

CGH Microarray Solutions for Genome-Wide Genetic Analysis

Custom & Catalog Microarrays



**High
Quality
Data**

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See Deeper. Reach Further.



Agilent Technologies

See Deeper. Reach Further.



Agilent Technologies

More flexibility. More content. Unparalleled data quality.

Comparative Genomic Hybridization (CGH) microarrays from Agilent.

Agilent CGH microarrays are widely recognized as the industry standard for genome-wide chromosomal analysis. With easy-to-use catalog products for a variety of CGH applications and the industry’s most affordable and flexible custom content program, Agilent’s CGH solution provides capabilities that can adapt to the changing needs of your laboratory and your research program.

Microarray CGH provides maximum resolution copy number data.

Comparative Genomic Hybridization (CGH) is a technique that measures copy number changes between two DNA samples—a sample and a control. The copy number information can be used to visualize large or small chromosomal aberrations, including very small DNA segments such as microdeletions and microduplications. This allows you to quickly scan an entire genome for imbalances. Using microarray technology, such as that provided by Agilent, you can scan the genome for imbalances on a massively parallel scale. This increases the coverage and resolution of your research data over traditional technologies such as karyotyping, FISH or traditional CGH (Table 1).

Oligo-based array methods such as Agilent’s CGH microarrays provide an even higher level of resolution and coverage over methods such as BAC (Bacterial Artificial Chromosome) arrays and other traditional technologies.

Method	Technology	Resolution	Coverage
Cytogenetics	Karyotyping	> 10 Mb	Genome wide
	SKY (Spectral Karyotyping)	> 2 Mb	Genome wide
	Traditional CGH	> 2 Mb	Genome wide
	FISH (metaphase)	≥ 100 kb	Probe specific
	FISH (interphase)	≥ 20 kb	Probe specific
aCGH	BAC (Bacterial Artificial Chromosome)	100 kb	Genome wide
	cDNA	2 kb	Gene only
	Agilent 60-mer oligo arrays	0.06 kb	Genome wide

Table 1. Comparison of genome coverage and resolution between traditional and aCGH methods.

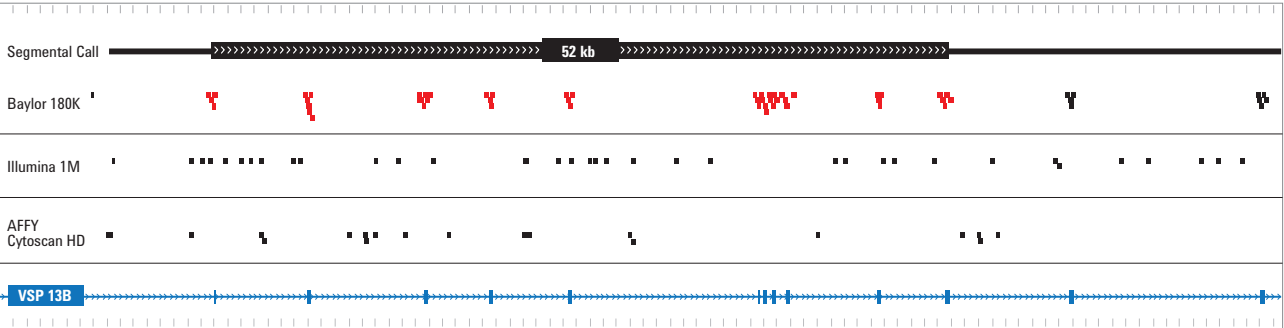


Figure 1. Postnatal Research Array 4x180K designed by Baylor College of Medicine provides greater exonic coverage (exons indicated by blue blocks) in VSP13B than SNP arrays. Copy number loss (indicated by probes colored red and shown by black bar) of band 8q22.2 of 52 kb, resulting in the deletion of exons 4-14 of the COH1 (VPS13B) gene. SNP-based arrays show comparatively fewer probes in all exons of this gene. (Data contributed by Baylor College of Medicine.)

Superior technology. Two-color oligo microarrays from Agilent.

Agilent’s 2-color CGH array provides superior copy number data as opposed to 1-color because sample and reference DNA are directly compared. Agilent’s long 60-mer probes are more specific than probes that are shorter in length, allowing you to use fewer probes to make accurate calls.

2-Color CGH Microarrays

True CGH as sample and reference are hybridized to the same array.

Probe placement across the entire genome is highly flexible.

VS.

