



SAFETY ASSESSMENT

Inhalation Toxicology

Service Highlights

- Focused toxicologists and technologists
- Custom-designed apparatus
- Formulation selection
- Delivery systems
- Study design and method development
- Dose estimation in animal models
- Data analysis

Inhalation is the primary method for delivering pharmaceuticals to patients with lung or airway diseases and is also a leading route of unintended exposure during manufacturing, handling, or use of (agro)chemicals. Safety assessment in both cases requires experience and specialized capabilities to successfully test the effects of inhaled compounds.

With a team of dedicated inhalation toxicologists, technologists, and specially equipped laboratories, Charles River offers testing and related services to effectively demonstrate the efficacy and/or toxicity of these substances.

Studies range from acute to sub-chronic and chronic through to carcinogenic exposures. We specialize in unique toxicology endpoints (e.g., neonatal, reproductive, neurotoxicologic) and are experienced in the conduct of radiolabeled aerosol disposition studies. We offer a variety of physiologic testing including respiratory and cardiology evaluations, bronchoalveolar lavage, and pharmacokinetic sampling, as well as efficacy studies for pharmaceutical agents.

Experience includes delivery of aerosols, vapors and gases through the use of various nebulizers, atomizers, dry powder generators, gas/vapor generators, or pressurized metered dose inhalers.

EVERY STEP OF THE WAY



Specialty Product Testing

- Drug carriers
- Drug degradation products
- Chlorofluorocarbon (CFC) alternatives
- Recombinant biotechnology products
- Gene therapy viral vectors
- E-liquid and e-vapor products
- Solvents and pesticides

Pharmaceutical and (Agro)chemical Support

With over 35 years of experience testing standard respiratory therapies like bronchodilators, steroids, anti-asthmatics, vaccines, and surfactants, we perform inhalation testing for a range of less common drugs such as hormones, oligonucleotides, antivirals, and anti-hypertensives, as well as dual and triple combination therapies. Our non-pharma group has more than 30 years of experience in testing the inhalation effects of chemical and agrochemical products including solvents, chemical intermediates, fluorinated hydrocarbons, and pesticides. Recently, we have been involved with the toxicologic evaluation of aerosols generated from e-liquid and e-vapor products.

Facilities and Equipment

We maintain separate dosing and husbandry rooms in our inhalation suites. Dosing for rodents can be achieved using either whole body exposure chambers or nose-only exposure systems (modular, flow-through, or flow-past inhalation exposure systems), while our nonrodent dosing utilizes oropharyngeal or oronasal face masks or head-only exposure systems to deliver test atmospheres.

Intranasal administration is an available alternative for all species, whereby a test article is delivered to the nasal passages by direct nasal instillation using a repeat dosing pipette or nasal pump spray device. For direct pulmonary administration, we offer intratracheal dosing in rodents and nonrodents as well as oropharyngeal aspiration in rodents. These routes are especially useful for certain pharmacokinetic investigations.

Exposure Atmosphere Characterization

Atmosphere characterization may include aerodynamic particle size distribution, gravimetric assessment, spatial and temporal homogeneity evaluation, and chemical analysis such as UPLC or LC-MS. Exposure atmospheres are routinely sampled using a variety of means, such as filters and impingers, while real-time aerosol monitors may provide a qualitative assessment of an aerosol atmosphere. When necessary, our analytical chemists develop and validate methods specific to the compound and collection substrate under investigation. Alternatively, we use online gas chromatography or infrared analysis to determine the concentration of gas or vapor atmospheres within an inhalation chamber.