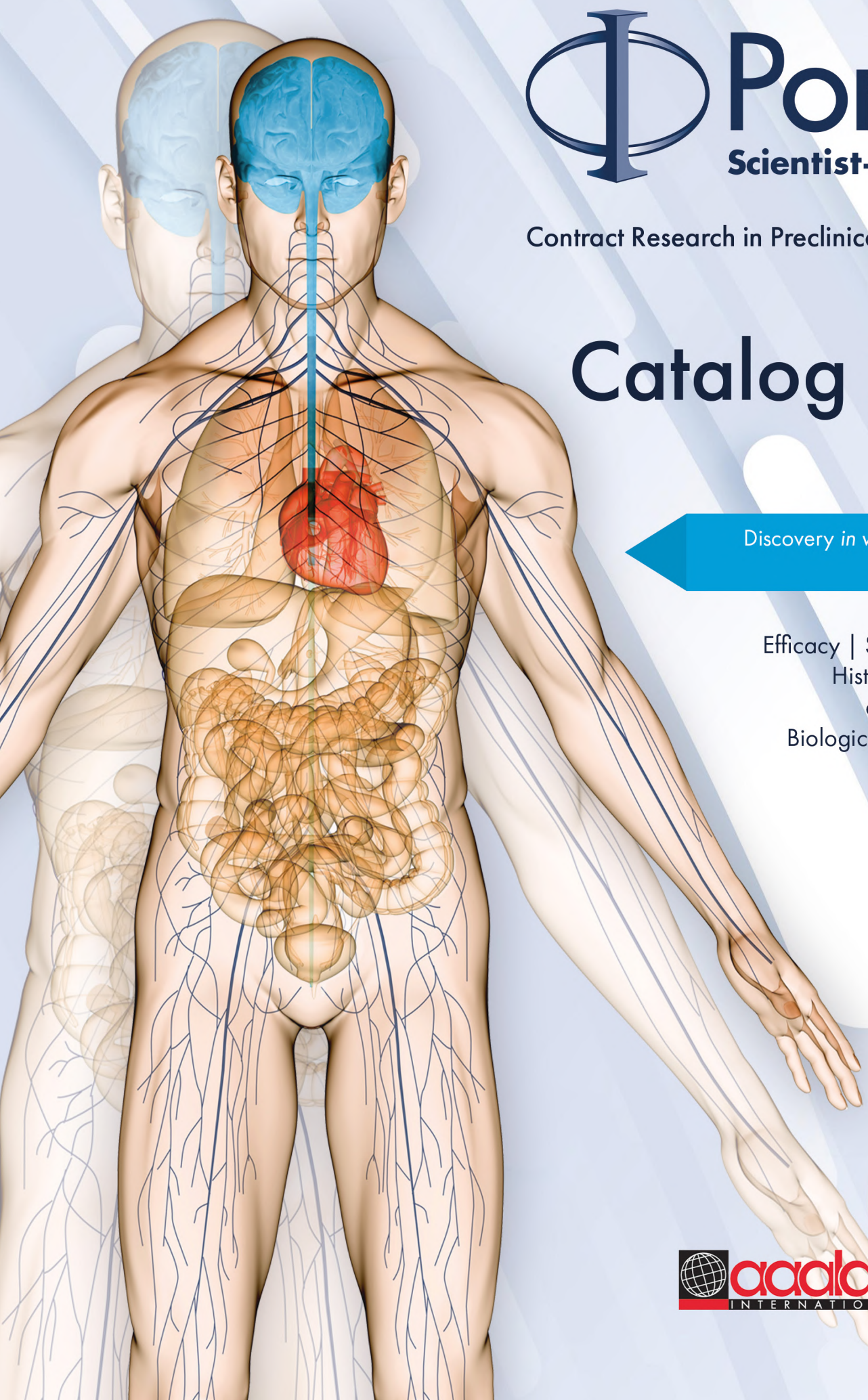


Porsolt

Scientist-to-Scientist

Contract Research in Preclinical Pharmacology

Catalog 2024

Discovery *in vitro* / *in vivo* Models
& Tailored Solutions

Efficacy | Safety | Toxicology
Histology | Biomarkers
of Small Molecules,
Biologics & Gene Therapies

aaalac INTERNATIONAL

GOOD LABORATORY PRACTICE GLP

Scientist-to-Scientist

Who Are We

We are a long established international preclinical CRO (Contract Research Organisation), **accredited by AAALAC and fully GLP compliant.** We have been providing efficacy evaluation and safety pharmacology services for almost 40 years, covering the drug development process from early screening through regulatory submission.

We provide pathophysiological models in multiple species and cell lines, customized procedures and tailored solutions, including *in vitro* assays, drug formulation analysis and bioanalytical services, from high throughput screening, high-content analysis and high-content histology platforms, to models for psychiatric and neurological disorders, pain, cardiac and vascular diseases, metabolic and eating disorders, dermatology, and oncology.

Our Values

Client projects are our priority

We listen to our clients and provide them with our expert advice, established models, tailor-made solutions and flexibility.

We aim to be an extension of your team of expert scientists

We continuously work hand in hand with our clients and their scientists. We develop the best solutions together.

We are reliable, experienced and quality-focused

We are AAALAC accredited and GLP compliant and we maintain operational excellence with the highest quality standards to meet and exceed expectations.

Where Are We

Representation

Our Clients

North America

Boston

San Diego

+ 3 800 CLIENTS TRUST US

+ 350 STUDIES PERFORMED ANNUALLY


Europe
France - Head office / Main Research Facility
Middle East
Australia
Asia

Our Expertise

Assay & Model Development

Our vast experience and varied expertise, including newly incorporated *in vitro*, biomarker and histology capabilities, provide the perfect solution for clients looking for bespoke model development.

We are uniquely placed to combine *in vitro* and *in vivo* models and capabilities from multiple species and disease areas in order to answer the specific questions from our clients.

Whether performing high-throughput screening, high-content analysis, mechanism of action, efficacy or safety testing, we are the ideal partner for your development programs.

Cell Biology

We maintain a panel of over 100 validated cell-based assays that allow for the quantification of key phenotypic and molecular events at the single-cell level.

Most of the cellular assays listed below can be adapted to different biological models, or modified for different detection platforms, according to your needs.

Learn about our assay development services :

- Cell proliferation, migration, differentiation (live cell kinetic image analysis - Incucyte®, flow cytometry, Ensight).
- Primary cell isolation, culture and characterization (Immunophenotyping ...) and iPS cell handling (culture and functional assays).
- Biomarker analysis (Luminex, WB, ELISA, CBA, HTRF, AlphaLisa ...).
- Cell stress, metabolism, inflammation and signaling pathways.
- Predictive toxicology (cell death/health, apoptosis).
- Gene expression modulation (siRNA transfection, AAV/LVV transduction).

Consulting

Our unique expertise and experience, combined with our broad portfolio of services in multiple species, allows us to provide unparalleled consulting and advice on the preclinical process and bespoke model development to address specific questions. This includes efficacy evaluation, safety pharmacology, discovery and regulatory needs.


MEDICAL DEVICES
ANIMALS HOUSING
IMAGE PROCESSING & DATA ANALYSING
SURGERY
BIOMARKER ASSAY
SAFETY REGULATORY PACKAGE
CONSULTING
ASSAY & MODEL DEVELOPMENT
TECHNICAL CAPABILITIES
PRECLINICAL MODELS
FORMULATION ANALYSIS
HISTOLOGY SERVICES
PHARMACOKINETICS
CELL & TISSUE BANKS
CELL BIOLOGY
TRANSGENIC BREEDING

contents

Recent News & Updates

Unique Screening Packages

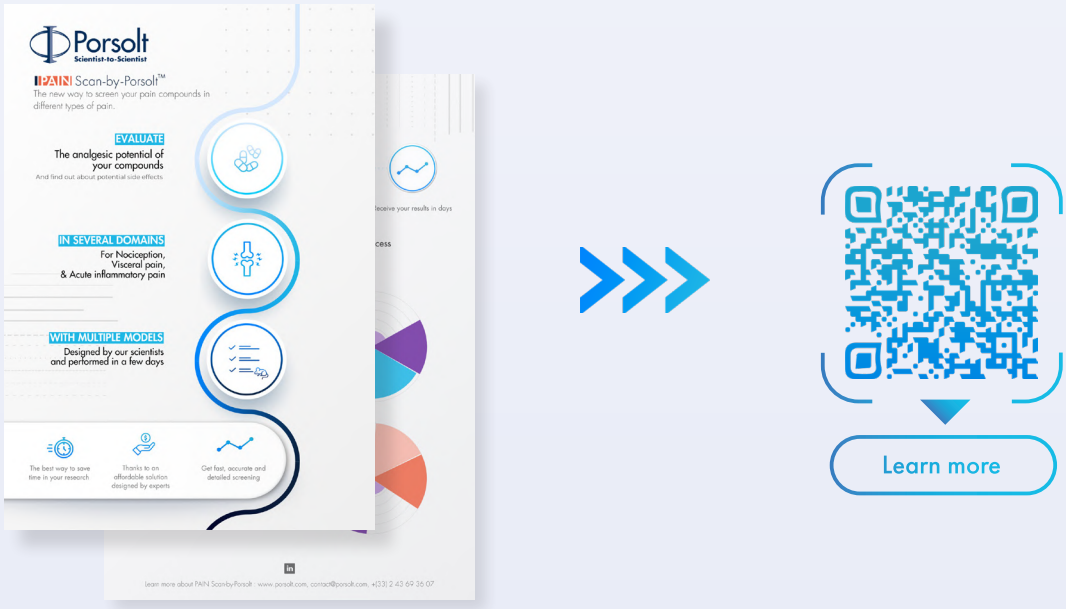
Porsolt has recently developed unique Scan-by-Porsolt™ screening packages, to assist our clients with their early stage development programs. These packages combine our many years of **experience** with our internationally **recognized expertise** and varied capabilities, to create a unique scan of compounds in a fraction of the time and at a very low cost, relative to standard screening models.

This innovative approach assists with the internal decision-making process and helps guide our clients' development programs at a very early stage, providing the necessary support to engage in more involved studies, where required.

Examples of screening packages offered in key therapeutic areas include :

Seizure Scan-by-Porsolt™ screens for different domains of Epilepsy, including General Seizure, Partial Seizure, and Refractory Seizure.

Pain Scan-by-Porsolt™ focuses on key domains within the Pain field including Nociception, Visceral Pain, and Inflammatory Pain – guiding the client towards the specific domain of relevance for their program.



These packages are extremely valuable for obtaining a preliminary signal of specific domains of interest within a therapeutic area and provide initial justification for where an asset could be of value.

*Please contact us (**contact@porsolt.com**) to learn more about our other screening packages that are relevant to specific therapeutic areas of interest.*

Dedicated Housing, Colony Management & Specialized Breeding Capabilities

Porsolt completed an extension of our facility at the end of 2023, focused on expanded space and capacity **for small and large animals**. This has resulted in faster turnaround times for the initiation of projects, at a time when lead times in the industry are being extended. More importantly, we are also now able to address **the specific needs** of our clients related to dedicated colony management.

These capabilities include **specialist housing and breeding services** for clients interested utilizing their own unique models, such as transgenic mice and knock-in rats, or dedicated large animal colonies for repeat projects. This new capacity overcomes many of the logistical issues involved with shipping and establishing colonies for immediate testing (as opposed to delaying projects due to the need for rederivation of colonies).

*Please contact us (**contact@porsolt.com**) to discuss your colony maintenance needs and specific requirements for your studies.*

Contracting Studies with Porsolt :

The Scientist-to-Scientist approach remains the priority

There are multiple ways Porsolt can be contracted to support the preclinical needs of our clients, including the use of third-party vendors for clients that centralize their procurement process.

- **Contracting directly with Porsolt**
- **Scientist.com : Please search for Porsolt services in the providers**
- **Science Exchange : Please search for Porsolt services in the providers**

It is important to emphasize that whichever platform is used for contracting with Porsolt, our unique **Scientist-to-Scientist approach**, for which we are known, will always remain consistent and of the highest priority. This elevated level of scientific communication, input, and guidance, from our expert scientists, allows us to best design client studies and address their specific preclinical needs.

Recent Posters

SPS 2023
Intravenous self-administration in the rat: Advantages of transcutaneous buttons for improving Animal Welfare
S. Brèche, B. Péan, C. Rondeau and C. Froger-Colléaux

SFN 2023
MDMA in the treatment of anxiety and PTSD: a behavioral assessment in rodents
K. Walker, E. Esneault, C. Froger-Colléaux, E. Camperos, A. Lecoq and A-M. Hernier

SFN 2023
Cuprizone-induced demyelination in the mouse: immunohistochemical characterization
E. Esneault, C. Rondeau, S. Cottereau, S. Pedron and F. Simon

AcTox 2023
Characterization of a model of neurotoxicity by histology
F. Simon, G. Peyon, E. Esneault, C. Froger-Colléaux and S. Brèche

AcTox 2023
Dog Telemetry Assay Sensitivity to Detect QTc Prolongation: Retrospective Statistical Power Analysis, and Moxifloxacin Effects by Timepoint and Concentration-QTc Relationship Analysis
P. Guillaume, F. Tantot, S. Goineau-Brissieux, S. Brèche and G. Froget

AES 2023
Screening cascade for the evaluation of new anti-epileptic drug candidates
K. Walker, F. Simon, M. Paquet, M. Martineau and E. Esneault

EACR 2022
Triple negative breast cancer preclinical models reveal the therapeutic potential of Fingolimod
T. Rupp, O. Pelouin, L. Genest, C. Legrand, G. Froget, V. Castagné

EACR 2022
Therapeutic potential of Fingolimod and Dimethyl Fumarate in Non-Small Cell Lung Cancer preclinical models
T. Rupp, S. Debasly, L. Genest, L.. Ribault; G. Froget, V. Castagné

AcTox 2022
In vitro predictive toxicity screening assays during early stage drug development: Case study data for the validity of 2D and 3D models
S. Brèche, E. Esneault, S. Goineau-Brissieux, C. Legrand, M. Paquet, K. Walker and F. Simon

SPS 2022
The ferret: The gold standard for emesis assessment
S. Goineau-Brissieux, P. Guillaume, G. Froget

Recent Publications

Imiquimod-induced pruritus in female wild-type and knockin Wistar rats: underscoring behavioral scratching in a rat model for antipruritic treatments
K. Lariosa-Willingham, D. Leonoudakis, F. Simon, K. Walker, P. Guillaume, L. Warren and J. Stratton
BMC Research Notes 2023 (DOI : 10.1186/s13104-023-06627-1)

