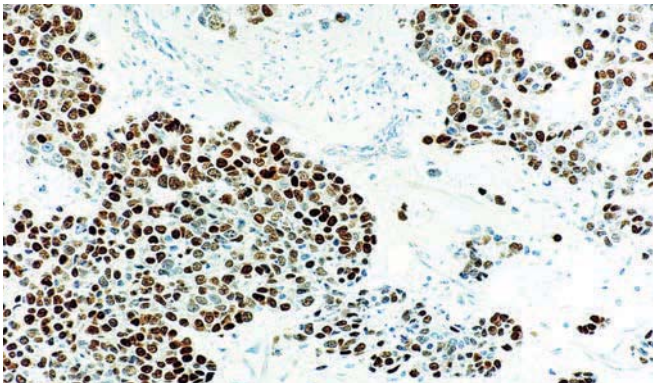
0.2 mL lyophilized NCL-p53-CM1 **F P (HIER) W**

### Antigen Background

Mutation of the p53 protein may represent the commonest genetic event in human malignancy. In colonic tumors, p53 protein has been reported to be overexpressed in some carcinomas and a small number of adenomas. No expression has been reported in normal mucosa.

### Product Specific Information

This polyclonal antibody recognizes both wild type and mutant forms of human p53 protein under denaturing and non-denaturing conditions. NCL-p53-CM1 is less sensitive to overfixation than clone DO-7.



Axillary lymph node infiltrated by metastatic breast carcinoma: immunohistochemical staining for p53 protein using NCL-p53-CM1. Note intense nuclear staining of a proportion of tumor cells. Paraffin section.

# Novocastra **p53 Protein (CM5)**

**Polyclonal**

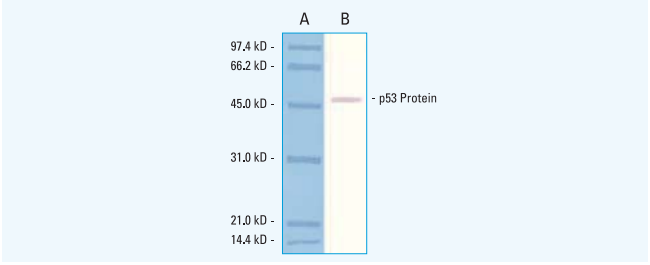
0.2 mL lyophilized NCL-p53-CM5p **P (HIER) W**

### Antigen Background

The accumulation of p53 protein in response to genotoxic stress in vitro is well established and appears to induce growth arrest and apoptosis by the transcriptional regulation of other genes and possibly by other direct mechanisms.

### Product Specific Information

NCL-p53-CM5p is specific for mouse and rat p53 protein.




Western blot: detection of p53 protein (53 kD) using NCL-p53-CM5p. Lane A, molecular weight markers. Lane B, T3T3 mouse cell line immunoblotted with NCL-p53-CM5p.

# Novocastra **p53 Protein (DO-1)**

**Clone DO-1**

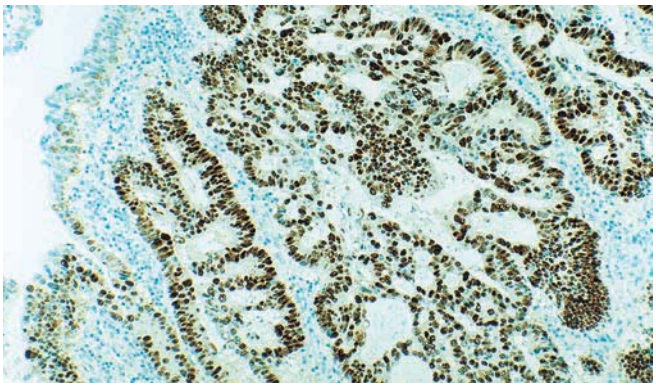
1 mL lyophilized NCL-p53-DO1 **F P (HIER) W**

### Antigen Background

In man, the p53 gene is located on the small arm of chromosome 17. Alterations of the p53 tumor suppressor gene are a common feature of human malignancies. A normal function of this gene is to induce apoptosis after DNA damage and, therefore, its activation can permit the survival of cells that have sustained genetic damage.

### Product Specific Information

Clone DO-1 recognizes both wild type and mutant forms of human p53 protein under denaturing and non-denaturing conditions. The epitope to which NCL-p53-DO1 maps is sited at the N-terminus at amino acids 20 – 25.



Human colonic adenocarcinoma: immunohistochemical staining for p53 protein using NCL-p53-DO1. Note intense nuclear staining of tumor cells. Paraffin section.

# Novocastra **p53 Protein (DO7)**

**Clone DO-7**

1 mL, 0.1 mL lyophilized NCL-p53-DO7 **F P W C**

1 mL, 0.5 mL, 0.1 mL liquid NCL-L-p53-DO7 **F P W C** New!

7 mL ready-to-use RTU-p53-DO7 **F P**

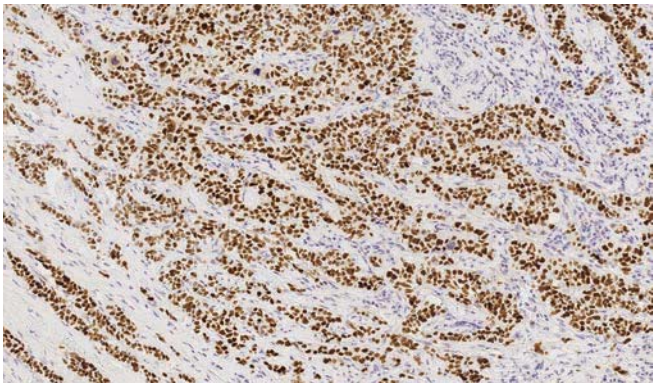
7 mL BOND ready-to-use PA0057 **P (HIER)**

### Product Specific Information

This monoclonal antibody recognizes both wild type and mutant forms of human p53 protein under denaturing and non-denaturing conditions. The epitope recognized by clone DO-7 can be destroyed by prolonged fixation in buffered formalin. The heat induced epitope retrieval technique may improve staining in some cases.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.



Human breast, ductal carcinoma in-situ: immunohistochemical staining for p53 protein using PA0057. Note intense nuclear staining of tumor cells. Paraffin section.

## Novocastra **p57 Protein (Kip2)**

**Clone 25B2**

1 mL, 0.1 mL lyophilized NCL-p57 **P (HIER)**

See also Kip2 (p57 Protein) on page 165.

## Novocastra **p63 Protein**

**Clone 7JUL**

1 mL lyophilized NCL-p63 **F P (HIER)**

1 mL, 0.1 mL liquid NCL-L-p63 **F P (HIER)** New!

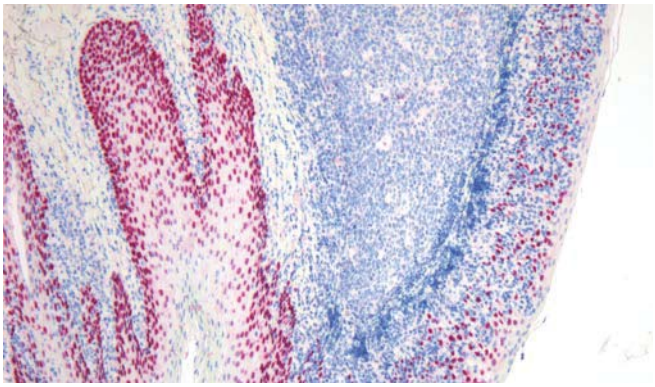
7 mL BOND ready-to-use PA0103 **P (HIER)** New!

### Antigen Background

p63 is a member of the p53 gene family and encodes for at least six major isotypes with transactivating, death-inducing activities (TAp63) and also dominant-negative activities (deltaNp63). p63 protein is reported to be expressed in a variety of normal human and mouse tissues, including proliferating cells of epithelium, cervix, urothelium and prostate. p63 protein is also reported to be expressed in most poorly differentiated squamous cell carcinomas. In epithelial cells, the dominant isotype, deltaNp63, lacks an acidic N-terminus corresponding to the transactivating domain of p53. The deltaN-isotype is also reported to be abundantly expressed in naso-pharyngeal carcinomas. p63 protein is required for prostate development and, in mice, it is essential for limb and epidermal morphogenesis. The human p63 gene is mutated in children with the disease Ectrodactyly Ectodermal Dysplasia and Facial Clefts syndrome. In contrast to the p53 gene, the p63 gene is rarely mutated in human cancer. p63 protein is reported not to be expressed in prostate adenocarcinoma but altered expression is a frequent event in bladder carcinogenesis.

### Product Specific Information

Clone 7JUL is raised to a prokaryotic recombinant fusion protein corresponding to a region (aa319-410) common to six isoforms of the p63 molecule.



Human tonsil: immunohistochemical staining for p63 protein using NCL-L-p63 in combination with BOND Polymer Refine Red detection system (DS9390). Note intense nuclear staining of tonsilar epithelial cells. Paraffin section.

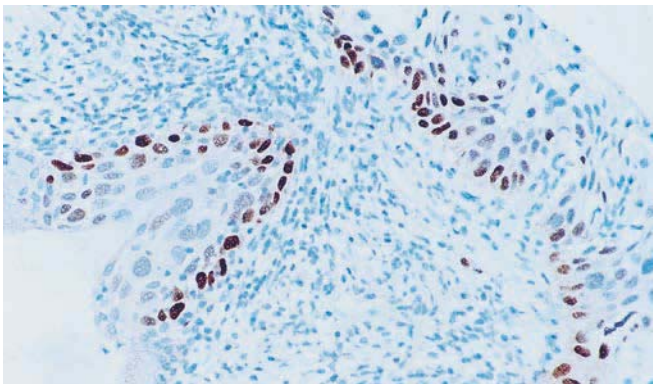
## Novocastra **p73 Protein (alpha)**

**Clone 24**

1 mL lyophilized NCL-p73 **F P (HIER)**

### Antigen Background

p73 protein was the first identified homolog of the tumor suppressor gene, p53. Overproduction of p73 protein reported in p53-defective tumor cells, activates p53-responsive promoters. This results in the induction of apoptosis but its function in tumor development is unclear. Alternative splicing produces at least six known p73 mRNA species resulting in p73 isoforms; alpha, beta, gamma, delta, epsilon and zeta. The relative expression level of each splice variant may modulate p73 transcriptional and growth suppression activity. p73 protein expression is reported to be low in normal tissues eg normal squamous epithelium. Elevated expression has been shown by RT-PCR and/or western blotting in a number of tumors.



Normal human cervix: immunohistochemical staining for p72 protein using NCL-p73. Note nuclear staining of basal epithelial cells.

# Novocastra **p80 (Anaplastic Lymphoma Kinase) (ALK) (CD246)**

**Clone 5A4**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-ALK **P (HIER)** New!
1 mL, 0.1 mL lyophilized NCL-ALK **P (HIER)**
7 mL BOND ready-to-use PA0306 **P (HIER)**

See also ALK (Anaplastic Lymphoma Kinase) (CD246) (p80) on page 93.

# Novocastra **Papillomavirus Antibodies**

**Clone 5A3**
2 mL, 0.1 mL lyophilized Papillomavirus (type 18)
NCL-HPV18 **F P (HIER)**

**Clone 4C4**
2 mL, 0.1 mL lyophilized Papillomavirus (types 6, 11,18)
NCL-HPV-4C4 **F P (HIER)**

### Antigen Background

Infection with specific types of human Papillomavirus (HPV) has been associated with an increased risk of developing cervical neoplasia. HPV types 6 and 11 have been associated with relatively benign diseases such as genital warts but types 16 and 18 are the causative agents of cervical, vaginal and vulvar malignancies.

### Product Specific Information

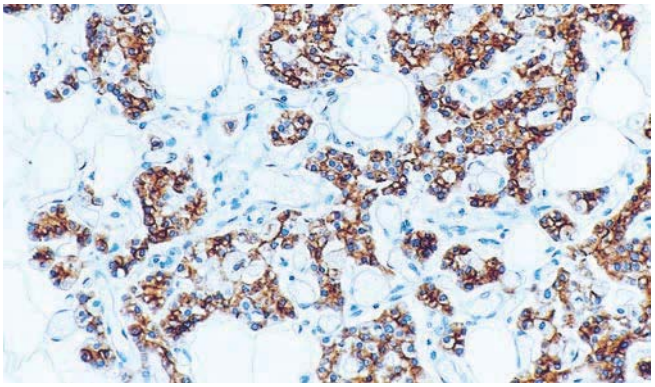
NCL-HPV18 is specific for the L1 coat protein of HPV type 18. NCL-HPV-4C4 is specific for HPV types 6, 11 and 18.

# Novocastra **Parathyroid Hormone**

**Clone 105G7**
1 mL, 0.1 mL lyophilized NCL-PTH-488 **P**

### Antigen Background

The parathyroid glands are small, oval, endocrine glands closely associated with the thyroid gland. The parathyroid glands regulate serum calcium and phosphate levels via parathyroid hormone (parathormone). Parathyroid hormone raises serum calcium levels directly, by increasing the rate of osteoclastic reabsorption and promoting breakdown of the bone matrix, and indirectly, by increasing the renal tubular reabsorption of calcium ions and inhibiting the reabsorption of phosphate ions from the glomerular filtrate, and finally, by promoting the absorption of calcium from the small intestine. Parathyroid hormone is the most important regulator of blood calcium levels and is essential to life, whereas calcitonin appears only to provide a complementary mechanism for fine adjustment. Chief cells are the most abundant cells in the parathyroid gland and are responsible for the secretion of parathyroid hormone.



Human parathyroid: immunohistochemical staining for parathyroid hormone using NCL-PTH-488. Note cytoplasmic staining of chief cells. Paraffin section.

# Novocastra **Parvalbumin (Alpha)**

**Clone 2E11**
1 mL lyophilized NCL-PARVALBUMIN **P (HIER)**

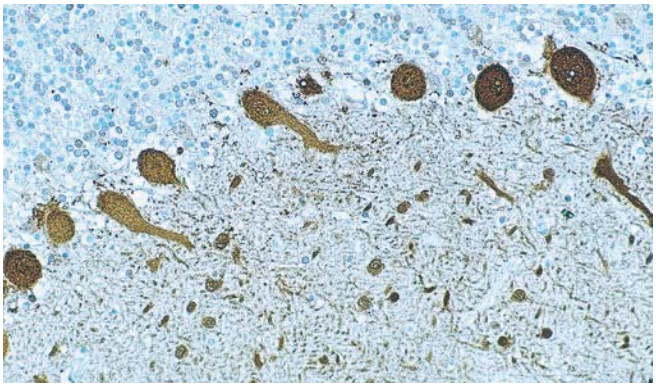
### Antigen Background

Alpha and beta parvalbumins are low molecular weight, water-soluble, calcium-binding proteins. The protein is found in a subset of fast-spiking inhibitory GABAergic interneurons with a $Ca^{2+}$ buffering capacity that reduces the $Ca^{2+}$ -dependent $K^{+}$ outward current. Unlike other $Ca^{2+}$ binding proteins, parvalbumin-containing neurons appear to co-localize only with corticotropin-releasing factor and not with other neuropeptides associated with GABA such as somatostatin, neuropeptide Y and cholecystokinin. Neurons which contain parvalbumin appear to be resistant to ischemia, epilepsy and N-methyl-D-aspartate receptor agonists due to their ability to buffer increase in intracellular calcium. Alpha and beta parvalbumins are reported to be expressed in different human tissues with the alpha form highly expressed in extracts of human cerebellum, weakly in kidney and not in skeletal muscle, thymus, lung, placenta, heart, liver and diaphragm. The beta form of parvalbumin has been detected only in preterm placenta. These expression patterns differ significantly between human and rodent species with these differences also reflected with some members of the S-100 family of $Ca^{2+}$ binding proteins. Within the cerebellum, alpha parvalbumin is reported to be localized to Purkinje, basket, stellate and Golgi cells. In cases of spinocerebellar ataxia-1 (SCA-1), the number of Purkinje cells expressing alpha parvalbumin is reported to be much reduced, which may reflect biochemical changes preceding Purkinje degeneration.

### Product Specific Information

NCL-PARVALBUMIN does not detect parvalbumin in preterm placenta indicating its specificity for the alpha form of this protein.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting



Human brain, cerebellum: immunohistochemical staining for alpha parvalbumin using NCL-PARVALBUMIN. Note cytoplasmic staining of Purkinje, basket and stellate cells. Paraffin section.

## Novocastra **Parvovirus B19**

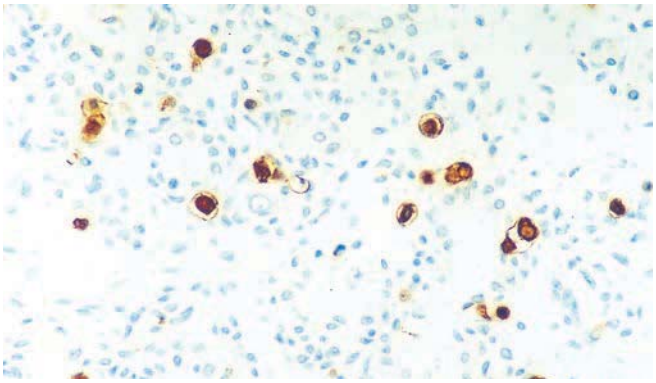
**Clone R92F6**
1 mL, 0.1 mL lyophilized NCL-PARVO **F P**

**Antigen Background**

Parvovirus B19 is a small, single-stranded DNA virus which causes erythema infectiosum also known as 'slapped cheek syndrome'. Clinically, this is a febrile disease in children, often epidemic, with a facial maculopapular rash causing flushed cheeks. In individuals with erythrocyte abnormalities, such as sickle cell anaemia, Parvovirus B19 can cause hemolytic complications where the virus replicates in bone marrow cells and inhibits erythropoiesis. Parvovirus B19 has also been implicated with spontaneous abortion in humans.

**Product Specific Information**

NCL-PARVO is specific for the viral antigens, VP1 (84 kD) and VP2 (58 kD).



Human fetal lung, post-mortem tissue: immunohistochemical staining for Parvovirus B19 using NCL-PARVO. Note intense staining of infected cells within the capillaries. Paraffin section.

## Novocastra **Pax-5**

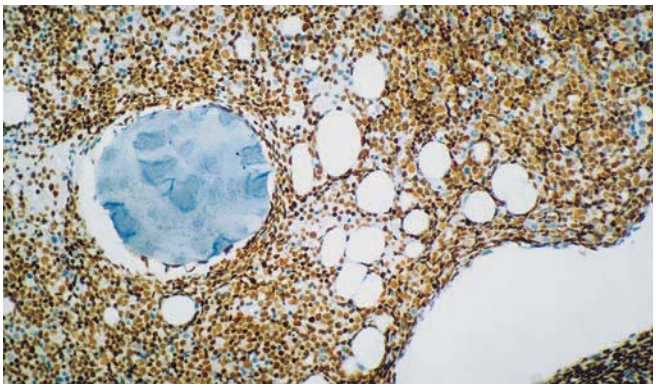
**Clone 1EW**
1 mL, 0.1 mL liquid NCL-L-PAX-5 **P (HIER) W**
7 mL BOND ready-to-use PA0552 **P (HIER)**

**Antigen Background**

Pax genes are a family of developmental control genes that encode nuclear transcription factors and have been implicated in the control of mammalian development. PAX-5 is a B cell specific transcription factor that is expressed in pro B cells, pre-B and mature B cells, and subsequently in all stages of B cell development until the plasma cell stage in which it is downregulated.

**Product Specific Information**

The use of $H_2O_2$ to block endogenous peroxidase has been shown to have a detrimental effect on the epitope recognized by Clone 1EW It is, therefore, critical that blocking with $H_2O_2$ should be carried out after application of the primary antibody with solutions of no greater than 3 percent, otherwise staining intensity will be reduced.



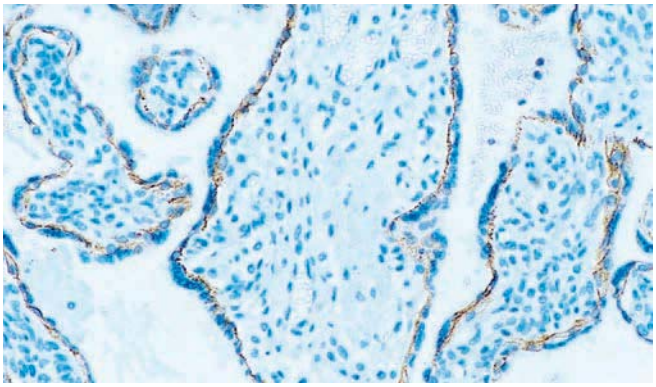
Human acute lymphoblastic leukemia: immunohistochemical staining for Pax-5 using NCL-L-PAX-5. Note nuclear staining of B cells. Paraffin section.

## Novocastra **P-Cadherin**

**Clone 56C1**
1 mL lyophilized NCL-P-Cad **F P (HIER) W**

**Antigen Background**

P-cadherin, like E-cadherin, is a $Ca^{2+}$ -dependent cell adhesion molecule and has a fundamental role in maintaining the integrity of multicellular structures. It is responsible for selective cell to cell adhesion. P-cadherin expression is reported to be restricted and the protein is only detected in the basal or parabasal layers of stratified epithelia. P-cadherin may contribute to the maintenance of the epithelial phenotype and be involved in the final stage of tumor progression in epidermal carcinomas.



Human placenta: immunohistochemical staining for P-cadherin using NCL-P-Cad. Note intense membrane staining of cytotrophoblasts. Paraffin section.

## Novocastra **PECAM-1 (CD31)**

**Clone 1A10**
1 mL, 0.1 mL lyophilized NCL-CD31-1A10 **P (HIER)**
7 mL BOND ready-to-use PA0250 **P (HIER)**

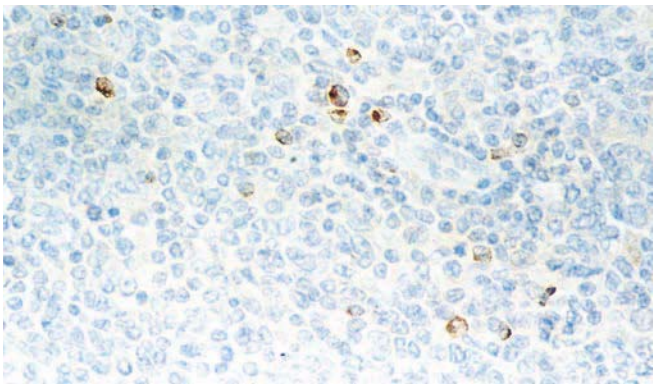
See also CD31 (PECAM-1) on page 114.

## Novocastra **Perforin**

**Clone 5B10**
1 mL, 0.1 mL lyophilized NCL-PERFORIN **P (HIER)**

**Antigen Background**

Perforin is a pore-forming protein found in cytoplasmic granules of cytotoxic T-lymphocytes (CTLs). CTLs bind to cells which express foreign antigens and induce them to lyse. Perforin forms circular lesions on the target cell membrane similar to those induced by complement. Perforin and C9 share a high degree of homology particularly at the membrane spanning region. Perforin is reported to be constitutively expressed in human CD3 negative, CD56 positive NK cells, CD3 positive large granular lymphocytes and gamma/delta T cells. This expression is significantly induced in CD8 positive T cells but to a lesser extent in gamma/delta T cells and NK cells. The induction of perforin mRNA is partially blocked by the immunosuppressive drug cyclosporin A.



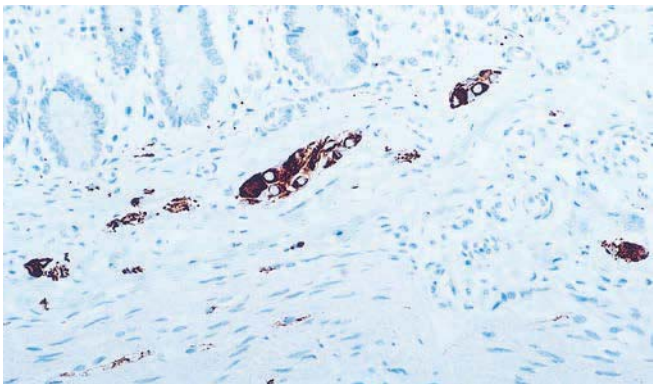
Human follicular lymphoma: immunohistochemical staining for perforin using NCL-PERFORIN. Note focal granular staining of occasional cytotoxic T lymphocytes. Paraffin section.

