

Analytics for genomics and gene therapy applications

GenomeLab GeXP™ Analysis System



GenomeLab GeXP System

Comprehensive genetic analysis applications

With the GenomeLab GeXP System your laboratory can:

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

You can do these all on one instrument using one capillary array, one gel, and one software. This flexible system allows you to run more than one application on the same plate and up to 192 samples unattended.



Range of system functions



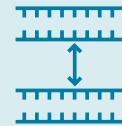
Gene Expression Profiling

Highly sensitive, multiplexed, quantitative and reproducible Gene Expression



DNA Sequencing

Delivers accurate DNA Sequencing through regions where other systems fail



Genotyping and SNP Analysis

We give you choices when it comes to Genotyping such as SNP, AFLP, MLPA and MLVA Analysis.



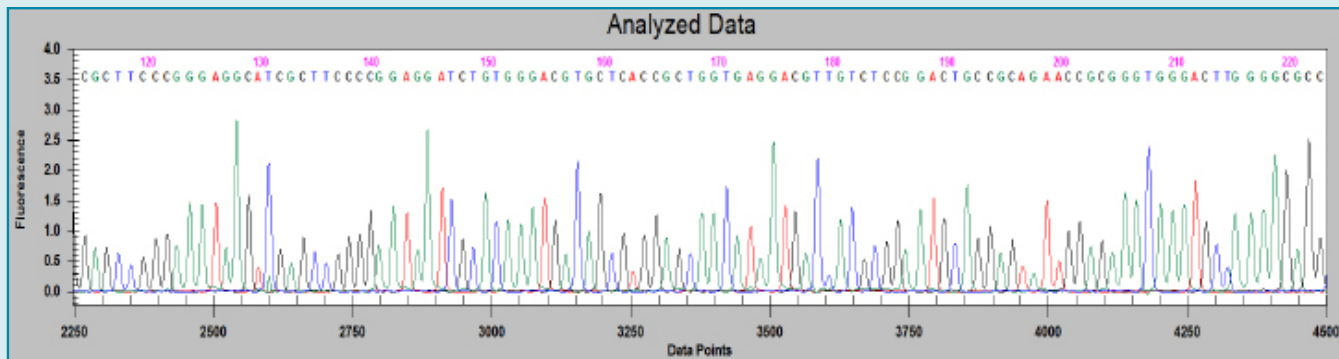
STR Analysis

Identify alleles even in the presence of enzyme stutter and the plus Adenosine artifact

Proven technology for accurate sequencing

200 nucleotides in 30 minutes & 600 nucleotides in less than 50 minutes

- Handles long strand of short tandem repeats better than next generation sequencing
- Detect insertion/deletion with remarkable precision
- Ability to sequence difficult GC rich regions quickly
- High specificity in C-methylation study of epigenetics



Accurate base-calling algorithm utilizes Call Scores and Quality Values to provide superior base read quality.



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.

Highly reproducible multiplex gene expression profiling

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

The GenomeLab GeXP 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 our strong foundation of innovation in laboratory automation and capillary electrophoresis technology, this system expedites your pathway to discovery.

Cost-effective and time-saving gene expression

Improve your lab's efficiency with the ability to simultaneously analyze up to 30 gene targets. Pre-labeled universal primers in the GeXP Start kit reduce cost per gene expression PCR expenses when compared to conventional qPCR.

Quantitative gene expression

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

High accuracy and specificity you can trust

Universal primer amplification eliminates primer bias typically associated with conventional qPCR and microarrays. The combination of target-specific primers and high-resolution CE separation increases data confidence because the assay offers two levels of target specificities.