Genetic Background Influence on Hippocampal Synaptic Plasticity: Frequency-Dependent Variations between an Inbred and an Outbred Mice Strain
C-M. Roux, P. Lecouflet, J-M Billard, E. Esneault, M. Leger, P. Schumann-Bard and T. Freret
Int J Mol Sci. 2023 Feb 21;24(5):4304. (DOI: 10.3390/ijms24054304)

Drug Discovery and Evaluation: Safety and Pharmacokinetic Assays
C. Froger-Colléaux, E. Esneault, A-M Hernier and V. Castagné

Repeated Anodal Transcranial Direct Current Stimulation (RA-tDCS) over the Left Frontal Lobe Increases Bilateral Hippocampal Cell Proliferation in Young Adult but Not Middle-Aged Female Mice
S. Dumontoy, B. Ramadan, P-Y. Risold, S. Pedron, C. Houdayer, A. Etiévant, L. Cabeza, E. Haffen, Y. Peterschmitt and V. Van Waes
Int J Mol Sci. (2023) May 14;24(10):8750. (DOI: 10.3390/ijms24108750)

Evaluation of Temozolomide and Fingolimod Treatments in Glioblastoma Preclinical Models
M. Davy, L. Genest, C. Legrand, O. Pelouin, G. Froget, V. Castagné and T. Rupp
Cancers (Basel). 2023 Sep 8;15(18):4478 (DOI : 10.3390/cancers15184478)

Discovery and Evaluation: Safety and Pharmacokinetics Assays Book Chapter: Central Nervous System (CNS) Safety Pharmacology studies
C. Froger-Colleaux, E. Esneault, A-M. Hernier, V. Castagné
December 2022 (DOI: 10.1007/978-3-030-73317-9_3-1)

New Tests & Models

Central Nervous System

CNS GENERAL SCREENING

Neurite outgrowth (*scratch assay*)

Neurite outgrowth (*scholl assay*)

Electrical amygdala kindling (*threshold stimulation*)

MK-801-induced neurotoxicity

Dermatology

Imiquimod-induced psoriasis-like skin inflammation *(rat)*

Gastrointestinal System

Mastocyte staining - Toluidine blue

Inflammation

Bleomycin-induced lung injury

Oncology

Leptomeningeal carcinomatosis model

Pain

NEUROPATHIC PAIN

Spared nerve injury

VISCERAL PAIN

Dextran Sodium Sulfate (*DSS*)-induced colitis in mouse

Respiratory System

Bleomycin-induced pulmonary fibrosis

New Capabilities

ROUTES OF ADMINISTRATION

Intracaecal, Long-term vascular infusion, etc.

HISTOLOGY

Expanded in-house capacity for tissue sectioning frozen and paraffin embedded

Histology process, FFPE tissue staining and veterinary pathologist analysis / scoring, immunohistochemistry (*IHC*), immunofluorescence (*IF*) & tissue microarray (*TMA*)

MOLECULAR BIOLOGY

qPCR

Models Under Development

Central Nervous System

COGNITION & AGING

Fear conditioning *(rat)*

ANXIETY

Fear extinction *(rat)*

NEURODEGENERATION

Cuprizone induced demyelination *(mouse)*

MPTP-induced lesion *(mouse)*

MICRODIALYSIS

Oncology

Organoid models of Glioblastoma

Inflammation

Biomarker analysis in inflammation models *(CFA, carrageenan...)*

Pain

Migraine model *(mouse - rat)*

Osteoarthritis *(guinea-pig)*

TNBS-induced colitis *(guinea-pig - rat)*

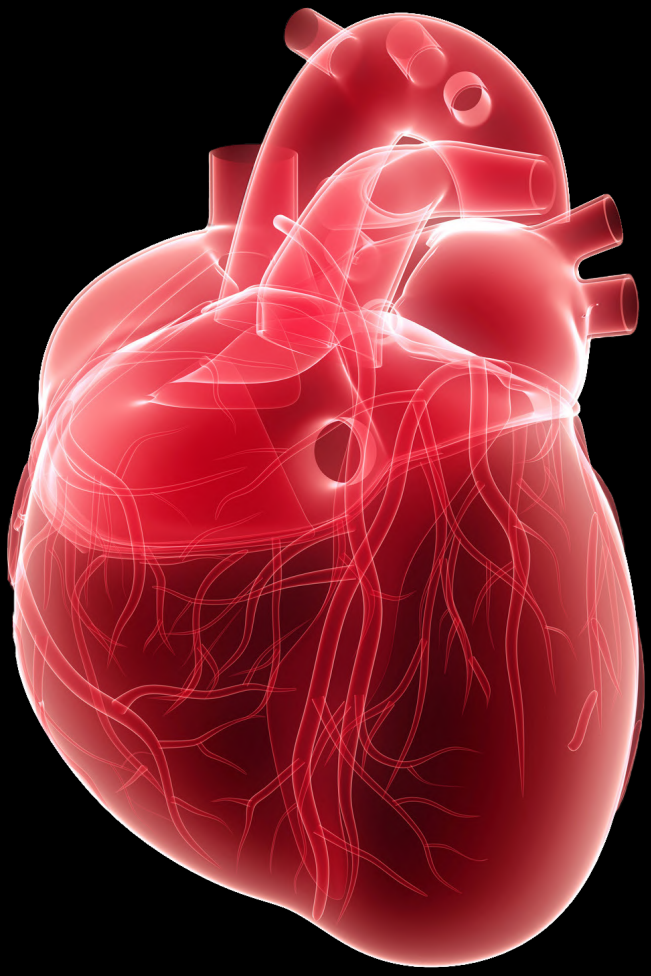
Respiratory System

Rhinitis *(guinea-pig)*

We have an extensive portfolio of cardiovascular procedures, ranging from standard cardiovascular telemetry studies for safety evaluation, to pathophysiological models for specific therapeutic areas.

CARDIOVASCULAR SYSTEM

We also possess considerable expertise with *in vitro* models, providing clients with a comprehensive assessment of all aspects of cardiovascular function.



2

in vivo ARRHYTHMIAS & CARDIAC TOXICITY

Digoxin-induced ventricular arrhythmias *(anesthetized animals)*	Guinea-pig	CV 3.5
Torsades de Pointes arrhythmias *(modified Carlsson model)*	Rabbit	CV 3.9

in vivo AUTONOMIC NERVOUS SYSTEM

Postural hypotension *(anesthetized animals)*	Rat	CV 6.3

in vitro CARDIAC ACTIVITY RECORDING

Calcium assay	iPSC-derived cardiomyocytes	PF 1.7
hCav1.2 channel	HEK 293 cells	CV 5.9
hERG channel	HEK 293 cells	CV 5.6
hERG trafficking	HEK 293 cells	CV 5.10
hKir2.1 channel	HEK 293 cells	CV 5.8
hKir2.1 trafficking	HEK 293 cells	CV 5.13
hNav1.5 channel	HEK 293 cells	CV 5.7
Inositol triphosphate receptor channel function	H9C2 cells	PF 3.21
MEA assay	iPSC-derived cardiomyocytes	CV 5.14

in vivo HEMODYNAMICS

ANESTHETIZED ANIMALS

Arterial blood pressure, heart rate and ECG	Rat - Guinea-pig	CV 1.1
Regional blood flow	Rat	CV 1.5
Systemic, cardiac, renal and pulmonary hemodynamics	Dog - Mini-pig	CV 1.7
Systemic and cardiac hemodynamics *(cardiac denervated animal)*	Dog	CV 1.11

CONCIOUS ANIMALS *(TELEMETRY)*

Arterial blood pressure, heart rate ± ECG	Mouse – Rat – Dog Guinea-pig – Mini-pig	CV 1.4
Left ventricular pressure, heart rate ± ECG	Rat – Dog	CV 1.16
Pulmonary arterial blood pressure, heart rate and ECG	Dog	CV 1.14
Right ventricular pressure and heart rate	Rat	CV 1.15

HYPERTENSION

in vitro	Endothelial cell activation / Drug-Induced Vascular Injury	HUVECs	PF 1.6
in vivo	5/6 nephrectomy	Rat	REN 3
	Arterial blood pressure and heart rate *(anesthetized animals)*	SH Rat	CV 2.1
	Arterial blood pressure and heart rate *(telemetry)*	SH Rat	CV 2.4
	Bile duct ligation-induced portal vein hypertension *(telemetry)*	Rat	CV 2.7
	Chronic *(2K1C)* Goldblatt hypertension *(high renin model)*	Rat	CV 2.5
	Chronic DOCA - salt hypertension *(low renin model)*	Rat	CV 2.3
	Monocrotaline-induced pulmonary hypertension *(anesthetized animals)*	Rat	CV 2.6
	Monocrotaline-induced pulmonary hypertension *(telemetry)*	Rat	CV 2.8

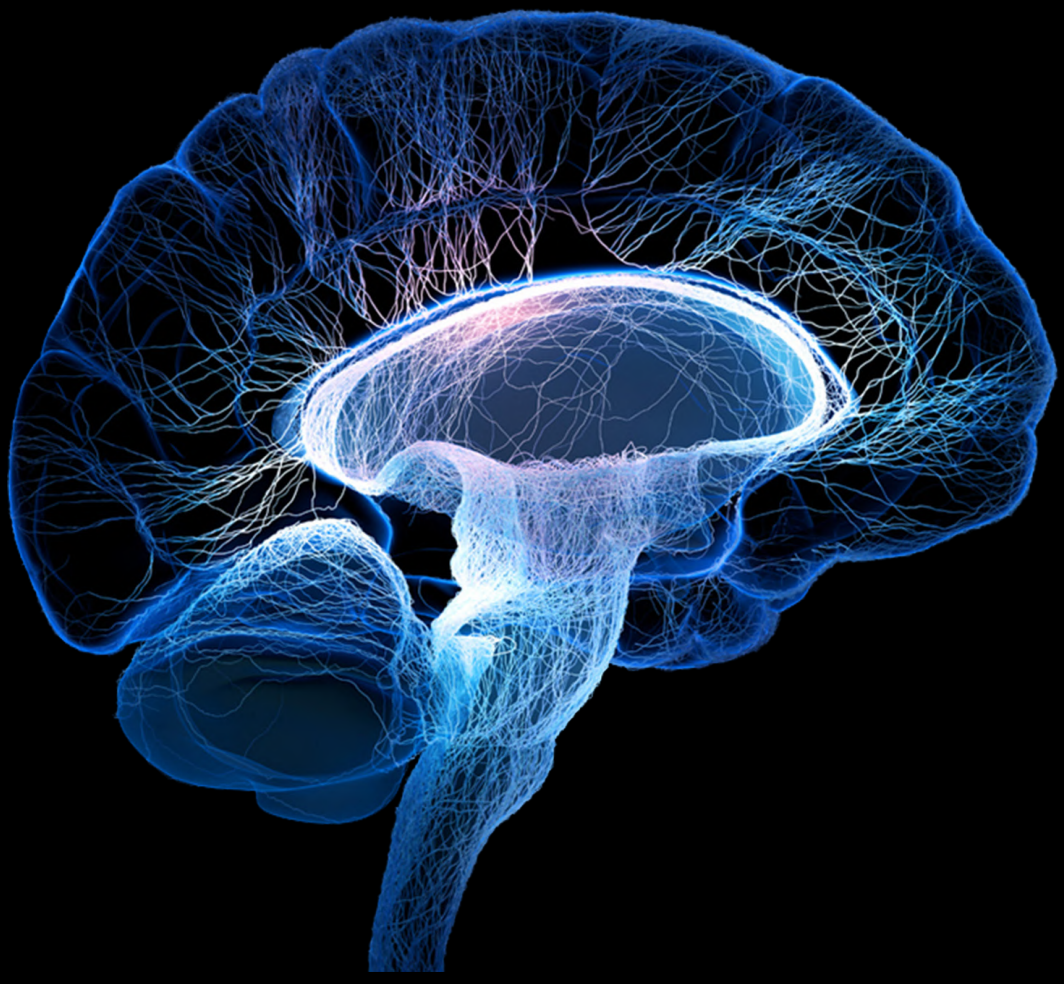
ISOLATED VASCULAR BEDS

ex vivo	Isolated mesenteric artery	Dog	CV 8.4
	Isolated saphenous vein	Rabbit – Dog	CV 8.2
	Isolated thoracic aorta	Rat – Rabbit	CV 8.1

We offer models in all areas of psychopharmacology, epilepsy, sleep-wake & neurodegenerative disorders.

CENTRAL NERVOUS SYSTEM

We are uniquely placed to offer a full range of CNS efficacy and safety pharmacology assessments, from basic models and regulatory tests, to the evaluation of abuse and dependence liability and proconvulsant risk using EEG.



3

in vitro CNS GENERAL SCREENING

Calcium response (release or sponsaneous oscillation)	Mouse - Rat primary neurons	PF 3.3
Cytolysis / Viability	Mouse - Rat primary neurons	PF 3.4
Mitochondrial membrane potential measurement	Mouse - Rat primary neurons	PF 3.4
Neurite outgrowth (scratch assay)	Rat primary neurons	PF 3.44
Neurite outgrowth (scholl analysis)	Rat primary neurons	PF 3.45
Accelerating rotarod	Mouse – Rat	CNS 1.17
Activity meter	Mouse – Rat	CNS 1.2
Barbiturate interaction (sleep induction)	Mouse – Rat	CNS 1.8
Beam walking	Mouse – Rat	CNS 1.12
Ethanol interaction (sleep induction)	Mouse – Rat	CNS 1.9
Foot-fault	Rat	CNS 1.16
Grip strength	Mouse – Rat	CNS 1.19
Neurological score	Rat	CNS 1.15
Odor discrimination	Rat	CNS 1.18
Primary observation (Irwin)	Mouse – Rat	CNS 1.1
Rectal temperature (option:implants)	Mouse – Rat	CNS 1.11
Removal of adhesive	Rat	CNS 1.14
Rotarod	Mouse – Rat	CNS 1.5
Tetrad test	Mouse – Rat	CNS 1.13

in vivo COGNITION

AGE-RELATED DEFICIT

Delayed alternation (acquisition)	Aged Rat	CNS 6.10
Delayed alternation (stabilized performance)	Aged Rat	CNS 6.11
Morris water maze (acquisition and retention)	Aged Mouse – Aged Rat	CNS 6.7
Operant reversal	Aged Rat	CNS 6.34
Social recognition	Aged Rat	CNS 6.9
Y-Maze (Novelty-based spatial preference)	Aged Rats	CNS 6.41
Y-Maze (Spontaneous alternation)	Aged Rats	CNS 6.39

