

Surgical Services - Europe

At Charles River we offer a range of standardised surgical services on rats and mice, at multiple international sites. Charles River France also offers on-site surgical services for guinea pigs (please enquire). Our surgical services – conducted by highly skilled surgeons with vast experience in veterinary medicine and animal science – range from simple procedures, such as soft tissue/organ extractions, to highly complex catheterisations and cannulations. With more than 60 surgical procedures now available, all of which meet exacting scientific and regulatory standards, we are committed to providing surgically altered animal models to meet your research needs. We take pride supporting your research goals by investing in our core programmes and facilities to offer high-quality products and services that are designed to meet your exact needs. We are continually striving to improve our surgical services offered in an effort to provide the models and technical support necessary to speed your development time.

State-of-the-Art Facilities

Charles River currently offers full surgical capabilities in several facilities in Europe. The surgical suites at each site are comprised of HEPA-filtered, positive-pressure barrier rooms with a series of entry locks. They come complete with functional areas that are used for surgical manipulations, animal husbandry support, preoperative holding, postoperative recovery, detailed reporting on animals, supply preparation and clerical activities.

Biosecurity

In the interest of biosecurity, Charles River UK and France surgery suites have been set up as barrier rooms. To ensure strict adherence to biosecurity policies, animals are transferred from on-site animal breeding rooms in filtered crates to the surgery suite through transfer ports. Non-Charles River animals are not permitted in the surgery area. Procedures on immunodeficient animals are performed under a laminar flow workstation in either the surgery suite or other buildings using a standardised aseptic technique.

Animal Welfare

Charles River is proud of the fact that all of our research model breeding and services facilities in Europe have received accreditation of their animal care and use programmes from the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC) International.

All procedures carried out at the UK site are strictly governed by adherence to Home Office project licences, guidelines and recommendations.

Procedures carried out in the French site are strictly governed by adherence to EU 2010/63. All staff are responsible for the well-being of the animals for the duration of surgery, from arrival to dispatch. This responsibility also extends to when procedures are performed in alternative designated surgery areas on-site. Justification for the use of surgically altered animals, review of experimental protocols and all aspects of the use of surgically altered animals after arrival are the responsibility of the local project licence holders along with the senior surgeon and technicians.

Charles River France utilises a 300 square meter facility dedicated to surgical services, and prepares over 20 000 surgically prepared animals each year.

European Surgical Locations

- Lyon, France
- Margate, United Kingdom

Capabilities

- Vascular catheterisations
- Non-vascular catheterisations
- Cardiovascular procedures
- Neurological procedures
- Soft tissue procedures
- Device implants
- Customised procedures and model development
- Biospecimens
- Excision surgeries
- On-site surgical support
- Training sessions

Vascular Catheterisations

Species	Procedure	Common Applications	Description/Comments
Rat	Abdominal aorta*	Blood pressure monitoring	A catheter is inserted into the abdominal aorta
Rat, Mouse	Carotid artery catheterisation- common**	Blood pressure monitoring, blood sampling, available in extended length catheters for automated samplers	A catheter is inserted into the common carotid artery. The catheter tip terminates at the aortic arch
Rat	Femoral artery catheterisation**	Blood pressure monitoring, blood sampling, available in extended length catheters for automated samplers	A catheter is inserted into the femoral artery. The catheter tip terminates in the abdominal aorta
Rat, Mouse	Femoral vein catheterisation**	Dosing compounds or blood sampling, available in extended length catheters for automated samplers	A catheter is inserted into the femoral vein. The catheter tips terminate in the vena cava
Rat, Mouse	Jugular vein catheterisation**	Blood sampling or compound dosing, available in extended length catheters for automated samplers	A catheter is inserted into the right jugular vein. The catheter tip terminates in the cranial vena cava
Rat, Guinea Pig	Jugular vein dual catheterisation**	Blood sampling from the right jugular vein and compound dosing through the left jugular vein	Combination of dual vascular or vascular/non-vascular catheterisations to suit customer requirements. Eg. Jugular/femoral or jugular/bile duct
Rat	Portal vein catheterisation via mesenteric vein**	Intestinal drug absorption, recommended for portal vein infusion only	A catheter is inserted into the portal vein via the cecoiliac vein. (for infusion only)
Rat, Mouse	PinPort™	Toxicology, pharmacodynamic and pharmacokinetic	The PinPort™ provides fast, aseptic access to externalised rodent catheters and can reduce study costs, as well as improve 3Rs compliance.

