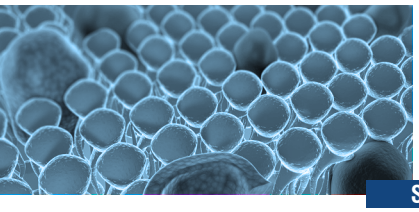
charles river



SAFETY ASSESSMENT

In Vitro Facilities & Capabilities Information (EU)

Many of Charles River's assays are direct replacements for tests or screenings previously performed in animal models, and we have been leading the way in the development, validation, and acceptance of various animal-free models. This datasheet provides an overview of Charles River Discovery and Safety Assessment *in vitro* services in Europe. Assays not listed as being available in Europe have been validated at one or more of our North American facilities. Please refer to our North American sheet for further details.

	Facilities											
	Szeged, Hungary (Solvo)	Veszprém, Hungary	Saint-Nazaire, France	Copenhagen, Denmark	England, United Kingdom	Edinburgh, Scotland, United Kingdom	Kuopio, Finland	Leiden, Netherlands	Den Bosch, Netherlands	Groningen, Netherlands	Freiburg, Germany	North America
ADMET												
Drug Transporter and Permeability												
- BCRP-MDCK	•				•							
- Caco-2 cells	•				•							
- Efflux inhibition (MDR1, BCRP, BSEP)	•				•							
- Efflux substrate (MDR1, BCRP)	•				•							
Efflux	•				•	•						
- FDA/EMA Drug Transporter Panel	•				•							
- Influx inhibition (OAT1, OAT3, OATP1B1, OATP1B3, OCT1, OCT2)	•				•							
- Influx substrate (OAT1, OAT3, OATP1B1, OATP1B3, OCT1, OCT2)	•				•							
Influx												
- Intestinal absorption models	•				•	•						
- MDCK cells	•				•							
- MDR1-MDCK	•				•							
Extrahepatic Metabolism												
- Plasma and blood					•							
- Skin, intestinal and lung					•	•						

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Hepatic Metabolism												
- Accurate mass MS					•	•						
- Hepatocytes					•	•						
- HPLC-MS/MS					•	•						
- Metabolite identification					•	•						
- Metabolic stability					•	•						
- Metabolite profiling					•	•						
- Metabolite profiling with accurate mass MS					•	•						
- Microsomes					•	•						
- MIST assessment						•						
- Radioprofiling						•						
- Reactive metabolite assessment					•	•						
- Species comparison					•	•						
- Subcellular fractions					•	•						
Protein Binding												
- Equilibrium dialysis					•	•						
- Melanin binding												•
- Microsomes/hepatocyte binding					•							
- Plasma protein binding					•							
- Rapid equilibrium dialysis (RED)					•	•						
- SPR (HAS, AGP)					•							
- Tissue binding					•							
- Ultracentrifugation						•						
- Ultrafiltration						•						
Prediction of Drug-Drug Interactions												
- CYP450 enzyme identification					•	•						
- CYP450 enzyme induction					•	•						
- CYP450 inhibition					•	•						
- Time-dependent CYP450 inhibition					•	•						
Red Blood Cell Partitioning					•	•						

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DERMAL ABSORPTION												
Flow Cells and Static Cells (OECD 428)												
- Consumer exposure						•						
- Dermal drug delivery						•						
- Formulation screening						•						
- Formulation supraequivalence						•						
- Human and animal skin						•			•			
- Operator exposure						•						
- Skin metabolism during absorption, including metabolite ID						•						
- Systemic availability						•						
- Transdermal drug delivery						•						
Skin Penetration						•						
DISCOVERY SERVICES												
Adeno/lentiviral production								•				
Adipokine Analysis (cytometric bead arrays)					•	•		•				•
Apoptosis Induction Assessment					•	•	•	•				•
Antisense Oligonucleotide Screening								•				
Biochemical Assays for HTS and Profiling					•			•				•
Biomarker Assays (MSD, Luminex®, AlphaLiSA®)					•			•				•
Biophysical Fragment Screening					•							
Cell Banking											•	•
Cell-Based Assays for HTS and Profiling					•			•				•
Cell Signaling Profiling					•	•	•					•
Cell Transfection					•	•		•				•
Cell Transduction												•
Chemoproteomics					•							
Compound Screening for Cytotoxicity in Primary CNS Cells							•	•				•
Compound Screening in Tumor Cells					•			•			•	•
CRISPR / Cas9 editing					•			•				
Custom Cell-Based Assay Development					•			•				•
eYgY, neutralizing antibody assay, antibody-dependent cell-mediated cytotoxicity (ADCC) assay and cytokine release assay					•	•	•	•				•

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Custom Cell Line Development and Validation					•			•				•
Cytokine Analysis (cytometric bead arrays)					•	•		•				•
Cytokine Analysis (ELISpot)												•
Excitotoxicity, Free Radical Challenge, Oxygen-Glucose Deprivation, 6-OHDA												•
- Cell death/viability endpoints, cell counts, immunocytochemistry							•	•				
Flow Cytometry					•	•	•	•				•
Gene Expression Analysis (LightCycler®, Droplet Digital™ PCR , Nanostring)					•			•				•
hESC / iPSC-Derived Cell-Based Assays								•				
High Content Assays					•			•				•
High-Throughput Ion Channel Screening and Profiling					•							•
High-Throughput Mass Spectrometry					•							•
Human Donor Blood Assays					•			•				
Human Primary Cell-Based Assays								•				•
Isothermal Titration Calorimetry					•							•
***In Vitro* Drug Combination Analysis**					•						•	•
Live Cell Imaging (IncuCyte®)					•							
Membrane Preparation					•							•
Multi-Electrode Arrays					•							
Neurite Outgrowth (NOG) Assay in Primary Cells							•	•				
NMR (protein ligand interactions)					•							
Pharmacology Assays					•	•	•	•				•
Proliferation Assays					•	•		•			•	•
Protein Expression (cytometric bead arrays)					•	•	•	•				•
Protein Production					•							
Radiometric Assay for HTS					•							
Radiometric Assay for Compound Profiling					•							
Receptor Binding Assays					•	•						•
RNAi Screening								•				
Slice Electrophysiology							•			•		•
Surface Plasmon Resonance (Biacore™)					•							•
Thermal Shift Assay					•							