EXPERIMENTAL PROCEDURES

Delayed alternation (acquisition)	Rat	CNS 6.13
Delayed alternation (stabilized performance)	Rat	CNS 6.15
Fear Conditioning (context & cue)	Mouse – Rat	CNS 6.38
Morris water maze (single session)	Rat	CNS 6.16
Morris water maze (acquisition and retention)	Mouse – Rat	CNS 6.17
Operant reversal	Rat	CNS 6.24
Operant Set-shifting	Rat	CNS 6.35
Passive avoidance	Mouse – Rat	CNS 6.19
Social recognition (30 minute retention)	Rat	CNS 6.20
Social recognition (120 minute retention) (delay-induced forgetting)	Rat	CNS 6.21
Y-Maze (Novelty-based spatial preference)	Mouse - Rat	CNS 6.41
Y-Maze - Spontaneous Alternation	Mouse – Rat	CNS 6.39

MODELS OF PHARMACOLOGICALLY - INDUCED AMNESIA

Diazepam - induced amnesia

		CNS 6.21
Passive avoidance	Mouse – Rat	CNS 6.27

MK 801 - induced amnesia

Delayed alternation *(stabilized performance)*	Rat	CNS 6.29
Morris water maze *(acquisition and retention)*	Rat	CNS 6.23
Operant reversal	Rat	CNS 6.31
Passive avoidance	Rat	CNS 6.26
Social recognition *(30 minute retention)*	Rat	CNS 6.33

Scopolamine - induced amnesia

Delayed alternation *(stabilized performance)*	Rat	CNS 6.28
Morris water maze *(acquisition and retention)*	Rat	CNS 6.18
Morris water maze *(single session)*	Rat	CNS 6.3
Operant reversal	Rat	CNS 6.32
Passive avoidance	Mouse – Rat	CNS 6.1
Social recognition *(30 minute retention)*	Rat	CNS 6.5

NEURODEGENERATION-RELATED DEFICIT

> *See "Neurodegeneration" section on page 24*

in vivo DRUG ABUSE & DEPENDENCE *(Safety and efficacy)*

Drug Discrimination	Rat	CNS 7.8
Flumazenil-precipitated withdrawal *(ECS threshold)*	Mouse	CNS 7.2
Naloxone-precipitated withdrawal *(Saelens)*	Mouse – Rat	CNS 7.1
Non-precipitated withdrawal *(option: telemetry)*	Rat	CNS 7.3
Opiate tolerance *(hot plate)*	Mouse – Rat	CNS 7.4
Place preference	Mouse – Rat	CNS 7.5
Self-administration *(initiation)*	Rat	CNS 7.6
Self-administration *(substitution)*	Rat	CNS 7.7
Self-administration *(reinstatement)*	Rat	CNS 7.9
Self-administration *(progressive ratio)*	Rat	CNS 7.10

ex vivo ELECTROPHYSIOLOGY

Brain slices *(LTP)*	Mouse	CNS 9.9
Brain slices (4-AP-induced seizure)	Mouse	CNS 9.10

in vivo CONCIOUS ANIMALS *(TELEMETRY)*

Anesthetized animals

Compound Motor Action Potential (CMAP)	Mouse - Rat	CNS 9.8
Nerve Conductance Velocity (NCV)	Mouse - Rat	CNS 9.8
EEG trace monitoring	Mouse – Rat – Dog	CNS 9.5

Electrical amygdala kindling	Rat	CNS 9.3
Quantified EEG	Mouse – Rat - Dog	CNS 9.7
Sleep/wakefulness cycle	Rat	CNS 9.2

EPILEPSY

4-AP calcium spontaneous oscillation modulation	Mouse - Rat Primary Neurons	PF 9.16
GABA Pathway (calcium spontaneous oscillations)	Mouse - Rat Primary Neurons	PF 9.17
Glutamate pathway (calcium release and spontaneous oscillations)	Mouse - Rat Primary Neurons	PF 9.18
Kainate (calcium release)	Mouse - Rat Primary Neurons	PF 9.19
NMDA antagonists (calcium release)	Mouse - Rat Primary Neurons	PF 9.20
4-AP induced seizure on hippocampal slices	Mouse	CNS 9.10
6Hz psychomotor	Mouse – Rat – Gerbil	CNS 5.9
Audiogenic seizures	Mouse	CNS 5.7
Bicuculline convulsions	Mouse – Rat	CNS 5.6
Electrical amygdala kindling (Electrophysiology)	Rat	CNS 9.3
Electroconvulsive threshold	Mouse – Rat – Gerbil	CNS 5.2
GBL-induced absence epilepsy (EEG telemetry)	Mouse	CNS 5.12
Genetic absence epilepsy (WAG)	Rat	CNS 5.14
Intravenous PTZ seizure threshold	Rat	CNS 5.11
Kainic acid convulsions	Rat	CNS 5.10
Kainic acid induced spontaneous seizure	Rat	CNS 5.16
Maximal electroshock	Mouse – Rat	CNS 5.1
Pentylenetetrazole seizures	Mouse – Rat – Dog	CNS 5.15
Pilocarpine induced spontaneous seizure	Rat	CNS 5.17
Pilocarpine convulsions	Rat	CNS 5.13
Picrotoxin convulsions	Mouse – Rat	CNS 5.5
Strychnine convulsions	Mouse – Rat	CNS 5.4

NEUROINFLAMMATION

Immune cell phagocytosis (E.Coli particles)	hiPSC derived microglia	PF 9.21
Immune cell phagocytosis (S.Aureus particles)	hiPSC derived microglia	PF 9.22
Inflammatory cytokine release (LPS stimuli)	hiPSC derived microglia	PF 9.23

NEURODEGENERATION

in vitro	Glutamate-induced excitotoxicity	Rat cortical or hippocampal neurons	PF 9.33
in vivo	Cuprizone-induced demyelination	Mouse	*In development*
in vivo	**ALZHEIMER DISEASE**		
	Streptozotocin *(STZ)* – induced cognitive deficit	Rat	CNS 10.11
	< EXPERIMENTAL PROCEDURES		
	Morris water maze		
	Y-maze (Novelty-based spatial preference)		
	HUNTINGTON DISEASE		
	Motor function and neuroscore Subchronic 3-NPA	Rat	CNS 10.8
	< EXPERIMENTAL PROCEDURES		
	Activity meter		
	Rotarod		
	Lesion volume		
	PARKINSON DISEASE		
in vitro	6-OHDA induced toxicity	hiPSC derived dopaminergic neurons	PF 9.32
	MPP+ induced toxicity	hiPSC derived dopaminergic neurons	PF 9.27
New !	Rotenone induced toxicity	hiPSC derived dopaminergic neurons	In development
New !	MPP+ induced toxicity	SH-SY5Y cells	PF 9.34
in vivo *New !*	Alpha Synuclein PFF model	Mouse	CNS 10.22
	Cognitive deficit Bilateral striatal 6-OHDA lesion	Rat	CNS 10.9
	L-DOPA dyskinesia Unilateral medial forebrain bundle (mfb)	Rat	CNS 10.5
	Motor deficit Unilateral medial forebrain bundle (mfb) 6-OHDA lesion	Rat	CNS 10.2R
	MPTP - induced lesion	Mouse	In development

PSYCHIATRIC DISEASES

ANXIETY

Elevated plus-maze	Mouse – Rat – Gerbil	CNS 3.3
Fear extinction	Mouse - Rat	CNS 6.38
Fear potentiated startle reflex	Rat	CNS 3.13
Four plates	Mouse	CNS 3.1
Light-dark box	Mouse	CNS 3.4
Marble burying	Mouse	CNS 3.7
Novelty-induced hypophagia	Mouse – Rat	CNS 3.5
Stress-induced hyperthermia (group-housed animals)	Mouse	CNS 3.6
Stress-induced hyperthermia (singly-housed animals) (option: implants)	Mouse	CNS 3.17
Vogel conflict	Rat	CNS 3.8

DEPRESSION

Behavioral despair	Mouse – Rat	CNS 2.5
Chronic Mild Stress	Mouse	CNS 2.10
Differential Reinforcement of Low rate *(DRL 30)*	Rat	CNS 2.6
Open space swimming	Mouse	CNS 2.8

PSYCHOSIS

Amphetamine hyperactivity	Mouse – Rat	CNS 4.1
Amphetamine stereotypy	Mouse – Rat	CNS 4.2
Catalepsy	Mouse – Rat	CNS 4.9
Dual-hit neonatal PCP and post-weaning social isolation	Rat	CNS.418
MK-801 hyperactivity	Mouse – Rat	CNS 4.13
PCP hyperactivity	Mouse – Rat	CNS 4.8
Prepulse inhibition *(deficit induced by apomorphine)*	Rat	CNS 4.11
Prepulse inhibition *(deficit induced by MK-801)*	Rat	CNS 4.14
Prepulse inhibition *(deficit induced by PCP)*	Rat	CNS 4.15
Sociability (3-Chamber) Test	Mouse	CNS 4.19

STROKE

in vitro

Excitatory neurotransmitter induced excitotoxicity (Glutamate, NMDA, and Kainate)	Rat / Mouse primary neurons	PF 9.29
Excitatory neurotransmitter induced excitotoxicity (Mitochondrial Membrane Potential) (Glutamate, NMDA, and Kainate)	Rat / Mouse primary neurons	PF 9.30
Excitatory neurotransmitter induced excitotoxicity (Calcium Response) (Glutamate, NMDA, and Kainate)	Rat / Mouse primary neurons	PF 9.31
Intrastriatal NMDA administration	Mouse	CNS 10.14

in vivo

Transient focal cerebral ischemia Middle Cerebral Artery Occlusion	Rat	CNS 10.3

< Experimental Procedure

Lesion volume

< Experimental Procedures

Beam walking

Foot-fault

Removal of adhesive

Neurological score

Lesion volume

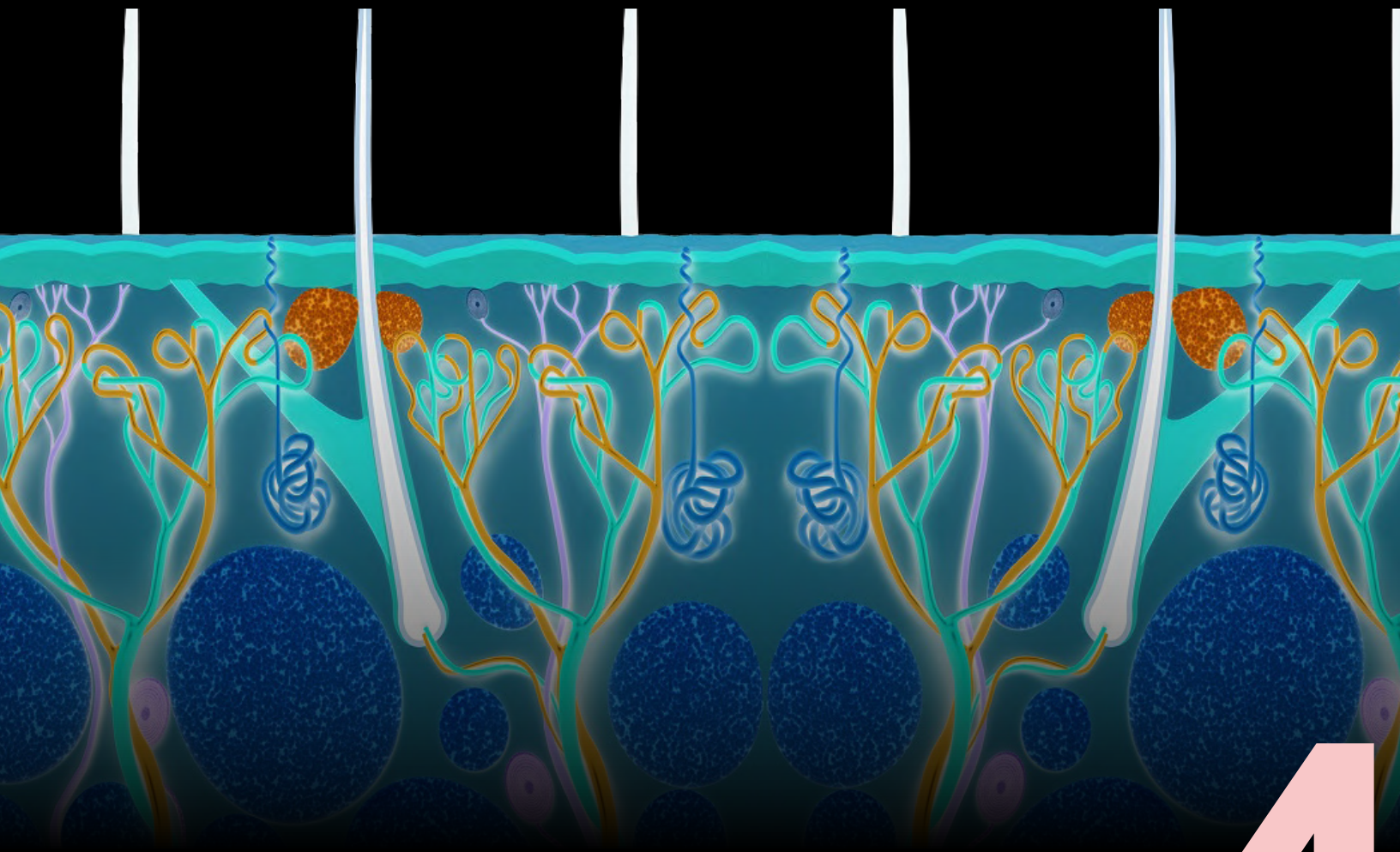
BIOMARKER ASSAYS

PLATFORM	BIOMARKER	SPECIES *(SAMPLE)*
Histology *(IHC-P)*	Neurons *(pan neuron, dopaminergic GABA interneuron, Purkinje)*	Rat - Mouse - Pig
	Glial cells *(astrocytes, microglia, oligodendrocytes)*	Rat - Mouse - Pig
	Aggregated protein α-synuclein	Human-Mouse (cell supernatant and brain)
	Neuron activity proteins *(synapsin / MBP, myelination)*	Rat - Mouse
	Nerve growth factor (NPY,TrkA)	Rat - Mouse
	Ubiquitin system/autophagy (Ubiquitin, P62)	Mouse
	Lysosome (LAMP-1,GCase, PSAP)	Mouse
Staining *(paraffin slices)*	Hematoxylin & eosin, Sirius red, Masson's trichrome,...	Multiple species & tissues
Luminex	Inflammation pathway IL-6, IL-10, MCP-1or IL-8 IFN-γ or IL-1β ,TNF and IL-12p70	Human - Mouse *(cell supernatant)*
qPCR	miR16, miR132, miR124 $TNF\text{-}\alpha$, IL- β, $IL\text{-}6$	Mouse (Hippocampus), Rat (Cortex), Primary Neurons
WB	RAS/Erk Signaling *(Erk, P-Erk, S6, P-S6)*	Mouse (Pancreas, cerebellum)
	Alzheimer Pathway *(P-Tau Ser398, P-Tau Ser202 Tyr205, GSK3b & P-GSK3)*	Rat (Hippocampus)
ELISA	Amyloid proteins *(β-amyloid)*	Dog (CSF, plasma)

We offer *in vitro* and *in vivo* models that allows for testing at multiple stages of the drug development process.

