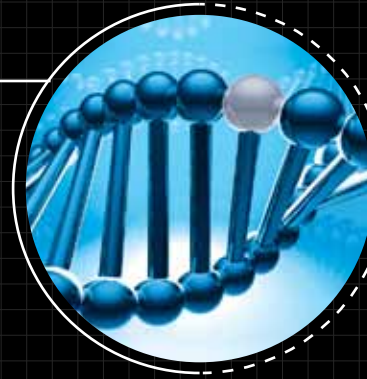


# THE SCIENCE OF ] SNP GENOTYPING



Accurate,  
sensitive,  
flexible

MassARRAY® System



## SNP GENOTYPING WITH iPLEX REAGENTS AND THE MASSARRAY SYSTEM

Biomarker validation  
Routine genetic testing  
Somatic mutation profiling

- ✓ Up to 400 biomarkers
- ✓ Multiple sample types
- ✓ Swift panel design
- ✓ Mid-density multiplex with high sample throughput
- ✓ Absolute detection

For Research Use Only. Not for use in diagnostic procedures.



Balancing power with flexibility



## THE MASSARRAY SYSTEM



The MassARRAY System, a MALDI-TOF mass spectrometer, provides precise, rapid, and cost-effective analysis for a variety of biomarkers against a full spectrum of biological samples.

### FLEXIBILITY OF SCALE WITH VERSATILITY OF APPLICATION

iPLEX genotyping on the MassARRAY System facilitates identification and prioritization of genetic targets within each stage of biomedical research. From targeted discovery utilizing 10s to 100s of multiplexed assays to validation of select markers against 100s to 1000s of samples, the MassARRAY System powers a variety of genomic studies in the fields of biomarker validation, pharmacogenomics, cancer genetics, and applied testing (e.g., breeding and crop strain validation).

Several system options are available for moderate to high throughput genetic analysis. Choose from a 96-well or 384/96-well analyzer system.

### CHALLENGING SAMPLE TYPES

Due to the short amplicon length inherent to the iPLEX method (80-120 bp), virtually all DNA sample types are amenable to analysis on the MassARRAY System.

- Blood plasma
- Serum
- Fresh frozen tissue
- Biopsy samples
- Formalin fixed tissue samples
- Micro-dissected cells
- Buccal cells
- Ear punches
- Hair follicles
- Whole genome amplified DNA
- Next-Gen libraries

## OVERVIEW

iPLEX® is the leading technology for SNP genotyping. The MassARRAY System is widely used for fine mapping, linkage studies, and routine genetic testing of SNP panels of interest.

The MassARRAY System combines the benefits of a simple, reproducible primer extension reaction chemistry with state-of-the-art MALDI-TOF mass spectrometry to quickly and cost-effectively characterize genotypes with the highest levels of accuracy.

The iPLEX assay allows you to routinely design assays at a multiplexing level of 36-plex, which gives a high level of flexibility and a low cost per genotype.

### For medium to high throughput studies

- Ideal for 10-400 SNP panel design.
- Routine multiplexing at 36-plex level.
- Broad throughput ranges from 10s to 1000s of samples per day.
- Ideally suited for fine mapping, GWAS, and NGS follow-up studies.

### Highest available data quality for your research

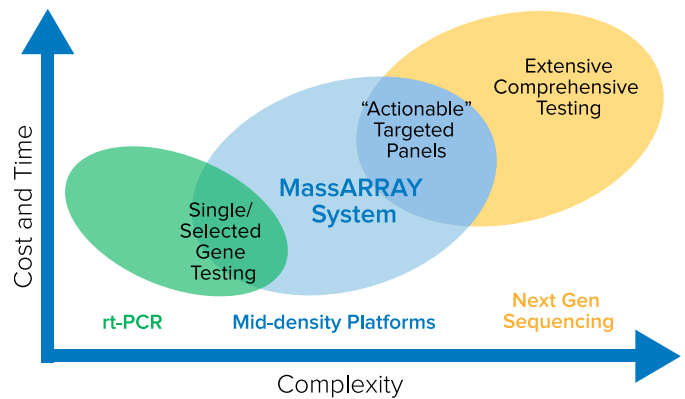
- Highly reproducible.
- Greater than 99.7% accuracy.
- Direct mass detection of the molecule of interest –unexpected events such as failed PCR or tri-allelic SNPs can easily be discovered.



### Cost effective and flexible to your research needs

- Low cost per genotype even with low number of SNPs.
- Flexible format - design experiments to match your sample or assay throughput.
- Reagent sets available in 96- or 384-well formats.

### Agena Bioscience's MassARRAY System: Delivering Low-Cost, Mid-Plex Assays



### CHOOSE THE OPTION THAT BEST MEETS YOUR NEEDS

- Design your own assays using our online Assay Design Suite.
- Purchase one of our pre-designed genotyping or somatic mutation panels.
- Let our Assays by Agena Custom Services Laboratory scientists develop custom assays for you.