Non-Vascular Catheterisations

Rat	Bile duct catheterisation	Routine sampling of bile for pharmacokinetic studies	A continuous loop system is used: one end of catheter placed in the bile duct, the other in duodenum. The catheter is looped over the animal's back subcutaneously, with direct catheter access in the scapula region or silicone harness system
Rat	Colon catheterisation**	Dosing compounds into colon	A catheter is inserted into the colon. For infusion only
Rat	Duodenal catheterisation**	Dosing compounds into duodenum	A catheter is inserted into the duodenum. For infusion only
Rat	Ileum**	Dosing compounds into ileum	A catheter is inserted into the ileum. For infusion only
Rat	Intraperitoneal catheterisation**	Infusion into the peritoneal cavity	A catheter is implanted in and secured to the abdominal wall allowing access to the peritoneal cavity for infusion of compounds
Rat	Intrathecal catheterisation-lumbar approach**	Direct infusion into subdural space of the spine	A catheter is inserted into the subarachnoid space of the spine at the L4-L5 region. For infusion only
Rat	Jejunum catheterisation**	Routine infusion of dosing compounds into jejunum	A catheter is inserted into the jejunum. For infusion only

* Available at Charles River UK only

** Can be connected to a harness or PinPort™ (optional)

PinPort™ is a trademark of Instech Laboratories, Inc., Plymouth Meeting, Pennsylvania, USA. Accessories available on request (injectors, lock solution, etc.).

Non-Vascular Catheterisations, *continued*

Species	Procedure	Common Applications	Description/Comments
Rat, Mouse	Stomach catheterisation**	Routine compound infusion	A catheter is inserted into the stomach. For infusion only
Rat	Urinary bladder catheterisation**	Used to study the effects of micturition of a normal or unstable bladder using cystometry	A catheter is implanted in the urinary bladder wall to allow for dosing compounds

** Can be connected to a harness or PinPort™ (optional)

Soft Tissue Procedures

Rat, Mouse	Adrenal demedullation*	Studies of sympathetic or parasympathetic nervous system, epinephrine, or norepinephrine	The cortex of each adrenal gland is cut and the medulla removed
Rat, Mouse	Adrenalectomy	Studies of steroidal hormone metabolism and obesity	Both adrenal glands are removed, on each side. Saline (0.9%) and saccharose at 10 g/L (1 %) supplementation of water is required after surgery
Rat	Bile duct ligation	Studies of hepatic fibrosis, cholestasis, and drug metabolism with compromised liver function	The bile duct is ligated
Rat, Mouse, Guinea Pig	Castration	Behavior studies, prostatic hyperplasia	Testes are removed
Rat, Mouse	Hepatectomy- partial	Liver function studies	70% of the liver tissue volume is surgically removed
Rat, Mouse	Hypophysectomy**	Endocrinology studies and growth hormone releasing batch	The pituitary gland is removed using transauricular approach. Animals require warm environments (24°C–26°C)
Rat, Mouse, Guinea Pig	Hysterectomy	Hormonal and reproductive physiology studies	The entire uterus is removed, leaving the ovaries intact
Rat, Mouse	Nephrectomy	Studies of hypertension or renal impairment	The left kidney is removed
Rat, Mouse	Nephrectomy- 5/6	Hypertension, renal failure, and drug metabolism with compromised renal function	This is a two-part surgery with 5-7 days between surgeries. Two-thirds of one kidney is removed during the first surgery. The contralateral kidney is removed during the second surgery
Rat, Mouse	Ovariectomy	Osteoporosis	Both ovaries are removed
Rat	Ovariectomy and hysterectomy	Osteoporosis, bone metabolism, and calcium absorption	Both ovaries and uterus are removed
Rat	Parathyroidectomy	Study of calcium and phosphorus deficiencies and metabolism	Parathyroid glands are removed only, leaving the thyroid glands intact. 4mg/ml calcium lactate water supplementation is required after surgery
Rat	Renal artery ablation*	Hypertension, renal failure, and drug metabolism with compromised renal function	The anterior and medium branches of the right kidney's renal artery are ligated. Then the left kidney is removed, but the adrenal gland is left intact

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** Available at Charles River France only

Soft Tissue Procedures, *continued*

Species	Procedure	Common Applications	Description/Comments
Rat	Renal artery banding	Hypertension model	Stenosis is created by a ligation in the renal arteries
Rat, Mouse	Splenectomy	Studies of immunology and hematopoietic diseases	The spleen is removed
Rat, Mouse	Thymectomy	Immunology studies and transplant research	Both lobes of the thymus gland are removed
Rat	Thyroidectomy	Thyroid function studies	Thyroid gland is removed. The parathyroid glands are left intact. 4mg/ml calcium lactate water supplementation is required after surgery.
Rat, Mouse	Thyroid-parathyroidectomy	Calcium metabolism and thyroid function studies	Both thyroid and parathyroid glands are removed. 4mg/ml calcium lactate water supplementation is required after surgery
Rat	Tubal ligation- bilateral	Studies of ovarian function	Both uterine horns are ligated just below the fallopian tubes
Rat	Tubal ligation- unilateral	Studies of ovarian function	One uterine horn is ligated just below the fallopian tube
Rat	Vagotomy- bilateral subdiaphragmatic	Differentiate peripheral and centrally mediated effects on autonomic nervous system of drugs or other therapies	Small sections of the vagus nerve from both trunks below the diaphragm are removed
Rat, Mouse	Vasectomy	Bred to produce pseudopregnant females	A section of each vas deferens (canals) is removed