DERMATOLOGY

Dermatological diseases such as Psoriasis, Allergic Contact Dermatitis (ACD) and Atopical Dermatitis (AD or Irritant Contact Dermatitis) are major skin diseases of immunological origin, and represent a major health problem due to the substantial patient population that is affected.



4

in vitro

INFLAMMATORY PATHWAY AND ANTI-INFLAMMATORY ACTIVITY

Atopic Dermatitis - Poly *(I:C)* induced cytokine release	NHEK	PF. 4.26
Cannabinoid anti-inflammatory evaluation Cytokine release	NHEK	PF. 4.27
Cytokine release	Keratinocytes Dendritic cells *(Langerhans)*	PF. 4.10
IL-6 induced secretion *(by IL-17)*	NHDF	PF. 4.25
TNFα induced cytotoxicity	L929	PF. 4.1

OXIDATIVE DAMAGE AND ANTI-OXIDANT POTENTIAL

Cell viability - protection	HaCaT, NHEK, NHDF	PF. 4.2 & 3.4
Lipid peroxidation induction	HaCaT, NHEK	PF. 4.23
Reactive Oxygen Species induction *(ROS) (multiple inducers)*	HaCaT, NHEK	PF. 4.22

PREDICTIVE TOXICITY

Cytotoxicity - Cell viability	Cell lines *(3T3, L929, HaCaT)* NHEK, NHDF	TOX 17&18
Ocular irritation HET-CAM	Chicken egg	PF. 4.14
Skin irritation	Reconstituted human epidermis	PF. 4.15
Skin sensitization	Monocyte cell line *(THP1)*	PF. 4.20

PROTECTION AGAINST POLLUTION

Indoor dust - Inflammatory cytokine release	Dendritic cells (Langerhans)	PF. 4.24
Urban dust - Inflammatory cytokine release	NHEK Dendritic cells (Langerhans)	PF. 4.10
Urban dust - Lipid peroxidation	NHEK	PF. 4.9
Urban dust - Reactive Oxygen Species induction (ROS)	NHEK	PF. 4.8

SKIN AGING

New ! Wound healing	Elderly fibroblast or keratinocyte donor	PF. 4.12
Senescence *(oxidative stress induction or high passage senescence)*	Keratinocytes	PF. 4.11
Total collagen secretion	Elderly fibroblast donor	PF. 4.13

SKIN REGENERATION

Cell migration/Wound healing	HaCaT, NHEK, NHDF	PF. 3.14
Cell proliferation	HaCaT, NHEK, NHDF	PF 3.9
Total collagen formation	NHDF	PF. 4.3

in vivo

IN VIVO

Allergic Contact Dermatitis	Pig	DER 2
Imiquimod-induced psoriasis-like skin inflammation	Mouse – Rat	DER 1
Pruritogens-induced scratching behavior	Mouse – Rat	DER 3
Wound healing	Mouse	DER 4

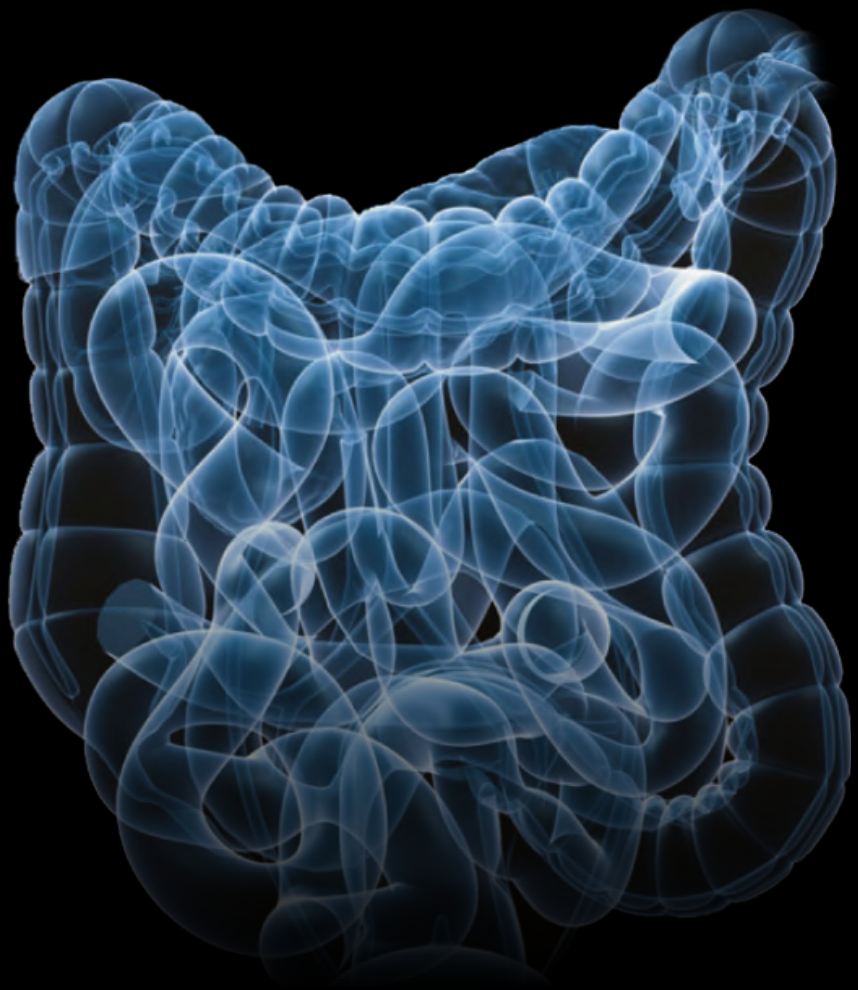
BIOMARKER ASSAYS

PLATFORM	BIOMARKER	SPECIES *(SAMPLE)*
Histology *(IHC-P)*	Skin structure *(keratin10, loricrin, filaggrin, elastin, involucrin, e-cadherin, ZO-1)*	Human *(explant or RHE)*
	Cell proliferation (Ki67,...)	Human *(explant or RHE)*
	Immune cells (*macrophages, T-cells, Langerhans,...*)	Human *(explant or RHE)* Mouse, Rat
	α-SMA	Rat Kidney
Staining *(paraffin slices)*	Hematoxylin & Eosin, Sirius red, Masson's trichrome,...	Multiple species & tissues
Luminex/CBA	Inflammation pathway IL-6, IL-10, MCP-1or IL-8 IFN-γ or IL-1β ,TNF and IL-12p70	Human *(cell supernatant)*
ELISA	Inflammatory cytokine *(TNF-α , IL-6, IL-17)*	Mouse *(ear)*
PCR	IL-17a, IL-17f, IL-22, IL-23p19, IL-1β	Mouse skin

We have extensive expertise and years of experience in gastrointestinal safety pharmacology & efficacy.

GASTROINTESTINAL SYSTEM

We provide models that focus on different gastrointestinal indications and different parts of the gastrointestinal system. We also continue to develop and validate new and relevant models.



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in vivo COLONIC MOTILITY

Anti-diarrhea *(castor oil)*	Mouse – Rat	GI 7
Colonic transit *(bead model)*	Mouse – Rat	GI 16
Fecal consistency	Mouse – Rat	GI 22

in vivo EMESIS - NAUSEA

Early and delayed emesis *(telemetry)*	Ferret	GI 15
Early anti-emetic activity *(morphine, cisplatin, emetine,...)*	Ferret	GI 10
Emesis induction	Ferret	GI 9
Pica behavior	Rat	GI 17

in vivo FOOD ALLERGY

Beta-lactoglobulin-induced allergy	Mouse	FA 2
Peanut-induced allergy	Mouse	FA 1

in vivo GASTRIC EMPTYING

Gastric emptying *(measurement of plasma acetaminophen levels)*	Rat	GI 23
Gastric emptying *(phenol red test)*	Mouse – Rat	GI 8

in vivo GASTROINTESTINAL TRANSIT

Charcoal meal test	Mouse – Rat	GI 1
Distribution pattern of phenol red	Mouse	GI 26

in vivo GASTROPARESIS

Clonidine-induced delayed gastric emptying *(liquid meal)*	Rat	GI 20
Clonidine-induced delayed gastric emptying *(solid meal)*	Rat	GI 21
Post operative ileus	Mouse	GI 25

in vivo INTESTINAL MUCOSITIS

Chemotherapy-induced intestinal mucositis	Mouse – Rat	GI 32

ULCEROGENIC ACTIVITY

in vitro	Indomethacin-induced gastric mucosal cell damage	Rat gastric mucosal cells	GI 29
in vivo	Colorectal distension (CRD model) after acetic acid sensitization	Rat	GI 13
	Colorectal distension (CRD model) after TNBS sensitization	Rat	GI 30
	Gastric acid secretion *(Shay's method)*	Mouse – Rat	GI 3
	Ulcerogenic activity *(acute and sub-chronic)*	Rat	GI 2

Ulcerogenic activity prevention *(induced by ethanol)*	Rat	GI 19
Ulcerogenic activity prevention *(induced by indomethacin)*	Rat	GI 27

ex vivo VISCERAL SMOOTH MUSCLE

Isolated colon	Guinea-pig - Rat	VSM 6
Isolated duodenum	Rat	VSM 2
Isolated ileum	Guinea-pig	VSM 1

in vivo ADDITIONAL MODELS

Conditioned taste aversion	Rat	GI 24
Pilocarpine salivation	Mouse – Rat	PNS 7
Salivation induction	Mouse – Rat	PNS 6

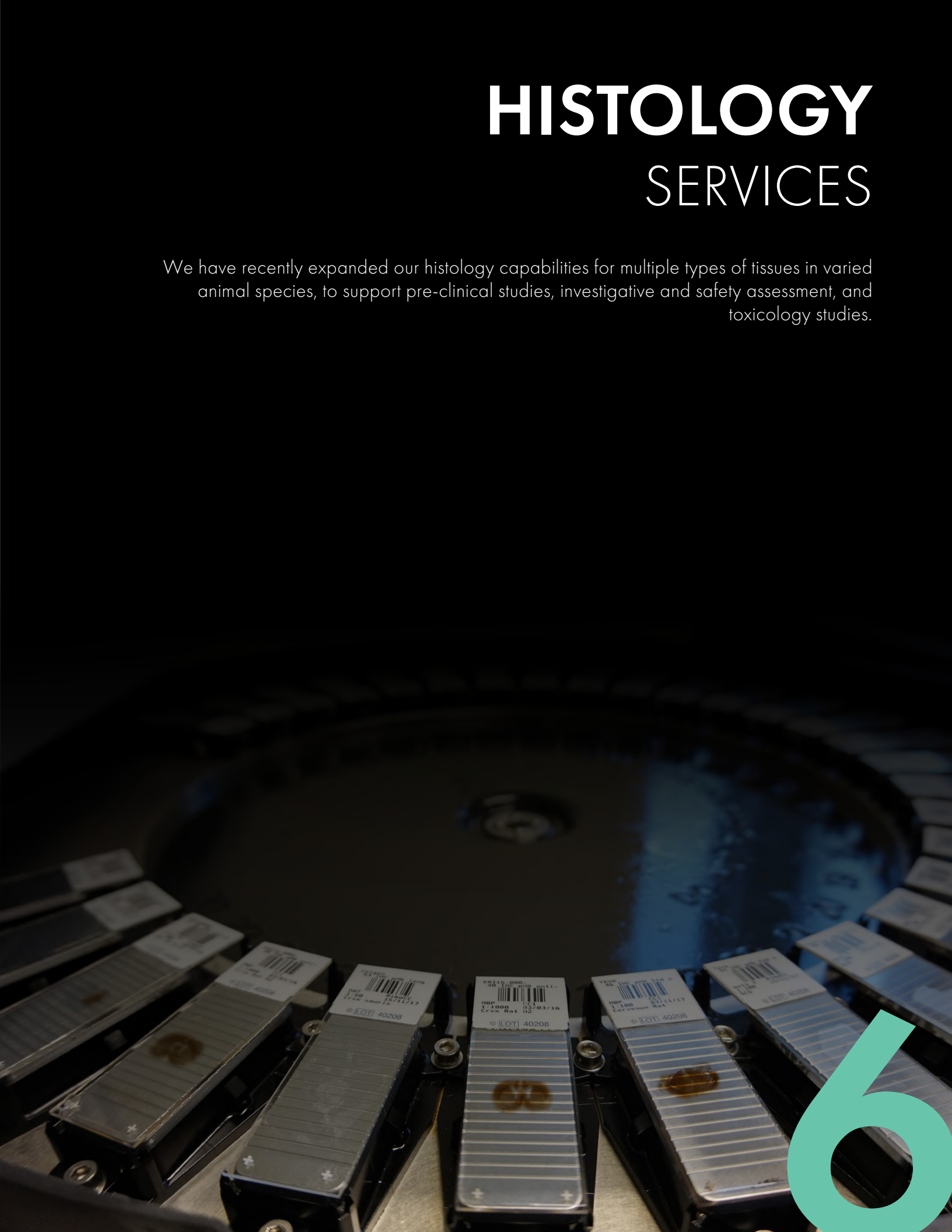
BIOMARKER ASSAYS

	PLATFORM	BIOMARKER	SPECIES *(SAMPLE)*
New !	Staining *(paraffin slices)*	Hematoxylin & Eosin, Sirius red, Masson's trichrome, Toludine blue	Multiple species & tissues
	Luminex	Inflammatory cytokines: IL-1α , IL-1β , IL-6, IL-10, MCP-1 and TNF	Mouse *(ileum, plasma) Mesentric lymph nodes and splenocytes*
	Biochemical	MPO activity	Mouse, Rat *(serum, plasma)*
		Ammonia	Rat *(serum, plasma)*
		Lipid panel *(HDL, LDL, GGT, FFA, TG, cholesterol ...)*	Mouse, Rat *(serum, plasma)*
		Liver function panel *(ALAT, ASAT, ALP, bilirubin ...)*	Mouse, Rat *(serum, plasma)*
	Elisa	Inflammatory cytokines: TNF-α /IL-1 , IL-6	Mouse, Rat *(serum, plasma, ileum)*
		Redox potential *(GSH)*	Mouse, Rat *(serum, plasma, ileum)*
		Allergy *(Total IgE, histamine, mMCP-1)*	*Mouse (plasma)*
	Histology (IHC-P)	Neutrophils (MPO)	Mouse (intestine)

Our capabilities can be included as part of ongoing models or as separate stand-alone services.

HISTOLOGY
SERVICES

We have recently expanded our histology capabilities for multiple types of tissues in varied animal species, to support pre-clinical studies, investigative and safety assessment, and toxicology studies.



