Genetic Testing Services

Charles River’s genotyping core processes thousands of samples per week for leading biopharmaceutical companies, world-renowned academic institutions, and a host of government agencies. Our full-service molecular-based genetic characterization laboratory is equipped to run multiple types of allele-specific assays including PCR, qPCR, SNP, and TaqMan® assays. While the overall process is highly automated for fast turnaround, our flexible, responsive laboratory can readily respond to scale up or expedited testing requests as driven by customer demand.

Effective colony management depends on genotyping results, not just data. Quality reporting is of the utmost importance; our trained staff not only reviews each submission to ensure the accuracy of results, but also that they concur with available information on the breed scheme, knowledge of the assay, and sample quality. Each order automatically checks reported genotypes against breed schemes to help identify incorrect breeders early before they impact a colony too greatly.

Combining multi-platform technology and expertise in laboratory animal genetics, our laboratory is unmatched in its ability to provide scientific and customer support with comprehensive information about their colonies for utmost ease of management. The ever increasing complexity of genetically engineered models often requires additional support with understanding what results mean, and how to interpret them to best manage breeding colonies. Our team can readily assist clients with questions about results, breeding strategies, and future colony direction. Our staff can also advise when unexpected colony events (e.g., transgene copy instability, genome-wide Cre-mediated deletions, and/or CRISPR/Cas9 founder INDEL variability) occur.

Core Services:
- PCR/Taqman® genotyping
- qPCR zygosity testing
- Speed congenics/Background strain characterization
- SNP testing/analysis
- Allele-specific assay creation
- Laboratory Testing Management (LTM™)
- Sample submission support
Testing Platforms
Our laboratory utilizes two primary platforms for sample analysis. The first, the Perkin Elmer Lab Chip GX microfluidic electrophoresis platform, analyzes all PCR testing in lieu of traditional gel electrophoresis. This technology is highly sensitive and provides additional data (compared to gel-based testing) that allows for highly accurate, automatic result interpretation. The GX software is able to make genotyping calls automatically and input results data directly into our laboratory testing management (LTM™) with no manual entry. The data is then processed by customized results interpretation rules pre-programmed into our LTM™ system. The GX platform’s high sensitivity is also used to screen CRISPR/Cas9 founders though the detection of heteroduplex formation when small INDELs are present. This technology produces more definitive data than the more commonly applied T7 endonuclease digestion analysis.

The second platform is the Applied Biosystems Quant Studio 12k. This platform allows for real-time data analysis and is utilized for our qPCR, Taqman® and SNP-based assays. Similar to the GX software, the data generated via the Quant Studio is exportable and can be directly input into LTM™ with no manual entry. This platform is also used for our OpenArray®-based speed congenics and background strain analysis services, as well as many of our expression analysis offerings.

Together, the two platforms form a powerful combination that provides a comprehensive set of molecular-based genetic tests for characterization of various mutations, among which are allele-specific assays targeting specific mutations, critical for genetic quality control (GQC), compound mutations, and complex breeding schemes involving Cre/Flpe-mediated recombination events. Our real-time qPCR assays are capable of detecting three versus four copies of a transgene, uniquely suitable for characterization of transgenic lines with potential segregation and instability issues that may result in varying levels of transgene expression.

PCR/Taqman® Genotyping
Fast, accurate genotyping conducted on a routine basis can help keep colony sizes manageable, select animals for study cohorts and set aside animals for future breeding. Our high-throughput, multi-platform genotyping laboratory delivers results in as little as 24 hours from sample receipt, facilitating more efficient colony management.

qPCR Zygosity Testing
It’s often difficult to discriminate between homozygous and hemizygous transgenic animals using traditional PCR, but the distinction between these zygostities is critical to transgenic breeding strategies, as well as to planning study cohorts. Charles River provides a definitive report on an animal’s zygosity quickly and accurately using our high-throughput, state-of-the-art qPCR technology.

Speed Congenics
Time is of the essence when creating custom research models, and speed congenics is a proven valuable tool in expediting the process of creating fully congenic strains. Our industry-leading MAX-BAX® service allows for the directed selection of individual breeders with a preferred genetic background. Backcrossing selectively (rather than randomly) significantly decreases the number of backcross generations — generally from ten to five — needed to produce a fully congenic strain. This not only accelerates the production of a research model, saving up to 18 months of breeding time, but also reduces facility, equipment, and personnel costs.

SNP Testing/Analysis
Charles River offers an array of off-the-shelf and custom-designed SNP panels designed to do everything from detecting a genetic contamination to fine-mapping a transgene insertion point.
Allele-Specific Assays
Each assay is allele-specific and custom-designed to ensure that it is both accurate and looking for the mutation in question. Having allele-specific assays also helps our laboratory to identify key colony events, such as Cre-mediated deletions in conditional models that may not be identified if generic assays are used. We design sensitive assays and perform an upfront critical protocol review that can help to identify potential colony issues early on, and prevent animals with undesired genotypes from being entered into experiments. All assays are fully validated by our team of scientists prior to general release and a complete assay validation report accompanies each approved assay. This report can be used to run the assay internally or shared with collaborators as needed. Fully deployed assays are managed through our custom assay database that is linked to LTM™, allowing each order to be automatically linked to the appropriate assay and line-specific controls. Further, our scientists can work with a client’s internal project manager to help resolve these issues and deploy new breeding strategies to overcome any challenges.

Laboratory Testing Management (LTM™)
Our online data management platform, Laboratory Testing Management™ (LTM™), allows clients to manage workflow, track order status and review results with ease. A secure, web-based portal provides users with 24/7 access to create orders, print forms and perform other administrative tasks. An easy-to-use dashboard allows them to see snapshot of past, current and future orders, common requests and alerts.

Sample Submission Support
To maintain the integrity of client samples during shipment to our laboratory, Charles River provides sample collection and shipping materials free of charge. Complimentary sample shipping materials are available for all sample types and service requests. Supplies may be ordered prior to each testing submission or in bulk quantities for multiple submissions. Our on-site security accepts samples 24/7 via any courier or hand delivery. Staff stores packages at the proper conditions until they are retrieved by the laboratory. Our team is happy to advise clients on the best transportation and collection method for multiple sample types, based on the needs of each order.