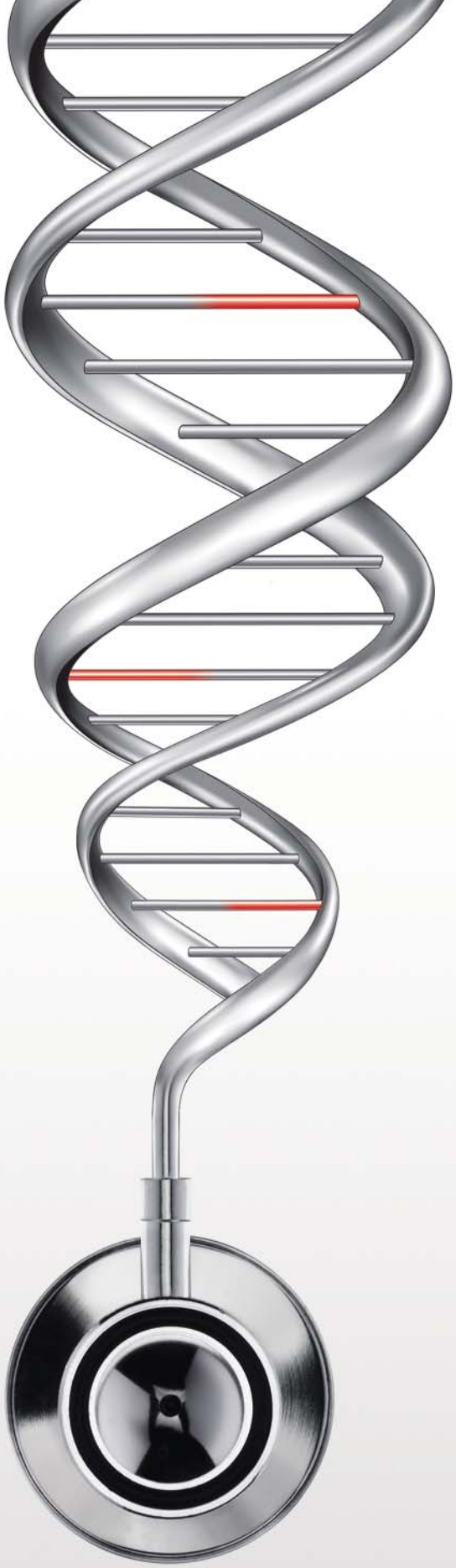


Affymetrix®
Revolutionize life

Affymetrix Medical Genomics Research Solutions

Your partner in translating genomic discoveries into clinical tools

Biomarkers and beyond

Traditional biomarkers, such as cholesterol and metabolites, are routinely used in diagnosing medical conditions and developing patient-specific treatment plans. The disease management of tomorrow will likely demand therapies tailored to an individual's disease status, treatment response, or clinical prognosis.

In the last 30 years, genomics researchers have uncovered an underlying genetic component of many complex diseases. The potential now exists for molecular biomarkers to associate disease or response to therapies with genetic variants, which would allow clinicians to make the most appropriate personalized treatment decisions.

A growing body of literature suggests that biomarkers based on genetic variation could help fill this critical need in disease management. A genomic biomarker, as defined by the US Food and Drug Administration (FDA), is "a measurable DNA and/or RNA characteristic that is an indicator of normal biologic processes, pathogenic processes, and/or response to therapeutic or other interventions."[1]

"Genomic medicine is an emerging discipline whereby clinical researchers can study genomic variation in well-defined populations to develop predictors of disease susceptibility, progression, and drug response."

DAVID SEO AND GEOFFREY GINSBURG (2005)[2]