1-Color SNP Arrays

Only the sample is hybridized to the microarray and then compared to a database.

Placement of probes in exons and other regions of interest is limited.

Agilent’s microarray technology. Find more.

- Proven to detect aneuploid events and smaller aberrations (e.g., microdeletions)
- Detect whole-genome triploidy and unbalanced tetraploidy
- Analyze heterogeneous cancer samples and constitutional samples down to 8% mosaicism
- Report clonal fraction in cancer samples
- Extract DNA and go—no need to pre-amplify samples

A complete workflow. For any sample.

Complete CGH microarray system.

The Agilent microarray workflow is streamlined and takes less time to process samples compared with other microarray methods. Agilent offers all of the reagents and instruments needed to process your aCGH data including custom and catalog arrays, labeling kits, hybridization and wash solutions, hybridization oven, the best-in-class SureScan microarray scanner, and easy-to-use software to interpret your results. The Agilent aCGH microarray workflow is streamlined and can be easily adapted into your lab.

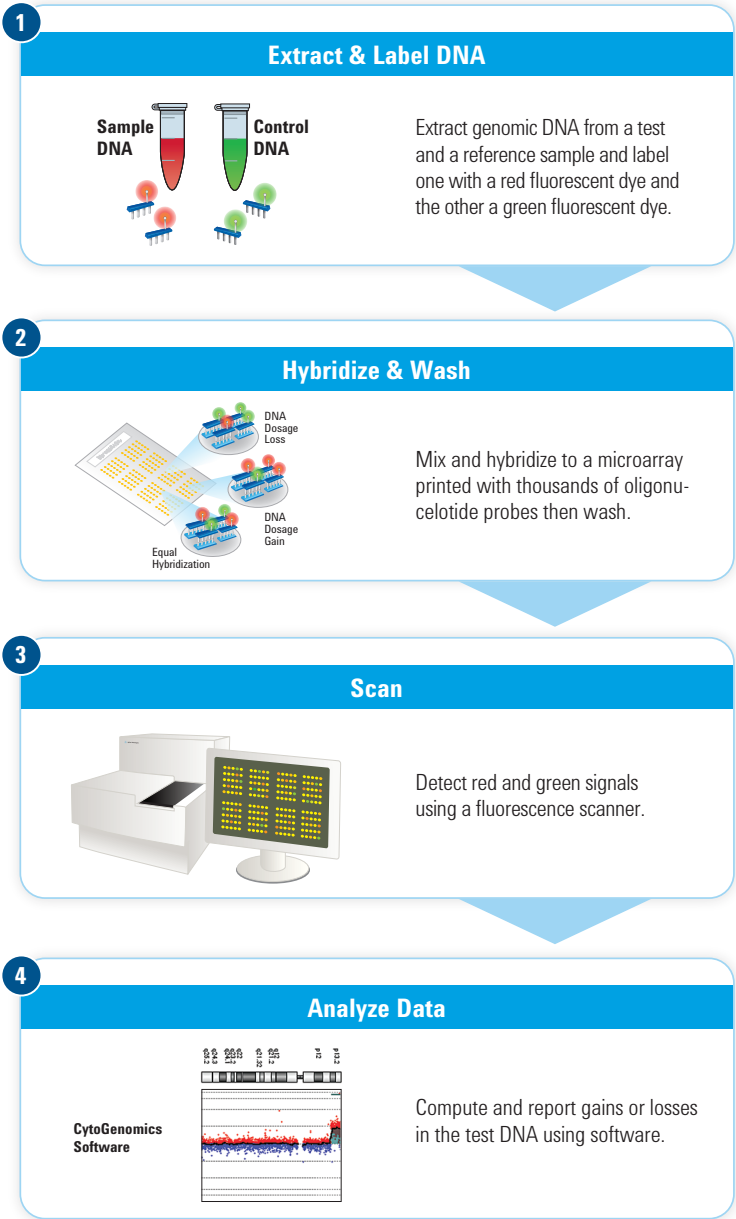


Figure 2. The complete aCGH process.

A comprehensive menu of products leveraging the latest innovations in aCGH.

Agilent’s aCGH products offer the most comprehensive menu of CGH microarrays for your specific research goals and the microarrays are optimized for the most challenging sample types including FFPE and single cells. Agilent offers three types of cytogenetic microarrays: CGH+SNP, CGH, and CNV.

