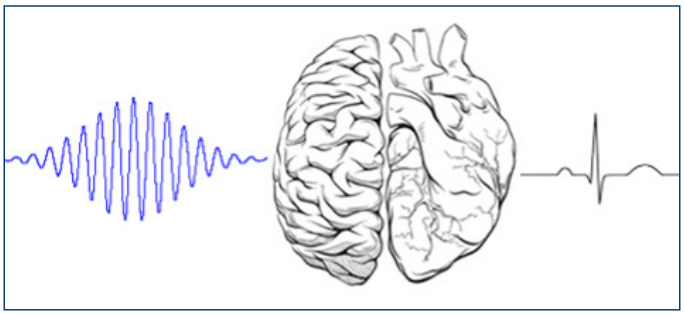
# SAFETY PHARMACOLOGY

Safety Pharmacology is an essential element of most small-molecule development programs and accompanies the general toxicology for IND filings. At Frontage, we provide an incorporated approach to GLP regulatory safety pharmacology and early non-GLP discovery pharmacology testing performed according to ICH S7A and S7B compliance from research and development to IND submission.



We offer a core battery of studies for in vitro & in vivo cardiovascular (CV) testing as well as neuroscience (CNS) and respiratory assessments for your non-clinical programs.

## CNS Safety Assessments

At Frontage we conduct CNS safety assessment either as stand-alone or as an embedded endpoint in the general toxicology study. Our stand-alone protocol includes evaluation of rodents at multiple dose levels via Functional Observation Battery plus motor activity evaluation and grip strength assessment. Our embedded rodent endpoint evaluates study animals at different study days via a modified Irwin assay.

**In-Vivo CNS (Irwin, Functional Observational Battery)**

- Locomotor activity
- Behavior
- Coordination
- Sensory Motor reflex
- Body temperature

*Species: mouse, rat, and monkey*

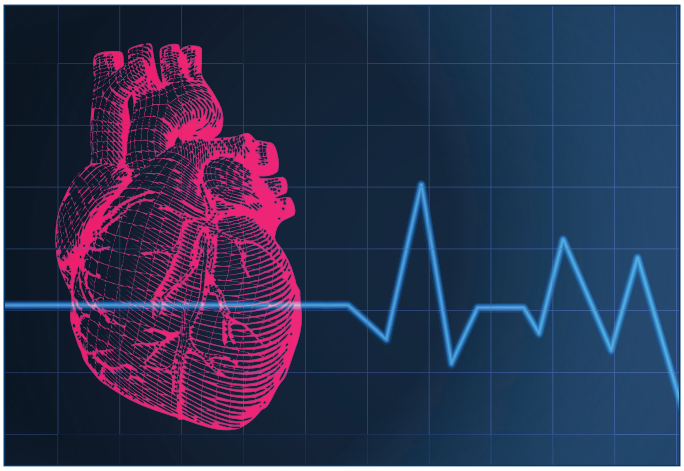
## Cardiovascular Safety Assessments

At Frontage we offer both in vitro and in vivo services.

### In-Vitro CV

- Safety testing options include the standard hERG ion channel study as well as the CiPA-compliant version of the study.
- Additional ion channel evaluations Cav1.2 and Nav1.5 also available.

FRONTAGE
YOUR DRUG DEVELOPMENT PARTNER



## In-Vivo CV

- Assay consists of evaluation of cardiovascular effects via implanted telemetry – the 'Gold Standard' for in vivo cardiovascular safety assessment.
  - Blood Pressure
- Systolic, Diastolic, Mean Arterial Blood Pressure
  - Heart Rate
  - Qualitative Assessment of electrocardiographic data by DVM, DACVIM veterinarian
  - Quantitative Assessment of electrocardiogram
- PR Interval, QRS Duration, QT Interval, and corrected QT
  - (QTcV) interval
  - Internal Temperature

*Species: canine (beagle dog)*

## Respiratory Safety Assessments

- Our Respiratory Safety studies include whole-body plethysmography
  - Tidal Volume
  - Minute volume
  - Respiratory rate

*Species: mouse, rat*

## Additional Assessments

For certain therapeutic indications, the respiratory and cardiovascular assessments may be conducted in the non-rodent general toxicology study by means of thorough examination by our facility veterinarian in conjunction with electrocardiograms. Supplemental studies can also be conducted on the Gastrointestinal tract and renal function.

Regardless of the approach, the molecule, or the therapeutic indication, Frontage can support your Safety Pharmacology needs.

Objective Key: I:immunogenicity S: safety E: efficacy Sc: screening

*Frontage Laboratories, Inc. is a contract research organization (CRO) that provides integrated, science-driven, product development services throughout the drug discovery and development process to enable pharmaceutical and biotechnology companies to achieve their development goals. Comprehensive services include drug metabolism and pharmacokinetics, analytical testing and formulation development, preclinical and clinical trial material manufacturing, bioanalysis, preclinical safety and toxicology assessment and early phase clinical studies. Frontage has enabled many biotechnology companies and leading pharmaceutical companies of varying sizes to advance a myriad of molecules through development and file regulatory submissions in the United States, China, and other countries.*

**FOR MORE INFORMATION, CONTACT US AT:** *sales@frontagelab.com* **OR VISIT US AT:** *frontagelab.com*

**Safety, Toxicology and Agrochemical Services**
10845 Wellness Way
Concord, Ohio 44077
**P: (440) 357-3200**