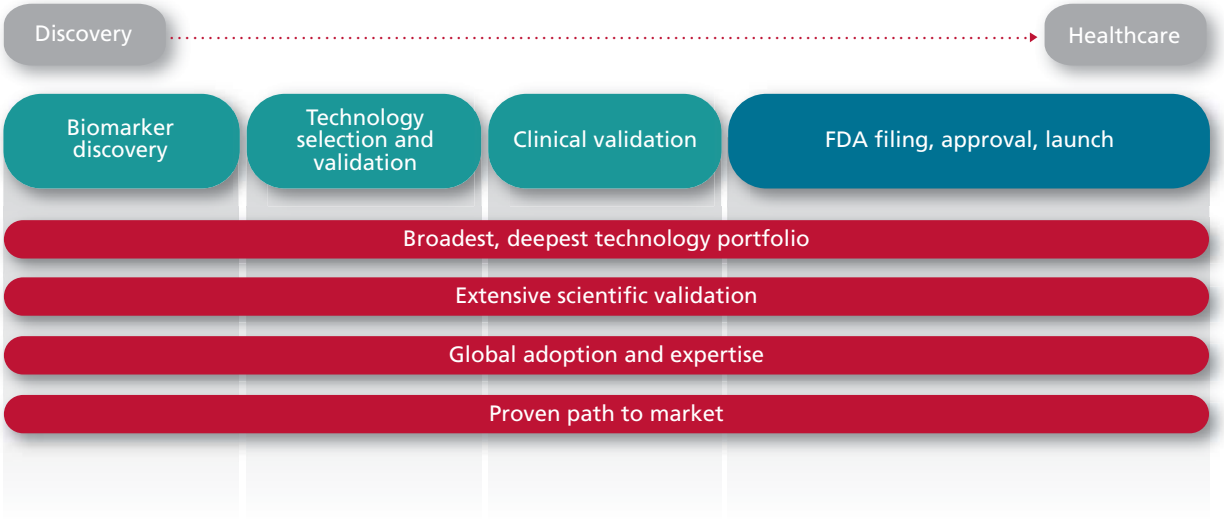
Single nucleotide polymorphisms (SNPs), DNA copy number variations (CNVs), cytogenetic rearrangements, RNA expression levels, and RNA processing variants are types of genetic variation that have the potential to become genomic biomarkers to enable earlier diagnosis, better treatment decisions, and the development of safer, more effective pharmaceutical agents.

Medical researchers are increasingly uncovering new associations between genetic variation and disease mechanisms, developing new genomic biomarkers based upon those findings, and translating them into accurate markers of disease status and predictors of drug response. Having this information at the disposal of healthcare professionals provides the opportunity for increasing the benefit-to-risk ratio for patients and ultimately tailoring disease management to individuals. If realized, these activities could have a revolutionary impact on human healthcare.

Proven technology, clear path to market

Affymetrix has pioneered tools for genetic analysis that are used throughout the world. Affymetrix is your expert partner of choice in translating your genomic discoveries into reliable clinical tools and facilitating more breakthroughs to help revolutionize healthcare.

AFFYMETRIX IS THE PARTNER OF CHOICE



Broadest, deepest technology portfolio

Whether you're interrogating entire genomes or individual molecules, RNA or DNA, 10,000 or 10 samples, Affymetrix offers solutions for every step in the biomarker discovery, qualification, and validation process.

Extensive scientific validation

To date, Affymetrix customers have published more than 18,000 peer-reviewed papers using our technology. In addition, the GeneChip® 3000Dx2 System is the first microarray-based system to gain FDA clearance, paving the way to translate your discoveries into medical practice.

Powered by Affymetrix Partners

- Roche
- Pathwork® Diagnostics
- Skyline Diagnostics
- Almac
- Veridex
- TessArae®
- Allegro
- Molecular Prognosis Institute
- Ipsogen
- Epigenomics
- Sysmex
- Signature Diagnostics

Global adoption and expertise

Leading organizations from around the globe have realized the importance of genetic variation. Affymetrix is currently helping to advance the research of these customers, including The Broad Institute of MIT and Harvard, Emory University, the Coriell and Salk Institutes, Cancer Research UK, Eli Lilly, Pfizer, and Novartis. National Institute of Health Sciences in Japan, King Faisal Specialist Hospital in Riyadh, Peter MacCallum Cancer Centre in Melbourne, and many more.

Proven path to market

The Powered by Affymetrix™ Program (PbA Program) enables partners to license our technology and develop microarray-based products for diagnostics and other applications. Two products developed under this program—the Roche AmpliChip® CYP450 Test and the Pathwork® Tissue of Origin Test—have already been cleared by the FDA for diagnostic use.

A platform for all applications

Affymetrix offers accurate and reproducible solutions for all multiplex, throughput, and sample type needs. Our solutions give you maximum genomic coverage during early discovery and flexible options for focused content during validation and translation into medical practice.

INSTRUMENT SYSTEMS

Application	GeneChip® System 3000 *Cartridge-based microarray platform*	GeneChip® System 3000Dx2* *Cartridge-based microarray platform for diagnostic laboratories*	GeneTitan™ System *Automated, medium- to high-throughput array plate platform*
3′ expression analysis	RUO	RUO Pathwork TOO Test	RUO
Whole-transcript expression analysis	RUO		RUO
Whole-genome association studies	RUO		RUO
Copy number detection studies	RUO		
Cytogenetics research	RUO	RUO	
Drug metabolism studies	RUO	RUO Roche AmpliChip®	
microRNA gene regulation studies	RUO		
Targeted genotyping	RUO	RUO	
Resequencing	RUO	RUO	

RUO = Research use only application (Middle column: Enables medical genomics research studies on the GCS 3000Dx2)

Third Party = In vitro diagnostics application developed by third party

*Only FDA-cleared microarray platform
The GeneChip® System 3000 and the GeneTitan™ System are for research use only.