Agilent CGH Array Type	Description	Sample Types
CGH+SNP	Simultaneous high-resolution detection of copy number and copy-neutral variations, including LOH and UPD	CVS, amniotic fluid, buccal swab, blood, and fresh frozen tissue
CGH	High-quality copy number data for human, mouse, and rat	CVS, amniotic fluid, buccal swab, blood, fresh frozen tissue, FFPE, and single-cell embryo
CNV	CNV association studies (“normal” difference in copy number of the genomes of unrelated people)	Blood

Agilent CytoGenomics Software.

Agilent CytoGenomics Software enables highly accurate and easy-to-use CGH and CGH+SNP analysis for constitutional and cancer samples.

- Streamlined workflow that is automation enabled for data upload and analysis
- Contains optimized algorithms for accurate detection of copy-number changes and copy-neutral changes, including LOH and UPD
- Convenient input and output support, allowing for integration with LIMS
- Designed specifically for cytogenetic research to put data into biological context

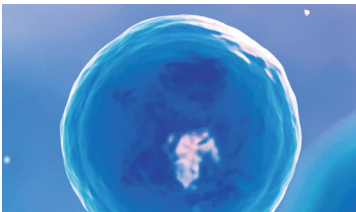
CytoGenomics



Figure 3. Triage view window in Agilent CytoGenomics Software showing the genome overview, chromosome view of chromosome 17, zoomed-in gene view with interpretation tracks, and aberration table.

A broad range of products to fit your research needs.

Constitutional Research



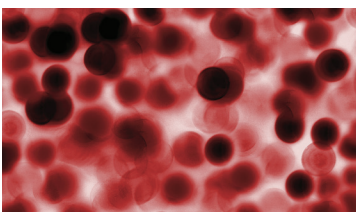
Single cells

Agilent offers CGH microarrays specifically for single-cell analysis for rapid detection of aneuploidy in embryos with the GenetiSure Pre-Screen Array Kit.



Amniotic fluid & CVS

Agilent's CGH arrays can be used on amniotic fluid and CVS samples. There are several content options, including ISCA-designed and Baylor College of Medicine microarrays.



Buccal swab & blood

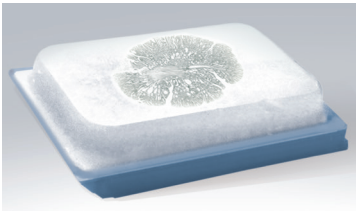
Agilent also offers a wide option of arrays for buccal swab and blood samples with content specific for research involving developmental delay and intellectual disability.

Cancer Research



Hematological tumor samples

Our CGH+SNP microarrays have higher probe density in tumor suppressor and oncogenes and offer increased resolution for the study of hematological cancers.



FFPE tumor samples

For the analysis of FFPE tumor samples with CGH microarrays, an optimized protocol that utilizes the direct labeling of fragmented and damaged DNA is available.