## Novocastra **Peripherin**

**Clone PJM50**
1 mL lyophilized NCL-PERIPH **F P (HIER) W**

**Antigen Background**

Peripherin is a 57 kD type III intermediate filament protein that is expressed in peripheral neurons, including enteric ganglion cells. Peripherin is expressed in the developing peripheral nervous system and is highly enriched in neuronal derivatives of the neural crest. The expression or absence of peripherin may be used to demonstrate abnormalities of the enteric nervous system. The assessment of the density of ganglion cells is of importance in Hirschsprung's disease (HD)-related disorders.



Human small bowel: immunohistochemical staining for peripherin using NCL-PERIPH. Note intense cytoplasmic staining of enteric ganglion cells and neural elements. Paraffin section.

## Novocastra **PETA-3 (CD151)**

**Clone RLM30**
1 mL lyophilized NCL-CD151 **P (HIER)**

See also CD151 (PETA-3) on page 125.

## Novocastra **P-glycoprotein (CD243)**

**Clone 5B12**
1 mL lyophilized NCL-PGLYm **F P (HIER)**

**Antigen Background**

The resistance of tumor cells to cytotoxic chemotherapeutic drugs is a major problem in the treatment of cancer. Studies have linked the presence of a 170 to 180 kD cell membrane protein, P-glycoprotein, with resistance to a wide range of lipophilic chemotherapeutic drugs, a phenomenon known as multidrug resistance. P-glycoprotein is reported to be expressed in transporting epithelia of several normal tissues, including liver, kidney, colon, adrenal and brain.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

# Novocastra **Placental Alkaline Phosphatase**

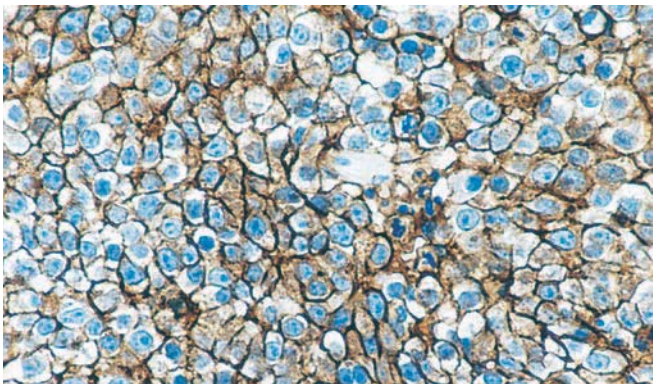
**Clone 8A9**
1 mL, 0.1 mL lyophilized NCL-PLAP-8A9 **F P (HIER)**
1 mL liquid NCL-L-PLAP-8A9 **F P (HIER)**
7 mL ready-to-use RTU-PLAP-8A9 **F P (HIER)**
7 mL BOND ready-to-use PA0161 **P (HIER)**

### Antigen Background

Placental alkaline phosphatase (PLAP) is a membrane-associated sialoglycoprotein enzyme normally present at high concentration in syncytiotrophoblasts within the placenta during the third trimester of gestation. The expression of PLAP was originally thought to be restricted to term placenta but a human PLAP-like variant has been described which shares more than 85 percent homology with PLAP itself. This high degree of homology between PLAP and PLAP-like enzyme together with cross-reacting antibodies has led to some confusion of the distribution of PLAP and PLAP-like enzyme in various tissues. PLAP is reported to be expressed only in normal term placenta, endocervix and fallopian tube and also in ovarian and proximal gastrointestinal tumors. PLAP expression is rare in malignant germ cell tumors. PLAP-like enzyme is reported to be predominantly found in normal fetal and neonatal testis, and in thymus. It is also commonly expressed in germ cell tumors and more recently described in seminomas.

### Product Specific Information

Reports indicate that clone 8A9 stains seminomas and placenta indicating a specificity for both PLAP and PLAP-like enzyme.



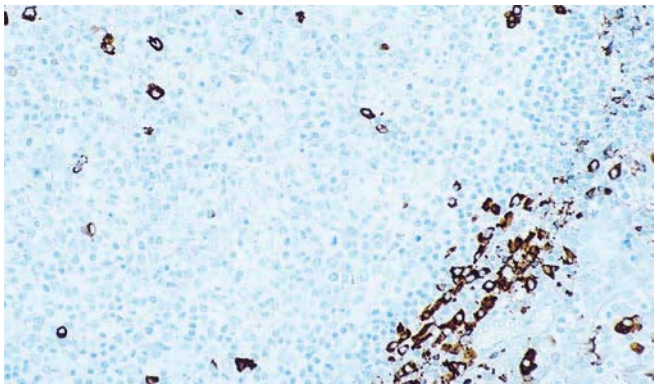
Human seminoma: immunohistochemical staining for placental alkaline phosphatase using NCL-PLAP-8A9. Note intense membrane staining of tumor cells. Paraffin section.

# Novocastra **Plasma Cell Marker**

**Clone LIV3G11**
1 mL lyophilized NCL-PC **P (Enzyme)**

### Antigen Background

The plasma cell is the resultant terminal stage of B cell differentiation and apart from morphological features may be distinguished from other B cells by their lack of surface HLA class I and class II antigens, surface immunoglobulin, Fc and C3 receptors or presence of intracytoplasmic immunoglobulin.



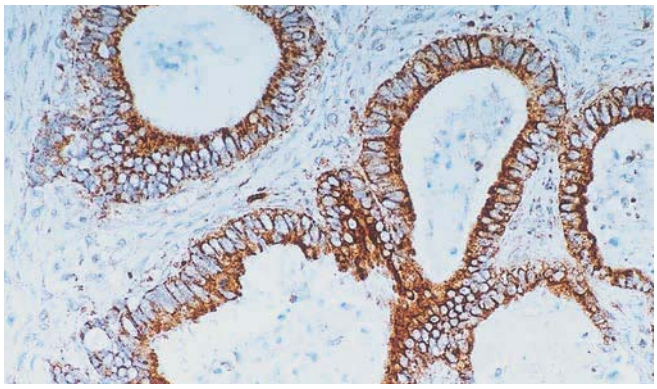
Human tonsil: immunohistochemical staining for plasma cells using NCL-PC. Note cytoplasmic staining of plasma cells. Paraffin section.

# Novocastra **Plasminogen Activator Inhibitor (Type 1)**

**Clone TJA6**
1 mL lyophilized NCL-PAI-1 **P**

### Antigen Background

Plasminogen activator inhibitor (Type 1, PAI-1) is a 48 kD protein which inhibits the conversion of plasminogen to plasmin. It is the principal inhibitor of the plasminogen activators t-PA and u-PA. PAI-1 is structurally related to the serine protease inhibitor (serpin) superfamily. The serpins are known to undergo a conformational rearrangement upon cleavage of the reactive central peptide bond ($P_1$-$P_{1'}$) and it is this conformational difference between the active and cleaved forms which determine their reactivity. PAI-1 is also reported to be expressed by endothelial cells and is stored in platelets.



Human ovarian adenocarcinoma: immunohistochemical staining for plasminogen activator inhibitor type 1 using NCL-PAI-1. Note intense cytoplasmic staining of malignant tumor cells. Paraffin section.

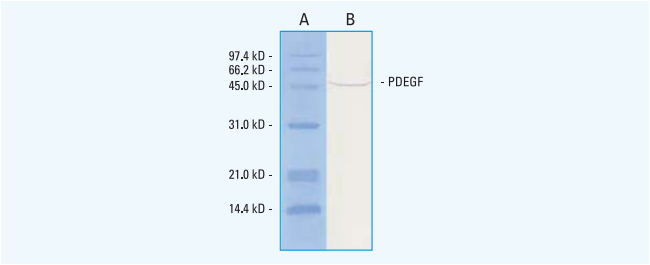
# Novocastra **Platelet-Derived Endothelial Growth Factor**

## Clone P-GF.44C

1 mL lyophilized NCL-PDEGF **P (HIER) W**

### Antigen Background

Angiogenesis, the formation of new blood vessels from an existing vascular bed is a complex multi-step process. It is controlled by a number of angiogenic factors, one of which is platelet-derived endothelial growth factor (PDEGF) also shown to be thymidine phosphorylase (TP). Angiogenesis is tightly regulated and is observed only transiently during reproduction, development and wound healing. PDEGF is reported to be expressed in the nucleus and cytoplasm, the highest expression being described in macrophages, stromal cells, glial cells and some epithelia. No expression is reported in gastro-intestinal epithelium, smooth muscle, adrenal glands, lung and testis. The high expression in macrophages and skin may be important for total body thymidine homeostasis.




Western blot: detection of platelet-derived endothelial growth factor (53 kD) using NCL-PDEGF. Lane A, molecular weight markers. Lane B, human tonsil immunoblotted with NCL-PDEGF.

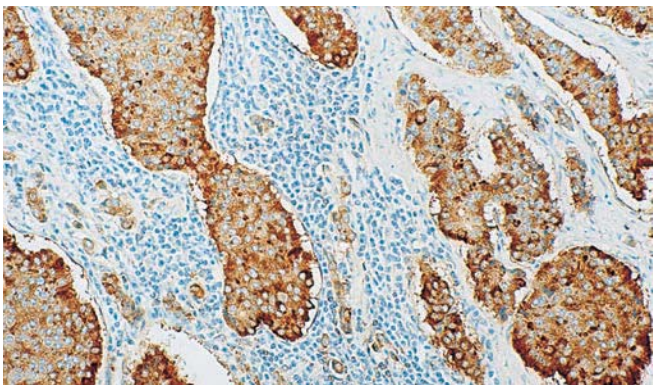
# Novocastra **Prealbumin**

## Polyclonal

1 mL lyophilized NCL-PREp **F P (Enzyme)**

### Antigen Background

Prealbumin, also known as transthyretin, is a 55 kD molecule synthesized in the liver. Prealbumin serves as a transport protein for thyroid hormones and vitamin A. Variant prealbumin has been identified as the major fibril subunit protein in several hereditary forms of systemic amyloidosis, including familial amyloid polyneuropathy types I and II.



Human small cell carcinoid tumor: immunohistochemical staining for prealbumin using NCL-PREp. Note cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **Progesterone Receptor**

## Clone 16

2 mL lyophilized NCL-PGR-312/2 **P (HIER) W**
1 mL, 0.1 mL lyophilized NCL-PGR-312 **P (HIER) W**
2 mL liquid NCL-L-PGR-312/2 **P (HIER) W**
1 mL, 0.1 mL liquid NCL-L-PGR-312 **P (HIER) W** New!
7 mL ready-to-use RTU-PGR-312 **P (HIER)**
7 mL BOND ready-to-use PA0312 **P (HIER)**

## Clone 1A6

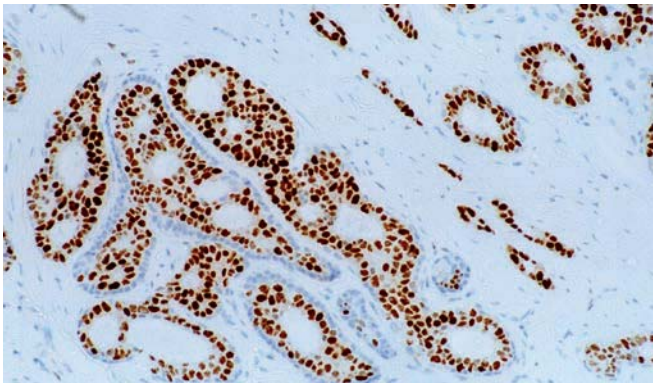
2 mL lyophilized NCL-PGR/2 **P (HIER) W**
1 mL lyophilized NCL-PGR **P (HIER) W**
1 mL liquid NCL-L-PGR **P (HIER) W**
7 mL ready-to-use RTU-PGR **P (HIER)**

### Antigen Background

The human progesterone receptor (PR) is expressed as two isoforms, PRA (94 kD) and PRB (114 kD), which function as ligand-activated transcription factors. These two isoforms are transcribed from distinct estrogen receptor (ER)-inducible promoters within a single copy PR gene. The PRA form is a truncated version of the PRB form, lacking the first 164 N-terminal amino acids. In humans, PRA acts as a transdominant repressor of the transcriptional activity of PRB, glucocorticoid receptor, ER, androgen receptor and mineralocorticoid receptor. PRB functions mainly as a transcriptional activator. PRB is expressed strongly in endometrial glandular and stromal nuclei in the proliferative phase of the menstrual cycle and weakly during the secretory phase and early pregnancy.

### Product Specific Information

Clone 16 is specific for a region of the N-terminus of the A form of PR. The precise epitope has not been mapped but it reacts with both A and B forms of PR by Western blot but only with the A form by immunohistochemistry. This suggests that the epitope is inaccessible in the native folded B form of the protein.



Breast carcinoma: immunohistochemical staining with BOND ready-to-use Progesterone Receptor (16) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

## Novocastra **Progesterone and Estrogen Receptor Antibodies (duo packs)**

**Clone 6F11, Clone 1A6**
2 × 1 mL lyophilized NCL-ER/PGRd/1 **F P (HIER) W**

**Clone 6F11, Clone 16**
2 × 1 mL lyophilized NCL-ER/PGR-312d/1 **F P (HIER) W**

See also Estrogen and Progesterone Receptor Antibodies (duo packs) on page 145.

## Novocastra **Progesterone Receptor (A/B Forms)**

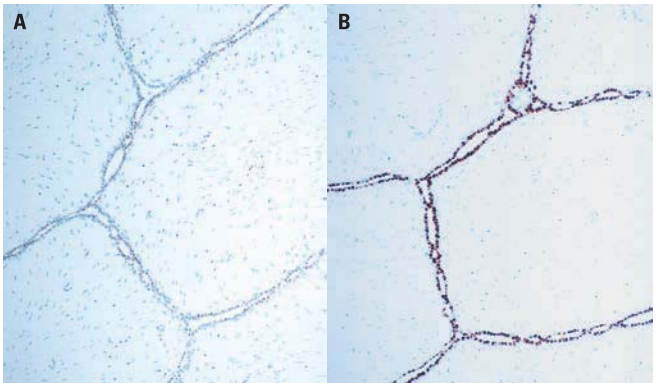
**Clone 16, Clone SAN27**
1 mL, 0.1 mL lyophilized NCL-PGR-AB **F P (HIER) W**
1 mL liquid NCL-L-PGR-AB **F P (HIER) W**
7 mL ready-to-use RTU-PGR-AB **F P (HIER)**

### Antigen Background

The human progesterone receptor (PR) is expressed as two isoforms, PRA (94 kD) and PRB (114 kD), which function as ligand-activated transcription factors. In vitro studies have indicated that PRA and PRB can activate different target genes and that PRA, in some circumstances, may act as a dominant inhibitor of the function of PRB and other steroid hormone receptors. PRA and PRB are both expressed in normal breast. Most endometrial carcinomas, however, are reported to express only one isoform with either PRA or PRB being expressed.

### Product Specific Information

Novocastra has formulated this cocktail of two clones, clone 16, specific for PRA, and SAN27, specific for PRB.



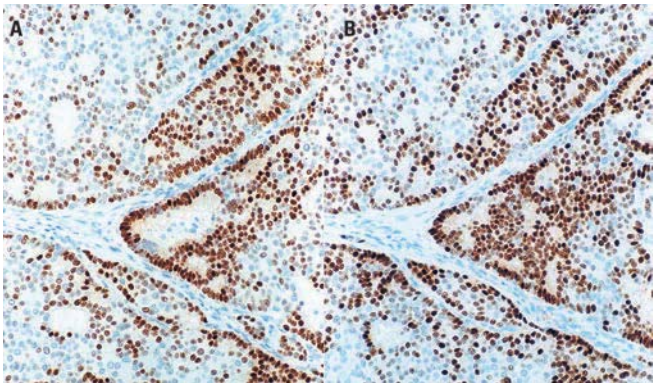

Human fibroadenoma (serial sections): immunohistochemical staining for progesterone receptor (A and B forms) using NCL-PGR (A) and NCL-PGR-AB (B). Note a smaller proportion of weakly staining tumor cell nuclei in A compared to B. Paraffin sections.

## Novocastra **Progesterone Receptor (B Form)**

**Clone SAN27**
1 mL lyophilized NCL-PGR-B **F P (HIER) W**

### Antigen Background

The human progesterone receptor (PR) is expressed as two isoforms; PRA (94 kD) and PRB (114 kD), which function as ligand-activated transcription factors. These two isoforms are transcribed through two distinct estrogen receptor (ER)-inducible promoters within a single copy PR gene. The PRA form is a truncated version of the PRB form, lacking the first 164 N-terminal amino acids. In humans, PRA acts as a transdominant repressor of the transcriptional activity of PRB, glucocorticoid receptor, ER, androgen receptor and mineralocorticoid receptor. PRB functions mainly as a transcriptional activator. Human progesterone receptors are reported to be expressed in osteosarcoma cells and in primary osteoblast cultures. PRB is reported to be highly expressed in endometrial glandular and stromal nuclei in the proliferative phase of the menstrual cycle and expressed at low levels during the secretory phase and early pregnancy. In contrast, in endometriosis, only PRA is expressed. In the majority of breast cancers, expression of PRB is reported to be low, resulting in high PRA:PRB ratios.




Human fibroadenoma (serial sections): immunohistochemical staining for progesterone receptor (B form) using NCL-PGR-312 (A) and NCL-PGR-B (B). Note the absence of staining of tumor cells in A and staining of tumor cell nuclei in B. Paraffin sections.

## Novocastra **Proinsulin**

**Clone 1G4**
1 mL lyophilized NCL-PROIN-1G4 **P (HIER)**

### Antigen Background

Preproinsulin is converted to proinsulin by the action of a signal peptidase in the lumen of the endoplasmic reticulum within pancreatic beta cells. The proinsulin is then transported from the endoplasmic reticulum to the Golgi apparatus and is further modified by the action of various enzymes to yield the mature hormone, insulin. Insulinomas exhibit many structural features in common with normal beta cells. Studies of proinsulin and insulin have reported proinsulin/insulin expression patterns to vary greatly among those tumors and no correlation seems to exist between the expression staining patterns and a particular histological tumor type. A diffuse expression pattern may be observed for proinsulin which differs from the crescent-shaped perinuclear staining seen in normal beta cells suggesting abnormalities in the prohormone processing.

# Novocastra **Proliferating Cell Nuclear Antigen**

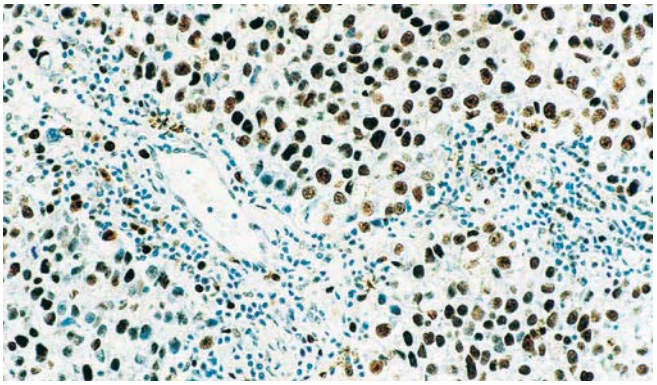
**Clone PC10**
1 mL, 0.1 mL lyophilized NCL-PCNA **P W C**
1 mL liquid NCL-L-PCNA **P W C**

**Antigen Background**

Proliferating cell nuclear antigen (PCNA) is a 36 kD protein which is highly conserved between species. PCNA functions as a co-factor for DNA polymerase delta in S phase and also during DNA synthesis associated with DNA damage repair mechanisms. The PCNA molecule has a half-life in excess of 20 hours, and therefore, may be detected in non-cycling cells eg those in G0 phase.

**Product Specific Information**

Heat induced epitope retrieval using 10mM citrate buffer (pH6.0) may improve staining on overfixed tissues, but due to increased sensitivity using this technique, care must be taken with the interpretation of results. Staining is reduced (and may be abolished) if sections are baked onto glass slides. Air drying overnight onto 3-aminopropyltriethoxysilane (Apes) coated slides may produce improved results.



Human seminoma: immunohistochemical staining for proliferating cell nuclear antigen using NCL-PCNA. Note nuclear staining of proliferating tumor cells. Paraffin section.

# Novocastra **Prostate Specific Antigen**

**Clone 35H9**
1 mL, 0.1 mL lyophilized NCL-PSA-431 **P**
7 mL BOND ready-to-use PA0431 **P (HIER)**

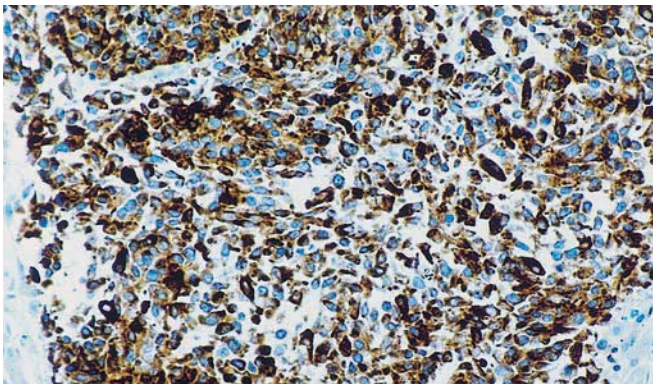
**Clone PSA 28/A4**
1 mL liquid NCL-L-PSA-28A4 **F P**
7 mL ready-to-use RTU-PSA-28A4 **F P**
*Clone 35H9 was developed to produce superior staining on paraffin sections.*

Prostate specific antigen (PSA) is a 34 kD protein belonging to the kallikrein family of serine proteases and was originally isolated and purified from human seminal plasma. It was found to be immunologically identical and biologically similar to a protein isolated from the prostate gland. PSA is distinct from prostatic acid phosphatase. Low levels of expression of PSA have been reported in non-prostatic tissues and tumors such as breast carcinomas.

# Novocastra **Prostate Specific Membrane Antigen**

**Clone 1D6**
1 mL liquid NCL-L-PSMA **P (HIER)**

The prostate specific membrane antigen (PSMA) is expressed as a 750 amino acid glycoprotein but may also be found as PSM, a form of the protein missing the first 57 amino acids. PSMA has two enzymatic activities, one as a prostate-specific integral membrane folate hydrolase and the other as a carboxypeptidase. Reports suggest that PSMA expression may correlate with tumor burden and serve as an indicator of metastatic involvement. The cellular localization of PSMA contrasts with that of prostate specific antigen (PSA) and prostatic acid phosphatase (PAP) that are secreted proteins.



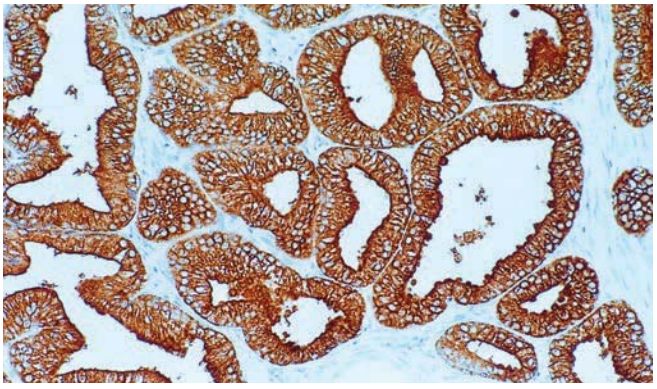
Human metastatic prostate carcinoma in liver: immunohistochemical staining for PSMA using NCL-L-PSMA. Note cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **Prostatic Acid Phosphatase**

**Clone PASE/4LJ**
1 mL liquid NCL-L-PAP **F P**
7 mL BOND ready-to-use PA0006 **P (HIER)**

**Antigen Background**

Prostatic acid phosphatase (PAP) is an isoenzyme of acid phosphatase found in large amounts in the prostate and seminal fluid. The precise function of PAP is unknown, but it may act as a hydrolase to split phosphoryl choline in semen and also function as a transferase. Elevated serum levels of the enzyme are reported in metastatic prostatic carcinoma.