Options for all DNA analysis needs

Discover disease-associated genetic variations with powerful genotyping arrays

With high marker densities across the genome, Affymetrix' genotyping solutions can be used for research purposes to enable the detection of rare SNPs and CNVs that can contribute to complex disease and drug response.
Affymetrix' genotyping solutions offer:

- High performance and accuracy with call rates higher than 99 percent
- Most comprehensive content for SNPs and CNVs
- Highly flexible throughput and analysis options

Understand the underlying genetic changes in cancer with the Affymetrix® Genome-Wide SNP Array 6.0

Cancer is a complex genetic disease and multiple types of genetic variation have been implicated in tumorigenesis, including SNPs, insertion/deletion variations, DNA copy number changes, and loss of heterozygosity (LOH). The SNP Array 6.0 is the only solution that reliably detects changes in DNA copy number and LOH on a single array. Features of the SNP Array 6.0:

- 1.8 million markers, including known cancer genes, offering the highest density across the genome
- Combination of copy number and LOH detection on a single array, allowing the discovery of copy-neutral LOH events implicated in cancer pathogenesis
- Simple workflow and flexible throughput options

Affymetrix continues to innovate in the area of copy number and LOH and will lead the way in providing tools for understanding genetic variation.

Detect the smallest chromosomal aberrations with the Affymetrix® Cytogenetics Research Solution

Many diseases, such as cancer and congenital abnormalities, are due to chromosomal aberrations. The Affymetrix Cytogenetics Research Solution has the power to detect both known and novel chromosomal aberrations with unbiased, whole-genome coverage. The Affymetrix Cytogenetics Research Solution offers:

- Highest resolution—2.7 million copy number markers enable you to detect even the smallest submicroscopic aberrations
- Simple, streamlined assay that works with a wide range of samples including amniotic fluid, blood, chorionic villi (CVS), fresh-frozen tissue, and cell lines
- Unique, flexible, and easy-to-navigate software that gives you confidence in your analysis results

Standardize your drug metabolism studies with the DMET™ Plus Premier Pack

Pharmacogenomic studies aim to improve drug safety and efficacy by enabling clinicians to prescribe the best drug, at the correct dose, to the right patient. The DMET Plus Premier Pack, which includes arrays, reagents, and analysis software, enables you to discover and confirm genetic variations associated with a particular drug or dosage response. The DMET™ Plus Panel features:

- 1,936 drug metabolism markers in 225 genes
- Markers in all FDA-validated genes
- More than 90 percent of the ADME Core markers as defined by the PharmaADME group

Technologies for gene expression analysis

Confidently detect gene expression changes with GeneChip® 3' IVT Arrays

With 3' IVT Arrays from Affymetrix, you can build on the knowledge of thousands of publications to find signature groups of genes and identify promising biomarkers. 3' IVT Arrays feature:

- A proven path to regulated environments—the only FDA-cleared expression arrays developed by PbA partners
- Highest number of probes per gene of any 3' in vitro transcription (IVT) array
- Highest reproducibility, as demonstrated by the MicroArray Quality Control (MAQC) Study[3]
- Flexible formats for a range of throughputs

Look beyond the 3' end of the gene with whole-transcript expression arrays

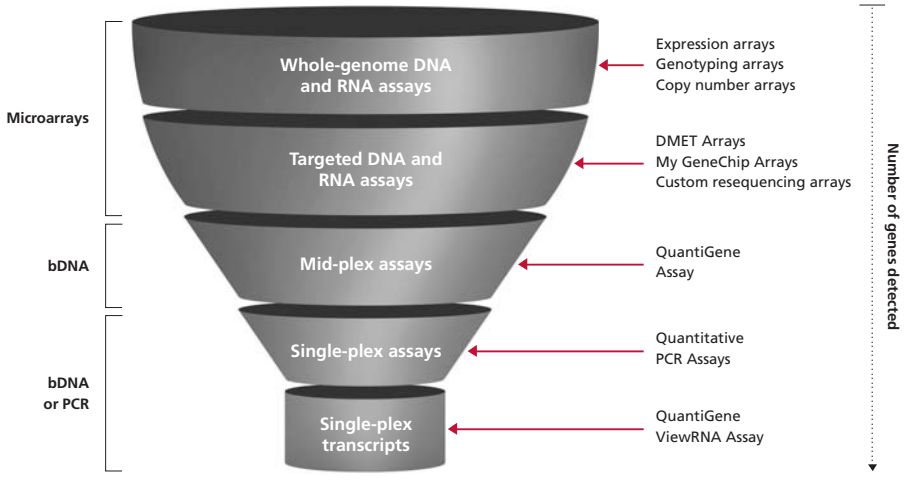
GeneChip® Exon and GeneChip® Gene 1.0 ST Arrays enable you to measure gene expression and detect alternative splicing events, which are recognized by scientists as a major source of proteome diversity and highly relevant to disease status and therapy selection[4]. Gene 1.0 ST Arrays provide comprehensive coverage of annotated genes while Exon 1.0 ST Arrays include additional predicted genes for novel detection of genetic variation. Whole-transcript expression arrays offer:

- Greatest single-array coverage of the transcriptome
- The ability to detect transcripts not found with other microarray platforms
- Multiple levels of analysis: gene, exon, and alternative splicing

Understand gene regulation with the GeneChip® miRNA Array

microRNAs (miRNAs) have taken center stage, as they have been implicated as having important roles in cancer, heart disease, and other complex diseases. The GeneChip miRNA Array has the most comprehensive coverage of miRNAs on a single array, making it a powerful tool for probing the mechanisms by which miRNAs regulate gene expression and how they are implicated in disease progression.

FROM ONE MILLION GENOMIC PROBES TO ONE RNA MOLECULE



Flexible genomic content for biomarker validation

Affymetrix offers tailored solutions regardless of your research. For focused medium- to low-plex confirmation studies of 10,000 genes, get flexible and scalable options to facilitate all your biomarker validation steps.

Focus your validation with MyGeneChip™ Arrays

The MyGeneChip Program gives you the flexibility to get the most out of your medical genomics research. Our custom arrays are ideal for focused validation or confirmation studies, with targeted sets of putative biomarkers or DNA polymorphisms with associations. Choose from whole-genome catalog arrays, your own sequences, or a combination of both, and Affymetrix will work with you from concept through design completion to ensure success.

Focus your research with GeneChip® CustomSeq® Resequencing Arrays

Affymetrix CustomSeq Arrays provide the most efficient and cost-effective method for quickly interrogating large amounts of sequence in a single experiment. The utility of these arrays for medical genomics research lies in their ability to screen known mutations quickly and cost effectively. Potential clinical applications include identifying disease susceptibility, understanding host pathogen interactions, pathogen detection, and identifying infectious disease and drug response markers. Resequencing arrays offer:

- More sequence per experiment, enabling analysis of up to 300,000 bases of double-stranded sequence (600,000 bases total) on a single array
- Delivered complete sequence in 48 hours with minimal alignment curation or hand editing, providing a faster, more efficient method to perform large-scale resequencing
- Flexible array content and formats of 50 kb, 100 kb, or 300 kb, covering single contiguous regions or multiple dispersed fragments, providing analysis of whole genomes, multiple genes, and/or multiple organisms on a single array

Validate your genetic variation discoveries with QuantiGene® single- and multiplex expression assays

Truly quantitative, branched DNA (bDNA) technology has its roots in quantitative clinical diagnostic viral load tests for HIV and HCV, marketed by Siemens under the trade name VERSANT®. This technology has recently been applied to drug discovery and drug development applications, including siRNA screening, compound screening, and biomarker validation testing. QuantiGene Assays use highly sensitive and specific bDNA signal amplification technology to detect RNA or DNA targets rather than amplify them. QuantiGene technology enables you to avoid RNA isolation, reverse transcription, PCR, as well as the amplification bias that occurs during PCR-based assays. These assays are available in multiplex or single-plex formats in 96- or 384-well plates, and they work well with all sample types, including cell, tissue, FFPE, and blood samples.

Revolutionize healthcare

Partnering with Affymetrix for your medical genomics research gives you access to a broad range of technologies, expertise, and experience. Now is the time to embark on a discovery and validation process to help you translate your findings into clinical tools that may ultimately revolutionize healthcare.

To learn more about how we can provide the tools and services you need, contact your local account manager or visit our website at www.affymetrix.com.

References

1. US Food and Drug Administration. Guidance for Industry: E15, Definitions for Genomic Biomarkers, Pharmacogenetics, Genomic Data and Sample Coding Categories (2008).
2. Seo, D., Ginsburg, G. S. Genomic medicine: bringing biomarkers to clinical medicine. *Current Opinion in Chemical Biology* **9**(4):381-6 (2005).
3. MAQC Consortium (Shi, L. et al.). The MicroArray Quality Control (MAQC) project shows interplatform reproducibility of gene expression measurements. *Nature Biotechnology* **24**(9):1151-61 (2006).
4. Garcia-Blanco M. A., Baraniak A. P., Lasda E. L. Alternative splicing in disease and therapy. *Nature Biotechnology* **22**(5):535-46 (2004).

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