



All your genetic analyses
on a single instrument

GENOMELAB GEXP GENETIC ANALYSIS SYSTEM



All on a single instrument

Perform your genetic assays on one instrument

A broad spectrum of applications

Gene Expression
Microbial ID
Sequencing
SNP Analysis
STR Analysis
AFLP
MLPA
MLVA

Complement your gene expression analysis with LOH studies. Confirm your SNP analysis results by sequencing. Combine MLPA genomic results with quantitative gene expression for the full story. Do all these on one instrument, with one capillary array, one gel and one software.

Furthermore, this flexible system allows you to run more than one application on the same plate and up to 192 samples unattended.

Gene Expression

The GenomeLab GeXP™ Genetic Analysis System is a multiplexed quantitative solution that reproducibly measures subtle, biologically relevant changes in gene expression. This system can detect down to 0.5-fold changes in gene expression, providing much more meaningful information than ever before. In addition, the GeXP multiplex feature allows multiple reference (housekeeping) genes, genes of interest and an internal control to be analyzed in a single well for improved accuracy.

Reduce bottlenecks with our high throughput, low-cost solution

Quantitative gene expression that is cost-effective. The GenomeLab GeXP Genetic Analysis System utilizes a patented, highly multiplexed reverse transcription PCR approach (XP-PCR) to quickly and efficiently look at the expression of multiplexed gene targets with greater sensitivity and speed. Building on more than a decade of innovative leadership in laboratory automation and capillary electrophoresis technology, the GenomeLab GeXP expedites your pathway to discovery.

Cost-effective and time-saving gene expression

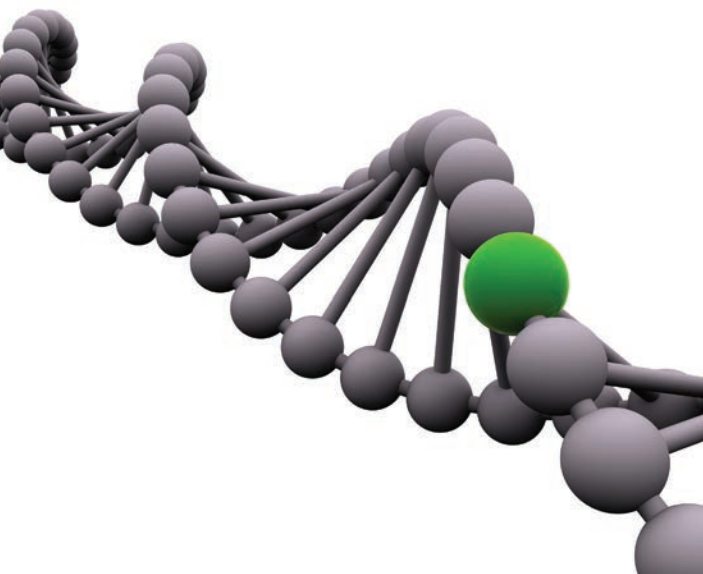
The ability to analyze multiple gene targets simultaneously improves efficiency. Pre-labeled universal primers in the GeXP Start kit reduced the cost per gene expression PCR expenses when compared to conventional qPCR.

High-throughput quantitative gene expression

With the capacity to analyze up to 30 genes per reaction, the scalable GenomeLab GeXP enables the examination of up to 5,760 data points unattended in 24 hours.

High accuracy and reproducibility you can trust

In addition, the universal primer amplification eliminates primer bias typically associated with multiplex amplification and therefore increases the accuracy and reproducibility of the result.



The GenomeLab GeXP™ Genetic Analysis System supports researchers who have completed their initial discovery work with literature or large-scale screening technologies. The system provides a multiplexed, quantitative gene expression and multipurpose genetic analysis platform. Please ask your local sales representative to calculate your own personal cost savings by making the simple change to multiplexed gene expression profiling.