Prostate adenocarcinoma: immunohistochemical staining with Prostatic Acid Phosphatase (PASE/4LJ) using BOND Polymer Refine Detection.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

## Novocastra **Protein Gene Product 9.5**

**Clone 10A1**
1 mL, 0.1 mL lyophilized NCL-PGP9.5 **F P (HIER) W**
1 mL liquid NCL-L-PGP9.5 **F P (HIER) W**
7 mL ready-to-use RTU-PGP9.5 **F P (HIER)**
7 mL BOND ready-to-use PA0286 **P (HIER)**

**Antigen Background**

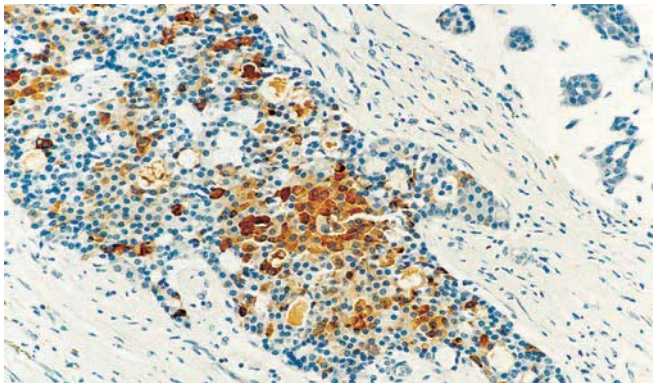
Protein gene product (PGP) 9.5 is a neuron specific protein, structurally and immunologically distinct from neuron specific enolase. The protein which has a molecular weight of 27 kD was first identified by high resolution two dimensional PAGE. PGP9.5 expression has been reported in neurons and nerve fibers at all levels of the central and peripheral nervous system, in many neuroendocrine cells, in segments of the renal tubules, in spermatogonia and Leydig cells of the testis, in ova and in some cells of both the pregnant and non-pregnant corpus luteum. PGP9.5 is known to be a member of the ubiquitin C-terminal hydroxylase family and is also concentrated within inclusion bodies suggesting that such structures may be metabolically active regions of the cells.

## Novocastra **pS2 Protein**

**Polyclonal**
0.5 mL lyophilized NCL-pS2 **F P**

**Antigen Background**

pS2, also known as pNR-2, was first identified by differential screening of cDNA libraries from estrogen responsive breast cancer cell lines. In normal tissue, pS2 protein is reported to be expressed in gastric mucosa, small intestinal mucosa and normal breast epithelium. pS2 is estrogen regulated in breast cancer cell lines and may have some growth factor activity. In malignant epithelial tumors, pS2 has been reported to be expressed in gastric carcinomas and gynecological cancers. The pS2 mRNA and protein are expressed predominantly in estrogen receptor positive breast cancers.



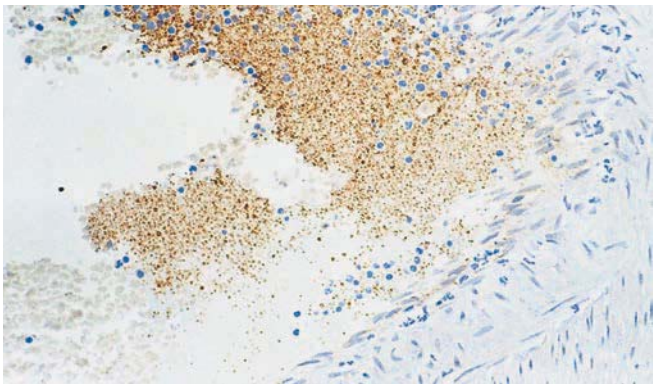
Human breast carcinoma: immunohistochemical staining for pS2 protein using NCL-pS2. Note cytoplasmic staining of a proportion of tumor cells. Paraffin section.

## Novocastra **P-selectin (CD62P)**

**Clone C34**
1 mL lyophilized NCL-CD62P-367 **P (HIER)**

**Antigen Background**

The CD62P antigen (140 kD), also known as P-selectin, mediates the interaction of activated platelets with neutrophils and monocytes and is responsible for the rolling attachment of neutrophils to activated endothelium. CD62P antigen binds to the carbohydrate structures Sialyl-Lewis$^x$ on neutrophils and to galactosyl ceramides on neutrophils and tumor cells. A soluble CD62P antigen inhibits the integrin-mediated adhesion of activated neutrophils to endothelium.



Human umbilical cord, blood vessel: immunohistochemical staining for CD62P antigen (P-selectin) using NCL-CD62P-367. Note intense staining of platelets. Paraffin section.

## Novocastra **Renal Cell Carcinoma Marker**

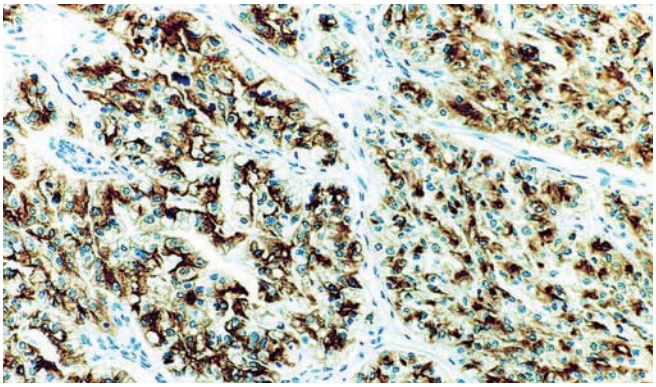
**Clone 66.4.C2**
1 mL, 0.1 mL lyophilized NCL-RCC **P (Enzyme)**

**Antigen Background**

In the normal kidney, a 200 kD glycoprotein is localized within the brush border of the pars convoluta and pars recta segments of the proximal renal tubule and on the luminal surface of Bowman's capsule adjoining the outgoing proximal tubule. The glycoprotein, gp200, is also reported to be expressed on the luminal surface of breast lobules and ducts, the luminal surface of the epididymal tubular epithelium and within the colloid of thyroid follicles. Reports indicate gp200 antigen to be expressed in the majority of metastatic renal cell carcinomas.

**Product Specific Information**

NCL-RCC is specific for a proximal nephrogenic renal antigenic site on the carbohydrate domain of gp200.



Human renal cell carcinoma: immunohistochemical staining for gp200 using NCL-RCC. Note cytoplasmic staining of tumor cells. Paraffin section. Section supplied courtesy of Dr Mouza Abdulla A. Al-Sharhan.

# Novocastra **Respiratory syncytial virus**

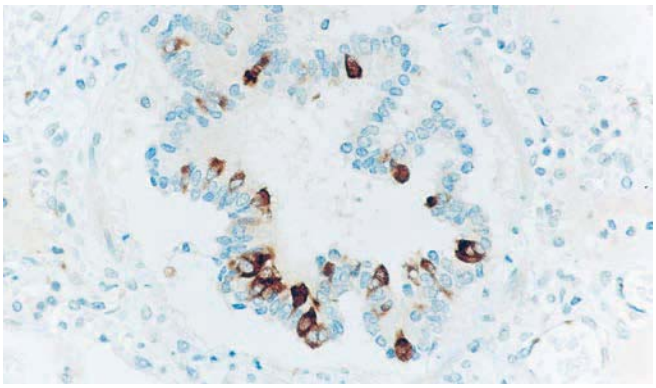
**Clone 5H5N, G12[2], 5A6, IC3 cocktail**
1 mL lyophilized NCL-RSV3 **F P (HIER) I**

### Antigen Background

Respiratory syncytial virus (RSV) is the most important respiratory pathogen of childhood and is responsible for approximately 50 percent of all cases of bronchiolitis and 25 percent of all cases of pneumonia during the first few months of life. Approximately one percent of babies who develop an RSV infection between two and six months die, particularly those with con-genital heart defects, bronchopulmonary dysplasia, low birth weight or immunodeficiency. The virus is also associated with significant lower respiratory disease in elderly and immunosuppressed individuals in whom mortality rates may be high. Multiple types and subtypes of RSV cocirculate in the population.

### Product Specific Information

NCL-RSV3 is a cocktail of four antibodies. NCL-RSV3 does not cross-react with Parainfluenza virus types 1, 2, 3 and 4b, Adenovirus, Mumps virus, Measles virus, Influenza virus types A and B, Poliovirus types 1, 2 and 3, Coxsackie B4 virus, echovirus 19, Varicella-zoster virus, Cytomegalovirus and Herpes simplex virus types 1 and 2.



Human infant lung, post-mortem tissue: immunohistochemical staining for Respiratory syncytial virus (RSV) using NCL-RSV3. Note intense staining of infected luminal bronchial epithelial cells. Paraffin section.

# Novocastra **ret Oncoprotein**

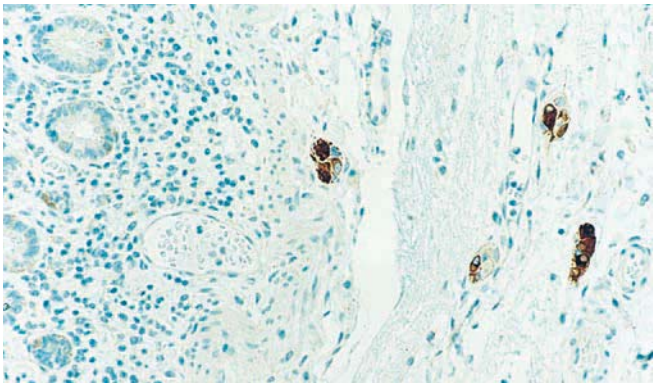
**Clone 3F8**
1 mL lyophilized NCL-RET **P (HIER)**

### Antigen Background

The ret proto-oncogene encodes a cell surface glycoprotein belonging to the receptor tyrosine kinase family and is located on chromosome 10q11.2. Three main 3' splice isoforms have been characterized from papillary thyroid carcinomas, themselves originating from thyroid epithelial cells. Ret expression is reported in several regions of the central nervous system; in the developing cranial nerve ganglia and a subset of cells within dorsal root ganglia, in motor neurons in the spinal cord and hindbrain, in neuroretina and the growing tips of the renal collecting ducts in developing kidney. Some individuals with Hirschsprung's disease have severe developmental abnormalities of the kidney and these phenotypic abnormalities may be linked with mutations of ret proto-oncogene. About 70 percent of individuals who carry one of the documented ret mutations that predispose to multiple endocrine neoplasia type II (MENII) will develop thyroid C cell derived tumors in their lifetime.

### Product Specific Information

NCL-RET was raised to the intracellular domain of the molecule, present in all isoforms of the protein. Mutations are reported to occur upstream of this domain.



Human small intestine: immunohistochemical staining for ret oncoprotein using NCL-RET. Note cytoplasmic staining of enteric ganglion cells. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Novocastra **Retinoblastoma Gene Protein**

## Clone 13A10

1 mL, 0.1 mL lyophilized NCL-RB-358 **F P (HIER) W**
1 mL liquid NCL-L-RB-358 **F P (HIER) W**

## Clone 1F8

1 mL lyophilized NCL-RB **F P (HIER) W**

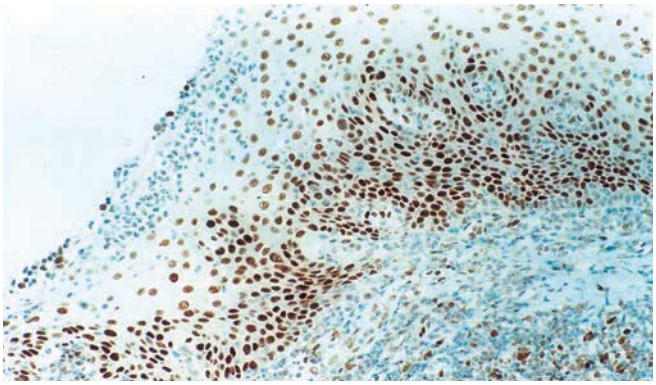
*Clone 13A10 was developed to produce superior staining on paraffin sections.*

### Antigen Background

Retinoblastoma (Rb) is a rare tumor of the retina associated with mutations of chromosome 13. The nuclear phosphoprotein encoded by the Rb tumor suppressor gene is present in many cells and may indirectly regulate cell growth by activating the transcription factor ATF-2. Activation of ATF-2 initiates expression of TGF-beta2, which in turn inhibits transcription of genes affecting cell growth. Bilateral mutation of the Rb gene may potentially play a role in the development of a number of malignant tumors.

### Product Specific Information

NCL-RB-358 was raised to the N-terminal region of the Rb gene protein.



Human tonsil: immunohistochemical staining for retinoblastoma gene protein using NCL-RB-358. Note intense nuclear staining of epithelial cells. Paraffin section.

# Novocastra **RHAMM (CD168)**

## Clone 2D6

1 mL lyophilized NCL-CD168 **F P (HIER)**

Refer to page 125 for further information about CD168.

# Novocastra **S-100**

## Clone S1/61/69

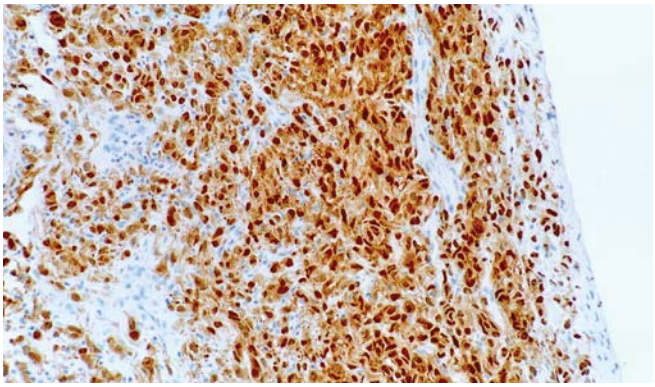
1 mL, 0.1 mL lyophilized NCL-S100 **F P**

## Polyclonal

1 mL lyophilized NCL-S100p **F P**
1 mL, 0.1 mL liquid polyclonal NCL-L-S100p **F P** New!
7 mL ready-to-use RTU-S100p **F P**
7 mL BOND ready-to-use PA0900 **P (Enzyme)**

### Antigen Background

S-100A and S-100B proteins are two members of the S-100 family of proteins. S-100A is composed of an alpha and beta chain whereas S-100B is composed of two beta chains. S-100 protein is reported to be expressed in neuroectodermal tissue, including nerves and melanocytes. Langerhans cells in skin and interdigitating reticulum cells in the paracortex of lymph nodes are also reported to express S-100 protein. It is noteworthy that S-100 protein is highly soluble and may be eluted from frozen tissue during immunohistochemical procedures.



Human lung, metastatic melanoma: immunohistochemical staining for S-100 using NCL-L-S100p. Note nuclear and cytoplasmic staining of metastatic melanocytes. Paraffin section.

# Novocastra **Sarcoglycan Antibodies**

**Clone Ad1/20A6**
1 mL, 0.1 mL lyophilized sarcoglycan, alpha (adhalin)
NCL-a-SARC **F W E**
1 mL liquid sarcoglycan, alpha (adhalin)
NCL-L-a-SARC **F W E**

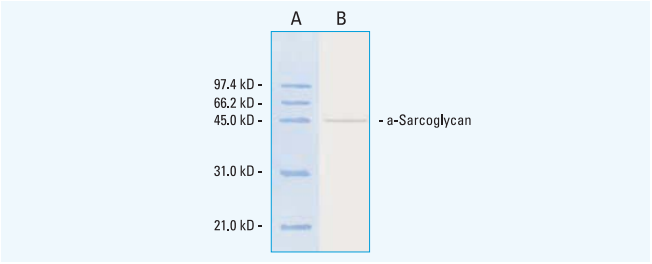
**Clone βSarc1/5B1**
1 mL, 0.1 mL lyophilized sarcoglycan, beta
NCL-b-SARC **F E**
1 mL liquid sarcoglycan, beta NCL-L-b-SARC **F E**

**Clone δSarc3/12C1**
1 mL lyophilized sarcoglycan, delta NCL-d-SARC **F W**

**Clone 35DAG/21B5**
1 mL, 0.1 mL lyophilized sarcoglycan, gamma
NCL-g-SARC **F E**

**Antigen Background**

In normal skeletal muscle, dystrophin, the protein product of the gene which is defective in Duchenne and Becker muscular dystrophy, is attached to the muscle membrane via a complex of at least seven proteins (dystrophin associated glycoproteins, DAGs). Dystrophin-deficient muscle shows a generalized reduction in DAG labeling. Recent studies have shown that expression of different members of the dystrophin glycoprotein complex are altered in several types of muscular dystrophy: the picture is complex and disease classification is currently under review. For example, individuals with LGMD2D have mutations in the gene for alpha-sarcoglycan, those with LGM2E have mutations in the beta-sarcoglycan gene, and those with LGM2F have mutations in the delta-sarcoglycan gene. Also, many individuals with severe childhood autosomal recessive muscular dystrophy (SCARMD) show defective expression in the sarcoglycan subgroup of complex proteins which includes alpha-sarcoglycan (adhalin) and gamma sarcoglycan. As the sarcoglycans function together as a subcomplex, individuals with mutations in any one of the sarcoglycan genes usually show reduced expression for the whole group, but the reduction may be most severe for the mutated single protein. Labeling for beta-spectrin is necessary to monitor membrane integrity.




Western blot: detection of alpha-sarcoglycan (50 kD) using NCL-L-a-SARC. Lane A, molecular weight markers. Lane B, human muscle extract immunoblotted with NCL-L-a-SARC.

# Novocastra **Serotonin**

**Polyclonal**
0.5 mL liquid NCL-L-SEROTp **P**
7 mL BOND ready-to-use PA0736 **P (HIER)**

**Antigen Background**

Serotonin (5-hydroxytryptamine, 5-HT) is reported to be a widely distributed neurotransmitter and hormone in the mammalian peripheral and central nervous system (CNS). Serotonin is formed by the decarboxylation of 5-hydroxy-tryptophan, its intermediate, which in turn is formed by hydroxylation of L-tryptophan by tryptophan hydroxylase. In the CNS, the action of serotonin is terminated by reuptake into the presynaptic terminal by specific serotonin transporters. Serotonin has been implicated in several neuropsychiatric disorders such as anxiety, depression and schizophrenia. The majority of serotonergic nerve terminals in the CNS originate in neuronal cell bodies of the Raphé nuclei (dorsal, median), nucleus Raphé obscurus and nucleus Raphé pallidus in the brainstem which project to specific areas of the brain and spinal cord. Serotonin is thought to be an inhibitory neurotransmitter regulating a wide range of sensory, motor and cortical functions in the CNS. In the periphery, serotonin is reported to be present in neural and non-neural structures such as platelets, gastro-intestinal tract (myenteric plexus, enterochromaffin cells), lungs (neuroepithelial cells), thyroid gland and spleen.

# Novocastra **Sialyl Lewis[a] (CA19-9)**

**Clone C241:5:1:4**
1 mL lyophilized NCL-CA19-9 **F P (HIER)**
1 mL liquid NCL-L-CA19-9 **F P (HIER)**
7 mL BOND ready-to-use PA0424 **P (HIER)**

Refer to page 101 for further information about CA19-9.

# Novocastra **SMA (Alpha Smooth Muscle Actin)**

**Clone αsm-1**
1 mL lyophilized NCL-SMA **F P (Enzyme) W**
7 mL ready-to-use RTU-SMA **F P (Enzyme)**
7 mL BOND ready-to-use PA0943 **P**

Refer to page 95 for further information about Alpha Smooth Muscle Actin.

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# Novocastra **Spectrin Antibodies**

**Clone RBC2/3D5**
1 mL, 0.1 mL lyophilized NCL-SPEC1 **F W E**

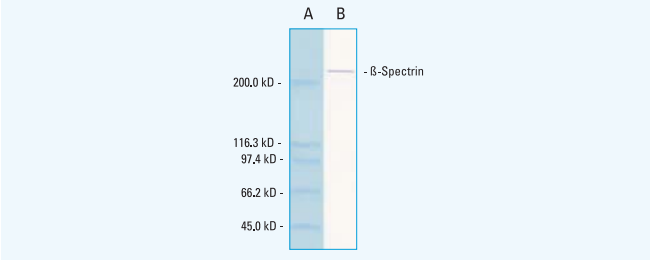
**Clone RBC1/5B1**
1 mL lyophilized Spectrin (broad spectrum) NCL-SPEC2 **F**

### Antigen Background

Spectrin is a cytoskeletal protein which has some structural homology with dystrophin, the protein that is defective in Duchenne and Becker muscular dystrophy. Subtle membrane damage frequently occurs during the excision and freezing of muscle samples. Labeling for spectrin is necessary to monitor membrane integrity. It is reported that fibers which show negative labeling for both dystrophin and spectrin are damaged (or in the early stages of regeneration), whereas fibers which are negative for dystrophin but positive for spectrin reflect true abnormalities of dystrophin expression.

### Product Specific Information

NCL-SPEC1 and NCL-SPEC2 recognize the beta chain of spectrin in erythrocytes and muscle. NCL-SPEC1 reacts with human beta-spectrin whereas NCL-SPEC2 reacts moderately with human beta-spectrin and weakly with rabbit, rat, mouse and dog beta-spectrin.



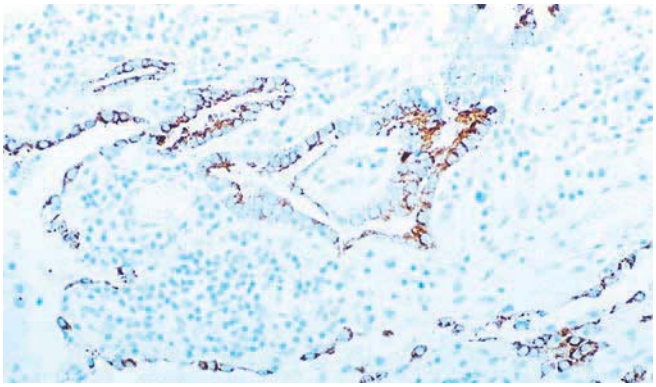

Western blot: detection of human beta-spectrin (253 kD in muscle) using NCL-SPEC1. Lane A, molecular weight markers. Lane B, urea extract of human muscle immunoblotted with NCL-SPEC1.

# Novocastra **Surfactant Precursor Protein B**

**Clone 19H7**
1 mL lyophilized NCL-SPPB **P (HIER)**

### Antigen Background

Pulmonary surfactant is a phospholipid-rich mixture that reduces the surface tension at the alveolar air-liquid interface, providing alveolar stability necessary for normal ventilation. Four distinct proteins which have been isolated from pulmonary surfactant are SP-A, SP-B, SP-C and SP-D. Surfactant precursor protein B (pro-SP-B) with a molecular weight of 42 kD undergoes proteolytic processing resulting in a 9 kD non-collagenous hydrophobic pulmonary surfactant, SP-B. SP-B mRNA has been detected in both type II cells and in bronchiolar epithelial cells of adult human, mouse, rat and rabbit lung.



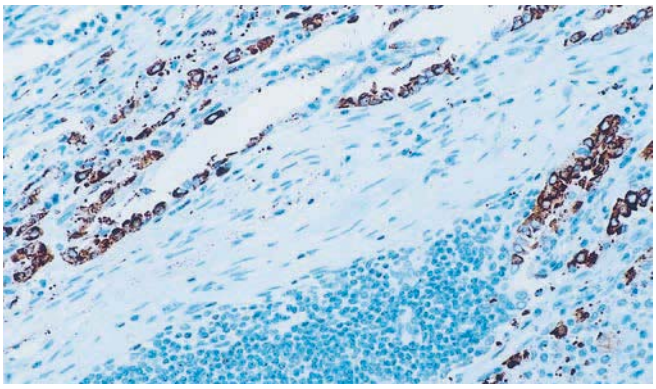
Human lung adenocarcinoma: immunohistochemical staining for surfactant precursor protein B using NCL-SPPB. Note cytoplasmic staining of Clara cells and extracellular protein. Paraffin section.