	Facilities											
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Ussing Chamber Electrogenic Transport Assay												•
X-ray Crystallography					•							
Zebrafish Developmental Toxicology												•
Zebrafish Neurotoxicology												•
GENETIC TOXICOLOGY												
Ames (OECD 471)		•							•			
Chromosomal Aberration (OECD 473)		•										
- CHO cells and human lymphocytes		•							•			
***In Vitro* Micronucleus (OECD 487) - bone marrow from rats or mice**		•							•			
MicroAmes									•			
MiniCAT™ (OECD 473)									•			•
Mouse Lymphoma (mammalian cell mutation) (OECD 476/OECD490)		•							•			
Screening Ames		•							•			
***IN VITRO* TOXICOLOGY**												
Blood/Plasma Compatibility						•						
Acute toxicity using 3T3 NRU test (OECD 129)												•
Skin Corrosion (OECD 431)												
MatTek EpiDerm™ model									•			•
MatTek EpiSkin™ model		•				•						
Membrane Barrier Test Method for Skin Corrosion (Corrositex™; OECD 435)									•			
Skin Irritation (OECD 439)												
MatTek EpiDerm™ model									•			•
MatTek EpiSkin™ model		•				•						
Eye Irritation												
- Bovine corneal opacity and permeability (BCOP) (OECD 437)						•			•			
- MatTek EpiOcular™ (OECD 492)		•				•			•			•
- SkinEthic™ HCE model (OECD 492)						•						
- Isolated chicken eye test (OECD 438)		•										

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Inhalation Toxicity (with or without inhaling robot)												
- Epithelix Sàrl MucilAir™						•						
- MatTek EpiAirway™						•						
3D toxicology testing MatTek 3D models						•						
SKIN SENSITIZATION												
in silico skin sensitization assessment (i.e. DEREK)									•			
in chemico direct peptide reactivity assay (DPRA) (OECD 442C)						•			•			
in chemico peroxidase peptide reactivity assay (PPRA)						•						
ARE- Nrf2 luciferase test method (OECD 442D) KeratinoSens™									•			
ARE- Nrf2 luciferase test method (OECD 442D) LuSens						•						
Myeloid U937 skin sensitization test (OECD 442E)									•			
h-CLAT : Human cell line activation test (OECD 442E)												
PHOTOTOXICITY												
Ultraviolet - visible spectral analysis									•			
3T3 Balb/c neutral red uptake assay phototoxicity assessment (OECD 432)									•			
Phototoxicity assessment in 3D differentiated human keratinocytes (PhotoEpiderm™)									•			
SAFETY PHARMACOLOGY												
Cardiac Channel Panel												•
hERG Channel Blockade (ICH S7B)												
- Screening hERG					•							
- Whole-cell patch clamp electrophysiology in hERG-transfected CHO cells						•						
- Whole-cell patch clamp electrophysiology in hERG-transfected HEK 293 cells					•							
hERGLite Channel Trafficking Assay												•
Purkinje Fiber Assay												•
Stem Cell-Derived Human Cardiomyocyte Impedance Assay												•
Stem Cell-Derived Human Cardiomyocyte Multiple Electrode Array Assay												
Whole-Cell Patch Clamp Electrophysiology in hERG- Transfected HEK 293 Cells					•							

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ENDOCRINE DISRUPTION*												
Estrogen receptor binding using rat Uuterine cytosol (OPPT/OCSPP 890.1250)									•			
Estogen receptor transcriptional activation (OPPS/OCSPP 890.1300 and OECD 455)									•			
Androgen receptor binding using rat prostate cytosol (OPPTS/OCSPP 890.1150)									•			
Androgen receptor transactivism using the AR-EcoScreen™									•			
Aromatase human recombinant (OPPTS/OCSPP 890.1200)									•			
TPO assay									•			
In vitro UGT induction (mRNA and/or enzymatic activity)									•			
Ex vivo glucuronidation/sulfation (mRNA and/or enzymatic activity)									•			
TECHNOLOGY TRANSFER												
Innovations & Bespoke Tests					•	•		•				
Evaluation of New Assays					•	•		•				
Formal (ECVAM) Test Validation EU NETVAL Membership						•						
BIOCOMPATIBILITY FOR MEDICAL DEVICES												
Cytotoxicity Testing (ISO 10993-5/USP-NF)* **												
- Agarose overlay						•						
- by elution		•				•						
Genotoxicity (GLP, ISO 10993-3)												
Pre-test to determine extraction method: Polar and non-polar extracts												•
Bacterial reverse mutation test Ames		•							•			
In vitro mouse lymphoma assay TK		•							•			
In vitro micronucleus test		•							•			
In vitro chromosome aberration test		•							•			
Hemocompatibility (GLP, ISO 10993-4)												
Hemolysis test				•					•			
Cytotoxicity (GLP, ISO 10993-5)												
In vitro cytotoxicity test NRU		•			•				•			

*Please ask for a full list of the Level I-V ED studies available across our facilities

** Cytotoxicity testing is also offered in Ballina, Ireland

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