Cardiovascular Procedures

Rat	Myocardial infarction*	Study of heart disease	The left anterior descending coronary artery is permanently ligated
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Neurological Procedures

Rat, Mouse	Third ventricular cannulation	Routine infusion to ventricular system	A cannula is implanted in the third ventricle using standard coordinates
Rat	Bilateral brain cannulation	Routine dosing into 2 areas of the brain simultaneously	Coordinates for insertion of brain cannula need to be specified by customer at time of order
Rat	Brain infusion	Lesioning of discrete brain areas	Unilateral or bilateral lesioning to meet customer request
Rat	Intracisternal cannulation	Cerebrospinal fluid (CSF) sampling	A cannula is implanted in the cisterna magna, between the caudal part of the cerebellum and the medulla oblongata
Rat, Mouse	Intralateral ventricular cannulation	Routine infusion of dosing compounds into the brain	A cannula is implanted in the lateral ventricle of the brain using standard coordinates

* Available at Charles River France only

Neurological Procedures, *continued*

Species	Procedure	Common Applications	Description/Comments
Rat	Intrathecal catheterisation	Direct infusion into subdural space of the spine	A catheter is inserted into the subarachnoid space of the spine at the L4-L5 region. The catheter is exteriorized from the scapular region. For infusion only
Rat	Microdialysis guide implantation*	Brain microdialysis	A microdialysis guide cannula is placed in a customer-specified target area of the brain
Rat	Osteoarthritis model induced with MIA	Studies involving therapeutics used to treat inflammation and osteoarthritis.	Monosodium iodoacetate is injected into the femoral-tibial joint inducing osteoarthritis
Rat	Parkinson's model	Parkinson's drug screening	6-hydroxydopamine solution is injected into the substantia nigra of the brain. An apomorphine challenge is done 7 days after surgery to verify success. Only animals that pass this challenge test are shipped
Rat, Mouse	Unilateral brain cannulation	Routine infusion to a target brain area	A cannula is implanted in the customer-specified target area on one side of the brain

Device Implant Procedures: Telemetry Devices

Compared to standard protocols for the measurement of physiological parameters, telemetry devices enable recordings to be made economically and reliably.

- Stress-related artefacts are significantly reduced.
- The effects of anaesthetics do not interfere with measurements.
- Recordings can be made continuously without restraint.

A variety of implants are available, and the following recordings may be made: blood pressure, temperature, electrocardiogram, electromyogram and electroencephalogram.

Rat, Mouse	Blood pressure telemetry	Blood pressure monitoring	For abdominal aorta approach, minimum 7-day postoperative holding time to ensure catheter adequately secured in place through healing process. Customer supplies telemetry device in manufacturer packaging
Rat, Mouse	Blood pressure / electrocardiograph telemetry	Blood pressure, heart rate and ECG monitoring	For abdominal aorta approach, minimum 7-day postoperative holding time to ensure catheter adequately secured in place through healing process. Customer supplies telemetry device in manufacturer packaging
Rat, Mouse, Guinea Pig	Electroencephalograph + electromyograph	Used for recording brain wave activity, as well as recording electrical activity associated with skeletal muscle function	Customer supplies the telemetry device in manufacturer packaging

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Device Implant Procedures: Telemetry Devices, *continued*

Species	Procedure	Common Applications	Description/Comments
Rat, Mouse	Electroencephalograph telemetry	Recording brain wave activity in neurological studies	Customer supplies telemetry device in manufacturer packaging
Rat, Mouse	Electromyograph telemetry	Used for monitoring animal activity or studying neuromuscular disorders by recording electrical activity associated with skeletal muscle functioning	Customer supplies telemetry device in manufacturer packaging
Rat, Mouse	Telemetry implant- activity + temperature monitoring	Activity/temperature monitoring	Customer supplies telemetry device in manufacturer packaging. The device is placed in abdominal cavity
Rat, Mouse	Electrocardiograph telemetry	Recording changes in electrical potential that occur as the heart beats	Customer supplies telemetry device in manufacturer packaging
Rat, Mouse	Electrocardiograph + electroencephalograph telemetry	Used in cardiovascular studies for recording changes in electrical potential that occur as the heart beats and for recording brain wave activity in neurological studies	Customer supplies telemetry device in manufacturer packaging
Rat	Electroencephalograph + Electromyograph	Used for recording brain wave activity using 2 sets of biopotentials, as well as recording electrical activity associated with skeletal muscle function.	Customer supplies the telemetry device in manufacturer packaging
Rat, Mouse	Electrocardiograph + electromyograph telemetry	Used in cardiovascular studies for recording changes in electrical potential that occur as the heart beats and for monitoring animal activity or studying neuromuscular disorders by recording electrical activity associated with skeletal muscle functioning	Customer supplies telemetry device in manufacturer packaging
Rat, Mice	Temperature + activity	Measures temperature and activity	Customer supplies the telemetry device in manufacturer packaging