See back for ordering and contact information, or visit our website at [www.agenabioscience.com](http://www.agenabioscience.com)



Amplify

## WORKFLOW - SUCCESS FROM ASSAY DESIGN TO RESULT

- Scalable and cost effective for most SNP genotyping studies.
- Simple workflow with convenient, universal reaction conditions.
- Multiplexed assay design with efficient re-plexing function.
- Rapid turn-around time from primer design to results.
- Convenient automated data analysis and reporting for unambiguous genotyping results.

### ASSAY DESIGN

Assay Design Suite (ADS) is an online tool for designing genotyping and somatic mutation assays for use with the MassARRAY System. ADS provides full support for human, bovine, and mouse genome sequences, and allows users to

- Import target sequences from a list of rs numbers, FASTA files, or sets of formatted SNP sequences.
- Check design criteria.
- Generate information and documents for oligo ordering, downstream workflow, and assay performance predictions.

The software has a proven design efficiency of > 95% with a throughput of more than 10,000 genotypes per day.

### iPLEX REACTION

After DNA or RNA extraction/cDNA synthesis, the desired region of interest is PCR-amplified using gene-specific primers (see Figure 1). An iPLEX single base extension is performed to identify the locus-specific allele(s). The iPLEX assay uses a single termination mix and universal reaction conditions for all SNPs. The primer is extended, dependent upon the template sequence, resulting in an allele-specific difference in mass between extension products. This mass difference allows the data analysis software to differentiate between SNP alleles.

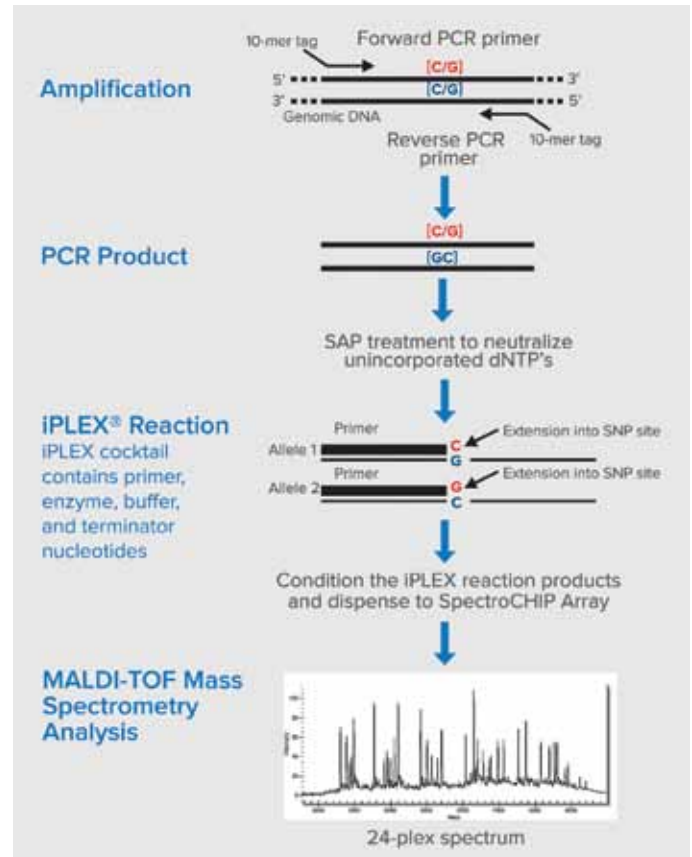


Figure 1. Overview of Genotyping Workflow on the MassARRAY System

### DATA ACQUISITION AND RESULTS REPORTING

The iPLEX reaction products are dispensed onto a SpectroCHIP Array, a silicon chip with pre-dispensed matrix crystal. The SpectroCHIP Array is then placed into the MALDI-TOF mass spectrometer and the mass correlating genotyping is determined in real time. A SpectroCHIP is typically processed in 45-60 minutes. The results are automatically loaded into a database that allows convenient data analysis with the Typer software.





## TYPYR SOFTWARE

Typyr software is a suite of modular applications that allows you to determine the SNP genotype of iPLEX reactions analyzed on the MassARRAY System. Typyr provides tools that enable you to evaluate and manage results, including viewing data in table and graphical formats, automatically checking results for errors, applying cluster analysis to results, and generating reports.

### CHIP SUMMARY

- Overview of genotypes for 1 Chip.

### PROJECT EXPLORER

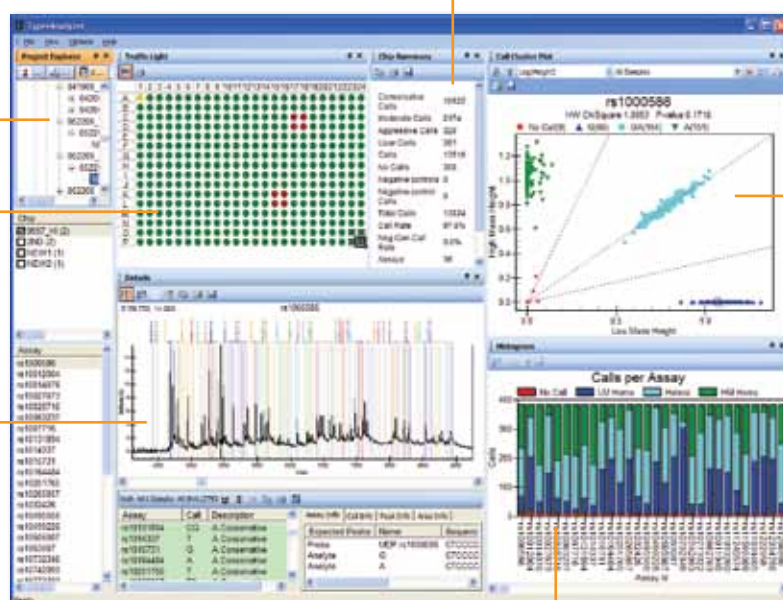
- Allows you to select single or multiple chips or assays to obtain an overview of genotypes.