Multiple applications for gene expression:

- Tumor biomarker discovery
- Development of gene signatures
- Transplantation and immune-tolerance study
- Drug toxicity study
- Stem cell research
- Vaccine development

Low sample requirement.

Our multiplexing capability, coupled with capillary electrophoresis readout, can be efficiently used to look at focused sets of genes using as little as 5-50 ng of total RNA.



All on a single instrument

The multiplex XP-PCR gene expression process and analysis

Total RNA target isolation

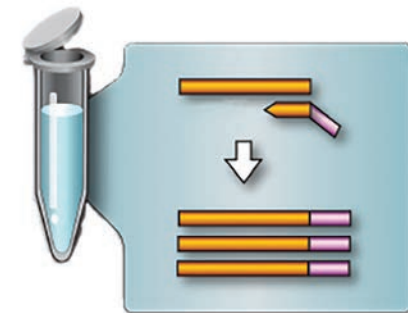
Extract Nucleic Acid



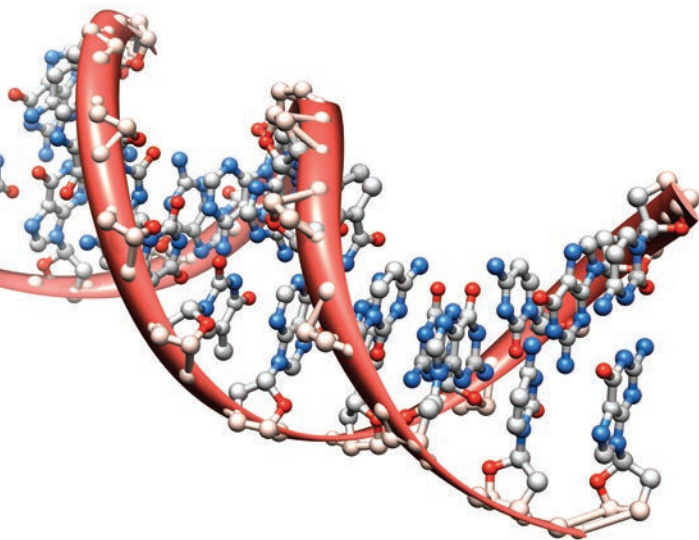
Total RNA isolation from various biological samples including blood, tissue, cell culture, sputum and swabs. The multiplex PCR chemistry is compatible with most total RNA isolation and purification procedures.

Reverse transcription of mRNA to cDNA

Multiplex Reverse Transcription



Reverse transcription reaction from total RNA uses gene-specific reverse primers that add a flanking universal reverse sequence to resulting cDNAs.

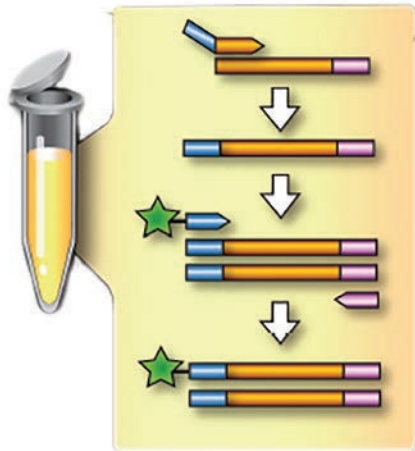


Simplified for multiplex capability

The GenomeLab GeXP™ Genetic Analysis System uses a simplified two-step multiplex PCR process for multiplexing biomarkers in gene expression assays. Each multiplex integrates biological controls in the same well as target genes and reference (housekeeping) genes. This approach not only reduces reagent consumption, but also eliminates pipetting variation and minimizes the need for technical replicates.

Scientists can design research specific panels using accession numbers or proprietary sequences. GeXP protocols accept any desalted, deprotected, unlabeled oligonucleotides.