By The Numbers: GenomeLab GeXP™ Genetic Analysis System



30 genes in a single reaction



92 % accuracy of relative gene target with linearity of (R2) > 0.99



0.5 fold detect as low as 0.5 fold in gene expression changes



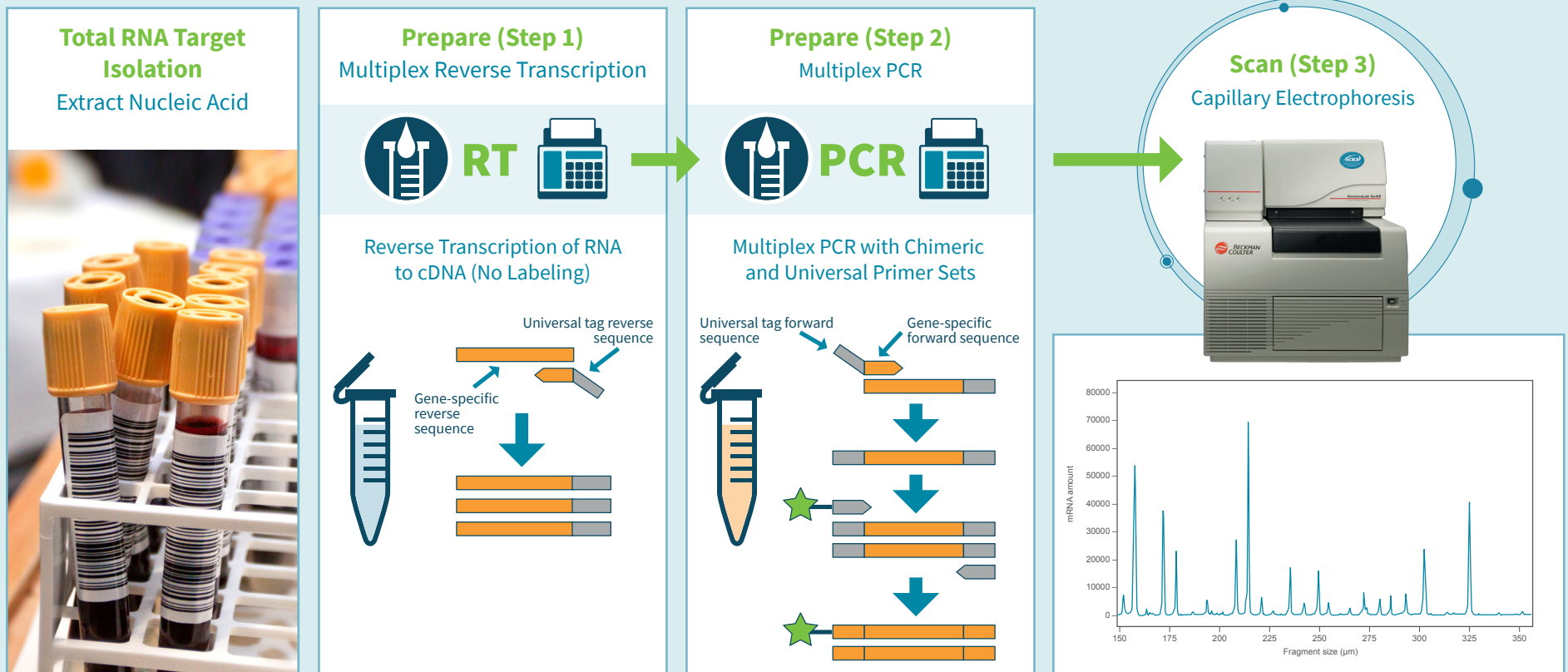
5 ng only 5ng RNA per reaction

Simplified for multiplex capability

The GenomeLab GeXP System uses a simplified two-step multiplex PCR process for multiplexing biomarkers in gene expression assays. 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.