Disease Models

Species	Procedure	Common Applications	Description/Comments
Rat*	Arthritis (Freund's Adjuvant)	Studies involving therapeutics used to treat inflammation and osteoarthritis.	Mycobacterium butyricum is injected into the foodpad inducing osteoarthritis.
Rat*	Diabetes model	Studies involving therapeutics used to treat diabetes.	Streptozotocine is injected into the saphenous vein at J0 on young rats.

* Available at Charles River France only

Device Implant Procedures: Delivery Pumps

ALZET® osmotic pumps are implantable miniature pumps which infuse your agents at a constant flow rate in mice, rats and other species.

Twelve ALZET® pump models are available with a range of flow rates from 0.11µl/hour to 10µl/hour offering drug infusion durations from 1 day to 6 weeks.

ALZET® pumps make it possible to optimise agent administration by doing away with repeated bolus dosing, which is time-consuming and contributes to animal stress.

Species	Procedure	Common Applications	Description/Comments
Rat, Mouse	Subcutaneous or intraperitoneal	Subcutaneous and intraperitoneal implantation with the ability to target organs and tumours	Osmotic pump implanted
Rat, Mouse	Vascular pump implant-osmotic	Osmotic infusion dosing studies	Osmotic pump implanted. Relevant vascular catheterisation procedure must be specified
Rat, Mouse	Intralateral or third ventricular cannulation for osmotic pump attachment	Continuous infusion into the brain	A cannula is implanted in the lateral ventricle of the brain. Tubing, connected to the cannula, is subcutaneously tunneled toward the scapular region to connect to an osmotic pump for continuous delivery of compound to the brain

Surgical Support

Rat, Mouse Guinea Pig	Rent-A-Surgeon	On-site surgical support for procedures	Full-day service only. Requires prior Ethical Reviews Committee approval of procedures to be performed
Rat, Mouse, Guinea Pig	Rent-A-Trainer	On-site surgical training for procedures	Full-day service only. Requires prior Ethical Reviews Committee approval of procedures to be performed
Rat, Mouse, Guinea Pig, Large Animals	Consultancy	Variable	Our surgical staff will work with clients to develop and validate a customized surgical model

Surgical Services

Surgical Procedure	By Therapeutic Area							By Type			
	Metabolism, Endocrino. Hepatic.	CNS	Inflammation Immunology	Cardio.	Renal Disease	Blood Pressure	Bone	Tox. or PK Studies	Sleep Studies	Blood Sampling/ Dosing	Continuous Dosing
Abdominal Aortic Banding	•			•	•	•					
Adrenalectomy	•										
Adrenal Demedullation*	•										
Alzet® Osmotic Pumps Implantation	•	•	•	•	•	•	•	•			•
Bile Duct Ligation	•										
Brain Cannulation		•									
Brain Lesioning		•									
Castration	•										
Hypophysectomy	•										
Hysterectomy	•						•				
Intracisternal Cannulation		•									•
Intrathecal Catheterisation		•									•
Left Coronary Artery Ligation (Myocardial Infarction)			•	•	•	•					
MIA-Induced Osteoarthritis			•				•				
Nephrectomy 5/6					•						
Nephrectomy					•						
Non-Vascular Catheterisations	•							•			•
Ovariectomy	•						•				
Parathyroidectomy	•						•				
Parkinson's Model		•									
Partial Hepatectomy	•				•						
Splenectomy	•		•								
Telemetry Device Implantation	•	•	•	•	•	•		•	•		
Thymectomy	•		•								
Thyroidectomy with Parathyroid Implant	•						•				
Thyroidparathyroidectomy	•						•				
Tubal Ligation - Bilateral	•										
Tubal Ligation - Unilateral	•										
Unilateral Ureter Ligation	•				•						
Vagotomy - Bilateral Supradiaphragmatic	•										
Vascular Catheterisations	•		•					•		•	•
Vasectomy	•										
RENT-A-SURGEON	•	•	•	•	•	•	•	•	•	•	•
RENT-A-TRAINER	•	•	•	•	•	•	•	•	•	•	•
CONSULTANCY	•	•	•	•	•	•	•	•	•	•	•

*Available at Charles River UK only

BASIC RESEARCH

DISCOVERY

SAFETY ASSESSMENT

CLINICAL SUPPORT

MANUFACTURING SUPPORT