6

TISSUE PREPARATION
- Paraffin
- Frozen sections

STAINING
- Routine & special stains
- Immunohistochemistry
- Immunofluorescence

DIGITALIZATION
- Brightfield
- Fluorescence
- Whole slide scanning

ANALYSIS
- Automated image analysis
- Pathologist review
- Machine learning

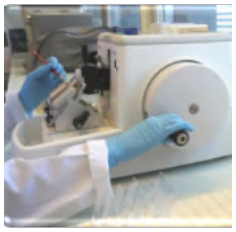
TISSUE PROCESSING

FFPE (Formalin fixed paraffin embedded) tissue

Frozen tissue embedding and cryosectioning

Decalcification of bone and hard tissues

Tissue Micro Array (TMA)



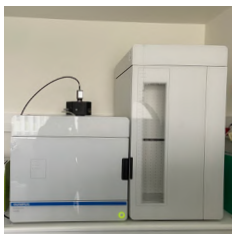
STAINING

Routine stains (Hematoxylin and Eosin, Toluidine Blue, Sirius Red ...)

Special stains (Safranin-O / fast Green, Masson Trichrome ...)

Immunohistochemistry staining

Immunofluorescence staining (multiplex colors)

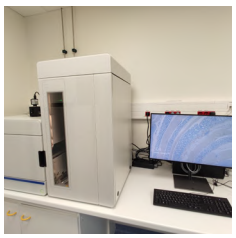


SCANNING

Whole Slide Scanning

Brightfield and Fluorescence (multiple colors)

High resolution and high throughput imaging



PATHOLOGY SERVICES

Microscopic observations and findings

Semi quantitative scoring

Reporting and image illustrations / annotations

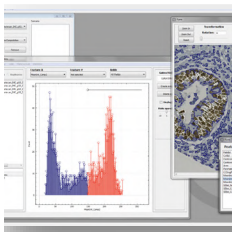
AUTOMATED IMAGE ANALYSIS

Tailor-made image analysis algorithm development for staining / IHC / IF slides

Automated and semi automated image analysis

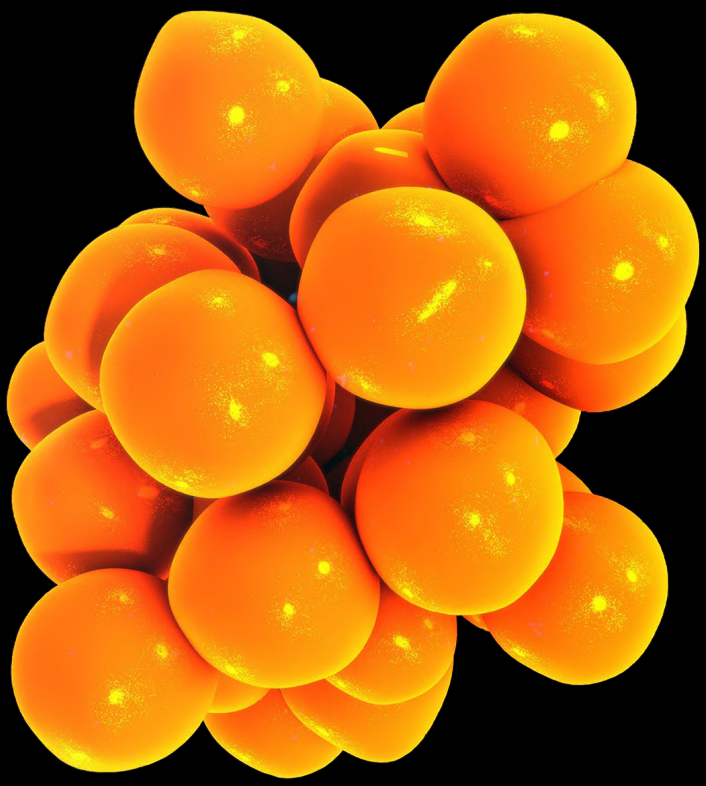
Machine learning / Deep learning approach

Cell population / Quantitative expression / Mapping analysis



INFLAMMATION

Inflammation is a response to a variety of stimuli, including damaged cells, irritants and pathogens, and is relevant for many different indications. Porsolt's varied capabilities and expertise, together with multiple in vitro and in vivo models used for screening, efficacy, and safety assessment of potential compounds, allows us to address the specific needs of the industry.



in vitro

IMMUNE RESPONSE

Basophile activation assay (CD200R)	Mouse whole blood	PF 5.11
Cell proliferation	Multiple cellular models	PF 3.9
Cytokine release (inflammation)	Mouse primary splenocytes and mesenteric lymph node hiPS microglia	PF 5.12
Cytolysis	Multiple cellular models	PF 3.4
Immune cell activation and proliferation	Primary mouse splenocytes	PF 5.8
Immune cell killing assay	Human T lymphocyte and tumor cells	PF 10.47
Immune check point inhibitor	*(PD1) - (PDL1)* biochemical assay *(HTRF)*	ONC 11.2
Immune check point inhibitor	*(CTLA-4) - (B7-1)* biochemical assay *(HTRF)*	ONC 11.2
Phagocytosis	Mouse – Rat Human macrophages	PF 5.10
Sensitization	Monocytes *(THP-1 cell line)*	PF 4.20

IN VIVO MODELS

in vivo

12-tetradecanoylphorbol-13-acetate *(TPA)* - induced ear edema	Mouse	PI 18
Air pouch	Mouse	PI 24
Arachidonic acid-induced ear edema	Mouse	PI 31
Carrageenan-induced edema	Mouse – Rat	PI 9.17
Peanut-induced allergy	Mouse	FA 1
Bleomycin-induced lung injury	Guinea-pig	RES 8
Lipopolysaccharide (LPS) Lung Injury (acute)	Mouse	RES 9
Yeast-induced hyperthermia	Mouse	PI 11
DSS-induced colotis model	Mouse	PI37

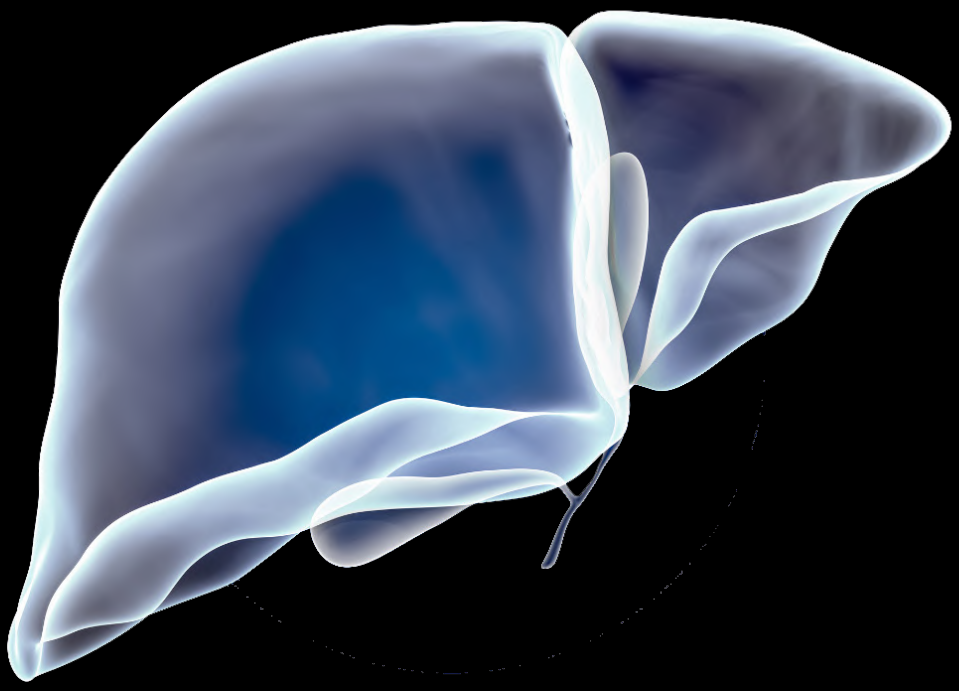
BIOMARKER ASSAYS

PLATFORM	BIOMARKER	SPECIES *(SAMPLE)*
Immunophenotyping *(flow cytometry)*	*Leukocytes (Treg,Tc), neutrophils, monocytes, macrophages*	*Mouse, Human (blood, bloodbags, buffy coat, bone marrow, tumors...)*
Histology *(IHC-P)*	Immune cell detection *(CD8, CD3, CD68, CD45,...)*	Rat, Mouse, multiple organs
Luminex	Inflammation pathway IL-6, IL-10, MCP-1or IL-8 IFN-γ or IL-1β ,TNFα and IL-12p70	Human *(cell supernatant)*
Flow cytometry *(ICC)*	STAT pathway *(STAT1, STAT2, STAT3, STAT6...)*	Human *(blood)*
	Cell signaling *(Erk, NFkB, C-jun)*	Human *(blood)*
ELISA	Inflammatory cytokines *(TNFα ,IL-1β ,IL-6,IL-10)*	Mouse *(air pouch exsudat, plasma)*
	Inflammatory protein *(CRP)*	Rabbit *(plasma, serum)*
Hematology	WBC (*White Blood Cell count*) : neutrophils, macrophages, lymphocytes, eosinophils, basophils	Guinea-pig, mouse (air pouch exsudat, bronchoalveolar lavage fluid, plasma)
qPCR	IL-1β, IL-6, IL-8, IL-12α, IL-12β, MCP-1, TNF-α and INF-γ	Guinea-pig (lung)
	COX-2, IL -1β, IL-6, IL-10, TNF-α	Mouse (paw)

Our experience in preclinical safety and efficacy have led to the development of models that focus on the liver & hepatic system.

LIVER & HEPATIC SYSTEM

This is an important part of the process to better understand the effects of compounds on the liver and the hepatic system.



8

in vitro	Acetaminophen (acute model)	Primary hepatocytes	PF 6.03
	Cholestasis/Bile canaliculi network	Primary hepatocytes sandwich configuration, Rat	PF 3.16
	Glutathione (GSH), intracellular GSH content	Primary human and rat hepatocytes	PF 3.28
	Steatosis/Lipid, intracellular accumulation : neutral lipids	Primary human and rat hepatocytes	PF 3.29
	Cytolysis	Primary human and rat hepatocytes	PF 3.4
	Lipid intracellullar accumulation : phospholipids	Primary human and rat hepatocytes	PF 3.30
	3D Hepatotoxicity (Viability)	Primary human hepatocyte spheroids	PF 6.02
in vivo	Acetaminophen (acute model)	Mouse, Rat	LI 2
	Bile Duct Ligation (BDL) (chronic model)	Rat	CV 2.7
	Carbon tetrachloride (CCl4) (acute model)	Rat	LI 1

BIOMARKER ASSAYS

PLATFORM	BIOMARKER	SPECIES *(SAMPLE)*
Histology *(IHC-P)*	Hepatic transporters *(MRP-2, ZO-1,...)*	Rat *(liver)*
	Hepatocellular ballooning *(H&E, p62)*	Rat *(liver)*
Staining *(paraffin slices)*	Hematoxylin & Eosin, Sirius red, Masson's trichrome,...	Multiple species & tissues
Biochemical	Lipid panel *(HDL, LDL, FFA, TG, cholesterol...)*	Mouse, Rat *(plasma, serum)*
	Liver function panel *(ALAT, ASAT, ALP, bilirubin...)*	Mouse, Rat *(plasma, serum)*
ELISA	Inflammatory cytokines *(TNF-α /IL-1β /IL-6)*	Mouse, Rat *(plasma, serum)*

MEDICAL DEVICES

Our vast array of models and technical capabilities that has been acquired and validated over many years, enable us to provide testing services for Medical Devices that follow ISO and OECD guidelines and include in vitro and in vivo models for sensitization, toxicity and safety.

CYTOTOXICITY

in vitro	MTT colorimetric cell viability assay	L929 cells	TOX 18
	Neutral Red colorimetric cell viability Assay	3T3 cells	TOX 19

IRRITATION

in vitro	Reconstituted human epidermis irritation assay	Episkin	TOX 21
in ovo	HET-CAM *(Hen's Egg Test Chorio Allantoic Membrane)* - alternative to occular irritation assay	Chicken egg	TOX 24
in vivo	Acute dermal irritation *(topical application)*	Rabbit	TOX 22
	Intradermal reactivity test *(intracutaneous injection)*	Rabbit	TOX 16
	Skin irritation test	Rabbit	TOX 3

SKIN SENSITIZATION

in vivo	Local Lymph Nodes Assay *(LLNA)*	Mouse	TOX 14

TOXICITY

	Skin sensitization	Monocyte cell line (THP1)	PF11.2
in vitro	Acute systemic toxicity *(or repeated doses)* alternative to embryotoxicity in mammals	Chicken egg	TOX 23
in ovo	Acute systemic toxicity	Mouse – Rat	TOX 11
in vivo	Repeat dose system toxicity	Mouse – Rat	TOX 12

OBESITY & METABOLIC DISORDERS

Obesity and metabolism related disorders are key therapeutic areas that have attracted a global focus in recent times. We have a comprehensive range of models available for obesity, impaired glucose tolerance, and diabetes, to assist with the development of novel therapeutic agents and treatment and reduction of risk factors associated with metabolic diseases.