High specificity XP-PCR gene expression profiling

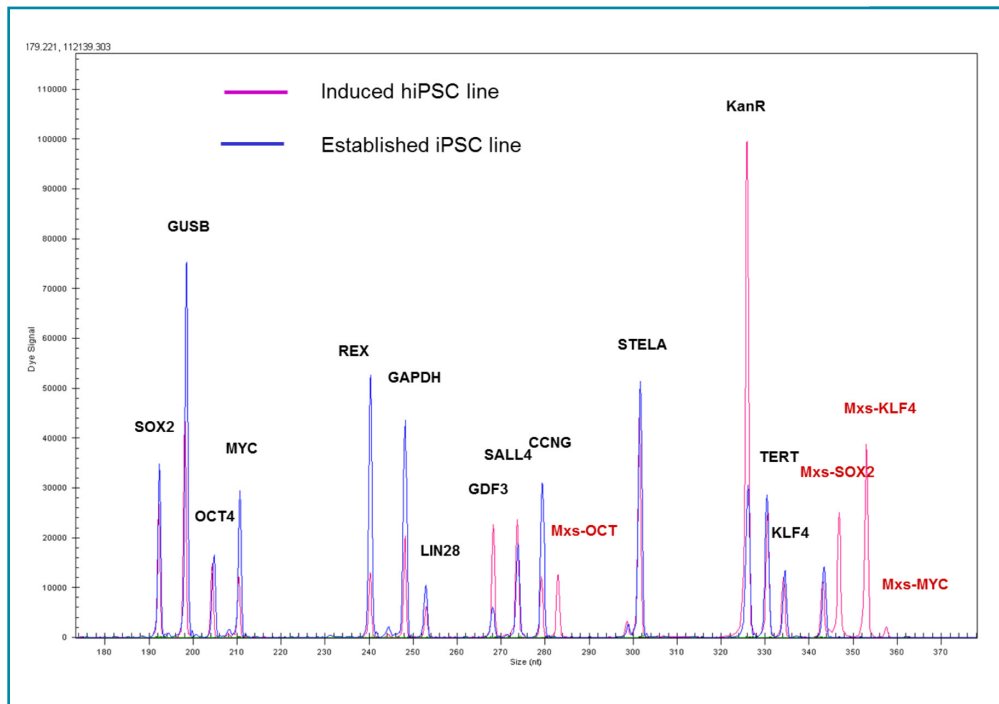
Universal primers amplify target genes simultaneously for consistent results. CE separation provides another layer of specificity when compared to qPCR.



A single reaction for transgenes and endogenous genes

The GenomeLab GeXP System provides the ability to monitor both transgenes and endogenous genes simultaneously in a single reaction. This enables scientists to accurately monitor gene delivery efficiency into target cells.

For stem cell and gene therapeutic applications

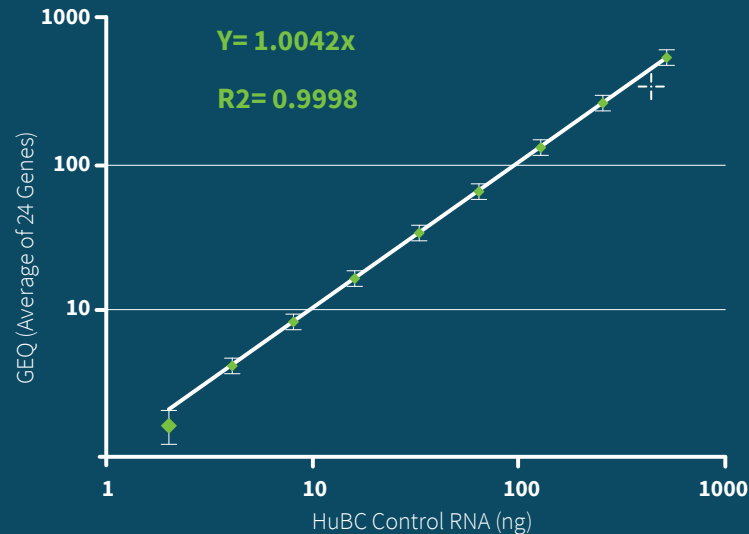


Identification of the established iPSC Clone

Marker	Gene Name	Size	Marker	Gene Name	Size
Reprogramming	SOX2	192	Transgenes	Mxs-LIN28	257
	OCT4	204		Mxs-OCT4	283
	cMYC	209		Mxs-NANOG	295
	LIN28	253		Mxs-SOX	347
	KLF4	334		Mxs-KLF4	353
Pluripotency	NANOG	343	Mxs-MYC	357	
	REX1_ZFP42	240	Housekeeping	GUSB	197
	GDF3	268		GAPDH	248
	SALL4	273		CCNG	278
	STELLA_DPPA3	301			
TERTv1	301				

All on a single instrument

Multiplexed gene expression delivers high sensitivity, accuracy and precision



Linearity and precision

The GenomeLab GeXP System 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.

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.