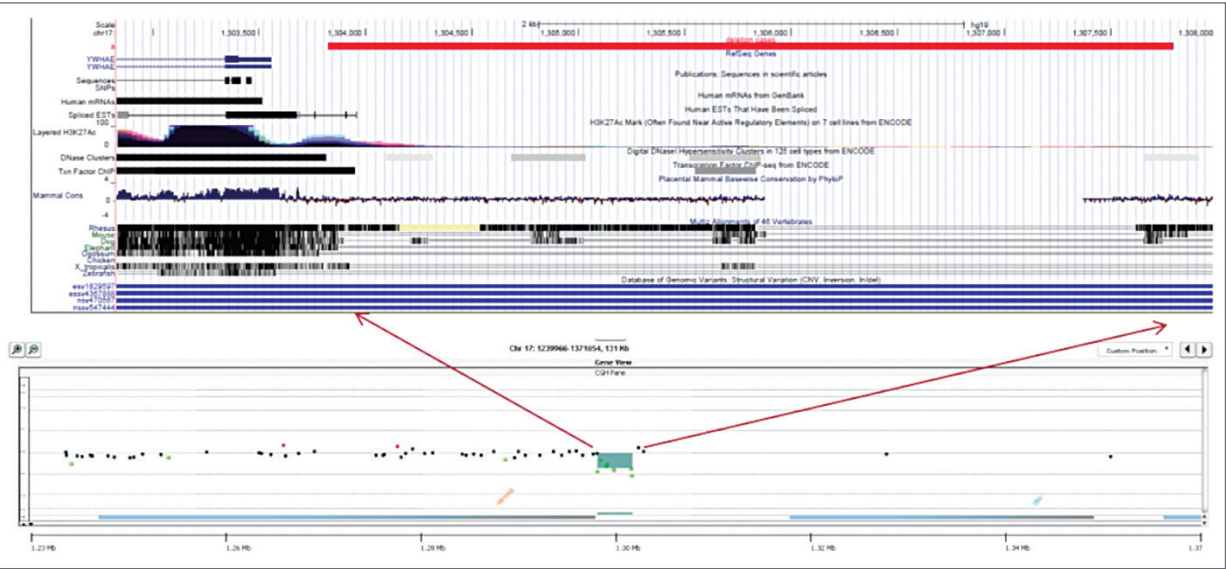


Figure 4. Agilent CytoGenomics view of CGH log₂ ratios indicating a 4 kb deletion (green shading) detected in the promoter region of the YWHAE gene. This very small deletion could be detected because of the high probe density in genes associated with neuro-developmental delay on the custom 4x180K CGH+SNP microarray (ClariView Array) designed by Claritas Genomics. Ann Neurol. 2014 Jun;75(6):943-58. doi: 10.1002/ana.24178

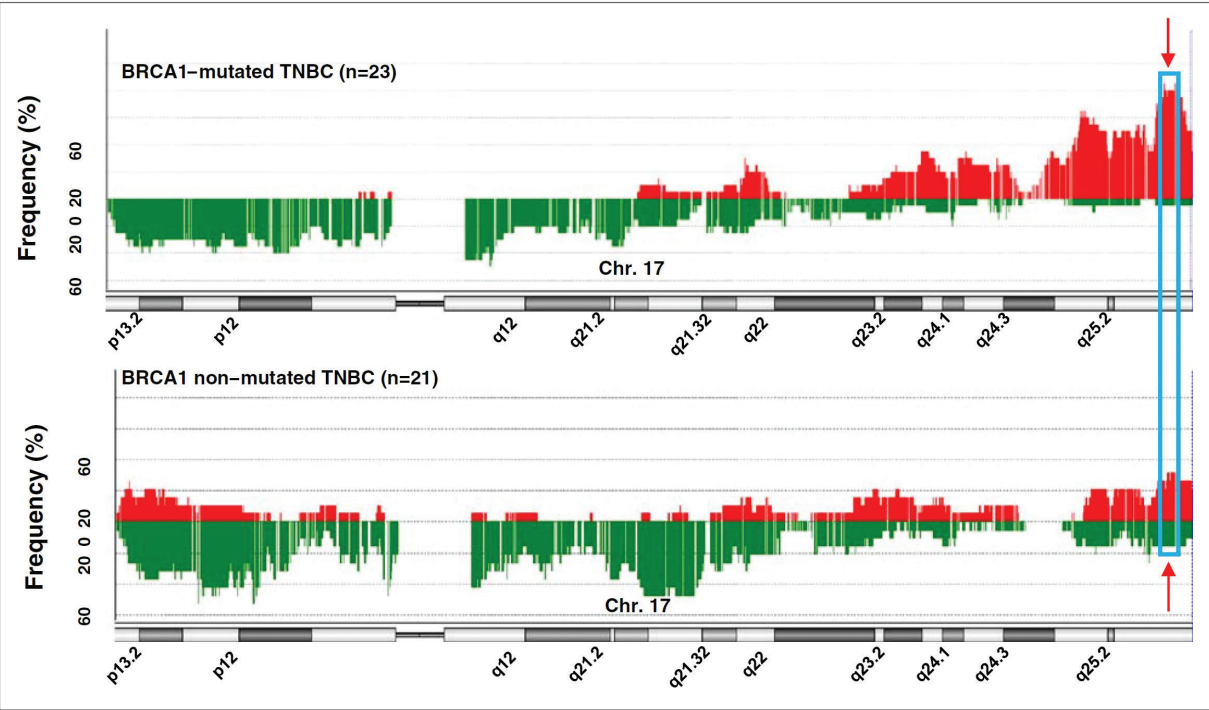


Figure 5. Frequency of the chromosomal aberrations along chromosome 17 in BRCA1-mutated and non-mutated TNBC (triple negative breast cancer). Frequency of gains (red) and losses (green) on chromosome 17 are plotted according to their genome location for 23 BRCA1-mutated and 21 non-mutated TNBC. The most recurrent and significant aberration on chromosome 17 in BRCA1-mutated TNBC is surrounded by a blue frame in the q25.3 region. Breast Cancer Research 2014, 16:466 doi:10.1186/s13058-014-0466-y

Your vision. Your design. Infinite possibilities.