### TRAFFIC LIGHT

- Quick assessment tool for the percent successful call rate of an assay per well.
- Four user-definable colors describe the percent of calls per well.

### SPECTRUM

- Shows analyte signals, genotypes and mass range.
- Annotations for all peaks.
- Rough judgment of intensities, resolution, and signal-to-noise ratio.



### HISTOGRAM

- Four categories: no calls, low mass homozygous, heterozygous, or high mass homozygous.
- Quick analysis tool of the calls per assay over all samples within the plate.
- Quickly monitor assay stability.

### CLUSTER PLOT

- Plot of low mass allele vs. high mass allele.
- Hardy-Weinberg values calculated for each genotyped population per assay.
- Click on any data point in cluster plot to review spectra and determine quality of individual assay.
- Provides whole population assessment of assay behavior and quality.

## ORDERING INFORMATION

Two iPLEX reagent versions are available - iPLEX Gold for routine genotyping, and iPLEX Pro for more demanding applications that require high performance and sensitivity, such as somatic mutation analyses. Reagent sets are available in 96-well and 384-well formats. iPLEX reagent sets are designed to be used with the MassARRAY System with Typer 4 Software.

### Each Complete iPLEX Genotyping Reagent Set includes:

- PCR reagents for amplification
- iPLEX Gold or iPLEX Pro reagents for primer extension
- SpectroCHIP Arrays and Clean Resin

### COMPLETE iPLEX PRO GENOTYPING REAGENT SETS

CAT NO	FORMAT
10217	10 x 384
10219	2 x 384
10160	10 x 96
10303	2 x 96

### COMPLETE iPLEX GOLD GENOTYPING REAGENT SETS

CAT NO	FORMAT
10148-2	10 x 384
10223	2 x 384
10158	10 x 96

## PUBLISHED STUDIES USING THE MASSARRAY SYSTEM

Visit <http://agenabioscience.com/genetics> to search our online database to find published studies using the MassARRAY System in your area of interest.



### AGENA BIOSCIENCE LOCATIONS

#### USA

Agena Bioscience, Inc.  
3565 General Atomics Court  
San Diego, CA 92121  
Phone: +1.877.4.GENOME  
Fax: +1.858.202.9220  
Order Desk: +1.858.202.9301  
Order Desk Fax: +1.858.202.9220  
Order Desk Email:  
orderdesk@AgenaBio.com  
Web: agenabioscience.com

#### EUROPE

Agena Bioscience GmbH  
Mendelssohnstraße 15D  
D-22761 Hamburg  
Germany  
Phone: +49.40.899676.0  
Fax: +49.40.899676.10  
Order Desk Email:  
orderdesk-europe@AgenaBio.com

#### ASIA PACIFIC

300 Herston Road  
Herston, QLD 4006, Australia  
Phone: +61.7.3088.1600  
Fax: +61.7.3088.1614

#### JAPAN

Agena Bioscience, K.K.  
PMO Nihonbashi Odemmacho  
Bldg 5F, 6-8, Nihonbashi Odemmacho  
Chuo-ku, Tokyo, 103-0011, Japan  
Phone: +81.3.6231.0727  
Fax: +81.3.3668.6088

#### CHINA

Beijing Representative Office  
Technology Building, Suite 702B  
No. 28, Tian-Zhu Rd,  
Tian-Zhu Airport Industrial Zone A  
Shunyi District, Beijing, China. 101312  
Phone: +86.10.8048.0737  
Fax: +86.10.8048.0740

The MassARRAY System, iPLEX Reagents, and SpectroCHIP Arrays are for Research Use Only. Not for use in diagnostic procedures.

Agena Bioscience's patented nucleic acid analysis by mass spectrometry methods and products are protected under United States patent rights including but not limited to 5,869,242; 6,024,925; 6,238,871; 6,258,538; 6,300,076; 6,440,705; 6,500,621; 6,558,623; 6,569,385; 6,979,425; 6,994,969; 7,019,288; 7,025,933; 7,285,422; 7,332,275; 7,390,672; 7,419,787; 7,501,251; 7,888,127; 8,003,317; 8,034,567; 8,315,805; and 8,349,566 and patents pending including but not limited to US20050272070 and US20130017960, and foreign counterparts including but not limited to, EP0815261B1, EP173622B1, EP1727911B1, EP1546385B1, EP1332000B1, EP1613723B1, EP1660680B1, and EP2107129B1.

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