10

DIABETES | METABOLIC DISORDERS | OBESITY

DIABETES

in vitro	Type 1 diabetes: Cytokine induced pancreatic cell death (ATP content)	Rat insulinoma INS-1 cells	PF 7.3
	Glucose stimulated insulin secretion	Rat insulinoma INS-1 cells	PF 7.2
in vivo	**Chemically-induced animal models**		
	Alloxan-induced type 1 diabetes single injection of alloxan	Rat	MET 17
	HFD/STZ-induced type 2 diabetes high fat diet and single injection of streptozotocin	Rat	MET 15
	Streptozotocin *(STZ)*-induced type 1 diabetes single injection of streptozotocin	Mouse – Rat	MET 16
	Genetic Animal Models		
	Zucker Diabetic Fatty *(ZDF)* type 2 diabetes, glucose intolerance, hyperinsulinemia...	Rat	MET 12
	Leptin-deficience ob/ob - db/db obesity, type 2 diabetes	Mouse	MET 7
	Nutritional Animal Models		
	Diet-induced obesity *(DIO)* special diets	Mouse	MET 18
	Assessments		
	Insulin tolerance test *(ITT)*	Mouse – Rat	MET 2
	Intravenous glucose tolerance test *(IVGTT)*	Rat	MET 1
	Oral glucose tolerance test *(OGTT)* HOMA-IR, QUICKI and ISI calculation	Mouse – Rat	MET 12

METABOLIC DISORDERS

in vivo	Insulin tolerance test *(ITT)*	Mouse – Rat	MET 2

in vivo

OBESITY

Genetic Animal models Leptin-deficience ob/ob - db/db obesity, type 2 diabetes	Mouse	MET 7
Zucker Fatty obesity, hyperlipidemia...	Rat	MET 7
Nutritional Animal models Diet-induced obesity *(DIO)* special diets	Mouse	MET 18
Assessments Acute 24-hr feeding	Rat	MET 14
Fast-induced feeding *(over 4 hours)*	Mouse	MET 13
Food/water intake and body weight gain *(3-hr schedule-fed over10 days)*	Rat	MET 6
Food/water intake and body weight gain *(over 28 days in pathologic animals)*	Mouse – Rat	MET 7

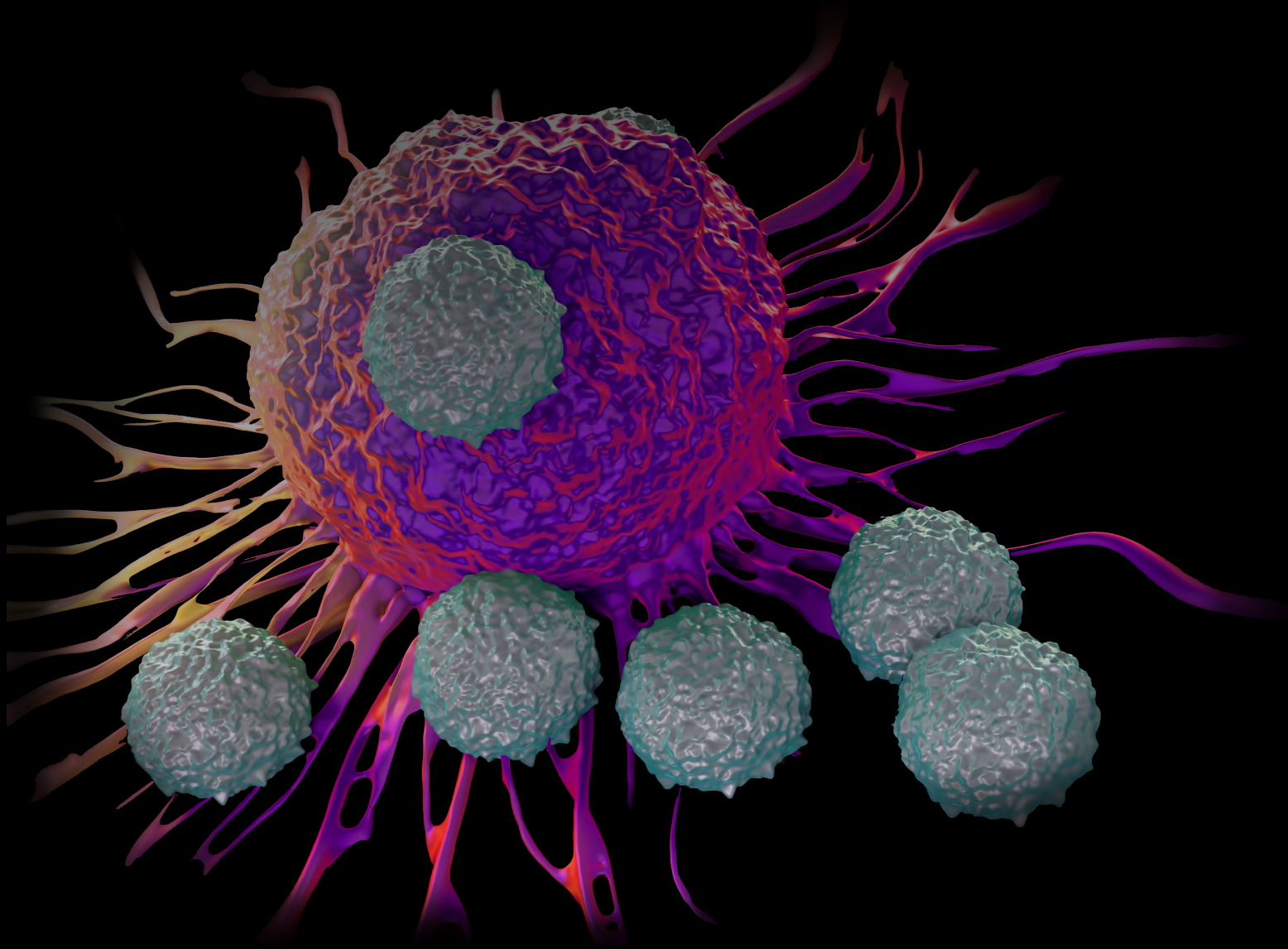
BIOMARKER ASSAYS

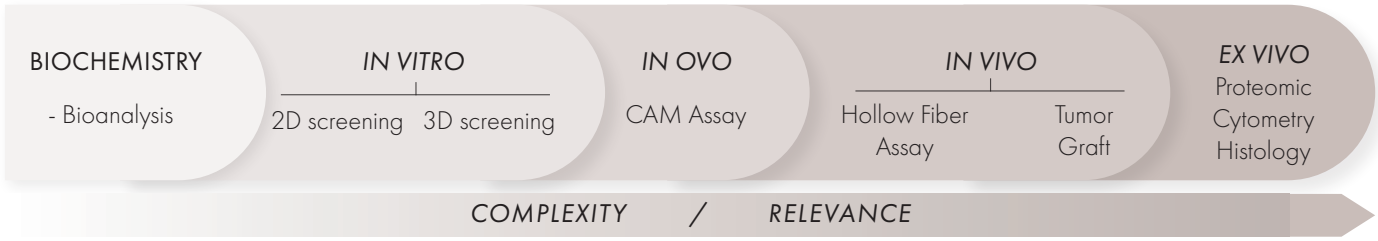
PLATFORM	BIOMARKER	SPECIES *(SAMPLE)*
ELISA	Pancreas activity *(insulin, glucagon)*	Mouse, Rat *(plasma)*
	Adipocytes (adiponectin, leptin)	Mouse, Rat *(plasma)*
	Sexual hormone (testosteron)	Mouse, Rat *(plasma, serum)*
	GI hormones (acyl ghrelin)	Mouse, Rat *(plasma, serum)*
Biochemical	Lipid panel *(HDL, LDL, FFA, TG, cholesterol...)*	Mouse, Rat *(plasma)*
	Liver function panel *(ALAT, ASAT, ALP, bilirubin...)*	Mouse, Rat *(plasma)*
	Renal function *(creatinin, urea, electrolytes...)*	Mouse, Rat *(plasma, urine)*
	Diabetes *(HbA1c)*	Mouse, Rat *(total blood)*
	Pancreas activity *(amylase, lipase)*	Mouse, Rat *(plasma, serum)*
Histology *(IHC IF)*	Insulin and glucagon, H&E Staining	Mouse, Rat (pancreas)

Oncology is an area that commands a larger proportion of the research world's resources.

ONCOLOGY

We can provide *in vitro* oncology screening and efficacy testing as well as testing in specific *in vivo* models.





in vitro

RECEPTOR PHARMACOLOGY AND SIGNALING PATHWAYS

High-content imaging

AKT phosphorylation	Multiple cellular models	PF 10.7
Androgen receptor nuclear translocation	LNCaP cell line	PF 10.1
Calcium homeostasis	Multiple cellular models	PF 3.33
cAMP quantification	Multiple cellular models	PF 3.40
ERK activation *(pERK1/2)*	Multiple cellular models	PF 3.27
NFkB activation	Multiple cellular models	PF 3.23
Prostate Specific Antigen *(PSA)* expression	LNCap cell line	PF 10.15

TARGETING ANGIOGENESIS

in ovo

HET-CAM assay (screening - 3R approach)	Chicken eggs, Multiple cells cancer	ONC 13.1

TARGETING THE IMMUNE SYSTEM: IMMUNO-ONCOLOGY

Biochem. Binding assay of immune check points inhibitors *(HTRF)*	Multiple inhibitors	ONC 11.2
in vitro Immune T-cell infiltration assay *(cytometry)*	3D co-culture multiple cells	ONC 10.6
Immune T-cell killing assay (high-content imaging)	2D co-culture	PF 10.47
T-cell activation assay (high-content imaging)	Human peripheral mononuclear blood cell and CD3+ T cells	PF 10.50
in vivo Syngeneic models of: Breast cancer (anti-PD-1/CTLA-4)	4T1 cells Mouse	ONC 3.1
Colon cancer (anti-PD-1/CTLA-4)	CT26.WT cells Mouse	ONC 3.2

	Glioblastoma (anti-PD-1/CTLA-4)	GL261 cells Mouse	ONC 3.3
	Renal cancer (anti-PD-1/CTLA-4)	RenCa cells Mouse	ONC 3.4

TARGETING METASTASIS

in vivo	Experimental lung metastasis syngeneic model of breast cancer	4T1 (Mouse)	ONC 1.1
	Experimental lung metastasis syngeneic model of colon cancer	CT26.WT (Mouse)	ONC 1.2
	Experimental lung metastasis xenograft model of breast cancer	MDA-MB-231 cells (Mouse)	ONC 8.1
New !	Leptomeningeal Carcinomatosis model	MDA-MB-231 cells (Mouse)	ONC 8.2
in vitro	Invasion assay (high-content imaging)	Multiple 3D cellular models	PF 3.15
	Migration assay (high-content imaging)	Multiple 2D cellular models	PF 3.1

in vivo TARGETING TUMOR-ASSOCIATED SIDE EFFECTS

PAIN

Chemotherapy - induced intestinal mucositis	Mouse	GI 32
Chemotherapy - pain - Vincristine model	Rat	PI 21
Chemotherapy induced Pain: Cisplatin model	Rat	PI 41

in vivo CACHEXIA

Drug-induced cachexia model	Rat	ONC 9.2
Tumor-induced cachexia model	AH-130 cells (Rat)	ONC 9.1
Tumor-induced cachexia model	C26 cells (Mouse)	ONC 9.3
Tumor-induced cachexia model	LLC1 cells (Mouse)	ONC 9.4

TARGETING PRIMARY TUMOR

in vitro	Cell cycle (cytometry)	Multiple 2D or 3D cellular models	PF 3.8
	Cell proliferation/cytolysis assay (high-content imaging)	Multiple 2D cellular models	ONC 10.2

	Cell viability (colorimetric assay)	Multiple 2D cellular models	ONC 10.1
	Clonogenicity assay anchorage-independent	Multiple 3D cellular models	ONC 10.4
	Spheroid proliferation/cytolysis assay (high-content imaging)	Multiple 3D cellular models	ONC 10.3
	Organoid models of Glioblastoma	Multiple patient samples	*In development*
in ovo	Tumor chicken ChorioAllantoic Membrane (TCAM) xenograft assay (screening – 3R approach)	Multiple cellular models Chicken eggs	ONC 4
in vivo	Hollow fiber assay (screening – 3R approach)	Multiple cellular models (Mouse - Rat)	ONC 5
	Orthotopic syngeneic models of:		
	Breast cancer	4T1 cells (Mouse)	ONC 3.1
	Colon cancer	CT26.WT/C26 cells (Mouse)	ONC 3.2
	Glioblastoma (brain tumor)	GL261 cells (Mouse)	ONC 3.3
	Kidney cancer	RenCa cells (Mouse)	ONC 3.4
	Orthotopic xenograft models of:		
	Breast cancer	MDA-MB-231/BT 20 (Mouse)	ONC 7.1
	Glioblastoma (brain tumor)	U87MG cells (Mouse)	ONC 7.2
	Pancreatic cancer	BxPC-3/PANC-1 cells (Mouse)	ONC 7.3
	Subcutaneous syngeneic models of:		
	Breast cancer	4T1 cells (Mouse)	ONC 2.1
	Colon cancer	CT26.WT/C26 cells (Mouse)	ONC 2.2
	Glioblastoma (brain tumor)	GL261 cells (Mouse)	ONC 2.3
	Lung cancer	LLC1/KLN205 cells (Mouse)	ONC 2.4
	Renal Cancer	105K cells (Mouse) (TSC Alliance)	ONC 3.4
	Subcutaneous xenograft models of:		
	Bladder cancer	SW780 cells (Mouse)	ONC 6.13
	Breast cancer	MDA-MB -231/BT-20 cells (Mouse)	ONC 6.1
	Colon cancer	HCT-8/HCT-116 cells (Mouse)	ONC 6.2
	Fibrosarcoma	HT-1080 cells (Mouse)	ONC 6.9

Glioblastoma (brain tumor)	U118MG/U87MG/ U138MG cells (Mouse)	ONC 6.3
Kidney cancer	ACHN cells (Mouse)	ONC 6.4
Liver cancer	Hep3B2.1-7/HepG2 cell (Mouse)	ONC 6.6
Lung cancer	A549/PC-9/H69 cells (Mouse)	ONC 6.5
Pancreatic cancer	BxPC-3/CFPAC-1/ PANC-1 cells (Mouse)	ONC 6.11
Prostate cancer	LNCaP/PC-3 (Mouse)	ONC 6.10

BIOMARKER ASSAYS

PLATFORM	BIOMARKER	MATRIX
Immunophenotyping	Regulatory T-cells *(CD4, FoXP3)* Cytotoxic T-cells *(CD8)*	Mouse
Histology	Breast cancer *(ER, PR, HER-2)*	Mouse, Human Tumor xenograft
	Epithelial to mesenchymal transition *(E-cadherin,Vimentin)*	Mouse, Human Tumor xenograft
	Immune cells *(T-cells, macrophages,...)*	Rat, Mouse
	Tumor microenvironment *(Apoptosis, proliferation, hypoxia, angiogenesis)*	Rat, Mouse, Human
Staining	Hematoxylin & Eosin, Sirius red, Masson's trichrome...	Multiple species
Luminex/CBA	Th1/Th2/Th17 pathway *(IL-2, IL-4, IL-6, IFN-γ , TNF α, IL-17A, IL-10)*	Mouse, Human
	Inflammation pathway *(IL-6, IL-10, MCP-1, IL-8, IFN-γ , IL-1β , TNF, IL-12p70)*	Mouse, Human
Western Blot	Ubiquitin, Lamin B1, ERK1/2, P-ERK1/2, P-S6k1, *S6K1* AKT, P-AKT, GSK3, P-GSK3, GAPDH, PSMA, *EGFR, H3, HIF-1a, CA9*	Mouse, Rat, Human (multiple cells and tissues)
Multimodal acquisition	Cell metabolism *(DHFR, protein synthesis),* Cell stress *(ROS, lipid peroxidation, intracellular phospholipid accumulation, mitochondrial membrane potential, GSH),* Hypoxia *(Pymonidazole),* Autophagy *(LC3B),* Signaling *(ERK1/2, NfKB, AKT, AR, PSA, cAMP, calcium homeostasis)*	

Pain is a growing area of interest in the industry and we are perfectly placed to provide services with recognized expertise and many years of experience.