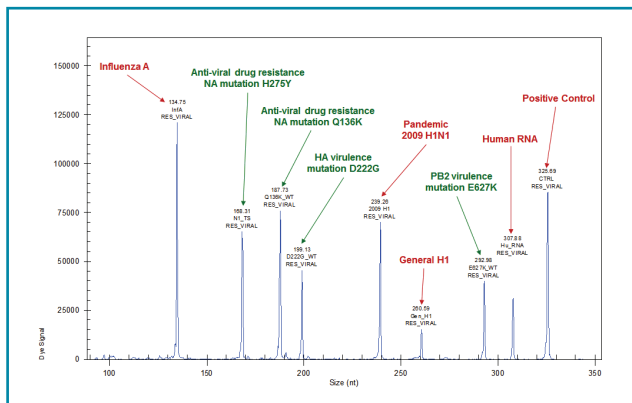
For more information, visit: sciex.com/products/capillary-electrophoresis/genomelab-gexp-genetic-analysis-system

Microbial identification and typing

The GenomeLab GeXP XP System 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

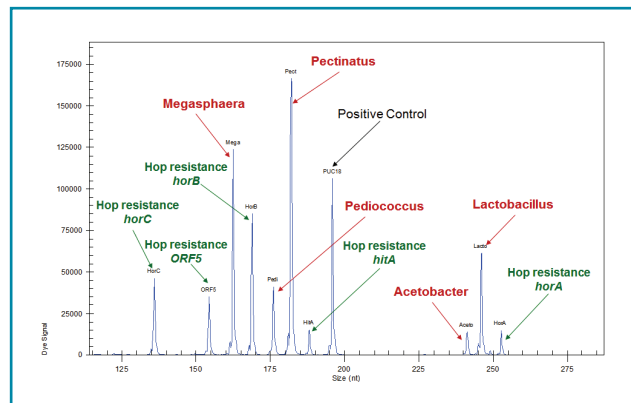
Detect multiple respiratory virus target regions along with human RNA in a single run eliminating ambiguity due to RNA sample degradation. The Genome GeXP System is also capable of detecting both RNA and DNA viruses simultaneously to determine co-infections, fast identification and typing when compared 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, and accurately with high level of specificity and sensitivity. This improves quality control testing throughput efficiency in food and beverage manufacturing processes.

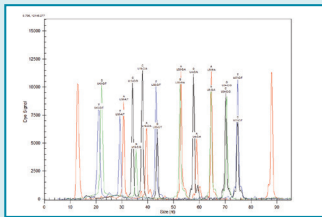


Molecular testing overcomes issues associated with conventional microbiology culture methodologies such as culture media limitations, slow microbial growth, laborious biochemical profiling and poor microbial characterization using archaic staining processes.

For more information, visit: [sciex.com/products/capillary-electrophoresis/genomelab-gexp-genetic-analysis-system](https://www.sciex.com/products/capillary-electrophoresis/genomelab-gexp-genetic-analysis-system)

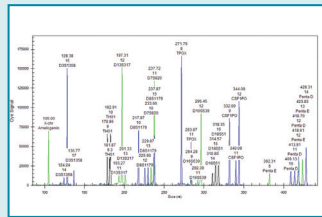
Multiplex fragment analysis results

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 System to provide high-precision DNA sizing and sophisticated software algorithms with these processes in mind.



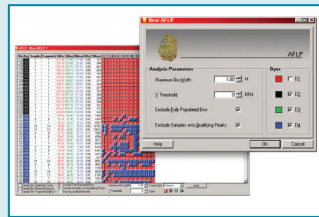
SNP analysis

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.



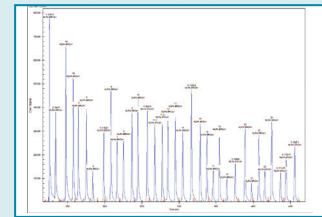
STR analysis

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.



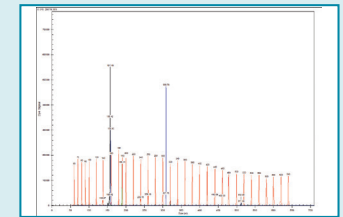
AFLP

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 GenomeLab GeXP System 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.

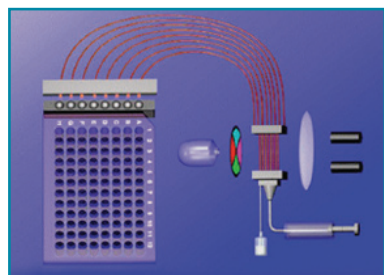


MLVA

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 System 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 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 Genome GeXP system 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 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 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.



- 1 Capillary heater cover
- 2 8 capillaries



- 3 Sample heating



- 4 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 and can be stored for future use

For more information, visit: sciex.com/products/capillary-electrophoresis/genomelab-gexp-genetic-analysis-system

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