Enjoy the industry’s most flexible and affordable custom design microarrays.

When your research needs grow beyond what Agilent offers as catalog products or you want to dig deeper into a specific gene or area of the genome, we’ve got you covered with our custom design program. Using Agilent’s web-based SureDesign software tool, you can quickly and easily choose from pre-defined genomic content or design your own microarray with custom content.

The design tool is free of charge and there is no minimum order on designs. All microarrays are manufactured to order using the same GMP process as our catalog, off-the-shelf microarrays.

Use the SureDesign Wizard to create a custom design in minutes.

SureDesign is a web-based application that enables you to harness the flexibility of Agilent’s SurePrint oligo manufacturing technology for the creation of custom microarray designs. There is no charge for the use of SureDesign.

SureDesign offers intuitive, guided workflows for new and advanced users to easily create custom CGH microarray designs. You can create custom CGH microarrays from our database of over 28 M highly curated CGH probes, ensuring optimal performance for your custom design.

SureDesign is fully e-commerce enabled – you can easily request a quote or place catalog or custom microarrays in the Agilent Genomics store shopping cart for convenient purchase.

SureDesign

Define Design

Define Targets

Review Targets

Select Probes

Finalize

Design Complete

CGH Array Design

Name: Gene Panel

Species: H. sapiens

Format: 8 x 60 K

Target Regions

Regions | Size: NA | NA

Probes

CGH | Backbone: NA | NA

Probe Spacing: NA

CGH Replicates: NA

Norm. | Rep.: 1262 | 5000

Ctrl. Probes: 3886

% Filled: ~ 16.11%

UCSC View

Download

Targets:

ABCA1

ABCA4

ABCB1

ABCB7

ABCC6

ABCC8

ABCC9

ABCD1

ABL1

ABL2

ACADM

ACADVL

ACTA1

ACTA2

ACTB

ACTC1

ACTG1

ACTN2

ACTV1R

Upload

Example

Clear

Databases

☒ RefSeq

☒ Ensembl

☒ CCDS

☒ Gencode

☒ VEGA

☒ CytoBand

Parameters

Replicate Count: 1

Genome-Wide Backbone: Fill

Include Flanking Regions (5' and 3'): 0

☐ Allow Synonyms

Cancel

Back

Next

Figure 7. SureDesign design wizard. Custom microarrays are easy to design with the SureDesign design wizard.

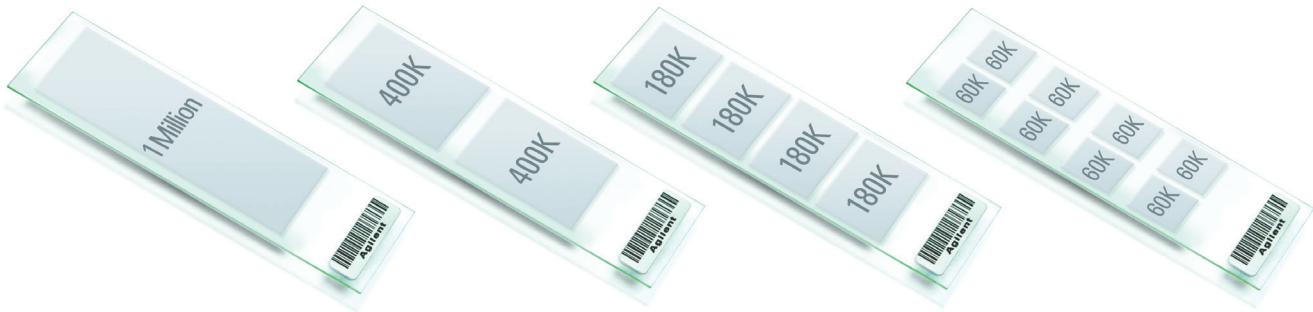


Figure 6. CGH microarray formats. Choose from 1, 2, 4, or 8 arrays per slide.



Experience best-in-class technical service and support.

Agilent is committed to helping you achieve success with your research goals. Our worldwide technical support and instrument service team will support you every step of the way. We offer onsite installation, training and product support. Our dedicated team of phone support specialists is available to field your questions at times that are convenient for your specific lab hours.