Multiplex PCR with chimeric and universal primer sets



The multiplex reaction contains the cDNA for all genes of choice tagged with a 5' end universal sequence. Two types of primers are present in the reaction:

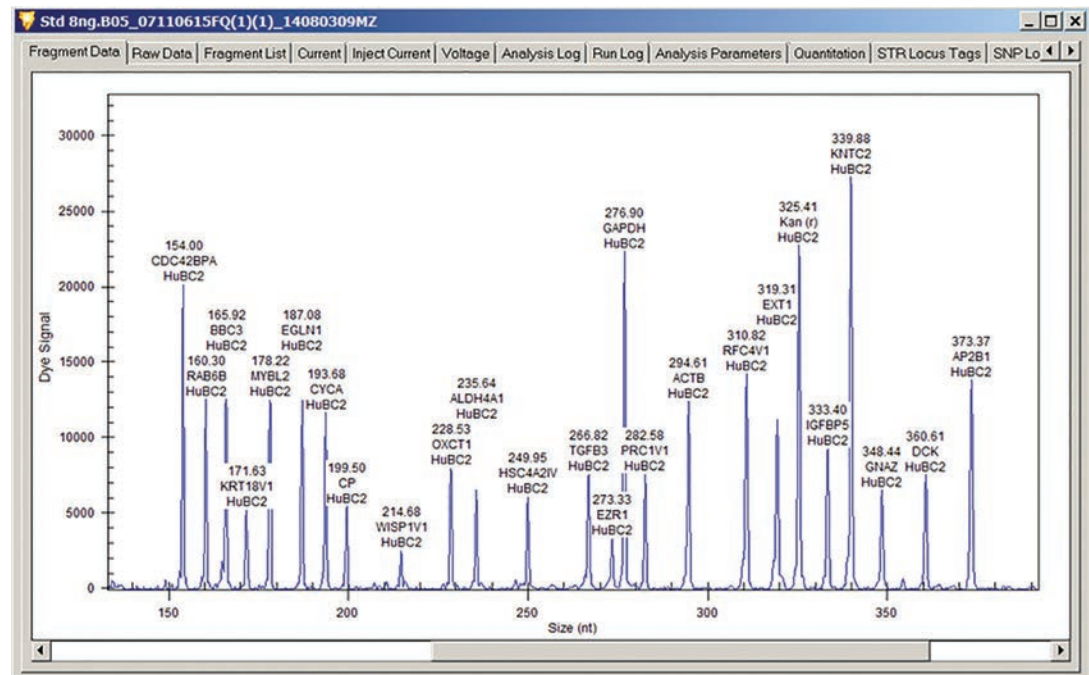
- 1) Chimeric primers containing a gene specific sequence with a universal tag at the 5' end. They are used to synthesize a double-stranded DNA template.
- 2) Universal primers have the same sequence as the universal tags in the chimeric primers. The forward universal primer is covalently labeled with a fluorescent dye for detection during capillary electrophoresis.

In the first two cycles, the PCR reaction is driven by the gene-specific sequence of the chimeric primers to produce amplicons that have universal tags at both ends. The universal primers take over during the third cycle and drive the remaining PCR reactions, due to their 60:1 molar excess relative to the chimeric primers. At this point, all of the templates are amplified with identical universal primers and any sequence bias is minimized. The result is a pool of amplicons corresponding to the genes of interest. Each amplicon is designed to have a discrete length, and each is labeled with a WellRED fluorescent dye for detection.

Analyze and Evaluate

Separate and Analyze

Samples are ready to load on the GenomeLab GeXP™ Genetic Analysis System without the need for sample clean-up. The multiplex PCR amplified fragments are separated and ready to be analyzed.

