

Molecular Pathology

We know how important functional genomics information is to your research and drug development. By combining a strong history in molecular biology and histopathology, Charles River can relate gene expression to tissue histomorphology in both normal tissues and therapeutic models of disease, providing you with that valuable functional genomics information. The end result is the best possible interpretation and troubleshooting of molecular-based tools, such as *in situ* hybridization (ISH) and real-time quantitative polymerase chain reaction (Q-PCR), applied to toxicological pathology issues.

In Situ Hybridization (ISH)

At Charles River, we perform both isotopic and non-isotopic *in situ* hybridization for cell-specific localization of expressed genes in frozen and paraffin-embedded tissues. The detection of DNA and mRNA by *in situ* hybridization allows us to localize target DNA and gene expression to specific cell types in tissue sections. This enables our pathologists to assess the toxicity, efficacy, and biological function of novel therapeutic compounds; evaluate the biodistribution and expression of gene therapy and antisense therapeutics; or assess the expression of target genes in both normal and disease tissues.

In Situ Gene Expression Studies

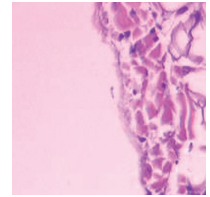
- Study tissue
 - Procurement
 - Processing
 - Embedding
 - Sectioning
- Design and synthesis of DNA or RNA probes to detect gene expression
- Optimized hybridization and detection conditions
- Variety of tissue samples from multiple species
- Experimental design assistance
- Histological evaluation by board-certified pathologists

In Situ Hybridization (ISH)

- Isotopic
 - ³²P-labeled probes
 - Autoradiographic emulsion detection
 - Microautoradiography detection
- Non-isotopic
 - Digoxigenin probe
 - Biotin probe
 - Fluorescein probe
 - Immunohistochemistry detection

Polymerase Chain Reaction (PCR)

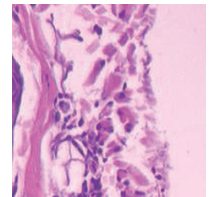
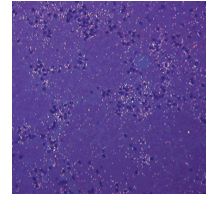
- Sequence detection systems
- Real-time PCR
- Target gene specific primers and fluorogenic probes
- Quantitative analysis
 - Absolute
 - Relative



Polymerase Chain Reaction (PCR)

Real-time Q-PCR is an extremely sensitive and specific fluorescence-based technology that enables pathologists to provide rapid quantitative results on the distribution and expression of target DNA or RNA from a variety of sample types over a broad range of diseases.

At Charles River, Q-PCR is used as a primary end point to analyze biodistribution and expression of target DNA or RNA in gene therapy studies. Our scientists assist in customizing design primers and probes that are specific for the researcher's target genes, and then optimize the assay conditions. We extract DNA and RNA from a variety of tissues and quantitate the amount of isolated nucleic acids. Using standard DNA or RNA stocks, standard curves used to quantify the amount of DNA or RNA target in an unknown sample are prepared. Samples are analyzed for the presence and quantity of target DNA or RNA by comparison to the standard curve using a sequence detection system.



Real-time Q-PCR Studies

- Optimized Q-PCR primer and probe design
- Assay qualification and validation
- Nucleic acid extraction and quantitation
- Real-time Q-PCR using sequence detection systems
- Experimental design consulting