# Novocastra **Surfactant Protein A**

**Clone 32E12**
1 mL, 0.1 mL lyophilized NCL-SP-A **P (HIER)**

### Antigen Background

Pulmonary surfactant plays a critical role in maintaining the structural integrity of the respiratory epithelium by reducing surface tension during expiration. It is a lipoprotein complex which is synthesized and secreted into the alveoli of the lung by type II pneumocytes. Lung surfactant protein-A (SP-A) is a major phospholipid-associated glycoprotein in surfactant and is a member of the C-type lectin superfamily that also inhibits lipid secretion and enhances the uptake of phospholipid by alveolar type II cells. Levels of SP-A in amniotic fluid are reported to reflect the degree of fetal lung maturity and inadequate levels of surfactant at birth, a frequent occurrence in premature infants, results in respiratory failure.



Human lung adenocarcinoma: immunohistochemical staining for surfactant protein A using NCL-SP-A. Note intense cytoplasmic staining of type II pneumocytes and alveolar macrophages. Paraffin section.

# Novocastra **Synaptic Vesicle Protein 2**

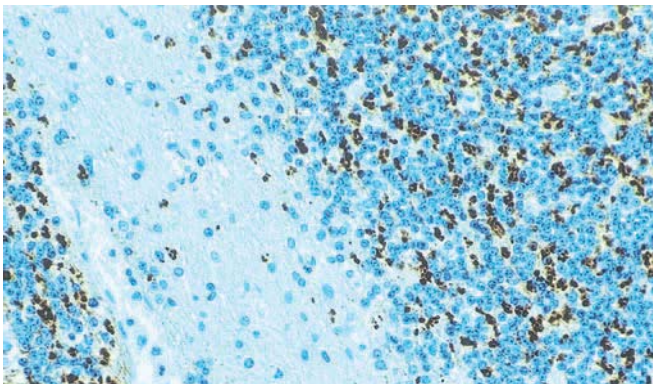
**Clone 15E11**
1 mL lyophilized NCL-SV2 **P (HIER)**

**Antigen Background**

Synaptic vesicle protein 2 (SV2) is an integral membrane glycoprotein. It is required for normal neurotransmission and may play a role in the regulation of calcium-stimulated exocytosis. SV2 exists in three isoforms, SV2A, SV2B and SV2C, each containing 12 transmembrane spanning regions. SV2 proteins are reported to be among the most abundant and conserved components of synaptic vesicles in vertebrates. They are present on all small synaptic vesicles independent of transmitter type. SV2A and SV2B are reported to be widely distributed in the nervous system, whereas SV2C is only observed in a small number of neurons in a few areas of the brain. In the brain, SV2A is reported to be expressed at the highest levels in subcortical regions, whereas the highest level of expression of SV2B is in the cortex and hippocampus. SV2 is also reported to be expressed on secretory vesicles of neuroendocrine cells in the gastrointestinal tract, pancreas, anterior pituitary gland, thyroid, parathyroid and adrenal medulla and also in exocrine chief cells of gastric mucosa.

**Product Specific Information**

NCL-SV2 is raised to the N-terminal cytoplasmic region of the SV2A isoform.



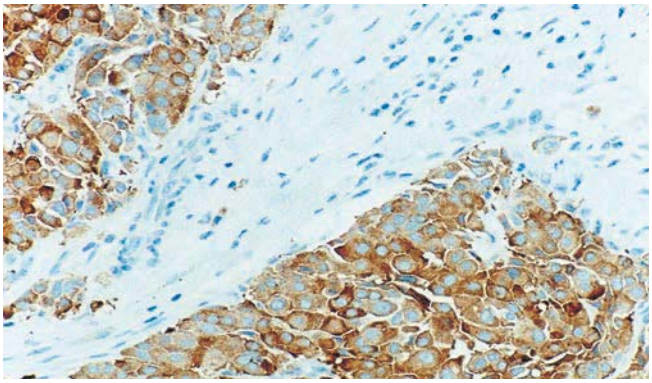
Human cerebellum: immunohistochemical staining for synaptic vesicle protein 2 using NCL-SV2. Note staining of neuronal processes. Paraffin section.

# Novocastra **Synaptophysin**

**Clone 27G12**
1 mL, 0.1 mL lyophilized NCL-SYNAP-299 **F P (HIER) W**
1 mL liquid NCL-L-SYNAP-299 **F P (HIER) W**
7 mL ready-to-use RTU-SYNAP-299 **F P (HIER)**
7 mL BOND ready-to-use PA0299 **P (HIER)**

**Antigen Background**

Synaptophysin is an integral membrane glycoprotein with a molecular weight of 38 kD. It is reported to occur in presynaptic vesicles of neurons in brain, spinal cord, retina, in similar vesicles of the adrenal medulla as well as in neuromuscular junctions. Synaptophysin may be involved in synaptic vesicle formation and exocytosis. Synaptophysin is reported to be expressed in a wide spectrum of neuroendocrine tumors including neuro-blastomas, ganglioneuroblastomas, phaeochromocytomas, chromaffin and non-chromaffin paragangliomas. Synaptophysin is also reported to be expressed in neuroendocrine tumors of epithelial type including pituitary adenomas, islet cell tumors, medullary carcinomas of thyroid, parathyroid adenomas, carcinoids of the bronchopulmonary and gastrointestinal tracts, neuroendocrine carcinomas of the bronchopulmonary and gastrointestinal tract and neuronendocrine carcinomas of the skin.



Breast carcinoma showing neuroendocrine differentiation: immunohistochemical staining for synaptophysin using NCL-SYNAP-299. Note cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **Syndecan 1 (CD138)**

**Clone MI15**
7 mL BOND ready-to-use PA0088 **P (HIER)**

Refer to page 123 for further information about CD138.

# Novocastra **Synuclein, Alpha**

**Clone KM51**
1 mL lyophilized NCL-ASYN **P (HIER)**
1 mL liquid NCL-L-ASYN **P (HIER)**

Refer to page 95 for further information about Alpha-Synuclein.

# Novocastra **Tartrate-Resistant Acid Phosphatase (TRAP)**

**Clone 26E5**
1 mL, 0.1 mL lyophilized NCL-TRAP **P (HIER)**
7 mL BOND ready-to-use PA0093 **P (HIER)**

**Antigen Background**

Tartrate-resistant acid phosphatase (TRAP) is a basic, iron-binding protein with high activity towards phosphoproteins, ATP and 4-nitrophenyl phosphate. This isoenzyme has been reported through different applications to be expressed in human alveolar macrophages, osteoclasts, spleen and liver. Expression of TRAP is reported to be increased in the spleen and monocytes of individuals with Gaucher's disease, Hodgkin's disease and the sera of individuals undergoing active bone turnover. Elevated levels are also reported to be associated with various B cell and T cell leukemias and lymphomas, decidual cells, syncytiotrophoblasts and some macrophages distributed throughout maternal and embryonic tissues.

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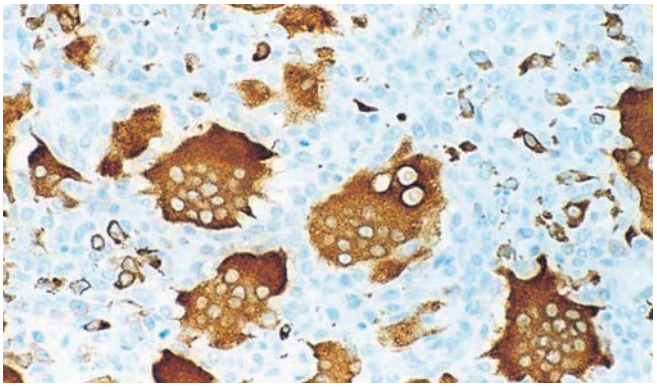


Human osteoclastoma: immunohistochemical staining for tartrate-resistant acid phosphatase using NCL-TRAP. Note intense cytoplasmic staining of osteoclasts. Paraffin section.

## Novocastra **Tau**

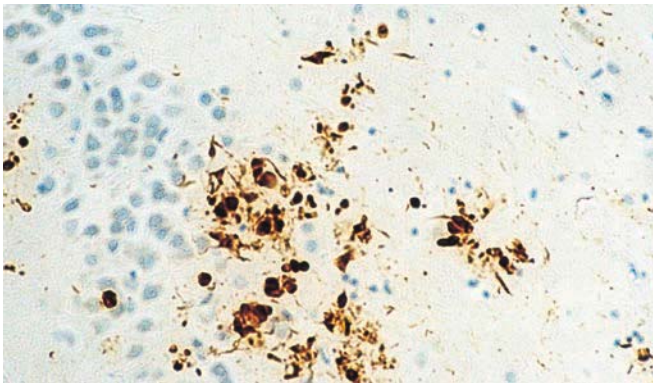
**Clone Tau-2**
1 mL, 0.1 mL lyophilized NCL-Tau-2 **P (HIER)**

**Antigen Background**

The brain tissues from individuals with Alzheimer's disease are characterized by an abundance of neurofibrillary tangles, neuropil threads and abnormal neurites in senile plaques. Tangles represent dense accumul-ations of ultrastructurally distinct paired helical filaments whose major component is a microtubule-associated tau protein.

**Product Specific Information**

NCL-Tau-2, raised against the bovine tau protein, cross-reacts with the phosphorylated form of human tau protein.



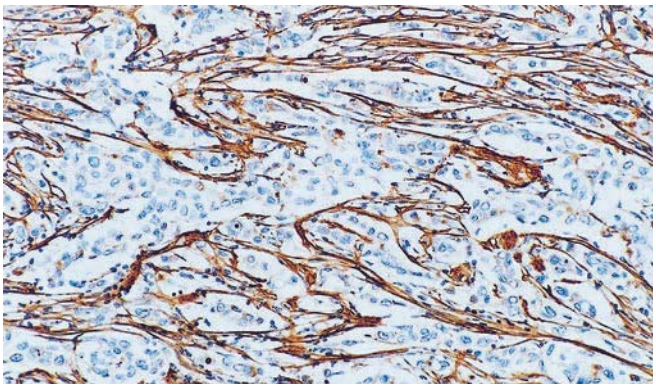
Human brain, Alzheimer's disease: immunohistochemical staining for tau protein using NCL-Tau-2. Note intense staining of senile plaques and the surrounding dystrophic neurites. Paraffin section.

## Novocastra **Tenascin C**

**Clone 49**
1 mL lyophilized NCL-TENAS-C **F P (HIER+Enzyme)**

**Antigen Background**

Tenascin is a high molecular weight glycoprotein which has a unique molecular structure containing domains homologous to epidermal growth factor, fibronectin and fibrinogen. There are at least five members of the tenascin family, tenascin C (TN-C), TN-R, TN-X, TN-Y and TN-W4. Tenascin C was originally called tenascin. Tenascin itself was previously known as myotendinous antigen and is thought to play a role in organizing the growth of the extracellular matrix eg in wound healing. In addition, the presence of tenascin on type III fibers on the inner periosteum and outer cortex of bone appears to be important for normal osteogenesis. The expression of tenascin is reported to correlate with cell proliferation and migration. Like fibronectin, tenascin is a cell-substrate adhesive molecule that shares the 'arginine-glycine-aspartic acid' sequence necessary for ligand recognition by most integrins.



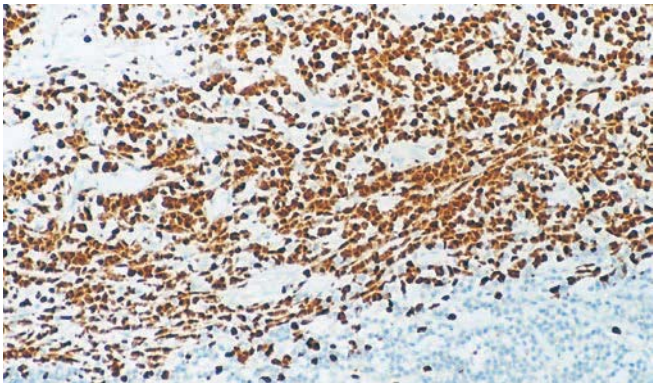
Human breast carcinoma: immunohistochemical staining for tenascin using NCL-TENAS-C. Note intercellular matrix staining around malignant cells. Paraffin section.

## Novocastra **Terminal Deoxynucleotidyl Transferase**

**Clone SEN28**
1 mL, 0.1 mL lyophilized NCL-TdT-339 **P (HIER) W**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-TdT-339 **P (HIER) W**
7 mL BOND ready-to-use PA0339 **P (HIER)**

**Antigen Background**

Terminal deoxynucleotidyl transferase (TdT) is a DNA polymerase of 58 kD located in the cell nucleus which catalyzes the polymerization of deoxynucleotides at the 3' hydroxyl ends of oligo or polydeoxynucleotide initiators and functions without a template. TdT is reported to be expressed in primitive T and B lymphocytes of the normal thymus and bone marrow. The identification of TdT-positive cell populations in primary and secondary lymphoid organs during maturation of the immune system is one area of interest but it is the reported occurrence of high levels of enzyme activity in white blood cells and bone marrow in certain leukemias which is of particular interest.



Human lymphoblastic lymphoma: immunohistochemical staining for terminal deoxynucleotidyl transferase using NCL-TdT-339. Note intense nuclear staining of tumor cells. Paraffin section.

## Novocastra **Thrombomodulin (CD141)**

**Clone 15C8**
1 mL, 0.1 mL lyophilized NCL-CD141 **F P (HIER)**

**Antigen Background**

Thrombomodulin is a transmembrane glycoprotein of 75 kD which can accelerate the activation of protein C. Activated protein C functions as an anticoagulant by combining with protein S to inactivate factors Va and VIIIa of the blood coagulation pathway and by binding thrombin. Several factors regulate thrombomodulin expression. Downregulation of thrombomodulin may be induced by the cytokine interleukin-1, tumor necrosis factor and endotoxin. Agents which increase cyclic AMP such as forskolin may upregulate thrombomodulin activity in endothelial cells. Thrombomodulin has been identified within a number of normal tissues. These include the lining cells of arteries, veins, capillaries and the lymphatics as well as mesothelial cells, meningeal lining cells, synovial cells, syncytiotrophoblasts, megakaryocytes and platelets.

## Novocastra **Thyroglobulin**

**Clone 1D4**
1 mL liquid NCL-L-THY **F P**
7 mL BOND ready-to-use PA0025 **P**

**Antigen Background**

Thyroglobulin is a heavily glycosylated protein of 670kD composed of two identical subunits and is synthesised by the follicular epithelial cells of the thyroid. Thyroglobulin provides iodination sites for the formation of the thyroid hormones.

## Novocastra **Thyroid Peroxidase**

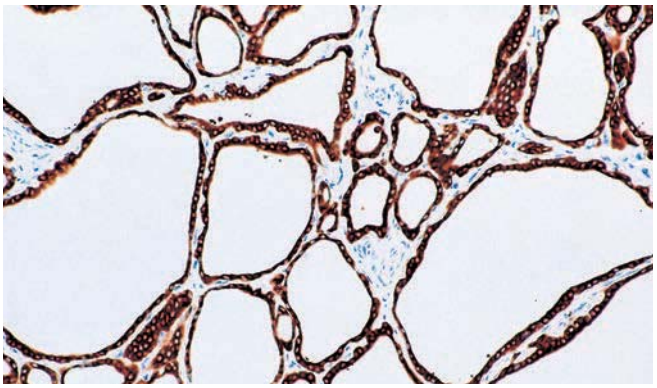
**Clone AC25**
1 mL liquid NCL-L-TPO **P (HIER)**

**Antigen Background**

Thyroid Peroxidase gene expression is under the regulation of thyroid stimulating hormone (TSH). In normal thyroid, expression of Thyroid Peroxidase (TPO) described immunohistochemically is reported to produce a diffuse, fine, granular cytoplasmic stain in all follicular cells. Some studies have shown qualitative, as well as quantitative differences in thyroid peroxidase expression in thyroid cancer compared to normal tissue.

**Product Specific Information**

NCL-L-TPO stains optimally when used in TBS-based wash buffer and diluent systems.



Thyroid, Grave's disease: immunohistochemical staining for thyroid peroxidase using NCL-L-TPO. Note intense cytoplasmic staining of thyroid epithelial cells. Paraffin section.

## Novocastra **Thyroid Stimulating Hormone**

**Clone QB2/6**
1 mL lyophilized NCL-TSH **F P (Enzyme)**
7 mL BOND ready-to-use PA0776 **P (Enzyme)**

**Antigen Background**

Thyroid stimulating hormone (TSH) is a pituitary hormone of 28 kD which stimulates thyroid growth and production of thyroid hormones. TSH is reported to be expressed in thyrotrophic cells of the pituitary and pituitary adenomas.

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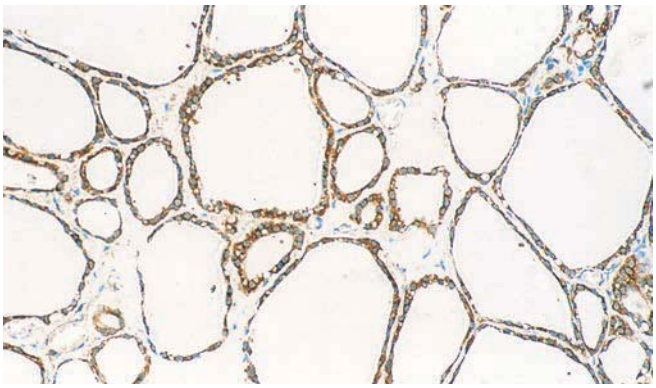
# Novocastra **Thyroid Stimulating Hormone Receptor**

**Clone 4C1/E1/G8**
1 mL lyophilized NCL-TSH-R2 **F P**

### Antigen Background

The thyroid stimulating hormone receptor (TSHR) is an important molecule for the control of growth and function of normal thyroid and in humans it is frequently an autoimmune target. In normal human thyroid tissues, TSHR is reported to be detected exclusively along the basal cell surface of the follicular cells with no expression observed in apical and lateral cell surfaces.



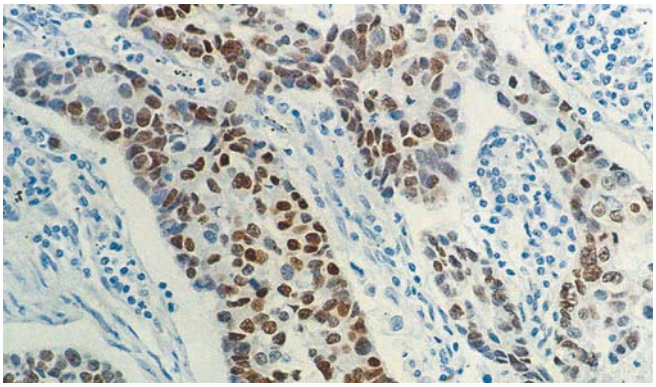
Normal human thyroid gland: immunohistochemical staining for thyroid stimulating hormone receptor using NCL-TSH-R2. Note cytoplasmic staining of thyroid epithelial cells. Paraffin section.

# Novocastra **Thyroid Transcription Factor-1**

**Clone SPT24**
1 mL, 0.1 mL lyophilized NCL-TTF-1 **F P (HIER) W**
1 mL liquid NCL-L-TTF-1 **F P (HIER) W**
7 mL BOND ready-to-use PA0364 **P (HIER)**

### Antigen Background

Thyroid transcription factor-1 (TTF-1) is a member of the homeodomain transcription factor family and plays a role in regulating genes expressed within the thyroid, lung and brain. These include thyroglobulin, thyroid peroxidase, Clara cell secretory protein and surfactant proteins. Human TTF-1 (38 kD) is a single polypeptide of 371 amino acids sharing 98 percent homology with the equivalent rat and mouse proteins. TTF-1 functions by binding to specific recognition sites in a manner that may be regulated by both the redox and phosphorylation status of the protein. In addition to its role as a tissue-specific transcriptional activator in adult organs, TTF-1 may also function in organogenesis. Gene targeting studies have shown TTF-1 to be essential for the proper development of the thyroid and lungs and abnormal expression may underline a number of congenital abnormalities.



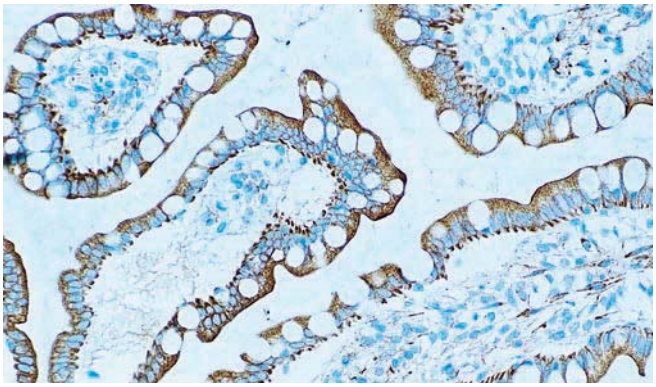
Human pulmonary adenocarcinoma: immunohistochemical staining for thyroid transcription factor-1 using NCL-TTF-1. Note nuclear staining in a proportion of tumor cells. Paraffin section.

# Novocastra **Tissue Inhibitor of Matrix Metalloproteinase Antibodies**

**Clone 6F6a**
1 mL lyophilized Tissue Inhibitor of Matrix Metalloproteinase 1 NCL-TIMP1-485 **P (HIER) W**

**Clone 46E5**
1 mL lyophilized Tissue Inhibitor of Matrix Metalloproteinase 2 NCL-TIMP2-487 **P (HIER) W**

The tissue inhibitors of metalloproteinases (TIMPs) are natural inhibitors of matrix metalloproteinases (MMPs), a group of zinc-binding endopeptides involved in degradation of the extracellular matrix (ECM). The remodelling of the ECM in a controlled fashion is essential during normal development and is a feature of physiological remodelling such as in wound healing. Tumor cell invasion and metastasis closely correlate with the activities of two MMPs, MMP2 and MMP9, both of which degrade type IV collagen in basement membranes. TIMPs constitute a family of at least four types of protein of which two of these are expressed in a wide variety of cell types. Although TIMP2 inhibits all types of activated MMPs to varying degrees, it is known to preferentially inhibit MMP2. TIMP2 also binds to proMMP9 and proMMP2 to form stable complexes in which activation of the proenzymes occur. Studies have revealed that TIMP2 can inhibit the invasive potential of tumor cells in vitro and their metastatic phenotype in vivo.



Human small intestine: immunohistochemical staining for tissue inhibitor of matrix metalloproteinase 1 using NCL-TIMP1-485. Note cytoplasmic staining of epithelial cells. Paraffin section.

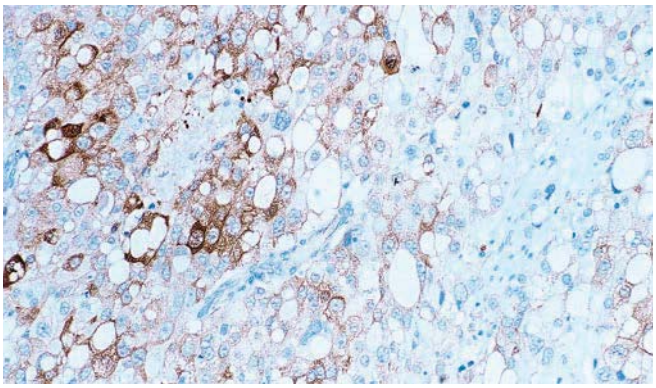
# Novocastra **TNF-Related Apoptosis-Inducing Ligand (TRAIL)**

## Clone 27B12

1 mL lyophilized NCL-TRAIL **P (HIER) W**

### Antigen Background

TRAIL (TNF-related apoptosis-inducing ligand), or APO-2L, is a 281 amino acid cytotoxic protein closely related to Fas/APO-1 ligand with the characteristic structure of a type II membrane protein. TRAIL induces extensive apoptosis in lymphoid as well as nonlymphoid tumor cell lines. Two TRAIL membrane receptors, DR4 and DR5, have been identified which are capable of mediating apoptosis and are distinct from Fas/APO-1 and TNF receptors. TRAIL-induced apoptosis in target cells is mediated by the activation of caspases. Normal tissues are resistant to TRAIL as they are reported to express high levels of decoy membrane receptors, DcR1/TRID and DcR2/TRUNDD which antagonize TRAIL-induced apoptosis. TRAIL induces apoptosis in a number of different tumor cell types because most transformed cells express little DcR1. TRAIL mRNA is expressed in spleen, lung, prostate, ovary and bowel with little expression in testis, heart, skeletal muscle and pancreas. TRAIL protein is reported to be expressed on CD4 and CD8 positive T lymphocytes following activation and is also predominant in first trimester placental syncytiotrophoblasts as well as Hofbauer cells.