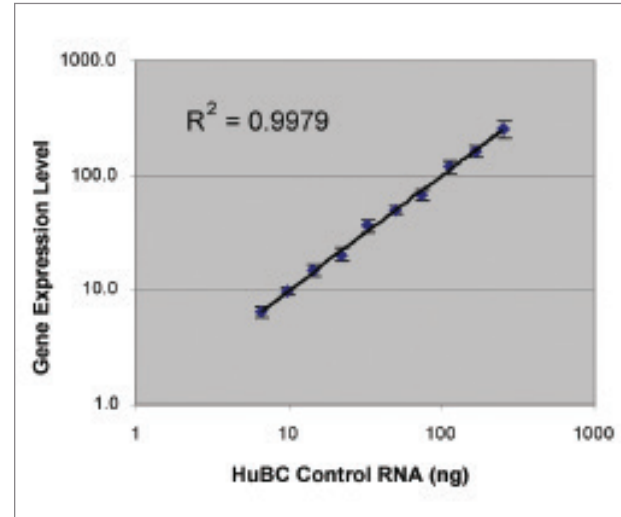


All on a single instrument

Multiplexed gene expression delivers high sensitivity, accuracy and precision

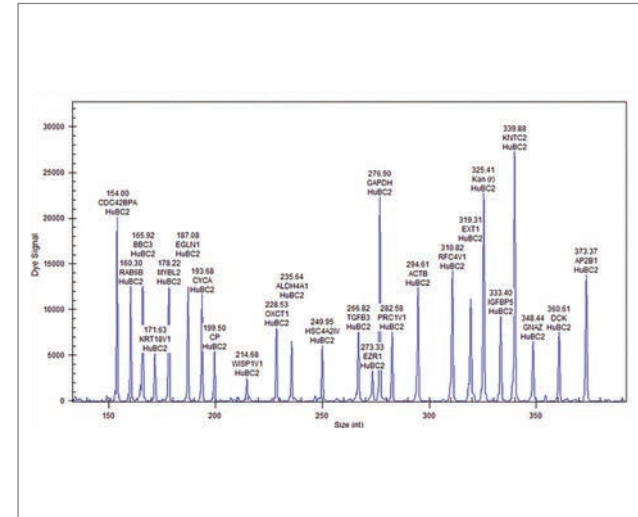
Linearity and precision

The GenomeLab GeXP™ produces gene expression data with superb linearity. A highly linear correlation between the amount of RNA and gene expression level is generated for each gene in a multiplex with an average correlation coefficient (R2) well above 0.99.



Human breast cancer electropherogram for clinical and biomarker research

Simultaneously analyzed 21 functional genes associated with tumor progression and three reference (housekeeping) genes in a single run.



Accuracy

HuBC control RNA(ng)	6.5	9.8	14.5	21.9	32.9	49.4	74	111	167	250
GEQ value	6.5	9.8	15.0	20.4	36.2	49.8	67.8	118	163	251
Relative accuracy	99%	99%	99%	93%	90%	99%	92%	93%	97%	99%
Average of RA	96%									

Relative accuracy (RA) of GeXP in detecting 0.5-fold change in the amount of Human Breast CancerPlex control RNA

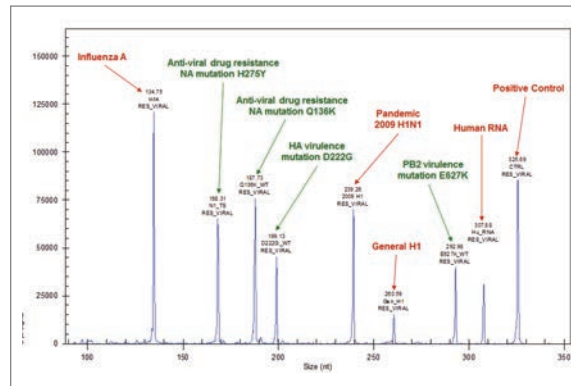
The GenomeLab GeXP is sensitive enough to precisely detect even small changes in gene expression. The 0.5-fold increases in RNA concentration are consistently and accurately quantified by the GeXP for all genes in a multiplexed assay.

Microbial Identification and Typing

The GenomeLab GeXP™ XP-PCR amplification chemistry is also well suited for multiplex microbial identification and typing, overcoming limitations associated with conventional microbial culture and immuno-staining processes. This enabling technology allows the identification of different viral, bacteria and yeasts from a single sample source. In addition, multiplexing offers the ability to detect several target regions from each microbe for analysis redundancy to improve identification and typing accuracy. The system has superior sensitivity, capable of detecting low copy numbers of microbial gene targets and fast identification and typing when compared to the conventional microbial culture techniques.