PAIN

We offer a variety of models, from *in vitro* screening, to *in vivo* acute, neuropathic, and chronic pain, addressing pain therapeutics and pain associated symptoms and side effects.

in vivo ACUTE PAIN

Cold plate	Mouse – Rat	PI 36
Hot plate	Mouse – Rat	PI 1
Modified hot plate	Mouse	PI 28
Pain after local administration	Mouse – Rat	PI 40
Pinchmeter	Mouse – Rat	PI 22
Tail flick	Mouse – Rat	PI 2

in vivo INFLAMMATORY PAIN

Capsaicin paw	Mouse – Rat	PI 30
Carrageenan-induced acute inflammatory pain *(reversal & prevention protocol)*	Mouse - Rat	PI 14
Complete Freund Adjuvant *(CFA)* - induced acute inflammatory pain	Mouse – Rat	PI 20
Complete Freund Adjuvant *(CFA)* - induced chronic inflammatory pain: monoarthritis model	Mouse - Rat	PI 15
Formalin paw *(early phase)*	Mouse – Rat	PI 7
Formalin paw *(late phase)*	Mouse – Rat	PI 8
Migraine model	Mouse – Rat	*In development*
Mono-iodoacetate *(MIA)* - induced chronic inflammatory pain: osteoarthritis model	Rat	PI 19
Mono-iodoacetate (MIA) - induced low back pain	Rat	PI 43
Osteoarthritis	Guinea-pig	*In development*

in vivo NEUROPATHIC PAIN

Chemotherapy - induced neuropathic pain: Cisplatin	Rat	PI 21
Chemotherapy - induced neuropathic pain: Vincristine model	Rat	PI 21
Chronic Constrictive Injury - induced neuropathic pain: CCI/Bennett model	Rat – Mouse	PI 12
Diabetic - induced neuropathy	Rat	PI 23
Spared nerve injury	Rat	PI 42
Spinal Nerve Ligation - induced neuropathic pain: SNL/Chung model	Rat - Mouse	PI 13

in vivo POST-OPERATIVE PAIN

Brennan model post-operative pain	Rat – Guinea-pig	PI 16

in vivo VISCERAL PAIN

Acetic acid writhing	Mouse	PI 6
Colorectal distension *(CRD)*	Rat	GI 30
Dextran Sodium Sulfate *(DSS)* - induced colitis	Mouse	PI 37
Parabenzoquinone writhing	Mouse	PI 27
TNBS-induced colitis	Guinea-pig - Rat	*In development*

NON-EVOKED PAIN ENDPOINTS

Home Cage Observation	Locomotor Activity	Rotarod
Dynamic Weight Bearing	Gait Score	Ptosis
Abnormal Postures		

BIOMARKER ASSAYS

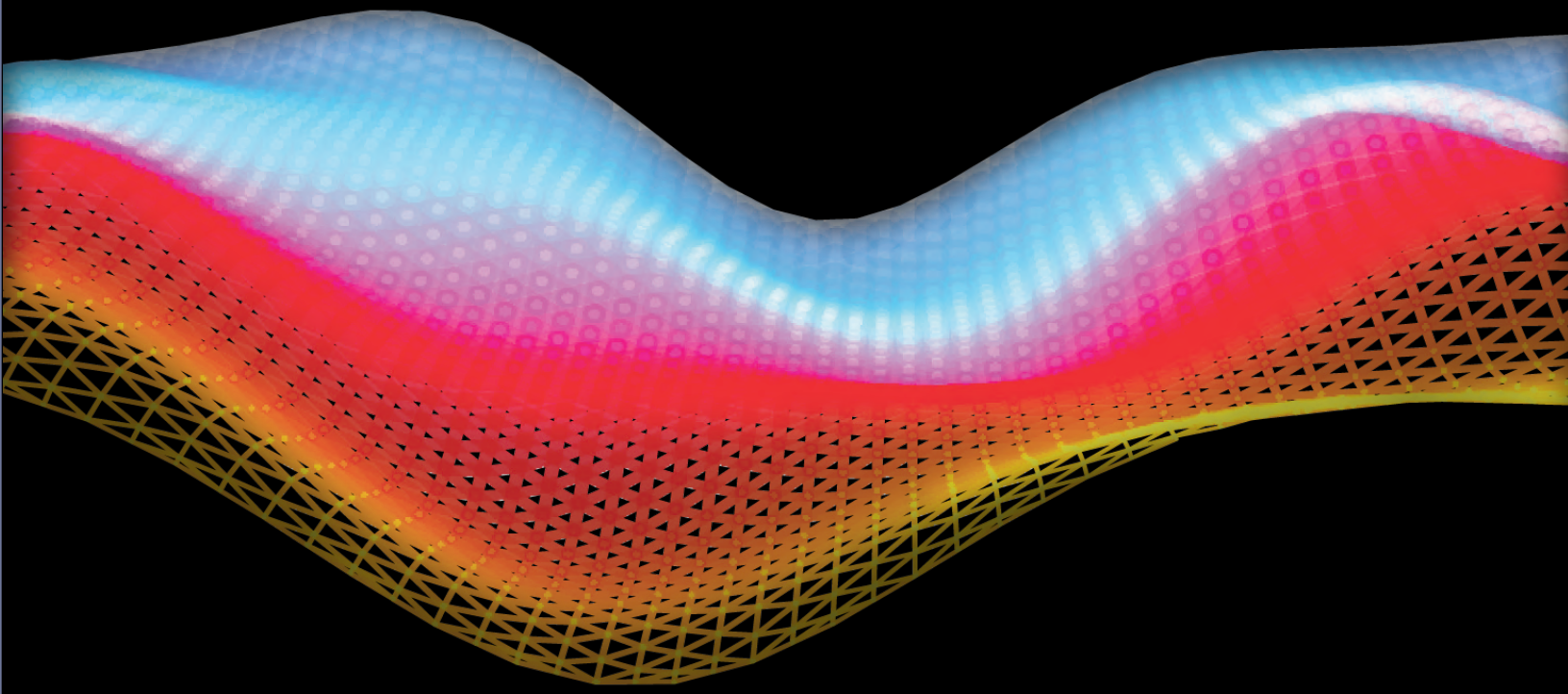
PLATFORM	BIOMARKER	MATRIX
qPCR	IL-1β, IL-6, IL-10, IL-17-A, IL-17F, MCP-1 and TNF α	Rat (colon)
	COX-2, IL-1β, IL-6, IL-10, TNF-α	Mouse (paw)
Luminex	*Under Development*	Rat Plasma

Our varied capabilities and expertise enable us to use multiple routes of administration, in different species & collect a variety of tissues for analysis.

PHARMACOKINETICS

Pharmacokinetics (PK) studies are a key component of drug development programs, that help determine the appropriate modes of administration, dose ranges and treatment timing.

We have many years of experience, performing pK studies, as stand-alone services, or as part of larger studies involving established models.



13

PK studies in multiple species:

- Mouse
- Rat
- Guinea-pig
- Ferret
- Rabbit
- Dog
- Mini-pig
- Pig (incl. piglet)

Routes of administration

Standard	Intracerebroventricular (i.c.v) Intramuscular (i.m.) Intranasal (i.n.) Intraperitoneal (i.p.) Intraplantar (i.pl.) Intravenous (i.v., caudal, cephalic, saphenous, ear) Nebulization Oral: per os (p.o.), capsule Subcutaneous (s.c.) Topical application (ex: ear, skin, ocular) Transdermal, transmucosal (using patch)
Under Anesthetic	Intra-tracheal Intra-lesion Intra mammary fat pad Intraarticular (knee, ankle, facet joint) Intracardiac (with or without thoracotomy) Intracaecal Intracerebroventricular (i.c.v), intracerebral (using stereotaxy) Intracolonic Intradermic Intrapancreatic Intrarenal Intrathecal (i.t.), intraspinal Intratibial Intratumoral Oropharyngeal aspiration Perineural (ex : perineural)

Catheterization	Intracaecal, intrajejunum, intravesical
Intravenous catheterization (iv. slow bolus or infusion)	Caudal, femoral, jugular, cephalic, saphenous veins
Mini-pump implantation (i-precio, osmotic) for infusion	s.c. i.v. i.p

Types of tissue and fluid collected

Adipose Tissue	Diaphragm	Paw
Adrenal Gland	Ear	Skin
Ascitic Fluid	Ganglia	Spinal Cord
Bladder	Heart	Spleen
Blood (Plasma, Serum, Whole)	Intestines	Stomach
Bone	Kidney	Testis
Brain (Cerebral Structures)	Liver, Lymph nodes	Thymus
Bronchoalveolar Liquid	Lung	Tumor
Caecum	Muscle	Urine
Cerebrospinal Fluid	Nerve	Vesicular Gland
Colon	Ovary	

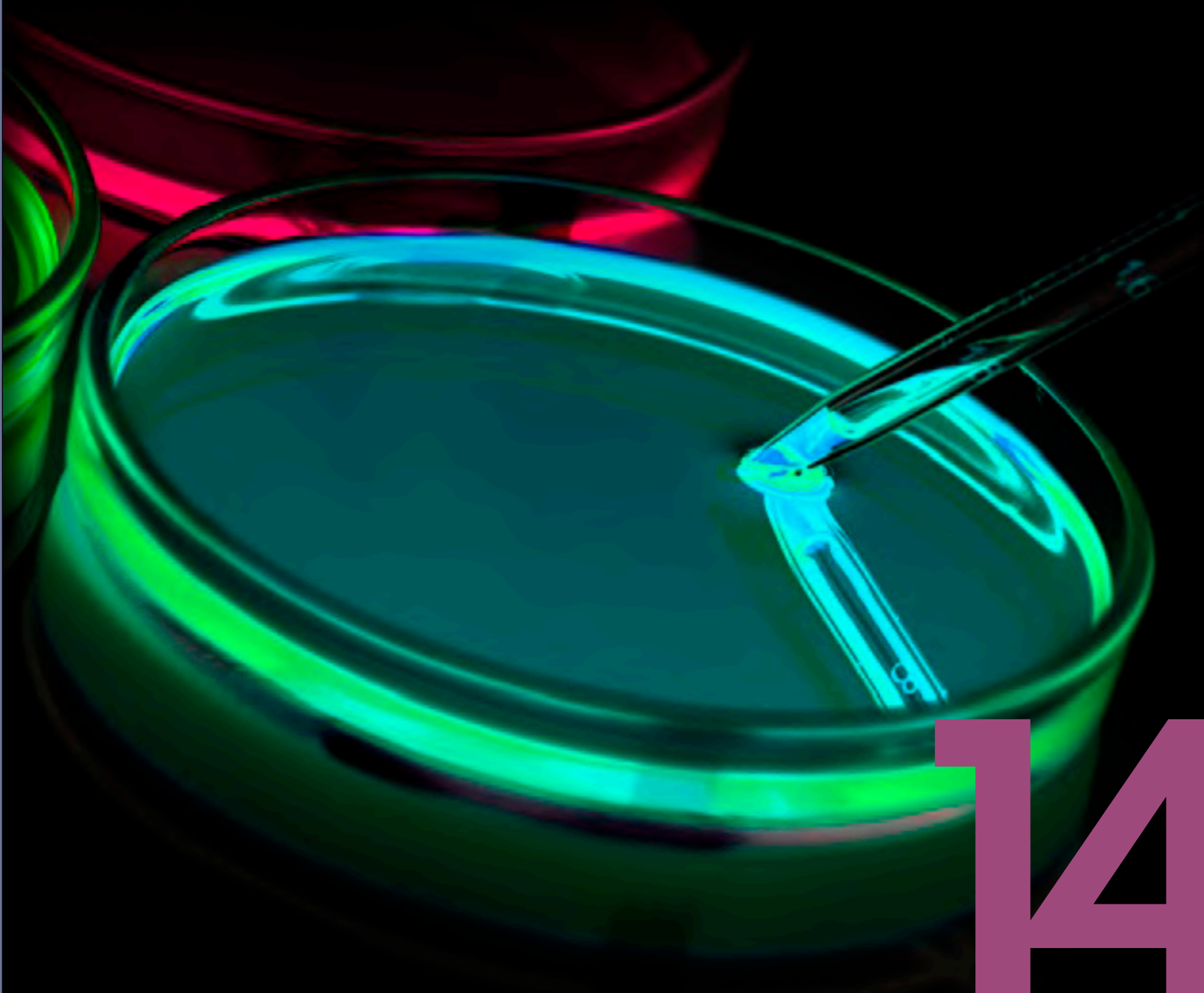
Clinical Chemistry | Coagulation | Hematology | ELISA

> *Read the detailed chapter "Biomarker Assays" (in Capabilities section) on p.78*

We have accurate toxicity prediction *in vitro* services conducted in true target cells and within the physiological environment found with primary cultures.

PREDICTIVE
TOXICITY

Drug toxicity is one of the major reasons for drug attrition. Existing traditional methods does not have adequate *in vitro* predictability. We combine the most predictive cell models (e.g. primary cultures of target organs) with optimized assays specific to each type of toxicity, analysis and specific methods.



in vitro CARDIOTOXICITY

COMPREHENSIVE *IN VITRO* PROARRHYTHMIA ASSAY ***(CIPA):***

* *Read the detailed list of these tests on page 16*

Electrophysiology measurement *(conventional manual patch-clamp)*	Cardiac ion channels	CV 5.6 to CV 5.9*
Cardiotoxicity	iPSC-derived cardiomyocytes: iCell2®	PF 1.08
Proarrhythmic risk assessment *(MEA & Calcium transient assay)*	human-induced pluripotent stem cell-derived cardiomyocytes *(hiPSC-CMs)*	CV 5.14 PF 1.7

in vitro DRUG INDUCED VASCULAR INJURY *(DIVI)*

Cell toxicity	HUVEC	PF 11.1
Coagulation impairment Tissue Factor and Thrombomodulin	HUVEC	PF 11.1
Leucocyte recruitment VCAM-1, E-Selectin and ICAM-1	HUVEC	PF 11.1

in vitro GASTROINTESTINAL SYSTEM

Gastric mucosal cell damage	Primary Rat gastric mucosal cells	GI 29

in vivo GENERAL TOXICITY

Acute toxicity	Rat – Mouse – Dog – Mini-pig	TOX 11
Preliminary chronic toxicity	Rat – Mouse	TOX 12

in vitro HEPATOTOXICITY

Cholestasis & bile canaliculi network	Primary hepatocytes *(R)* sandwich configuration	PF. 3.16
Cytolysis *(2D & 3D)*	Primary hepatocytes *(H & R)* and HepG2	PF. 3.4
Oxidative stress: Glutathione *(GSH)* depletion	Primary hepatocytes *(H & R)* and HepG2	PF. 3.28
Phospholipidosis	Primary hepatocytes *(H & R)* and HepG2	PF. 3.30
Steatosis: intracellular lipid accumulation triglycerides	Primary hepatocytes *(H & R)* and HepG2	PF. 3.30

NEPHROTOXICITY

in vitro

Cytolysis	RPTECs, HK-2, MDCK-II and CRFK	PF 3.4
Lysosomal activity	RPTECs and HK-2	PF 3.7
Mitochondrial membrane potential	RPTECs and HK-2	PF 3.3

NEUROTOXICITY

Cytolysis	Primary neurons (R,M) cell lines	PF 3.4
Excitotoxicity Calcium measurement	Primary neurons *(R, M)* cell lines	PF. 3.33
Mitochondrial membrane potential	Primary neurons *(R, M)* cell lines	PF. 3.3
Neurite outgrowth	Primary neurons (R,M) cell lines	PF 3.6

in vitro

SKIN TOXICITY

Cytotoxicity - Cell viability	3T3 & L929 fibroblasts	TOX 18&19
Ocular irritation *(HET-CAM)*	Chicken egg	TOX 24
Skin irritation	Reconstituted human epidermis	TOX 21
Skin sensitization	Monocyte cell line *(THP1)*	PF 11.2

in vitro

The effects of compounds and therapies on the respiratory system can be assessed using a variety of models & species, with which we have extensive experience.

