



SAFETY ASSESSMENT

Toxicology Services

At Charles River, we take a comprehensive approach to assessing the safety of a potential new human therapy using multiple disciplines including toxicology, pharmacology, drug metabolism, toxicokinetics and chemistry.

Leveraging a global network of AAALAC-accredited preclinical facilities, we design and perform *in vitro* and *in vivo* safety programs to best characterize potential human drug toxicity. Our staff of toxicologists, pathologists, veterinary surgeons, regulatory specialists and support personnel has a strong mechanistic understanding of drug toxicity, bolstering our ability to determine potential risk factors early in the drug development process.

Many of our scientists have served on or are currently participating in regulatory and industry body working groups, shaping the future of our studies. Because we are on the front lines, we ensure that our products, services and processes keep pace with the rapid evolution of science, technology and the ever-changing needs of our clients' product development.

Areas of Expertise:

- General toxicology
- Phototoxicology
- Immunotoxicology
- Genetic toxicology
- Ocular toxicology
- Safety pharmacology
- Inhalation programs
- Developmental and reproductive toxicology
- Infusion studies
- Neurotoxicology
- Dermal studies
- Musculoskeletal toxicology

EVERY STEP OF THE WAY

Animal Welfare, Scientific Pride and Ethical Business Practices

At Charles River, ethical conduct includes the humane care of research animals. Humane care is not only a moral imperative, it is a scientific necessity. The treatment of research animals has a discernible effect on the success of our clients' programs, and our goal is to ensure that every employee has the necessary skills to handle our animals with care and compassion. As a scientific commitment to the 3Rs, we have dedicated efforts to the development and implementation of new techniques like [microsampling](#) that promote animal welfare. Microsampling allows for evaluation of multiple endpoints, provides better toxicokinetic profiles, and reduces the population of animals needed for a study by eliminating the need for satellite animals. Our dedication to scientific excellence, devotion to animal welfare and our insistence on integrity and ethical conduct is reflected in all of our business practices.

General Toxicology

Charles River offers both standard and novel study designs for the assessment of toxicology, and can guide our clients' course of action if and when unexpected findings or toxicity issues arise during the course of a safety assessment program. Studies range from acute to chronic, employing rodent and nonrodent species and multiple routes of administration.

Phototoxicology

Our scientists have pioneered the quantitative study of cutaneous photobiology by designing instruments, techniques and protocols now accepted as industry standards. Expert knowledge of light sources, including xenon arc solar simulators and fluorescent sources, informs our ability to accurately control these sources. We serve the pharmaceutical, chemical and agrochemical industries with *in vivo* and *in vitro* study designs that meet not only standard, but specialized requirements for evaluation of any test material.

Immunotoxicology

Regulatory guidelines recommend incorporation of immunotoxicity assessments within preclinical and clinical studies. Charles River conducts immunotoxicity assessments in relevant animal models, either as part of a toxicology study or as a stand-alone service. We offer a complete panel of GLP-validated immunotoxicology assays, including development, validation and sample analysis for antidrug antibodies as part of preclinical and clinical safety assessments of peptide and protein therapeutics.

Genetic Toxicology

Genetic toxicology studies are conducted to assess the potential for induction of genetic mutations or chromosomal damage. A comprehensive range of genotoxicity assays can be integrated into a standard toxicology program to predict potential long term adverse health effects. In addition to standard study designs, we offer customized or micronized protocols for the rapid *in vitro* screening of lead candidate compounds.

Ocular Toxicology

Our ocular specialists perform safety and efficacy studies using intravitreal injection, topical instillation, subretinal dosing and other systemic routes of exposure. Programs are designed for therapeutic agents targeting a range of diseases and conditions, such as age-related macular degeneration, diabetic retinopathy, glaucoma and cytomegalovirus. In addition, we can perform *in vitro* eye irritation testing and can confirm negative tests *in vivo*.

Safety Pharmacology

Charles River is an industry leader in the design and execution of safety pharmacology studies. Available as stand-alone and integrated repeat-dose designs, we offer a core battery of studies and supplementary tests for the evaluation of a test article's effects on all major organ systems.

Inhalation Programs

Inhalation toxicology studies are conducted in a variety of species. We have specialized rodent inhalation dosing rooms with adjacent husbandry space, as well as dosing rooms for exposure of nonrodent species. Each dosing suite is equipped with customized generation and exposure systems for delivery of powder, liquid or metered dose inhaler test atmospheres.

Developmental and Reproductive Toxicology

Leading the industry with the largest number of specialists in the field, we design and conduct reproductive toxicity studies for international product registrations across industrial sectors. Our historical control database is the largest in the industry, providing the critical background data that is essential to the success of a drug development program.

Infusion Studies

Our scientists and technicians conduct routine and specialized studies requiring continuous and intermittent intravenous administration in rodents and nonrodents across a wide range of study durations. We administer infusions via tethered and ambulatory systems, with specialized routes and custom study designs also available according to program needs.

Neurotoxicology

We offer a wide range of GLP services related to the safety evaluation of the central and peripheral nervous systems, including developmental neurotoxicology, functional teratology and juvenile evaluation. Specialized dose routes of cerebrospinal delivery, including but not limited to intrathecal, epidural, intracisternal, intracerebroventricular injections or infusions, are used to mimic the intended clinical route. In addition, neurological evaluations can be conducted as part of a routine toxicology or safety pharmacology study, or as a stand-alone study.

Dermal Studies

Our full dermal toxicology testing service is designed to cross all industrial sectors. Therapeutic indication and topical use are considered in the design of a dermal testing program. We offer a range of studies to include penetration, irritation, sensitization, wound healing and photobiology. In addition, access to advanced technology allows us to offer *in vitro* alternatives to traditional *in vivo* models for some forms of testing.

Musculoskeletal Toxicology

Our musculoskeletal specialists can assess the safety and efficacy of drugs and devices that have an intentional or unintentional effect on the musculoskeletal system. This includes comprehensive evaluation of bone and cartilage drug efficacy, musculoskeletal tissue healing and biocompatibility, orthopedic device efficacy and the effects of new orthobiologic applications. Non-GLP efficacy models are available for early research.