Respiratory virus identification and typing electropherogram for epidemiology surveillance and research

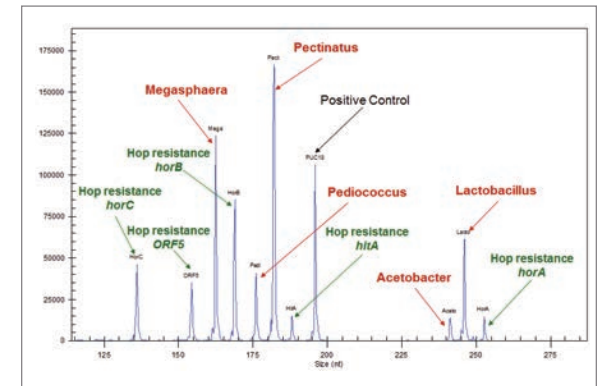
Detect multiple respiratory virus target regions along with human RNA in a single run eliminating ambiguity due to RNA sample degradation. The GeXP is also capable of detecting both RNA and DNA viruses simultaneously to determine co-infections, fast identification and typing when compared to the conventional microbial culture techniques.



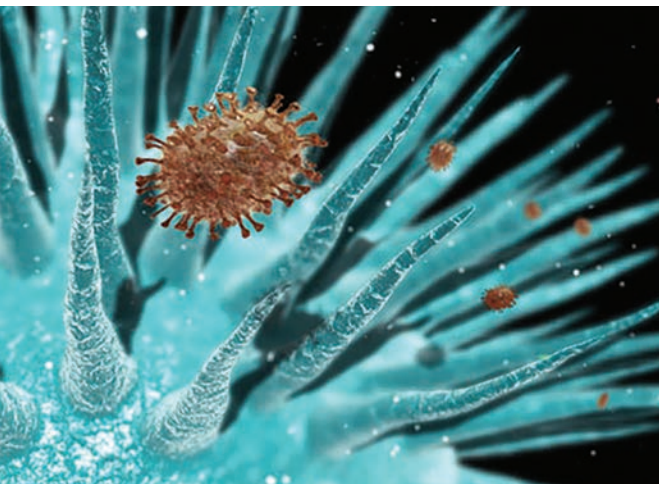
Multiplex enables functional genes, viral targets along with various internal controls to be detected in a single reaction improving the call confidence and minimize false negative as well as false positive.

Food and beverage microbial contaminants electropherogram

Identify various bacteria, yeasts and hop resistance genes from contaminated beer samples. Large number of food and beverage samples can be processed quickly, accurately with high level of specificity and sensitivity. This improves quality control testing throughput efficiency in food and beverage manufacturing processes.



Molecular testing overcomes issues associated with conventional microbiology culture methodologies such as culture media limitations, slow microbial growth, laborious biochemical profiling and poor microbial characterization using archaic staining processes.