RESPIRATORY
SYSTEM

These models can be used for assessing the efficacy and/or safety of compounds, and include models for airway function, asthma, cough, fibrosis, bronchospasm, etc.

15

ex vivo	Isolated pulmonary artery	Rat	RES 10
	Isolated trachea	Rat – Guinea-pig	RES 4
in vivo	Airway function (whole body plethysmography)	Mouse – Rat Guinea-pig	RES 1
	Airway function in large animals	Dog	RES 7
	Airway function under hypercapnia (whole body plethysmography)	Rat	RES 2
	Bleomycin-induced pulmonary fibrosis	Guinea-pig - Mouse	RES 8
	Citric acid-induced cough	Guinea-pig	RES 6
	Histamine bronchospasm	Guinea-pig	RES 3
	LPS-induced pulmonary injury	Guinea-pig - Mouse	RES 9
	Ovalbumin-induced asthma	Guinea-pig	RES 5
	Tracheal mucus output	Mouse	RES 11

BIOMARKER ASSAYS

PLATFORM	BIOMARKER	SPECIES *(SAMPLE)*
Staining *(paraffin slices)*	Hematoxylin & Eosin, Sirius red, Masson's trichrome...	Multiple species & tissues
Luminex/CBA	TNF, IL-6, IL-1β , IL-10 and MCP-1	Mouse *(BAL)*
Biochemical	MPO activity	Mouse *(whole lung)*
Hematology	WBC *(White Blood Cell count)*: Neutrophils, Macrophages, Lymphocytes, Eosinophils,Basophils	Guinea-pig - Mouse *(BAL)*
ELISA	TNF, IL-6, IL-1β	*Mouse (BAL)*
qPCR	IL IL-6, IL-10,TNF-a, IL-1β, IL-6, IL-8, IL-12a, IL-12β, MCP-1, TNF-a and INF-γ	Guinea-pig - Mouse

SAFETY REGULATORY PACKAGE

Our broad expertise and years of preclinical pharmacology experience make us the ideal partner to conduct your GLP Safety Pharmacology experiments. We offer safety studies in both *in vitro* and *in vivo* models with facilities, procedures, materials and software, that are validated to GLP standards.

GOOD LABORATORY PRACTICE
GLP

BEHAVIORAL PHARMACOLOGY STUDIES FOR INVESTIGATING ABUSE AND DEPENDENCE POTENTIAL

	Conditioned place preference	Rat	CNS 7.5
	Drug discrimination	Rat	CNS 7.8
	Non-precipitated withdrawal *(option: telemetry)*	Rat	CNS 7.3
	Self-administration *(initiation)*	Rat	CNS 7.6
	Self-administration *(substitution)*	Rat	CNS 7.7

CORE BATTERY [ICH S7]

CARDIOVASCULAR ACTIVITY RECORDING

in vitro	hERG channel	HEK 293 cells	CV 5.6

CARDIOVASCULAR STUDIES IN CONSCIOUS ANIMALS

in vivo	Arterial blood pressure, heart rate and ECG	Mouse – Rat – Dog Guinea-pig – Mini-pig	CV 1.4

CENTRAL NERVOUS SYSTEM STUDIES

in vivo	Activity meter	Mouse – Rat	CNS 1.2
	Primary observation *(Irwin)*	Mouse – Rat	CNS 1.1
	Rotarod	Mouse – Rat	CNS 1.5

RESPIRATORY STUDIES

in vivo	Airway function *(whole body plethysmography)*	Mouse – Rat Guinea-pig	RES 1

FORMULATION ANALYSIS

> *Read this detailed content in "Capabilities Section" on page 80*

SUPPLEMENTAL STUDIES

in vivo	Autonomic nervous system	Rat	CV 6
	Cardiovascular studies in anesthetized animals	Multiple species	CV 1*
	Gastrointestinal system	Multiple species	GI
	Renal function	Mouse – Rat	REN
in vitro	Cardiomyocytes	iCell²®	CV5.14

THROMBOSIS & BLOOD

We provide models for assessing the effects of compounds and potential therapies on blood flow. These models can be used for investigating direct effects or confounding and side effects of specific treatments on blood flow.

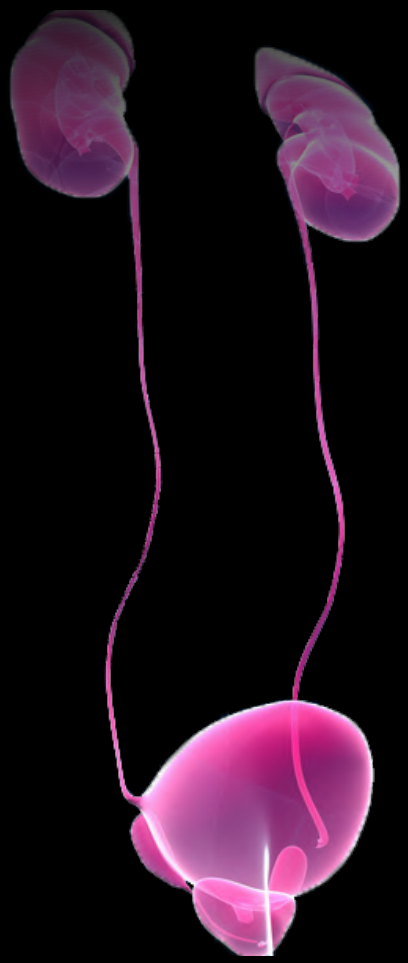
in vitro	Endothelial cell activation/ Drug-Induced Vascular Injury (DIVI)	HUVECs cells	PF 2.1
in vivo	Arterial thrombosis (FeCl2)	Rat	BL 3
	Arterio-venous shunt (silk thread model)	Rat	BL 5
	Bleeding time (anesthetized animal)	Rat	BL 2
	Venous thrombosis (FeCl2)	Rat	BL 4

BIOMARKER ASSAYS

PLATFORM	BIOMARKER	SPECIES *(SAMPLE)*
Coagulation	APTT *(Activated Partial Thrombin Time)*	Multiple species
	Prothrombin time	Multiple species
	Fibrinogen	Multiple species
Hematology	Complete Blood Count: - Red blood cells: hemoglobin, hematocrit, mean cell volume, mean cell hemoglobin concentration, platelets - White blood cells: lymphocytes, neutrophils, eosinophils, basophils, monocytes	Multiple species

UROGENITAL
SYSTEM

We provide models for assessing the effects of compounds and potential therapies on blood flow. These models can be used for investigating direct effects or confounding and side effects of specific treatments on blood flow.



BLADDER FUNCTION

Isolated bladder strip	Rat	VSM 4

in vivo

GENITAL SYSTEM

Isolated uterus	Rat	VSM 3
Penile erection	Rat	UG 1

in vitro

IN VITRO NEPHROLOGY

Cytolysis	RPTECs, HK-2, MDCK-II and CRFK	PF 3.4
Lysosomal activity	RPTECs	PF 3.7
Mitochondrial membrane potential	RPTECs and HK-2	PF 3.3

in vivo

RENAL FUNCTION

Diuresis and urinary electrolytes	Mouse – Rat	REN 1
Unilateral ureteral obstruction-induced renal fibrosis	Rat	REN 4

HYPERTENSION MODELS

5/6 nephrectomy	Rat	REN 3
Chronic *(2K1C)* Goldblatt hypertension *(high renin model)*	Rat	CV 2.5
Chronic DOCA – salt hypertension *(low renin model)*	Rat	CV 2.3

BIOMARKER ASSAYS

PLATFORM	BIOMARKER	SPECIES *(SAMPLE)*
Histology *(IHC-P)*	Urothelium structure & thickness *(E-Cadherin)*	Rat
Fibrosis	αSMA	Rat
Staining *(paraffin slices)*	Hematoxylin & Eosin, Sirius red, Masson's trichrome...	Multiple species & tissues
Biochemical	Renal function *(creatinin,urea, electrolytes, total protein, albumin)*	Mouse, Rat *(urine, serum, plasma)*
	Glomerular filtration *(creatinin clearance)*	Mouse, Rat *(serum, plasma)*
	Blood Urea Nitrogen *(BUN)*	Mouse, Rat *(urine, serum, plasma)*
qPCR	αSMA, TNF-α, Fibronectin, CCL-2 and TGF- β1	Mouse

CAPABILITIES

19

Biomarker Assays

Clinical chemistry

< PARAMETERS MEASURED ON SERUM/PLASMA SAMPLES

Calcium *(total)*

Magnesium, Phosphorus, Sodium, Potassium

Chloride/Triglycerides/Creatinine

Total Bilirubin

AST *(Aspartate Aminotransferase)*/ALP *(Alkaline Phosphatase)*/ALT *(Alanine Aminotransferase)*

GGT *(Gamma Glutamyl Transferase)*

Cholesterol/HDL cholesterol/LDL cholesterol/Glucose

NEFA *(Non Esterified Fatty Acids)*

Total proteins/Urea/Albumin

Amylase *(pancreatic)*/Lipase

Insulin/Glucagon

Adiponectin/Leptin

< PARAMETERS MEASURED ON URINARY SAMPLES

Creatin

Sodium, Potassium, Chloride

Albumin *(microalbumin)*/Total proteins/Semi-quantitative parameters

< PARAMETERS MEASURED ON CELL CULTURE SUP.

LDH *(lactate deshydrogenase)*

< PARAMETERS MEASURED ON TOTAL BLOOD

HbA1c *(glycated hemoglobin)*

Coagulation

< PARAMETERS MEASURED ON PLASMA SAMPLES

APTT *(Activated Partial Thrombin Time)*

Prothrombin Time/Fibrinogen

Hematology

< PARAMETERS MEASURED ON TOTAL BLOOD SAMPLES

Complete blood count including red blood cell, hemoglobin,hematocrit, mean cell volume, mean cell, hemoglobin, mean cell hemoglobin concentration, platelets, white blood cell, neutrophils, lymphocytes, monocytes, eosinophils, basophils.

Immuno assays:

- ELISA / AlphaLISA
- HTRF *(Homogeneous Time Resolved Fluorescence)*
- Immunostaining of cell surface and intracellular biomarkers
- Multiplexed immunophenotyping & biomarker detection by automated 5-laser flow cytometry
- Multiplexed analysis of soluble and intracellular protein expression by the Luminex and BD™ Cytometric Bead Array *(CBA)* technique
- High-throughput flow cytometry
- FLIPR Tetra high-throughput cellular screening system
- High-content histology:
  - tissue sections
  - 3D microtissues
  - tissue microarray
- High-throughput image acquisition of IF/IHC-stained tissue sections or tissue microarrays

Cell & Tissue Banks

Fresh blood from healthy donors through an agreement with the French blood bank.

Primary cell cultures:

- Cryopreserved primary cells *(rodents and human)*
- Freshly isolated rodent primary cell cultures:
  - neurons, astrocytes, oligodendrocytes, microglia
  - pituitary cells
  - hepatocytes
  - splenocytes

Human Induced Pluripotent Stem Cells *(hIPSC)* derived cells:

- hiPSC derived dopaminergic neurons
- hiPSC derived Microglia
- iCell[2®] *(Cardiomyocytes)*

Cell lines:

- Cancer cell lines: liquid and solid tumors
- Normal immortalized cell lines
- Cell lines expressing our proprietary specific biosensors

Artificial 3D microtissues

Human & animal tissue access & processing
(commercial and tailor-made Tissue Micro Arrays)

Formulation Analysis

Porsolt's vast portfolio of models and services for different indications also allows us to provide a comprehensive follow-up analysis of your project as part of a larger development program.

Method transfer or development

Method validation:

- specificity
- linearity
- accuracy
- precision

Stability and homogeneity evaluation
(stock and dosing formulations)

Adsorption evaluation
(for in vitro studies)

Formulation analysis:

- concentration verification
- homogeneity of formulations

Image Processing & Data Analysis

Image processing and data analysis provide very useful tools for biological applications.

Firstly,acquired images are described based on adapted and customized features *(texture, color, grey-level, shape, etc.)*. The obtained image information is classified using data analysis and visualization methods.

Image acquisition:

- High image resolution
- Tissue preview and ROI selection
- Brightfield and fluorescence for IHC and IF

Quantitative image analysis:

- Intensity of labeling
- Subcellular target characterization
- Event counting
- ROI detection
- Tissue structure description *(shape, tissular organization, etc.)*
- Features linked to neuronal biology
- Indices to assist pathologists with their diagnoses *(e.g. in oncology)*

> Clients can send their own images for quantitative image & data analysis and pathology review.

Technical Skills

Stereotaxic surgery
Cystometry
Induction of cognitive deficits
Induction of neuropathic pain
Induction of arthritis and osteo-arthritis
Ligation models
Medical device implantation
Microdialysis
Nephrectomy
Post-operative pain
Pump administration
Spinal surgery
Telemetry device implantation

> Read «Routes of administration» and «Types of tissue and fluid collected» p. 62-63

Technical Capabilities

Facilities

Conventional animal facility | IVC housing | Biosafety level 2 *(BSL2)* facilities

Equipment

HPLC

High-throughput Fluorometric Luminometric Imaging Plate Reader *(FLIPR)*

Automated multipurpose plate reader *(e.g. for HTRF, Absorbance, Luminescence, Fluorescence measurements)*

QuantStudio™ 5 Real-Time PCR System

High-content imaging

Immunohistology processing platform

Live-content imaging

Automated flow cytometry

Automated video detection

In vivo telemetry systems

High-throughput label-free and image-based cytometry

Biochemistry analyzer

Hematology analyzer

Non-invasive multimodal *in vivo* imaging *(e.g. for luminescence, fluorescence, and X-ray)*

Ultrasound imaging

Automated Immunoassay multiplex array Bio-Plex 200 System (Luminex® technology)

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