Human prostatic carcinoma: immunohistochemical staining for TNF-related apoptosis-inducing ligand using NCL-TRAIL. Note cytoplasmic staining of a proportion of malignant cells. Paraffin section.

# Novocastra **Topoisomerase I**

## Clone 1D6

1 mL lyophilized NCL-TOPO I **F P (HIER)**

### Antigen Background

Topoisomerases are nuclear enzymes involved in a variety of cellular activities such as chromosomal condensation, DNA replication, transcription, recombination and segregation at mitosis. Human topoisomerase I is a 100 kD protein capable of relaxing positively and negatively supercoiled DNA by performing a transient single-stranded nick which is then re-ligated at the end of the reaction. It has been shown that the enzyme is located in regions of the genome that are undergoing active RNA synthesis where it probably reduces superhelical stresses in the DNA enabling RNA polymerase to function properly. In normal eukaryotic cells, DNA topoisomerase I does not show relevant fluctuations across the cell cycle, unlike DNA topoisomerase II alpha. Both DNA topoisomerases I and II have been found to be targets of autoantibodies in the sera of individuals with certain autoimmune diseases eg systemic lupus erythematosus and also of some anti-tumor drugs and antibiotics. Elevated levels of DNA topoisomerase I, detected by $^{32}P$ transfer assays, have been reported in colorectal tumors compared with normal colon mucosa as a result of increased transcription or mRNA stability.

### Product Specific Information

The use of phosphate-containing wash buffers or diluents with NCL-TOPO I has an adverse effect on staining. Only Tris-containing wash buffers or diluents should be used.

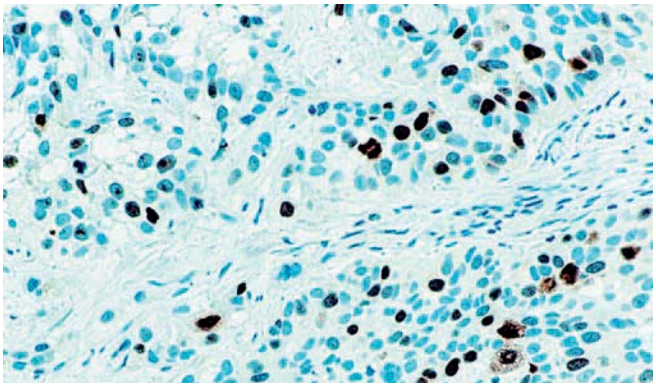
# Novocastra **Topoisomerase II Alpha**

## Clone 3F6

1 mL, 0.1 mL lyophilized NCL-TOPOIIA **F P (HIER) W**

### Antigen Background

Topoisomerase II alpha is an essential nuclear enzyme involved in DNA replication and is a target for many anti-cancer drugs used for cancer therapy. Decreased expression of topoisomerase II alpha is the predominant mechanism of resistance to several chemotherapeutic agents. A significant variation in the range of expression of this protein has been reported in many different tumors. Reports of the analysis of primary breast tumors have indicated that topoisomerase II beta is more widely expressed than topoisomerase II alpha. Topoisomerase II alpha expression and activity is linked to the cell cycle and is associated with the proliferation status of cells.



Human bladder tumor: immunohistochemical staining for topoisomerase II alpha using NCL-TOPOIIA. Note intense nuclear staining of malignant cells and occasional mitotic figures. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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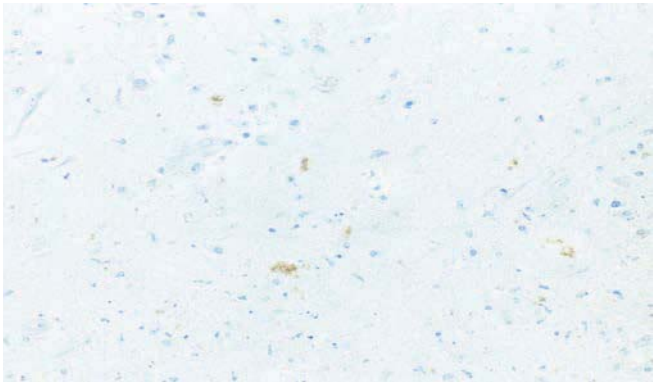
# Novocastra *Toxoplasma gondii* P30 Antigen

**Clone TP3**
1 mL lyophilized NCL-TG **P (HIER)**

**Antigen Background**

Toxoplasma gondii is a ubiquitous protozoan parasite which can infect healthy humans, often asymptomatically, but may also cause severe congenital defects in the fetus and life-threatening infection in immunocompromised hosts. It has been shown that P30, also referred to as SAG-1, the major surface antigen of Toxoplasma gondii tachyzoites is involved in the first steps of invasion. This antigen has been reported to have generated interest as a potential subunit for vaccine production. P30 is a highly conserved antigen between most strains.



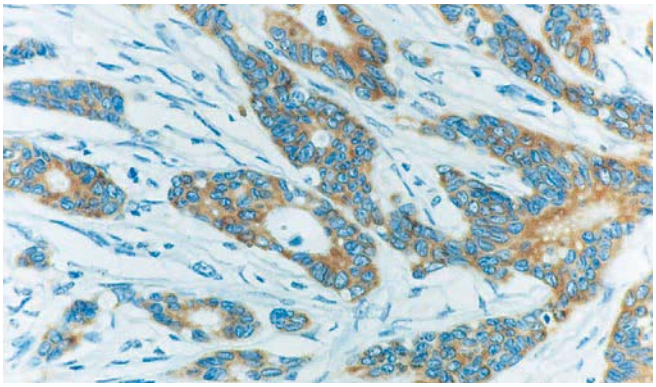
Infected human brain: immunohistochemical staining for Toxoplasma gondii P30 antigen using NCL-TG. Note staining of the parasites in infected areas. Paraffin section.

# Novocastra Transforming Growth Factor Beta

**Clone TGFB17**
1 mL, 0.1 mL lyophilized NCL-TGFB **P (HIER)**

**Antigen Background**

Transforming growth factor beta (TGFB) is a potent cell regulatory polypeptide homodimer of 25 kD. It variably affects cell growth, differentiation and other aspects of cellular metabolism such as extracellular matrix production. Its effect depends upon the cell type and other growth factors present but in general, TGFB inhibits the growth of epithelial cells and stimulates the growth of mesenchymal cells. Most breast lesions, benign and malignant, involve abnormal proliferation and altered architecture of stromal and/or epithelial elements. Inflammatory cells present in the earliest lesions of progressive systemic sclerosis (PSS) are reported to release TGFB possibly resulting in chemotactic recruitment of additional chronic inflammatory cells. Platelets, a rich source of TGFB, are known to exhibit aggregability and may contribute to the etiology of PSS.



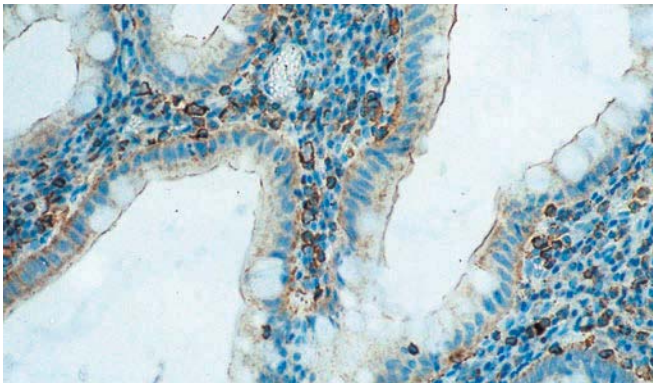
Human breast carcinoma: immunohistochemical staining for transforming growth factor beta using NCL-TGFB. Note cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra Transforming Growth Factor Beta Receptor (Type 1)

**Clone 8A11**
1 mL lyophilized NCL-TGFBR1 **P (HIER)**

**Antigen Background**

Transforming growth factor beta (TGFB) inhibits cell proliferation and stimulates cell differentiation. This is achieved through a receptor complex of types I and II TGFB receptors. The type II receptor is a transmembrane serine/threonine kinase which is able to bind TGFB and trans activate the type I receptor. TGFB receptors are reported to be expressed in all myometrial tissues and, in the kidney, they are found exclusively in renal tubular cells. In normal gastric mucosa, type I and type II receptors are expressed in fundic glands but not on the surface mucous cells and in normal small bowel and colon, TGFB receptors are expressed in the epithelial cells of the upper crypts.



Human colon, ulcerative colitis: immunohistochemical staining for transforming growth factor beta receptor (type 1) using NCL-TGFBR1. Note membrane staining of a proportion of epithelial cells and lymphocytes. Paraffin section.

# Novocastra **Troponin Antibodies**

**Clone 1A2**
1 mL lyophilized troponin C NCL-TROPC **P**

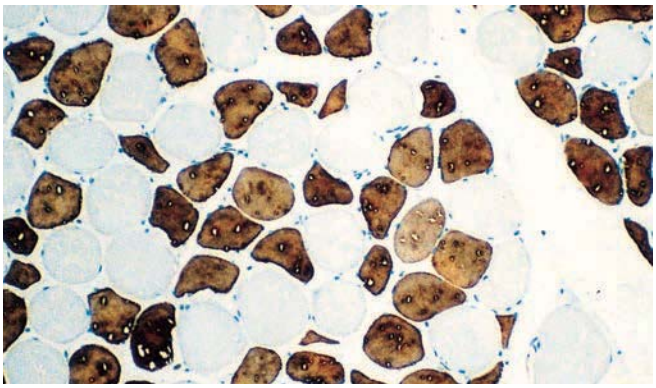
**Clone T1/61**
1 mL lyophilized troponin C NCL-TROPT **F P (Enzyme) W**

### Antigen Background

Troponin comprises three protein subunits, troponin C, troponin I and troponin T. It is a contractile protein which comprises 5 percent of muscle proteins. Troponin C, an 18 kD protein, binds calcium and is responsible for regulating the process of thin filament activation during skeletal muscle contraction. Troponin I, a 21 kD protein, is the inhibitory subunit of the complex and troponin T is responsible for binding the troponin subunits to tropomyosin, a 66 kD protein that links the troponin complex to the actin helix. The troponin C gene is reported to be expressed in three distinct striated muscle lineages; cardiac myocytes, embryonic fast skeletal myotubules and adult slow skeletal myocytes. Reports have indicated that cardiac myofibers from cardiomyopathic rodent models display decreased $Ca^{2+}$ sensitivity and that this property is a result of an alteration in the troponin/tropomyosin regulatory complex in the fibers.

### Product Specific Information

NCL-TROPT reacts with human and chicken fast muscle troponin, but not slow muscle troponin T.



Human skeletal muscle: immunohistochemical staining for troponin T using NCL-TROPT. Note intense staining of fast muscle fibers. Paraffin section.

# Novocastra **Tumor Necrosis Factor Receptor-Associated Factor 1**

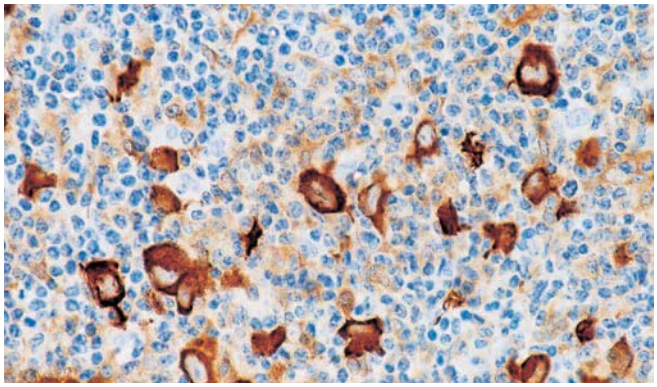
**Clone 7C11**
1 mL liquid NCL-L-TRAF-1 **P (HIER)**

### Antigen Background

TNF receptor-associated factors (Traf) are a family of proteins that bind to surface receptors forming signalling complexes with additional proteins that mediate some cellular responses. Traf-1 can homodimerize or heterodimerize with other Traf proteins leading to the activation of some transcription factors such as nuclear factor kappa B and Jun-N-kinase. The activation of nuclear factor kappa B is known to act in concert with additional proteins to suppress TNF-alpha mediated apoptosis. The expression of this protein is reported to be induced by Epstein-Barr Virus (EBV).

### Product Specific Information

NCL-L-TRAF-1 stains optimally when used in TBS-based wash buffer and diluent systems.



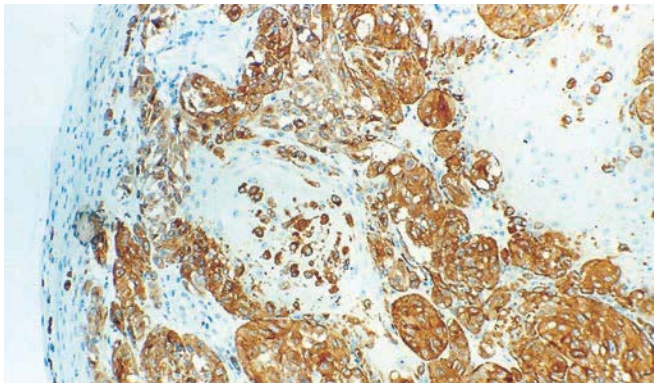
Hodgkin's Lymphoma: immunohistochemical staining for Traf-1 protein using NCL-L-TRAF-1. Note intense membrane staining of Reed Sternberg cells. Paraffin section.

# Novocastra **Tyrosinase**

**Clone T311**
1 mL lyophilized NCL-TYROS **F P (HIER)**
1 mL liquid NCL-L-TYROS **F P (HIER)**
7 mL ready-to-use RTU-TYROS **F P (HIER)**
7 mL BOND ready-to-use PA0322 **P (HIER)**

### Antigen Background

The biosynthesis of melanin within melanocytes involves a family of enzymes, a key member of which is tyrosinase. Tyrosinase deficiency is associated with various forms of albinism and in particular oculocutaneous albinism. L-tyrosine is the initial substrate for melanin biosynthesis and its conversion to dopaquinone is catalyzed by tyrosinase whose expression is reported in melanocytes and melanomas.



Human malignant melanoma: immunohistochemical staining for tyrosinase using RTU-TYROS. Note cytoplasmic staining of tumor cells. Paraffin section.

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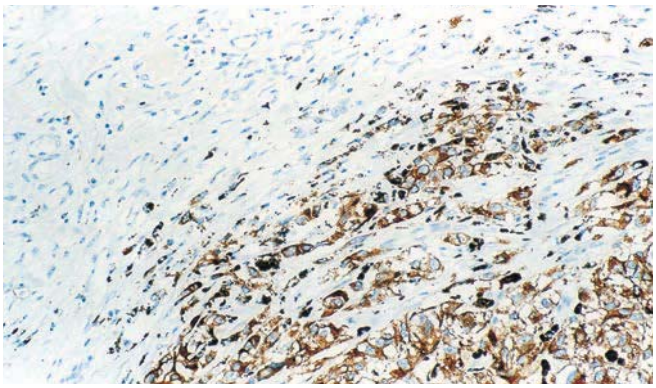
# Novocastra **Tyrosinase-Related Protein-1**

**Clone G3E6**
1 mL lyophilized NCL-TRP-1 **P (HIER)**

**Antigen Background**

Tyrosinase-related protein-1 (TRP-1) is a member of a family of proteins which are involved in melanin biosynthesis. The catalytic function of TRP-1 has not been fully resolved but the enzyme appears to be important in the oxidation of 5,6-dihydroxyindole-2-carboxylic acid to form a high molecular weight pigmented biopolymer. In mammals, there are two basic types of melanin, the brown-black eumelanin and the reddish-yellow phaeomelanin. The concentrations of each are variable and are not related to skin type. In skin exposed to suberythemal doses of UVB, an increase in the number of melanocytes expressing TRP-1 and TRP-2 is reported with no increase in the number of tyrosinase-expressing melanocytes. In normal, untreated skin the number of melanocytes that express either TRP-1, TRP-2 or tyrosinase are similar irrespective of skin type. TRP-1 is also reported to be expressed in more than 50 percent of choroidal melanocytes in the adult eye.



Human malignant melanoma: immunohistochemical staining for tyrosinase-related protein-1 using NCL-TRP-1. Note cytoplasmic staining of tumor cells. Paraffin section.

# Novocastra **Tyrosine Hydroxylase**

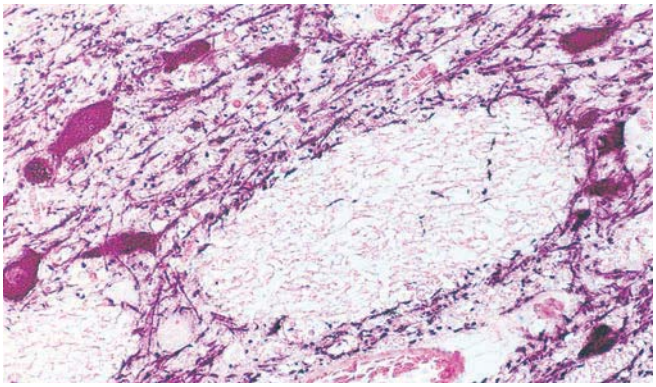
**Clone 1B5**
1 mL lyophilized NCL-TH **P (HIER) W**

**Antigen Background**

Tyrosine hydroxylase is the first enzyme in catecholamine (CA) biosynthesis and catalyzes the conversion of L-tyrosine to L-DOPA. Tyrosine hydroxylase is reported to be expressed in all CA neurons. Despite the abundant data about the distribution of catecholaminergic neurons in a wide variety of species, data on their distribution in the human brain is less comprehensive. However, one such study has reported that tyrosine hydroxylase products in the substantia nigra were restricted to neural bodies, axons and dendrites. These in turn were restricted to the third decade of life and their number increased in this location with age. This finding may be related to ageing of melanin-pigmented neurons.

**Product Specific Information**

NCL-TH is reactive with tyrosine hydroxylase in human, mouse and rat brain tissue.



Human midbrain: immunohistochemical staining of tyrosine hydroxylase enzyme using NCL-TH. Note cytoplasmic staining of catecholaminergic cells and their processes. Paraffin section (Peroxidase substrate: nickel DAB, Counterstain: eosin).

# Novocastra **Ubiquitin**

**Clone FPM1**
1 mL lyophilized NCL-UBIQm **P**

**Antigen Background**

Ubiquitin, a small protein consisting of 76 amino acids, has been reported to be found in all eukaryotic cells studied. It is one of the most conserved proteins known. Ubiquitin is required for ATP-dependent, non-lysosomal intracellular protein degradation, which eliminates most intracellular defective proteins as well as normal proteins with a rapid turnover. Degradation involves covalent binding of ubiquitin to the protein to be degraded and it is believed that in this way ubiquitin acts to label the protein for disposal by intracellular proteases. The most abundant ubiquitin-protein conjugate, however, is ubiquitin-histone H2A. This conjugate is not degraded. Since such ubiquitinated histones are present primarily in actively transcribed chromosomal regions, ubiquitin may play a role in regulation of gene expression.

# Novocastra **Utrophin**

**Clone DRP3/20C5**
2.5 mL, 1 mL lyophilized NCL-DRP2 **F E**

**Antigen Background**

Utrophin, located on chromosome 6, is a ubiquitously expressed homologue of dystrophin and is known as dystrophin-related protein. In normal muscle, utrophin is restricted to neuromuscular junctions. However, in dystrohin-deficient muscle, utrophin expression is reported to be upregulated and appears around the periphery of most fibres. Utrophin has a role as a cell anchoring molecule. The amino terminal region of utrophin binds to the actin cytoskeleton, acting as an intracellular anchor whereas the carboxyl terminal regions bind to a group of proteins anchored in the cell membrane.

# Novocastra **Varicella-zoster virus**

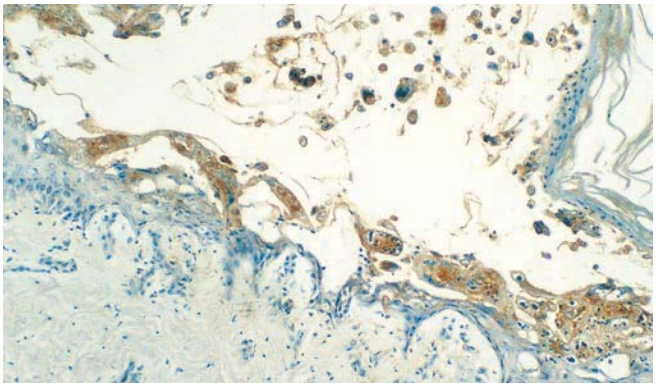
**Clone C90.2.8**
1 mL lyophilized NCL-VZV **P I**

**Antigen Background**

Varicella-zoster virus is a member of the alphaherpesvirinae. It is responsible for two ubiquitous diseases: varicella (chickenpox), an exanthem of childhood, and herpes zoster (shingles), a disabling disease of the elderly and immunocompromised individuals.

**Product Specific Information**

NCL-VZV is specific for Varicella-zoster virus and does not cross-react with Respiratory syncytial virus, Parainfluenza virus types 1, 2, 3 and 4b, Adenovirus, Herpes simplex virus types 1 and 2, Influenza virus types A and B, Mumps virus, Measles virus, echovirus 19, Coxsackie B4 virus and Poliovirus types 1, 2 and 3.

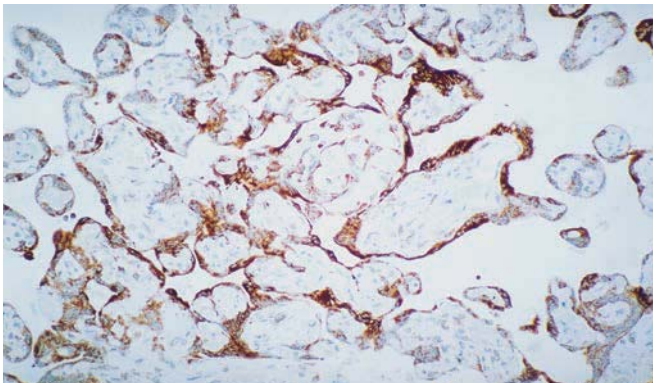


Human skin: immunohistochemical staining for Varicella-zoster virus using NCL-VZV. Note staining of infected cells within a vesicle. Paraffin section.

# Novocastra **Vascular Endothelial Growth Factor Receptor-3**

**Clone KLT9**
1 mL liquid NCL-L-VEGFR-3 **P**

VEGFR-3 (FLT4) is a receptor tyrosine kinase similar in structure to VEGFR-1 and VEGFR-2 but does not bind VEGF. However, the two known ligands have a high degree of homology to VEGF and are known as VEGF-C and VEGF-D. VEGFR-3 is reported to be found in many tissues including lung, intestine, brain and placenta (syncytiotrophoblasts). Throughout embryogenesis, VEGFR-3 mRNA is expressed in most endothelial cells, whilst being restricted to lymphatic vessels later in development. It appears to play an important role in the normal development of blood and lymphatic vessels. In tumors, expression has been reported in blood capillary endothelium and VEGFR-3 is thought to be involved in angiogenesis during tumor growth.