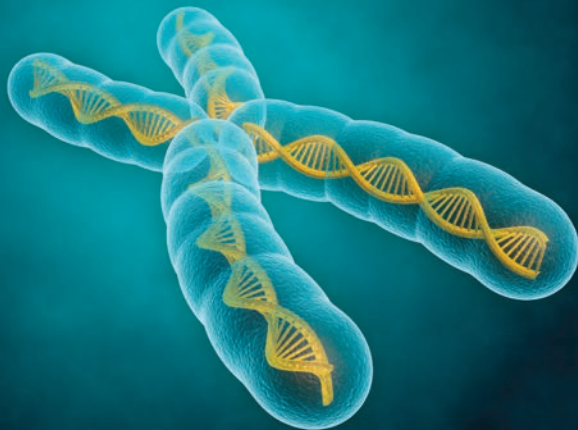
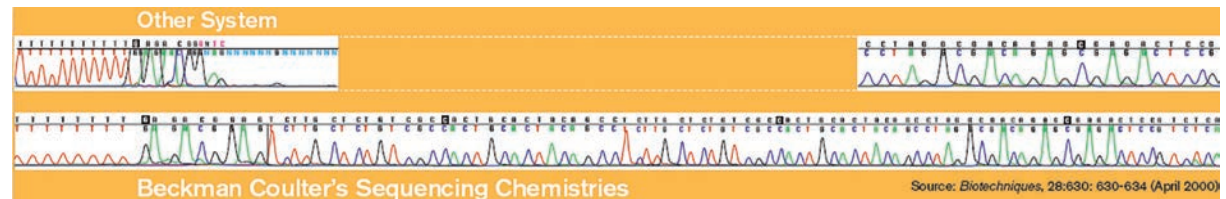


All on a single instrument

Resolve complex sequences with high-quality information

Sequencing

Using a novel approach to chemistry, our system features unique DNA sequencing reagents – including linear polyacrylamide gel (LPA), coated capillaries, dITP chemistry and near-infrared dyes – coupled with online denaturation. This results in less correction, more meaningful raw data and higher-quality final analyses. In this example, the GenomeLab GeXP™ is compared with another automated sequencing system for the completion of a problematic human genome sequence region. A Section of gene sequence the other system could not resolve was accomplished using our innovative chemistry. The GenomeLab GeXP, in combination with the chemistry kits, provides high sensitivity to dye-labeled sequencing reaction products, robust signal and precise control over electrophoretic separation conditions. This has been optimized for four-color DTCS methods, to deliver a robust signal for 700 bases per sample at better than 98% accuracy in about a 100 minutes cycle time.



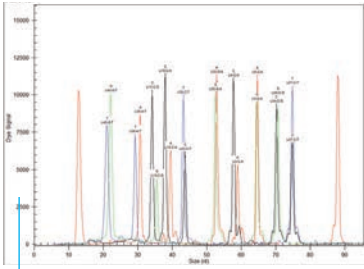
The sequencing process is further simplified by the use of a single mastermix in the GenomeLab DTCS Quick Start Kit. A smaller number of pipetting steps, and the use of larger transfer volumes, help reduce variability and errors in the process.



The GenomeLab Methods Development Kit provides a solution that will enable sequencing of difficult templates, polymerase hard stops, etc.) with uniform dye incorporation and low background fluorescence.

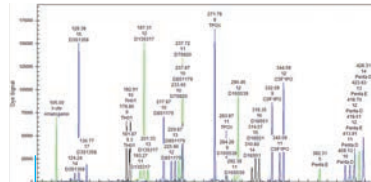
Multiplex fragment analysis results

Expand your genetic analyses capabilities to include various fragment analysis chemistries and applications. Whether you are genotyping, SNP scoring or quantifying microsatellite instability, the accurate and timely assignment of alleles can dramatically impact your lab's productivity. Compatible with assays such as MLVA or MLPA, multiplexing reduces time and cost and uses fewer samples. We developed the GenomeLab GeXP™ Genetic Analysis System to provide high-precision DNA sizing and sophisticated software algorithms with these processes in mind.



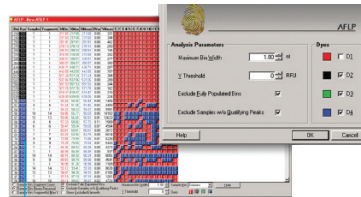
SNP Analysis

The GenomeLab SNPStart Primer Extension Kit is based on single base primer extension technology, a gold standard in the industry. Validated and optimized to multiplex up to 10 SNPs in a single reaction, the SNPStart Kit is ideal for low- to medium-throughput applications. The kit provides high accuracy and reproducibility by utilizing 4 different fluorescent labeled ddNTPs for each target allele, reducing testing cost and increasing assay robustness. SNP genotypes are summarized and reported in a fragment list through automated SNP locus tag assignments.



