

# Laboratory Sciences

Quality, scientific integrity, cost-effectiveness, and regulatory compliance are essential considerations when selecting an outsourcing partner. The ability to provide these key service components within specified timeframes is vital. Charles River understands the critical importance of all these aspects and is positioned to provide the laboratory support required throughout the drug development process.

With facilities in North America, Europe, and Asia, we provide clients with the consistent application of laboratory procedures, regardless of study location. Charles River's global services provide the necessary resources to perform all of your laboratory assays or simply to supplement your in-house capabilities. We believe in remaining at the forefront of analytical technology and are quick to evaluate and invest in new technologies as they become available.

## Services

- Bioanalysis
- Central Laboratory Services
- Immunology
- Formulation Development, Pharmacy, and Analytical Chemistry
- Genetic Toxicology
- *In Vitro* Services
- Environmental Risk Assessment
- Radioanalysis



## Bioanalysis

At Charles River, we provide routine and specialized bioanalytical services in support of discovery, preclinical, and clinical programs. Our Bioanalysis group performs research-grade assays (RGAs) to assist in lead candidate selection and develops and validates quantitative bioanalytical assays from first principles or by method transfer from a client's laboratory.

We validate assays in full compliance with Good Laboratory Practice (GLP) and other internationally recognized regulatory guidelines. These methods are then applied to determine the concentrations of specific compounds and metabolites in a range of biological matrices.

Compounds routinely analyzed range from small new chemical entities (NCEs) to large macromolecules. To assist in bioanalysis, our chemical synthesis group can produce non-labeled or stable-labeled compounds for use as internal standards.

- Automated sample extraction
- Microcolumn analysis
- LC-MS and LC-MS/MS
- HPLC
- GC and GC-MS
- Capillary Electrophoresis (CE)
- Immunoassays

## Central Laboratory Services

Charles River's Central Laboratories provide high-quality diagnostic investigations for preclinical and clinical development. All studies are conducted according to GLP/GCP standards, and a comprehensive series of standard assays, specialized biomarkers, and client-specific techniques are available.

Our Laboratory Information Management System (LIMS) ensures rigorous quality control of all aspects of analytical and reporting procedures. Using a panel of laboratory tests and biomarkers, Charles River conducts safety screening of volunteers and patients prior to study entry, and then continues to monitor safety and efficacy throughout each trial.

Tailored laboratory kit preparation and a validated LIMS for sample tracking, laboratory scheduling, and flexible reporting enable clinicians to monitor studies and make prompt judgment on the safety of therapeutics under investigation.

- Clinical chemistry
- Immunochemistry
- Flow cytometry
- Quantitative polymerase chain reaction (Q-PCR)
- Microbiology and virology
- Genetic analysis
- Method development and validation
- Drugs of abuse screening
- Hemocompatibility

## Immunology

Charles River has developed significant expertise in the areas of immunology, immunotoxicology, and immunogenicity testing that is applied to the analytical method development, validation, and analysis of preclinical and clinical samples. Immunological end points should be considered in programs for a range of drugs and biologics. Our scientific, technical, and support staff work together in dedicated immunology laboratories to conduct GLP immunotoxicology assessments in both rodent and nonrodent species.

Charles River provides preclinical and clinical immunogenicity expertise from initial antibody screening assays to extended characterization of the immunogenic response for protein, peptide, and monoclonal antibody therapeutics. Full method development, optimization, and validation, plus high-throughput sample analyses, are all performed in accordance with GLP regulations.

- Development and validation of immunology methods
- Immunologic characterization
- Immunotoxicology
- Clinical biomarkers
- Cell-based assays
- Molecular biology

## Formulation Development, Pharmacy, and Analytical Chemistry

Formulation development services range from preformulation investigations to assay development and validation. By using the latest instrumentation, in combination with our formulation expertise and knowledge of vehicle suitability in animal models, Charles River prepares formulations to meet all your preclinical requirements.

Verification of concentration and other chemical characteristics in a dose formulation is critical to the success of a study. No matter what your formulation and analytical needs, our dedicated staff adhere to strict international regulatory guidelines, including tightly controlled test article receipt, storage, distribution, use, and disposal at all of our global facilities.

- Preformulation investigation
- Assay development and validation
- Formulation preparation
- Concentration verification
- Analysis of chemical characteristics
- Bulk test article Certificate of Analysis (CofA)

## Genetic Toxicology

Genetic toxicology studies are conducted early in the safety testing program of pharmaceuticals, medical devices, chemicals, food additives, etc. Charles River conducts its genetic toxicology studies in a tiered approach, starting with an Ames test and progressing to the conduct of mammalian cell and *in vivo* assays, which are designed to assess the toxicological relevance of any earlier observations.

- Cytotoxicity
- Bacterial mutation (Ames)
- Chromosome aberration using human lymphocytes or CHO cells
- Mammalian cell mutation (mouse lymphoma L5178Y TK assay)
- Rodent micronucleus
- UDS (*in vivo* rodent liver and *in vitro* hepatocyte)

## In Vitro Services

The *In Vitro* Services group at Charles River provides information to complement the metabolic, toxicokinetic, and bioanalytical investigations undertaken in pharmaceutical product development. Our *in vitro* experts provide qualitative and quantitative data to address a variety of regulatory questions. *In vitro* studies can be conducted with both radiolabeled and nonradiolabeled test articles as required.

- Species variation in metabolism – hepatic and extrahepatic whole cells (e.g., hepatocytes) and subcellular fractions (e.g., microsomes)
- Drug-drug interactions (CYP450 inhibition and induction)
- Drug absorption and kinetics (Caco-2 cells)
- Protein binding
- *Ex vivo* induction studies using validated CYP-specific assays and Western blotting
- CYP450 reaction phenotyping
- Dermal absorption
- Metabolite stability, profile, and identification
- hERG channel inhibition (QT prolongation)
- Aqueous solubility
- Cell viability (cytotoxicity)
- Cell proliferation
- Melanin binding
- Enzyme and immunoassays (ELISA, RIA, DPP-IV, and more)

## Environmental Risk Assessment

The environmental assessment of human pharmaceuticals can be a lengthy and involved process, potentially taking years depending on your product and target geographical market. Therefore, it is important to develop an appropriate environmental risk testing program early in the process to ensure that there are no unexpected delays in getting your product to market. Charles River has the expertise to assist in developing timely and cost-effective testing strategies.

- Physico-chemical testing
- Environmental fate
- Ecotoxicology

## Radioanalysis

Charles River provides timely data and responsive service for a full range of absorption, distribution, metabolism, and excretion (ADME) studies covering a broad spectrum of radioactive isotopes. The samples from any metabolism program can be analyzed in our dedicated radioanalysis laboratory or analytical chemistry department using HPLC radiochemical detection. We support the analysis of radioactive samples from animal and human radiolabeled studies either by solubilization or oxidation for measuring beta- and gamma-emitting compounds.

Charles River scientists operate robotic sample handling and radioanalysis instrumentation that is integrated with the DEBRA® data management system to provide electronic data collection and evaluation. We also accept sample deliveries for analysis as a stand-alone service, which provides some of the quickest real-time testing in the industry.