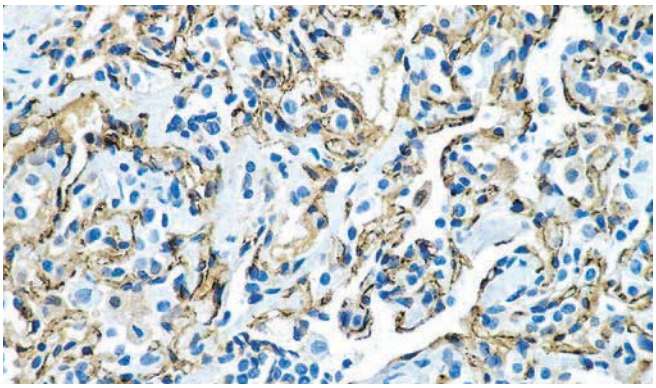
Human placenta: immunohistochemical staining for VEGFR-3 using NCL-L-VEGFR-3. Note cytoplasmic staining of syncytiotrophoblasts. Paraffin section.

# Novocastra **VE-Cadherin (CD144)**

**Clone 33E1**
1 mL liquid NCL-L-VE-Cad **P (HIER)**

**Antigen Background**

Vascular endothelial cadherin (VE-Cadherin) is a calcium dependant molecule involved in the adhesion cells to the extracellular matrix. VE-Cadherin is localized to the intracellular junctions of endothelial layers, such as those of blood and lymphatic vessels and placenta. VE-Cadherin is unique among the adherin proteins as it is expressed only in the endothelial layers. VE-Cadherin has been reported to be used to identify tumors derived from endothelial tissue.



Human angiosarcoma: immunohistochemical staining for VE-Cadherin using NCL-L-VE-Cad. Note staining of malignant endothelial cells. Paraffin section.

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## Novocastra **Villin**

**Clone CWWB1**
1 mL, 0.1 mL lyophilized NCL-VILLIN **F P (HIER) W**
1 mL liquid NCL-L-VILLIN **F P (HIER) W**

Villin and the structurally-related proteins gelsolin, fragmin and severin, all regulate the framework and assembly of actin. Villin is unique among these proteins in its ability to cross-link actin filaments into bundles, a process observed only at low $Ca^{2+}$ concentration. Villin is composed of three domains. The first two domains are homologous and the third domain is called the "headpiece". This "headpiece" region is located at the C-terminus. Villin is mainly produced by epithelial cells that develop a brush border. Cells producing villin are reported to be found either in the epithelial cells of the intestinal mucosa and gall bladder, or in epithelial cells of the kidney proximal tubules and ductuli efferentes of the testis. However, villin is also reported to be found in some epithelia which lack a brush border but which are derived from embryonic gut such as duct cells of the exocrine pancreas and biliary cells of the liver. In these cell types, villin is concentrated in the apical cytoplasm. Epithelial cells of the intestinal mucosa are continually being renewed and this involves a migration of these cell types from the intestinal crypts to the tips of the villi, gradually acquiring their differentiated phenotype as they do so. The maximum production of villin occurs at the base of the villus. Villin, therefore, shows tissue-specific expression being restricted to certain epithelia and their apical domains, thus indicating their polarity. The morphological loss of polarity of colonic epithelial cells is reported to be one of the most significant indicators of dysplasia or neoplasia.

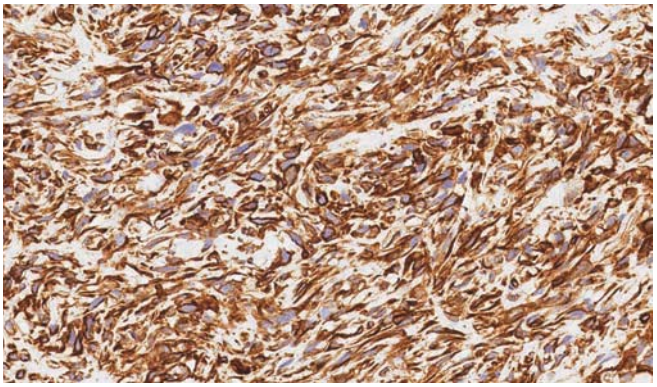
## Novocastra **Vimentin**

**Clone V9**
1 mL, 0.1 mL lyophilized NCL-VIM-V9 **F P (HIER) W**
1 mL, 0.5 mL, 0.1 mL liquid NCL-L-VIM-V9 **F P (HIER) W** New!
7 mL ready-to-use RTU-VIM-V9 **F P (HIER)**
7 mL BOND ready-to-use PA0640 **P (HIER)** New!

**Clone SRL33**
1 mL, 0.1 mL liquid NCL-L-VIM-572 **P (HIER) W**
7 mL BOND ready-to-use PA0033 **P (HIER)**

**Antigen Background**

Eukaryotic cells contain a number of types of cytoplasmic filamentous proteins, microtubule, microfilaments and intermediate-sized filaments (IF). , a 57 kD protein that is an intermediate filament is reported to be expressed in most cells of mesenchymal origin, including fibroblasts, endothelial cells, smooth muscle, melanocytes as well as T and B lymphocytes.



Human spindle cell carcinoma: immunohistochemical staining for vimentin using NCL-L-VIM-V9. Note intense staining of tumor cells. Paraffin section.

## Novocastra **von Willebrand Factor (Factor VIII-Related Antigen)**

**Clone 36B11**
1 mL, 0.1 mL lyophilized NCL-vWF **F P (HIER)**
1 mL, 0.1 mL liquid NCL-L-vWF **F P (HIER)** New!
7 mL BOND ready-to-use PA0400 **F P (HIER)**

See also Human von Willebrand Factor (Factor VIII-related antigen) on page 160.

## Novocastra **WAF1 Protein (p21, C1P1)**

**Clone 4D10**
1 mL lyophilized NCL-WAF-1 **P (HIER)**
1 mL liquid NCL-L-WAF-1 **P (HIER)**

**Antigen Background**

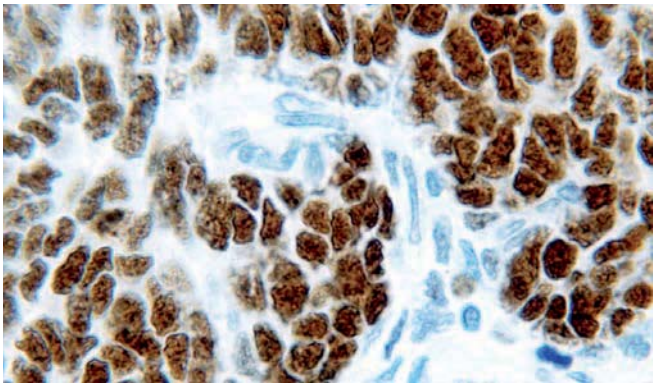
The gene encoding WAF1, also termed p21, is transcriptionally regulated by the suppressor protein, p53. Overexpression of WAF1 is growth suppressive, possibly by inhibiting the activity of cyclin/CDK complexes. One consequence of WAF1 binding to cyclin/CDK complexes is the inhibition of Rb protein phosphorylation. Induction of WAF1 expression requires wild type p53 activity in cells undergoing p53 dependent G1 arrest or apoptosis. Mutation of the p53 gene is a common event in human cancer and results in the failure to produce WAF1. The effect of this may lead to uncontrolled cell proliferation.

# Novocastra **Wilms' Tumor**

**Clone WT49**
1 mL, 0.1 mL liquid NCL-L-WT1-562 **P (HIER)**
7 mL BOND ready-to-use PA0562 **P (HIER)**

**Antigen Background**

Wilms' tumor protein (WT1) has a role in transcriptional regulation and is expressed in the kidney and a subset of hematopoietic cells. Alteration of transcription factor function is a common mechanism in oncogenesis. The WT1 protein contains a DNA binding domain and any deletions or point mutations of the WT1 gene which destroy this activity result in the development of the childhood nephroblastoma Wilms' tumor and Denys-Drash syndrome. The description of WT1 involvement in nephroblastoma is not clear.



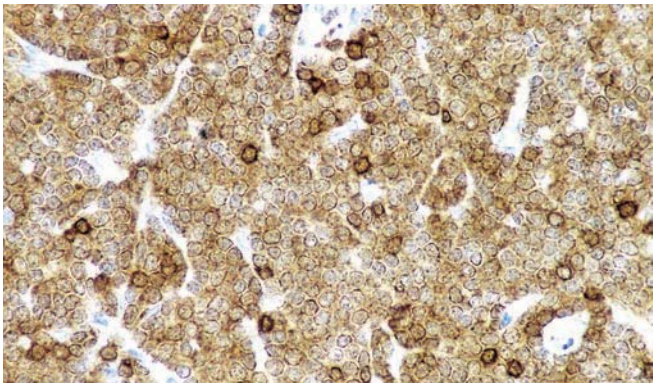
Human Wilms' Tumor: immunohistochemical staining for WT1 using NCL-L-WT1-562. Note intense nuclear staining of malignant cells. Paraffin section.

# Novocastra **Zap-70**

**Clone L453R**
1 mL liquid NCL-L-ZAP-70 **P (HIER) W**
7 mL BOND ready-to-use PA0998 **P (HIER)**

**Antigen Background**

ZAP-70 is a member of the syk family of proteins. It is expressed on T cells and NK cells and is required for the T cell receptor activation that triggers an immune response. CLL B cells that express the non-mutated immunoglobulin $V_H$ genes express levels of ZAP-70 protein that are comparable to those found in the blood T cells of healthy adults. Leukemic cells that express mutated IgVH genes generally do not express detectable levels of ZAP-70 protein and this is correlated with the high level expression of CD38.



Human B cell chronic lymphocytic leukemia: immunohistochemical staining for ZAP-70 antigen using NCL-L-ZAP-70. Note staining of malignant lymphocytic leukemic cells and intense staining of infiltrating T lymphocytes. Paraffin section.

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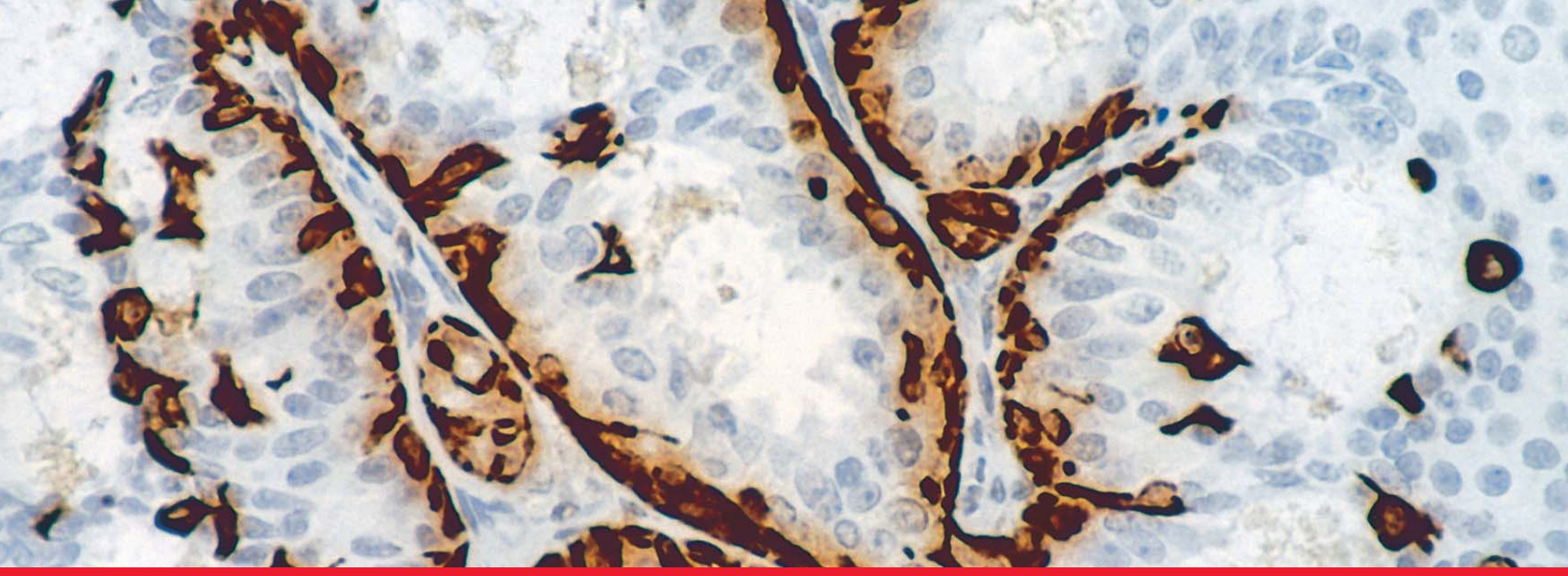


# Manual Detection Systems

Don’t compromise – when staining sections by hand, rely on Novolink™ detection, Novocastra diluent, and Novocastra ancillary reagents.

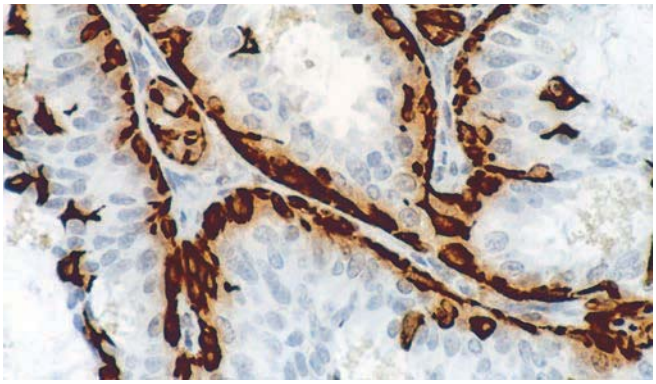
3

# Polymer Detection Systems

## Novolink Polymer Detection Systems

1,250 Tests kit Novolink Max Polymer Detection System RE7280-K **P** IVD
1,250 Tests kit Novolink Max Polymer Detection System RE7320-K **P** RUO*
500 Tests kit Novolink Polymer Detection System RE7150-K **P** IVD
250 Tests kit Novolink Polymer Detection System RE7140-K **P** IVD
250 Tests kit Novolink Polymer Detection System RE7310-K **P** RUO*
50 Tests kit Novolink Min Polymer Detection System RE7290-K **P** IVD
50 Tests kit Novolink Min Polymer Detection System RE7300-K **P** RUO*

The Novolink Polymer Detection Systems utilize a novel Compact Polymer technology. Therefore, the problem of non-specific staining that can occur with Streptavidin/Biotin detection systems due to endogenous biotin does not occur. Novolink Polymer Detection Systems contain pre-diluted, reagents in color coded bottles for ease of use and ultimate convenience. These systems can be used for the visualization of mouse IgG, mouse IgM and rabbit IgG primary antibodies. These detection systems contain Peroxidase Block, Protein Block, Post Primary Block, Novolink Polymer, DAB Chromogen, Novolink DAB Substrate Buffer (Polymer) and Hematoxylin.



Novolink Polymer Detection System (RE7150-K) staining for cytokeratin 5 with NCL-L-CK5 on breast carcinoma. Paraffin section.

# Polymer Ancillaries

## Peroxidase Block

**Blocking Reagent**
25 mL RE7101 **P** IVD

Novocastra Peroxidase Block, RE7101, is intended for use in the peroxidase based immunohistochemical (IHC) staining procedures. The presence of pseudoperoxidase (erythrocytes) and endogenous peroxidase in paraffin sections to be stained by immunoperoxidase procedures, can result in non-specific staining. A method for the blocking of pseudoperoxidase was described (Streefkerk J G, Journal of Histochemistry and Cytochemistry. 20: 829 (1972)). This product is used in a peroxidase based IHC procedure. Incubating sections with Novocastra Peroxidase Block, RE7101, can neutralize endogenous peroxidase activity. 25 mL of reagent is supplied.

## Protein Block

**Blocking Reagent**
25 mL RE7102 **P** IVD

Novocastra Protein Block, RE7102, is intended for use in immuno-histochemical (IHC) staining procedures. In immunohistochemistry, diffuse non-specific staining (background) may occur as a result of hydrophobic and ionic interactions between antibodies and tissue components. Novocastra Protein Block, RE7102, is a serum-free, protein blocker. 25 mL of reagent is supplied.

## Novolink Polymer

1,250 Tests kit Novolink Max Polymer RE7260-K **P** IVD
250 Tests kit Novolink Polymer RE7200-K **P** IVD

Novolink (Polymer), RE7200-K, is a two part ready-to-use kit comprising 25 mL of Novocastra Post Primary Block, RE7111, and 25 mL of Novolink Polymer, RE7112, sufficient to perform approximately 250 tests. The larger format Novolink Max (Polymer), RE7260-K, is a two-part ready-to-use kit comprising 125 mL of Novocastra Post Primary Block, RE7159, and 125 mL of Novolink Polymer, RE7161, sufficient to perform approximately 1,250 tests.

## Novolink DAB (Polymer)

1,250 Tests kit Novolink Max DAB (Polymer) RE7270-K **P** IVD
250 Tests kit Novolink DAB (Polymer) RE7230-K **P** IVD

Novolink Max DAB (Polymer) RE7270-K is a two part DAB kit comprising 150 mL of Novolink Substrate Buffer (Polymer), RE7163, and 8mL of Novocastra DAB Chromogen, RE7162, sufficient to perform approximately 1,250 tests. Novolink DAB (Polymer), RE7230-K, is a two part DAB kit comprising 30 mL of Novolink DAB Substrate Buffer, RE7143, and 3 mL of Novocastra DAB Chromogen, RE7105, sufficient to perform approximately 250 tests.

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# Peroxidase ABC

## DAB Enhancer

25 mL RE7125 P O IVD

Novocastra DAB Enhancer, RE7125, is used to enhance the staining of the Novocastra Peroxidase Detection Systems RE7110-K/RE7120-K, Novocastra Concentrated Peroxidase System, Novolink Polymer Detection Systems and the Peroxidase Detection System for Novocastra RTU Primary Antibodies, RE7100-K. This product is used in peroxidase-based immunohistochemical (IHC) procedures to allow the qualitative identification by light microscopy of antigens in sections of formalin-fixed, paraffin-embedded tissue. It intensifies the staining of the chromogen, 3, 3' diaminobenzidine (DAB). 25 mL of DAB Enhancer is supplied.

## Hematoxylin

25 mL RE7107 P IVD

Novocastra Hematoxylin, RE7107, is intended for use in immuno-histochemical (IHC) staining procedures. Hematoxylin stains cell nuclei and has many uses in histology, the most common of which is the Hematoxylin and Eosin stain. In IHC procedures, hematoxylin can be used as a counterstain to aid the visualization and localization of the colored end product. 25 mL of the reagent is supplied.

## Concentrated Peroxidase Detection System

500 Tests kit Concentrated Peroxidase Detection System RE7130-K P IVD

Novocastra Concentrated Peroxidase Detection System (500 tests), RE7130-K, is for the visualization of mouse IgG, mouse IgM and rabbit IgG primary antibodies. The detection system contains Novocastra Concentrated Biotinylated Secondary Antibody, RE7108, Novocastra Concentrated Streptavidin-HRP, RE7109, Novocastra DAB Chromogen, RE7105, and Novocastra DAB Substrate Buffer, RE7106. The components in this kit are concentrated and require dilution prior to use.

## Peroxidase Detection Systems (Ready-to-Use)

250 Tests kit Peroxidase Detection System RE7110-K P IVD
500 Tests kit Peroxidase Detection System RE7120-K P IVD

Novocastra Peroxidase Detection Systems (250 tests), RE7110-K, and (500 tests), RE7120-K, are for the visualization of mouse IgG, mouse IgM and rabbit IgG primary antibodies. Each detection system contains Novocastra Peroxidase Block, RE7101, Novocastra Protein Block, RE7102, Novocastra Biotinylated Secondary Antibody, RE7103, Novocastra Streptavidin-HRP, RE7104, Novocastra DAB Chromogen, RE7105, Novocastra DAB Substrate Buffer, RE7106, and Novocastra Hematoxylin, RE7107. The components in these kits are pre-diluted, ready-to-use reagents in color coded bottles for ease of use and ultimate convenience. Components of these Detection Systems are also available, separately.

## Peroxidase Detection System for Novocastra RTU Primary Antibodies

500 Tests kit Peroxidase Detection System RE7100-K P IVD

**Product Specific Information**

Novocastra Peroxidase Detection System for Novocastra RTU Primary Antibodies, RE7100-K is a system titered for the optimum visualization of Novocastra ready-to-use (RTU) mouse IgG, mouse IgM and rabbit IgG primary antibodies. The kit consists of Novocastra Biotinylated Secondary Antibody, RE7144, Novocastra Streptavidin-HRP, RE7145, Novocastra DAB Chromogen, RE7105, and Novocastra DAB Substrate Buffer, RE7146. The components in this kits are pre-diluted, ready-to-use reagents in color coded bottles for ease of use and ultimate convenience.

## Streptavidin-HRP

25 mL RE7104 P IVD

Streptavidin-HRP is a streptavidin-conjugated horseradish peroxidase reagent. It is supplied ready-to-use in a volume of 25 mL.

# ABC Ancillaries

## Avidin/Biotin Blocking System

2 × 18 mL kit RE7170-K **F P W** RUO*

Some tissues may bind avidin, biotinylated horseradish peroxidase, biotinylated alkaline phosphatase or other Biotin/Avidin System components without prior addition of biotinylated antibody. This binding may be due to endogenous biotin or biotin-binding proteins, lectins or non-specific binding substances present in the section. If high background is present using Avidin Biotin Complex (ABC) reagents, or other avidin conjugates in the absence of biotinylated secondary antibody, the use of the Novocastra Avidin/Biotin Blocking System RE7170-K may be of benefit. 18 mL of each reagent is supplied.

## Biotinylated Secondary Antibody

25 mL RE7103 **P** IVD

Biotinylated secondary antibody is for the detection of mouse IgG, mouse IgM and rabbit IgG primary antibodies. It is supplied ready-to-use in a volume of 25 mL.

# Chromogens

## 3,3' Diaminobenzidine Tetrahydrochloride

10 tablets NCL-DAB **F P W** RUO*

3,3' diaminobenzidine tetrahydrochloride (DAB) is a substrate for horseradish peroxidase, suitable for use in immunohistochemical staining and Western blotting techniques. 10 DAB tablets are provided in individually sealed foil packs. Each tablet is sufficient to produce 10 mL of working strength DAB solution.

## DAB (250 tests)

250 Tests kit RE7190-K **P** IVD

DAB (250 tests) is a two part DAB kit comprising 30 mL Novocastra DAB Substrate Buffer, RE7106, and 3 mL of Novocastra DAB Chromogen, RE7105, and is sufficient to perform approximately 250 tests.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

Products in this catalog are subject to regulatory approval. Please consult your Leica Biosystems representative for availability in your region.

# Miscellaneous

## Biotin (Hapten Antibody)

**Clone Hyb-8**

1 mL lyophilized Biotin NCL-BIOTIN **F P W O** RUO*

NCL-BIOTIN is an antibody of high affinity, suitable for the localisation of biotinylated antibodies or oligonucleotide probes. NCL-BIOTIN may also be used in ELISA techniques.