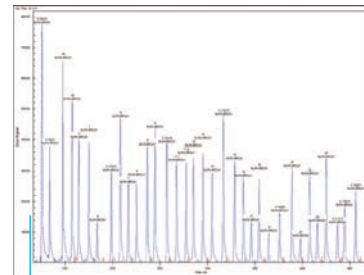
STR Analysis

The GenomeLab Human STR Primer Kit is used to determine the purity and quality of DNA for sample tracking and monitoring contamination. It is ideal for researchers working with large numbers of DNA samples in stem cell research, tissue culture and core testing laboratories.



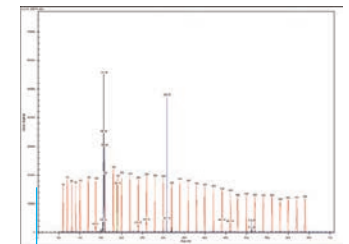
AFLP

The dominant scoring algorithm automatically scores the presence or absence of AFLP-generated fragments in binary mode (1/0) through an integrated binning process. The dominant scoring results are easily used for phylogenetic analysis. Quantitative analysis is possible by using an option to export the peak heights.



MLPA

The GeXP is the perfect platform to run the increasingly popular MLPA (Multiplex Ligation-dependent Probe Amplification) assays to study genetic variations in hereditary cancer, chromosomal aberrations as well as methylation patterns and tumor characterization in a research setting.

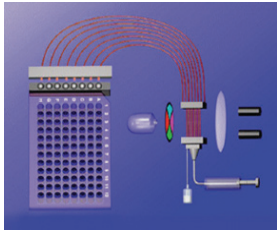


MLVA

The system is ideally suited for MLVA (Multiple Locus VNTR Analysis) in bacteria typing for epidemic or microbial outbreak surveillance.

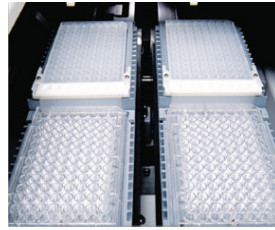
A genetic analysis solution that meets your needs

The GenomeLab GeXP™ utilizes single or dual plates with the sample tracking technology option to provide an advanced, genetic analysis solution. The result is a fully automated, high-resolution system that adapts well to daily workflow changes in sample type and complexity. The GenomeLab GeXP Genetic Analysis System has the ability to process and track samples in two 96-well plates. An array of eight capillaries takes full advantage of the 96-well plate format, enabling you to process over 192 samples, including thousands of genes, within 24 hours. This level of throughput reduces the cost and complexity associated with microarrays. Samples are automatically denatured online prior to electrokinetic injection.



Long-life lasers

On-column, laser-induced fluorescence with auto capillary alignment ensures sensitive and reliable detection. Long-life diode lasers are used to excite infrared dyes, providing higher sensitivity at a fraction of the cost of argon ion lasers.



Dual plates

This system has the ability to process and track samples in two 96-well plates. An array of eight capillaries takes full advantage of the 96-well plate format, enabling over 192 samples, including thousands of genes, to be processed within 24 hours. Single plate GeXP is also available. Please ask your sales representative for more details.



Sample tracking made simple

An integrated barcode reader ensures accurate sample tracking and reporting. It also lets you create GenomeLab GeXP sample setup with automated liquid handlers. Integrated barcode reader is only available on the dual plates systems.



WellRED dyes

WellRED Dye-Labeled Phosphoramidites use cyanine-based fluorescent dyes with high extinction coefficients that absorb in the near infrared region. These dyes were designed specifically for use with the GenomeLab GeXP Genetic Analysis Systems, and are excited to fluoresce using diode lasers. This method is more stable and cost-effective than traditional argon ion lasers. WellRED Dye-Labeled Phosphoramidites are easily coupled to the 5' end of oligonucleotides using commercial DNA synthesizers. These oligonucleotides may be used for direct hybridization or in PCR amplification processes. DNA fragments may be detected, quantitated and sized by the GeXP Genetic Analysis System.