## Goat Anti-Mouse Peroxidase-Conjugated Immunoglobulin

1 mL NCL-GAMP **F P W O** RUO*

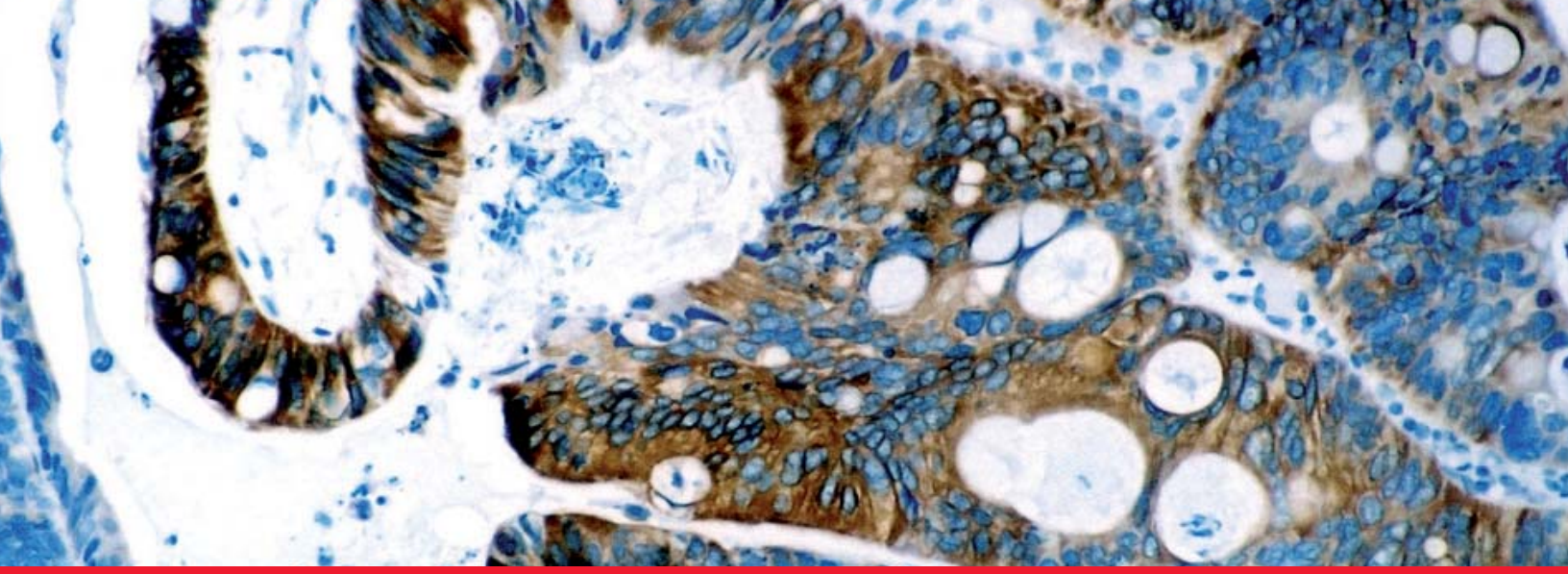
NCL-GAMP is an affinity-purified polyclonal anti-mouse immunoglobulin conjugated to horseradish peroxidase. NCL-GAMP is a useful reagent for immunohistochemistry, Western blotting and ELISA techniques.

## NovoPen

1 reagent pen NCL-PEN **F P**

NovoPen is designed to minimize wastage of reagents by allowing the user to ring the tissue(s) or cells to be stained thereby localizing the staining reagents. The pen contains a light blue hydrophobic reagent which is soluble in commonly used clearing agents, eg xylene and xylene substitutes. It can be used in immunostaining techniques on paraffin sections, frozen sections and on cytology preparations and is insoluble in alcohol and acetone. NovoPen is compatible with enzyme or fluorescent-based detection systems. The pen is supplied as a single item together with a product datasheet.


Reagent Pen – NCL-PEN.



# Epitope Retrieval Reagents & Buffers

Don't compromise – always rely on Novocastra diluent, retrieval solutions and ancillary reagents. Novocastra antibodies are proven with Novocastra primary antibody diluent, don't trust your important stains to unproven substitutes.

- Novocastra diluent –the proven performer
- Novocastra retrieval solutions – a range of pH levels lets you optimize your retrieval
- Novocastra ancillaries – completing the total IHC/ISH staining solution

# Buffers

## Antibody Diluent

500 mL RE7133 **F P O** IVD
500 mL RE7189 **F P O** RUO*

Novocastra IHC Diluent is intended for use as a diluent for Novocastra primary antibodies, Novocastra Concentrated Biotinylated Secondary Antibody, RE7108, and Novocastra Concentrated Streptavidin-HRP, RE7109, in immunohistochemical (IHC) procedures. Novocastra IHC Diluent is not intended for the reconstitution of lyophilized reagents.

## Normal Serum Reagents

### Blocking Reagent

10 mL Normal Goat Serum NCL-G-SERUM **F P** RUO*
10 mL Normal Horse Serum NCL-H-SERUM **F P** RUO*
10 mL Normal Rabbit Serum NCL-R-SERUM **F P** RUO*

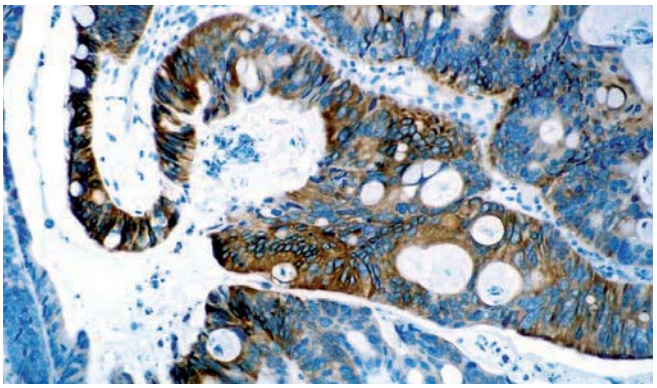
Normal serum is often used as a negative control or as a blocking reagent in immunoassays. These may be of use as 'no primary' controls and as a diluent for primary and secondary antibody reagents. Novocastra offers these animal sera in a convenient 10 mL pack size. 200 mL of working strength diluent can be prepared, sufficient for up to 2000 slides.

# Epitope Retrieval Solutions

## Epitope Retrieval Solutions pH6

1 L pH6 (x10 Concentrate) RE7113 **P (HIER)** IVD

Novocastra Epitope Retrieval Solutions are intended for Heat Induced Epitope Retrieval (HIER) on formalin-fixed, paraffin-embedded tissue sections as part of an immunohistochemical procedure. HIER using an appropriate pH solution improves the staining of some antibodies by exposing epitopes within tissue that has been masked during fixation. The development of Epitope Retrieval using heat was first reported in 1991 by Shi S-R et al., Journal of Histochemistry and Cytochemistry 39: 741-748 (1991). Since then numerous studies have been published looking at the effects of molarity, pH and heating methods on epitope retrieval. A universal HIER technique suitable for all epitopes does not exist. A combination of different heating methods and epitope retrieval solutions may be used to optimize unmaskingof antigens where this technique is recommended. HIER is not recommended for all antibodies. Optimum conditions for epitope retrieval should be validated by the user, as these are dependant upon tissue, fixation and/or primary antibody. RE7113 is supplied as a 1 L volume, sufficient to prepare 10 L of working solution.



Colonic adenocarcinoma pre-treated with Epitope Retrieval Solution pH6 (RE7113). Staining for Cytokeratin 20 protein using NCL-L-CK20-561. Paraffin section.

## Epitope Retrieval Solutions pH8

1 L pH8 (x10 Concentrate) RE7116 **P (HIER)** IVD

Novocastra Epitope Retrieval Solutions are intended for Heat Induced Epitope Retrieval (HIER) on formalin-fixed, paraffin-embedded tissue sections as part of an immunohistochemical procedure. HIER using an appropriate pH solution improves the staining of some antibodies by exposing epitopes within tissue that has been masked during fixation. The development of Epitope Retrieval using heat was first reported in 1991 by Shi S-R et al., Journal of Histochemistry and Cytochemistry 39: 741-748 (1991). Since then numerous studies have been published looking at the effects of molarity, pH and heating methods on epitope retrieval. A universal HIER technique suitable for all epitopes does not exist. A combination of different heating methods and epitope retrieval solutions may be used to optimize unmasking of antigens where this technique is recommended. HIER is not recommended for all antibodies. Optimum conditions for epitope retrieval should be validated by the user, as these are dependant upon tissue, fixation and/or primary antibody. RE7116 is supplied as a 1 L volume, sufficient to prepare 10 L of working solution.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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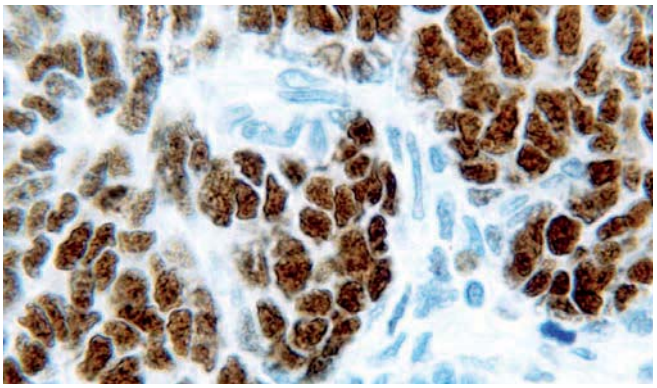
# Epitope Retrieval Solutions pH9

1 L pH9 (x10 Concentrate) RE7119 **P (HIER)** IVD
1 L pH9 (x10 Concentrate) RE7224 **P (HIER)** RUO*

Novocastra Epitope Retrieval Solutions are intended for Heat Induced Epitope Retrieval (HIER) on formalin-fixed, paraffin-embedded tissue sections as part of an immunohistochemical procedure. HIER using an appropriate pH solution improves the staining of some antibodies by exposing epitopes within tissue that has been masked during fixation. The development of Epitope Retrieval using heat was first reported in 1991 by Shi S-R et al. Journal of Histochemistry and Cytochemistry 39: 741-748 (1991). Since then numerous studies have been published looking at the effects of molarity, pH and heating methods on epitope retrieval. A universal HIER technique suitable for all epitopes does not exist. A combination of different heating methods and epitope retrieval solutions may be used to optimize unmasking of antigens where this technique is recommended. HIER is not recommended for all antibodies. Optimum conditions for epitope retrieval should be validated by the user, as these are dependant upon tissue, fixation and/or primary antibody. RE7119 is supplied as a 1 L volume, sufficient to prepare 10 L of working solution.



Kidney pre-treated with Epitope Retrieval Solution pH9 (RE7119). Staining for Wilms' Tumor protein using NCL-L-WT1-562. Paraffin section.

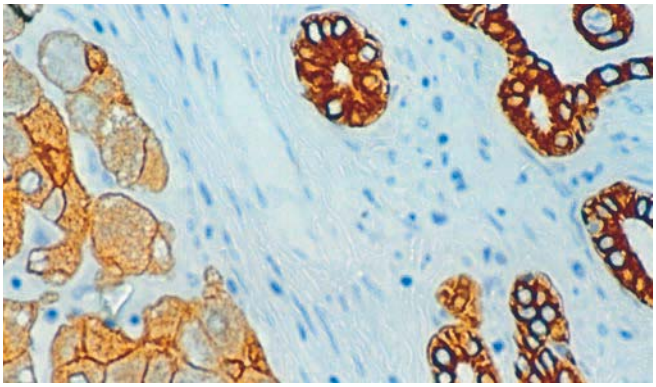
# Enzyme Proteinase K (IHC)

100 mL kit RE7160-K **P (Enzyme)** IVD
100 mL kit RE7330-K **P (Enzyme)** RUO*

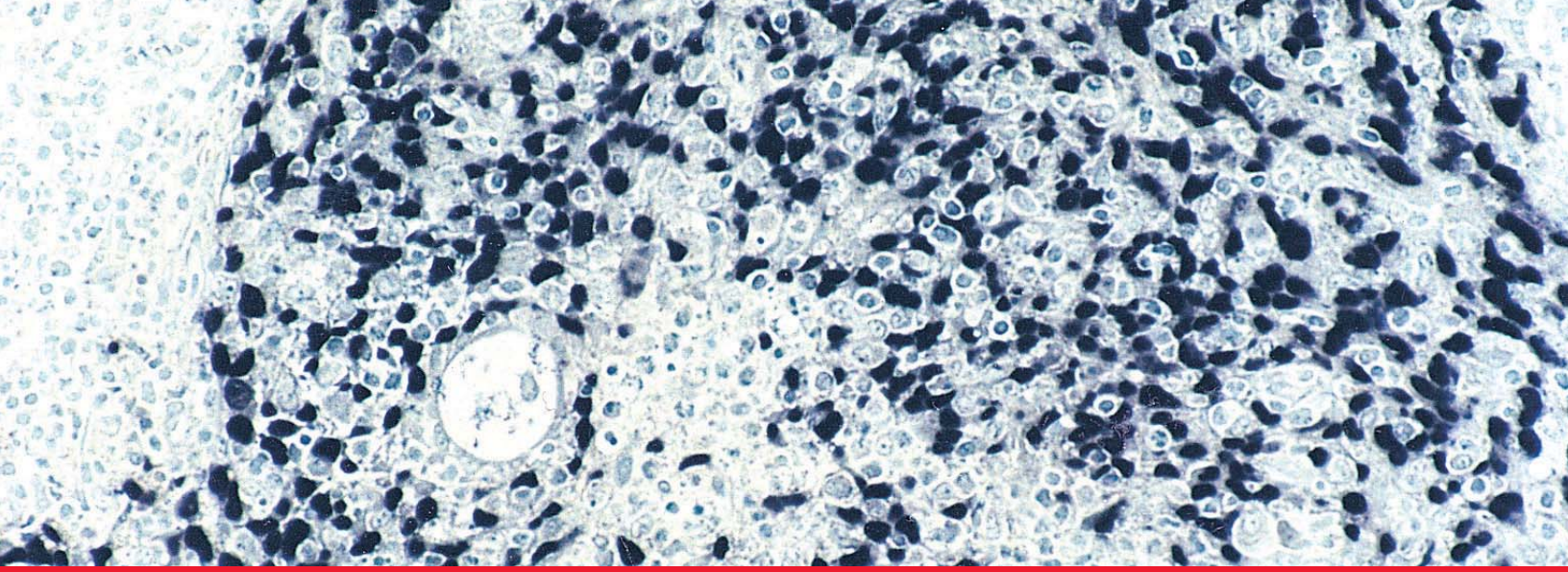
Enzyme pretreatment of formalin-fixed, paraffin-embedded tissue sections improves the staining of some antibodies by exposing epitopes within tissue that have been masked during fixation. The first proteolytic enzyme employed for epitope retrieval was trypsin. More recently, proteinase K which is commonly used in in situ hybridization techniques has been reported to be of use.

**Product Specific Information**

Novocastra Enzyme Proteinase K (IHC), RE7160-K, is intended for the enzymatic pretreatment of formalin-fixed, paraffin-embedded tissue sections prior to incubation with a primary antibody in an immunohistochemical (IHC) procedure. This product can be used for epitope retrieval with Novocastra antibodies for which trypsin is recommended, known exceptions to this are NCL-C-JEJUNI, NCL-BrdU, NCL-CYCLIN D1, NCL-COLL-IIp, and NCL-CYCLIN D1-GM. This two part kit comprises 0.75 mL of Enzyme Proteinase K Concentrate, RE7126, and 100 mL of Enzyme Proteinase K Buffer, RE7127, sufficient to produce 100 mL of working strength enzyme solution. This product is used in an IHC procedure, which allows the qualitative identification by light microscopy. Epitope retrieval by enzymatic pretreatment is recommended for a limited number of antibodies. Optimum conditions for epitope retrieval should be validated by the user as these are dependent upon tissue, fixation and/or primary antibody.



Liver pre-treated with Enzyme Proteinase K (RE7160-K). Staining for Cytokeratin 8/18 using NCL-L-5D3. Paraffin section.



# ISH Reagents/Probes

The Novocastra ISH probe range includes fluorescein-conjugated oligonucleotide probes for the qualitative detection of RNA transcripts.

5

## Control Probe (Fluorescein-Conjugated)

50 Tests liquid probe NCL-CONTROL **P**

**Product Specific Information**

NCL-CONTROL has been produced by labeling randomly generated oligonucleotide sequences with fluorescein using the same procedures as applied to the mRNA specific oligonucleotide probes from Leica Microsystems. Therefore, NCL-CONTROL is ideally suited for use as a negative control alongside RNA specific probes providing confirmation of the staining pattern obtained by these specific oligonucleotide probes.

## Cytomegalovirus Probe (Fluorescein-Conjugated)

50 Tests liquid probe NCL-CMV **P**

**Background**

Cytomegalovirus (CMV) infection may occur in lung, kidney, gut and other organs of individuals who are immunologically immature, such as the fetus and neonate. CMV infection also occurs in situations of immunosuppression such as transplant recipients, individuals undergoing chemotherapy and those with HIV infection.

**Product Specific Information**

NCL-CMV detects an early gene RNA transcript which is expressed in permissive infection.

## Epstein-Barr virus Probe (Fluorescein-Conjugated)

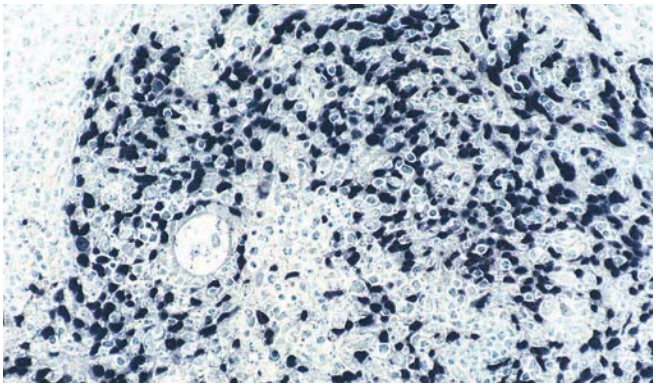
50 Tests liquid probe NCL-EBV **P**

**Background**

EBV infection is associated with a variety of pathological conditions. The virus has been reported to be demonstrated in infectious mononucleosis, Burkitt's lymphoma, the Reed Sternberg cells of Hodgkin's disease and in nasopharyngeal carcinoma. In HIV infection, EBV has also been reported to be demonstrated in primary CNS lymphomas and oral hairy leukoplakia lesions.

**Product Specific Information**

NCL-EBV is a fluorescein-labelled oligonucleotide cocktail of probes designed to demonstrate cells latently-infected with EBV. The probe hybridizes to abundantly expressed Epstein-Barr virus-encoded RNA (EBER) transcripts which are concentrated in the nuclei of latently-infected cells. These transcripts are thought to block the activation of dsRNA-dependent eukaryotic initiation factor 2a (eIF-2a) protein kinase DAI. In the absence of EBER, eIF-2a inhibits cellular protein synthesis.



Human nasopharyngeal carcinoma: in situ hybridization for Epstein-Barr virus (EBV) encoded RNA (EBER) using NCL-EBV. Note intense staining of EBV-infected cells. Paraffin section.

## Epstein-Barr virus Probe ISH Kit

50 Tests kit NCL-EBV-K **P**

**Background**

Epstein-Barr virus encoded RNA (EBER) is reported to be present in both latent and lytic EBV infection. These transcripts are thought to block the activation of dsRNA-dependent eukaryotic initiation factor 2a (eIF-2a) protein kinase DAI.

**Product Specific Information**

NCL-EBV-K contains a fluorescein-labelled oligonucleotide cocktail for the detection of mRNA sequences contained in 1 mL of hybridization solution sufficient to stain 50 preparations. A control probe is a fluorescein-labelled random oligonucleotide cocktail contained in 1 mL of hybridization solution which is also included. The control probe is ideally suited for use as a negative control alongside the EBV probe. Other reagents include 500 µg of lyophilized Proteinase K, anti-fluorescein isothiocyanate conjugated to alkaline phosphatase, 5-bromo-4-chloro-3-indolyl phosphate (BCIP) and nitro blue tetrazolium (NBT) in dimethylformamide solution, levamisole hydrochloride and 3-aminopropyltriethoxysilane (APES)-coated slides.

## Human Herpesvirus (type 8) Probe (Fluorescein-Conjugated)

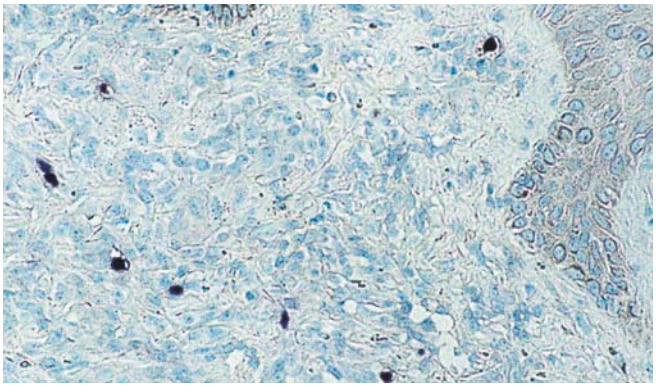
50 Tests, 10 Tests liquid probe NCL-HHV8 **P**

**Background**

Human herpesvirus 8 (HHV-8), also known as Kaposi's sarcoma associated herpesvirus, is one of the eight known human herpes viruses and belongs to the Gammaherpes virinae, the same subfamily as Epstein-Barr virus. HHV8 has a large double strand DNA genome that carries a complement of over 85 open reading frames.

**Product Specific Information**

NCL-HHV8 is a cocktail of fluorescein-labelled oligonucleotide probes contained in 1 mL of hybridization solution, designed to hybridize with a small transcript, designated T1.1 mRNA, which accumulates in the nuclei of infected cells.



Human Kaposi's sarcoma: in situ hybridization for human herpesvirus (type 8) (HHV8) mRNA using NCL-HHV8. Note intense staining of HHV8-infected cells. Paraffin section.

## Kappa/Lambda Probes (Fluorescein-Conjugated)

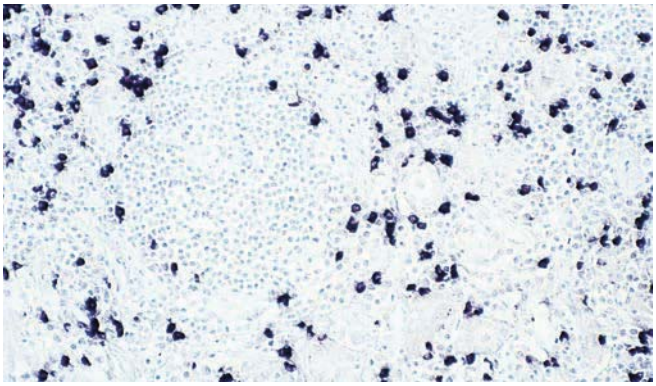
2 × 25 Tests liquid probes NCL-KAP/LAM **P**

**Background**

Immunoglobulins are polypeptides that consist of heavy and light protein chains. There are two classes of light chain: kappa and lambda. The ratio of kappa chains to lambda chains varies in a species-specific fashion. In humans about 60 percent of light chains are kappa. However, in any individual immunoglobulin molecule the light chains will be either kappa or lambda, never a mixture. B cells contain kappa or lambda mRNA.

**Product Specific Information**

NCL-KAP/LAM consists of two sets of fluorescein-conjugated kappa and lambda oligonucleotide probes provided in two separate vials, each containing 0.5 mL of hybridization solution, sufficient for the in situ hybridization staining of 25 kappa and 25 lambda preparations, respectively.



Human low grade mucosa associated lymphoma of thyroid: in situ hybridization for lambda mRNA using the lambda probe. Paraffin section.

## Poly d(T) Probe (Fluorescein-Conjugated)

50 Tests liquid probe NCL-POLYd(T) **P**

**Background**

The precursors of mRNA are transcribed from DNA by RNA polymerase II and are known as heterogenous nuclear RNA (hnRNA). Enhanced stability is conferred to 70 to 90 percent of these transcriptions by the addition of 5' methyl caps and 3' tails of approximately 200 adenyl residues. Following these reactions, most hnRNA is spliced to remove non-coding intron sequences to produce mRNA. Due to the destruction of RNases by formalin fixation, polyadenylated mRNA sequences are conserved in routine paraffin wax preparations, only when they have been fixed promptly. This can be readily demonstrated using labelled polythymidine (poly d(T)) probes. Detection of poly A tails provides a way of monitoring the translational activity of cells and assessing the relative preservation of mRNA in tissue preparations.

**Product Specific Information**

NCL-POLYd(T) consists of fluorescein-labelled oligonucleotide for the detection of polyadenylated mRNA sequences contained in 1 mL of hybridization solution.

## Proteinase K

500 µg lyophilized enzyme NCL-PK **P**

**Product Specific Information**

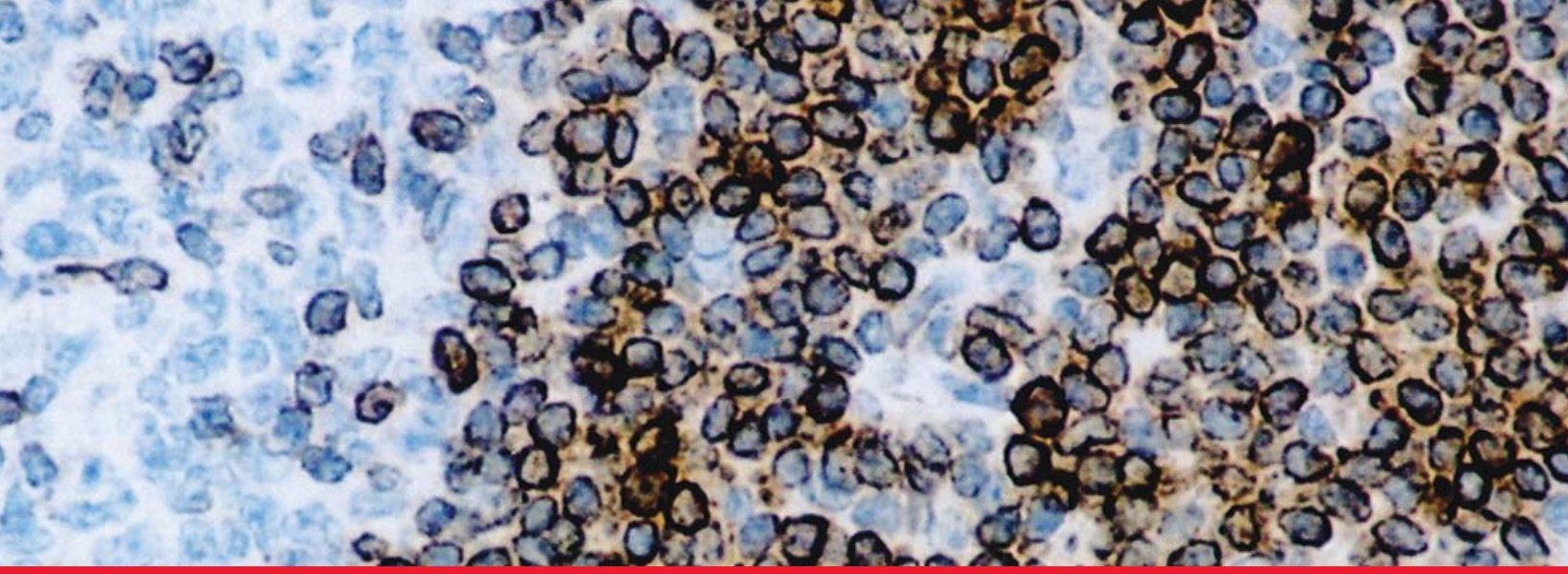
NCL-PK is effective for the digestion of proteins on tissue sections, as a pre-treatment, to aid in the preparation of mRNA and its detection by in situ hybridization methods using oligonucleotide probes from Leica Microsystems.

## Universal ISH Detection Kit

100 Tests kit NCL-ISH-D **P**

**Product Specific Information**

The Universal ISH Detection Kit from Leica Microsystems is intended for the detection of bound fluorescein-conjugated oligonucleotide probes. The ISH Detection Kit comprises affinity-purified rabbit F(ab') anti-fluorescein isothiocyanate conjugated to alkaline phosphatase, 5-bromo-4-chloro-3-indolyl phosphate (BCIP) and nitroblue tetrazolium (NBT) and levamisole hydrochloride.



# Origin

Trusted Novocastra clones for use on Ventana® immunohistochemistry staining platforms. Each antibody has been independently proven to pass a verification test with equivalent Ventana Medical Systems products.

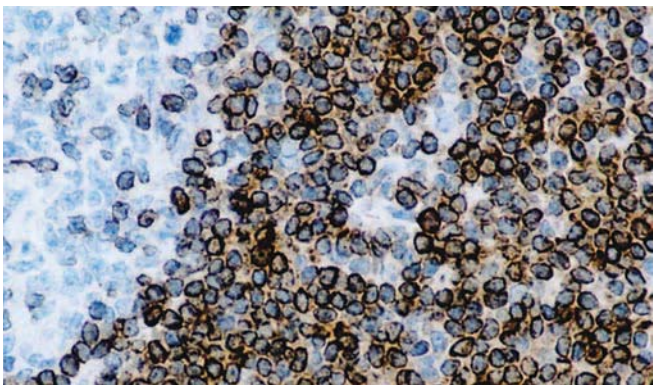
# bcl-2 Oncoprotein

## Clone bcl-2/100/D5
50 Tests ORG-8714

### Antigen Background

Bcl-2 antigen is a member of a family of proteins that are involved in apoptosis. The antigen is an integral inner mitochondrial membrane protein of 25 kD and has wide tissue distribution. It is considered to act as an inhibitor of apoptosis. For this reason bcl-2 expression is inhibited in germinal centers where apoptosis forms part of the B cell production pathway. In 90 percent of follicular lymphomas a translocation occurs which juxtaposes the bcl-2 gene at 18q21, to an immunoglobulin gene, with subsequent deregulation of gene expression and cell proliferation.

Refer to page 98 for further information about Clone bcl-2/100/D5.



Origin bcl-2 (Clone bcl-2/100/D5) on tonsil. Paraffin section.

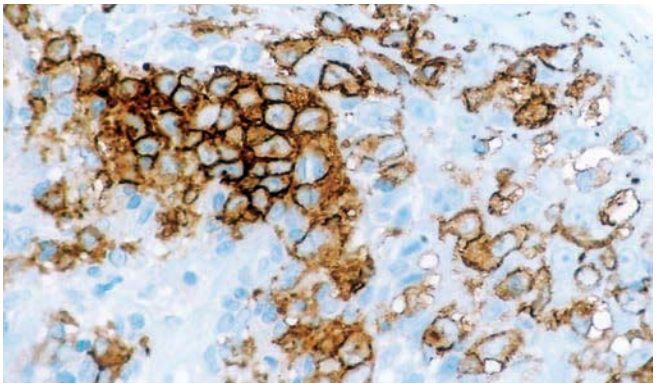
# CD1a

## Clone JPM30
50 Tests ORG-8968

### Antigen Background

CD1a is a protein of 43 to 49 kD expressed on dendritic cells and cortical thymocytes. CD1a antigen expression has been shown to be useful in differentiating Langerhans cells, powerful antigen presenting cells present in skin and epithelia, from interdigitating cells. Immunohistochemical studies for CD1a antigen have reported a reduction in epidermal Langerhans cells in graft versus host disease and the participation of CD1a in atherosclerotic lesion formation and asthmatic inflammation.

Refer to page 106 for further information about Clone JPM30.



Origin CD1a (Clone JPM30) on skin. Paraffin section.

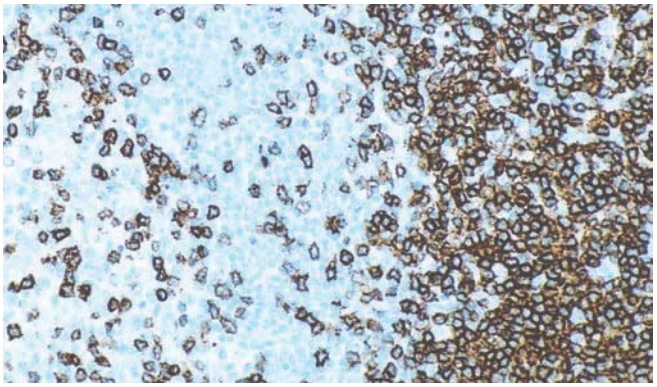
# CD3

## Clone PS1
50 Tests ORG-8982

### Antigen Background

The CD3 antigen is a marker of T cell differentiation, expressed in normal and neoplastic T cells. The CD3 antigen is first detected in early thymocytes and its appearance probably represents one of the earliest indicators of commitment to the T cell lineage.

Refer to page 107 for further information about Clone PS1.



Origin CD3 (Clone PS1) on tonsil. Paraffin section.

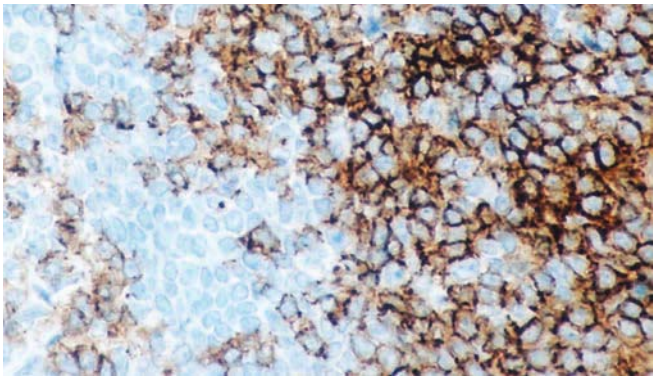
F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

# CD4

## Clone 1F6
50 Tests ORG-8756

### Antigen Background

The CD4 antigen is expressed on a T cell subset (helper/inducer) representing 45 percent of peripheral blood lymphocytes and at a lower level on monocytes. Most cases of cutaneous T cell lymphoma, including mycosis fungoides, express the CD4 antigen. HTLV-1 associated adult T cell leukemia/lymphoma is also generally CD4 positive.



Origin CD4 (Clone 1F6) on tonsil.

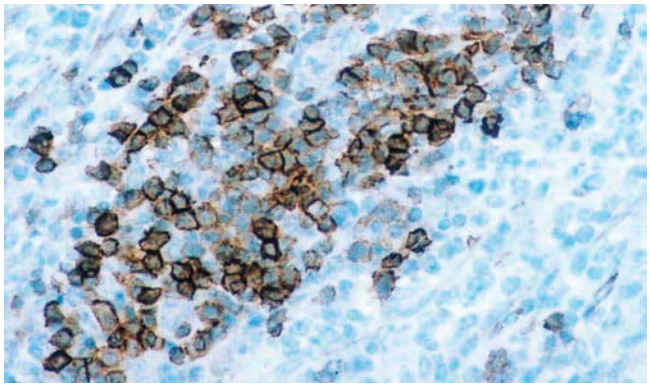
# CD5

## Clone 4C7
50 Tests ORG-8919

### Antigen Background

CD5 is a protein of 67 kD, expressed on 95 percent of thymocytes and 72 percent of peripheral blood lymphocytes. In lymph nodes, the main reactivity is observed on T cells. CD5 antigen is expressed by many T cell lymphomas, activated T cells and on a subset of B cells. CD5 antigen expression is reported in T cell acute lymphocytic leukemias (T-ALL), some B cell chronic lymphocytic leukemias (B-CLL) as well as B and T cell lymphomas. CD5 antigen is not expressed in follicular cell lymphomas.

Refer to page 108 for further information about Clone 4C7.



Origin CD5 (Clone 4C7) on spleen. Paraffin section.

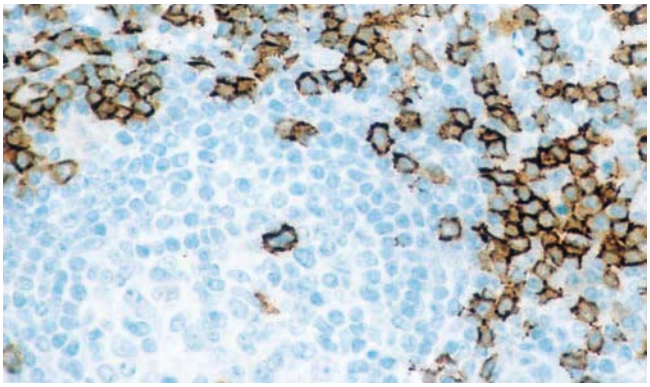
# CD8

## Clone 1A5
50 Tests ORG-8936

### Antigen Background

The CD8 molecule is composed of two chains and has a molecular weight of 32 kD. It has been found on a subset of normal cytotoxic/suppressor cells which make up approximately 20-35 percent of human peripheral blood lymphocytes. The CD8 molecule is reported to be detected on natural killer cells, 80 percent of thymocytes, on a sub-population of 30 percent of peripheral blood null cells and 15-30 percent of bone marrow cells.

Refer to page 108 for further information about Clone 1A5.



Origin CD8 (Clone 1A5) on tonsil. Paraffin section.

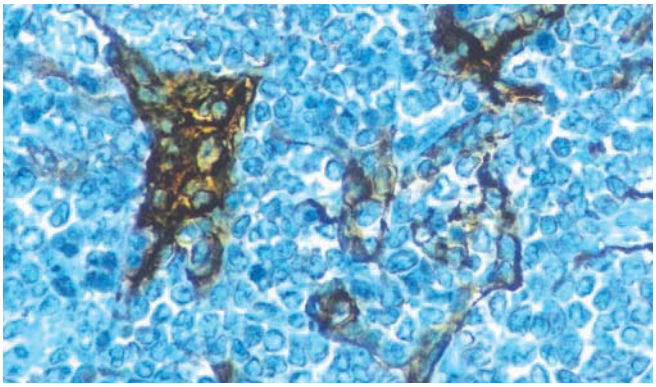
# CD10

## Clone 56C6
50 Tests ORG-8941

### Antigen Background

CD10 antigen is also known as neprilysin and common acute lymphoblastic leukemia antigen (CALLA). CD10 antigen is expressed on a wide variety of normal and neoplastic cells.

Refer to page 109 for further information about Clone 56C6.



Origin CD10 (Clone 56C6) on lymphoma. Paraffin section.

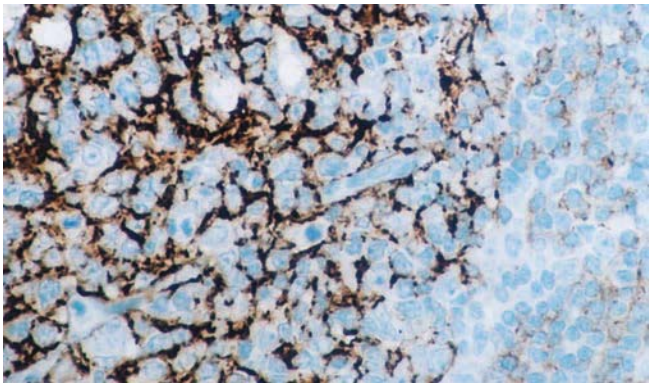
# CD23

## Clone 1B12
50 Tests ORG-8826

### Antigen Background

The CD23 antigen, a membrane glycoprotein of 45 kD, is reportedly found on a subpopulation of peripheral blood cells, B lymphocytes and on EBV-transformed B lymphoblastoid cell lines. The CD23 molecule is also known as the low affinity IgE receptor found on B cells. Expression has been reported on neoplastic cells from B cell chronic lymphocytic leukemias and centrocytic/centroblastic lymphomas.

Refer to page 112 for further information about Clone 1B12.



Origin CD23 (Clone 1B12) on tonsil. Paraffin section.

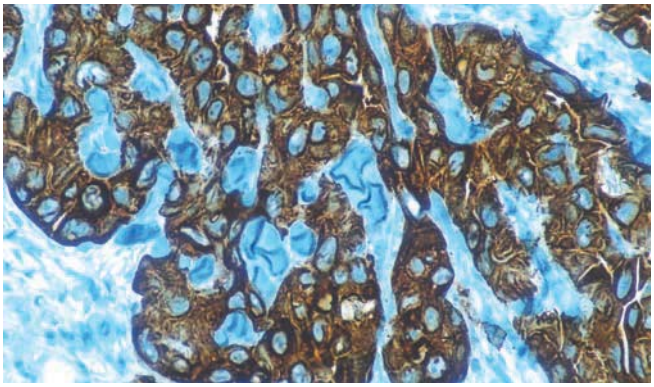
# Cytokeratin

## Clone 34βE12
50 Tests ORG-8735

### Antigen Background

The expression of different cytokeratins in epithelial-derived tumors and the general tendency towards maintenance of cytokeratin polypeptide patterns during malignant growth and metastasis serves as a basis for approaching the characterization of tumors, using cytokeratins as differentiation markers.

Refer to page 174 for further information about Clone 34βE12.



Origin Cytokeratin (Clone 34βE12) on squamous cell carcinoma. Paraffin section.

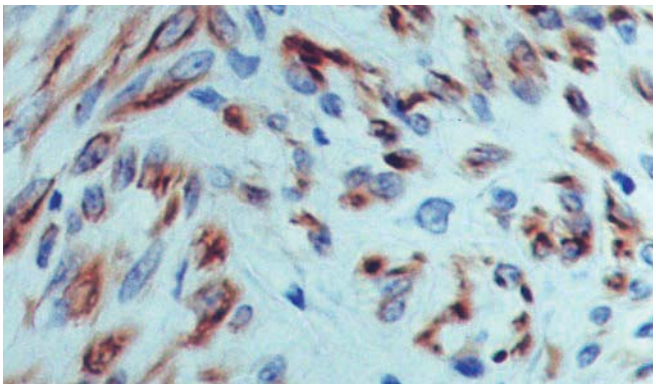
# Desmin

## Clone DE-R-11
50 Tests ORG-8889

### Antigen Background

Human desmin is a 53 kD cytoplasmic intermediate filament protein in striated and smooth muscle cells. It is confined to the Z bands in skeletal and cardiac muscle giving a characteristic striated appearance when immunohistochemically stained.

Refer to page 139 for further information about Clone DE-R-11.



Origin Desmin (Clone DE-R-11) on bowel. Paraffin section.

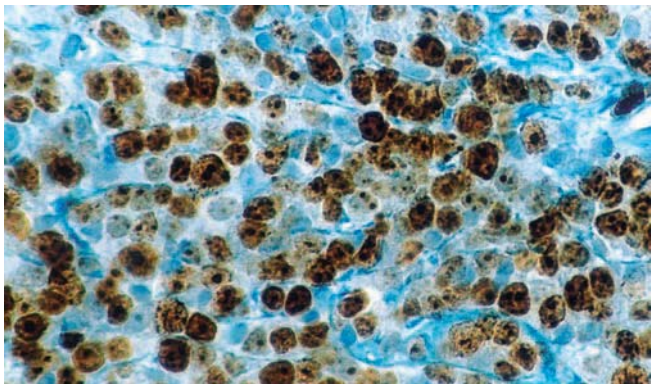
# Ki67

## Clone MM1
50 Tests ORG-8772

### Antigen Background

Ki67 is a nuclear cell cycle associated protein, which is expressed in all active parts of the cell cycle (G1, S, G2 and mitosis) but not in resting cells (G0). In contrast to many other cell cycle associated proteins the Ki67 antigen is consistently absent in quiescent cells and is not detectable during DNA repair processes. Thus, the presence of Ki67 is strictly associated with the cell cycle and confined to the nucleus.

Refer to page 164 for further information about Clone MM1.



Origin Ki67 (Clone MM1) on breast carcinoma. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

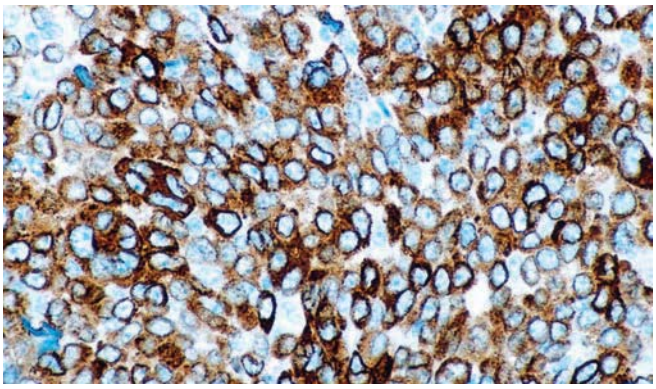
# Melan A

## Clone A103
50 Tests ORG-8953

### Antigen Background

Melan A, a product of the MART-1 gene, is a melanocyte differentiation marker recognized by autologous cytotoxic T lymphocytes. Other melanoma-associated markers recognized by autologous cytotoxic T cells are reported to include MAGE-1, MAGE-3, tyrosinase, gp100, gp75, BAGE-1 and GAGE-1. The analysis of these different molecules and their expression in individual melanomas may be of help in the study of their particular roles in tumorigenesis.

Refer to page 169 for further information about Clone A103.



Origin Melan A (Clone A103) on malignant melanoma. Paraffin section.

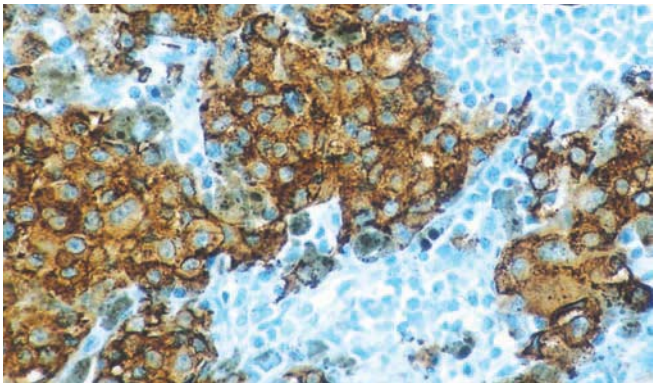
# Melanosome

## Clone HMB45
50 Tests ORG-8854

### Antigen Background

The melanosome antigen has been identified in retinal pigment epithelium (RPE) but is reported to be reactive only with transient prenatal and infantile RPE. Tumor cells of epithelial lymphoid, glial and mesenchymal origin are reported to be negative.

Refer to page 169 for further information about Clone HMB45.



Origin Melanosome (Clone HMB45) on malignant melanoma. Paraffin section.

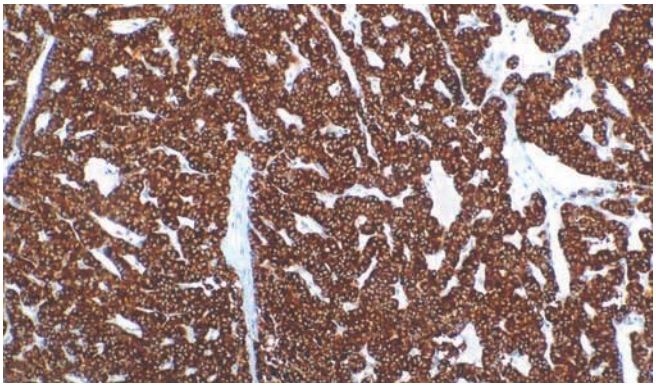
# Synaptophysin

## Clone 27G12
50 Tests ORG-8848

### Antigen Background

The Synaptophysin antigen is an integral membrane glycoprotein present in many human normal and neoplastic neuroendocrine cells. It is reported to occur in presynaptic vesicles of the neurons in the brain, spinal cord and retina and in similar vesicles in the adrenal medulla and as well as neuromuscular junctions. The synaptophysin antigen may be involved in synaptic vesicle formation and exocytosis.

Refer to page 198 for further information about clone 27G12.



Origin Synaptophysin (Clone 27G12) on carcinoid tumor. Paraffin section.

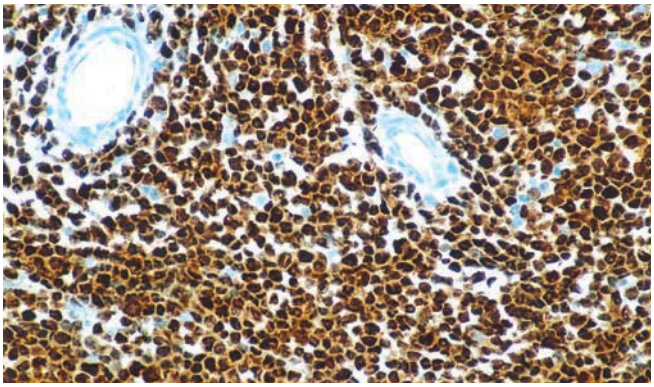
# Terminal Deoxynucleotidyl Transferase

## Clone SEN28
50 Tests ORG-8865

### Antigen Background

Human TdT, a nuclear DNA polymerase with a molecular weight of 58 kD, is reported to be expressed in primitive B and T cells of the normal thymus and bone marrow, acute lymphoblastic lymphomas and leukemias.

Refer to page 199 for further information about Clone SEN28.



Origin TdT (Clone SEN28) on lymphoid leukemia. Paraffin section.

F Frozen I Immunofluorescence E Electron microscopy P Paraffin C Flow cytometry O Other applications W Western blotting

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