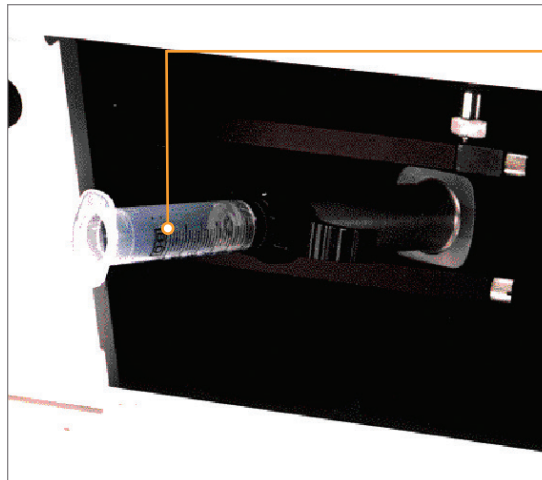
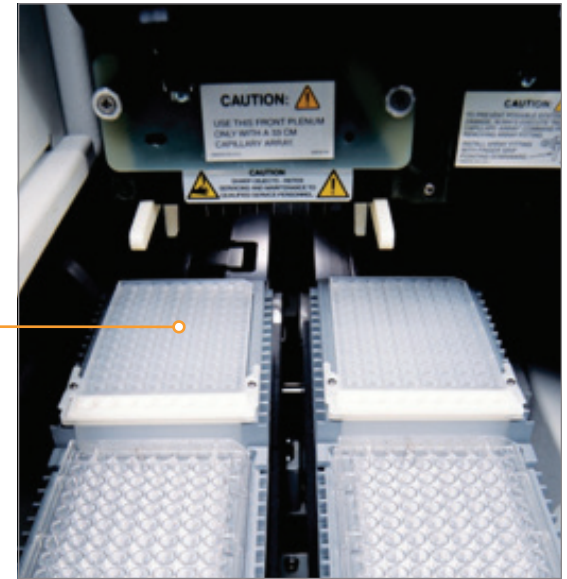
Ability to process and track samples in two 96 well plates. On instrument sample heating improves separation reproducibility, allowing more consistent results across plate.



Capillary heater cover

Sample heating

8 capillaries



Loading the Gel cartridge

Linear Polyacrylamide Gel – LPA

Universal gel provides

- Flexibility allowing various fragment separation applications in a single run (20bs SNP – 1200bs MLVA)
- One year shelf-life minimizes unnecessary waste. Gel can be stored for future use



All on a single instrument

ORDERING INFORMATION

GenomeLab GeXP™ Genetic Analysis System Uses linear polyacrylamide (LPA) – maximizing performance

- Coated eight-capillary array
- Four-wavelength laser-induced fluorescence detection
- 96-well microplate format for samples/buffer
- Eight samples read in parallel
- Automatic gel replenishment
- Automatic sample denaturation and introduction
- Single setup facilitates gene expression analysis, DNA sequencing and fragment analysis

A26572 GenomeLab GeXP Dual-Rail Genetic Analysis System

- Integrated barcode reader
- 2 x 96 well sample microplate format

A62684 GenomeLab GeXP One-Rail Genetic Analysis System

- 1 x 96 well sample microplate format

World-class support at your fingertips

Wherever you are, our world-class customer service and support is dedicated to making sure your Sciex system functions at peak efficiency throughout its lifetime. Across the globe, a network of technical and application experts is available online, on site and by phone to help with all your system support needs.

Specifications

- Weight 180 lb (81.6 kg)
- Height 37 in (94 cm)
- Width 24 in (61 cm)
- Depth 26 in (66 cm)
- Power 100-240 VAC, 5A, 50/60 Hz
- Dual wavelength (650nm & 750nm) diode laser excitations.
- Class 1 laser hazard

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