charles river

RESEARCH MODELS

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SCANBUR

Improving Life Sciences

More than a Mouse

Research Models and Services

What began as a thousand cages in a warehouse in Boston is now a global network of comprehensive research facilities that are strategically positioned to support your research in all major therapeutic areas. Through vital husbandry and study support, as well as supplementary staffing, consulting, training and equipment, Charles River help you fill the gaps so you can focus on your research. Their portfolio includes:

- **Research Animal Models**
- **Biospecimens**
- **Animal Health Monitoring**
- **Surgical Services**
- **Animal Colony Management**
- **Embryology Pending Services**
- **Preconditioned Models**
- **Genetic Testing Services**

Further downstream, they can help you maintain momentum on the way to market by shepherding your drug through discovery, safety assessment, clinical development and manufacturing. Also visit **www.criver.com** to explore how Charles River can help streamline your operations throughout the course of research.

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Rat models												
18 Health Profiles												
19 Outbred Rats												
CD® IGS	Crl:CD(SD)	•	•	•	•	•	•	•	•	•		19
Lister Hooded	Crl:LIS		•			•			•			19
Long Evans	Crl:LE	•			•		•	•	•			20
OFA	Crl:OFA(SD)			•					•			20
Wistar Han IGS	Crl:WI(Han)	•	•	•		•			•			21
Wistar WI IGS	Crl:WI	•	•		•	•	•	•	•			21
Wistar WU	Crl:WI(WU)		•						•			22
Sprague Dawley®	Crl:SD	•							•			*
23 Inbred Rats												
Brown Norway	BN/Crl	•	•					•	•			23
Fischer 344	F344/IcoCrl				•				•			23
Fischer 344	F344/DuCrl	•	•					•	•			23
Lewis	LEW/Crl	•	•			•			•			24
WAG	WAG/RijCrl				•				•			24
BDIX	BDIX/CrCrl	•										C
Copenhagen	COP/CrCrl	•										C
25 Metabolic, Renal and Cardiovascular Models												
SHR	SHR/NCrl	•	•						•			25
Wistar Kyoto WKY	WKY/NCrl	•	•						•			25
ZDF	ZDF-*Lepr^{fa}*/Crl	•		•					•			26
Zucker	Crl:ZUC(Orl)-*Lepr^{fa}*				•			•	•			26
Zucker	Crl:ZUC-*Lepr^{fa}*	•							•			27
SHHF	SHHF/MccGmiCrl-*Lepr^{cp}*/Crl	•							•			27
Stroke Prone	SHRSP/A3NCrl	•							•			27
ZSF1	ZSF1-*Lepr^{fa}Lepr^{cp}*/Crl	•							•			27
PCK	PCK/CrljCrl-*Prkhd1^{pck}*/Crl	•							•			C
Dahl/Salt Sensitive Rat	SS/JrHsdMcwiCrl	•							•			C
SS-13BN Rat	SS-Chr 13BN/McwiCrl	•							•			C
Obese Prone CD® Rat	Crl:OP(CD)	•							•			C
Obese Resistant CD® Rat	Crl:OR(CD)	•							•			C
SHROB	SHROB/KolGmiCrl-Leprcp/Crl	•							•			C
28 Oncology Models												
Wistar Furth	WF/CrCrl	•										C
Noble	NBL/CrCrl	•										C

** not listed in the catalogue, C = Cryopreserved*

Sprague Dawley® is a registered trademark of EnvigoHolding, I, INC.

Mouse models

30 Health Profiles

31 Outbred Mice

Model	Nomenclature	United States	Germany	France	Italy	UK	Canada	Japan	SPF (VAF/Plus®)	SOPF	JAX Strain	Page
CD-1® IGS	Crl:CD1(ICR)	•	•	•	•	•	•	•	•	•		31
NMRI	Crl:NMRI(Han)		•	•					•	•		31
OF1	Crl:OF1			•					•			32
SKH1	Crl:SKH1-*Hr*^{hr}	•	•						•	•		32
SKH3	Crl:SKH3(SKH2)-*Hr*^{hr}	•										C
Black Swiss	Crl:NIHBL(S)	•										*
CF-1™	Crl:CF1	•										*
CFW® - Swiss Webster	Crl:CFW(SW)	•										*

33 Inbred Mice

Model	Nomenclature	United States	Germany	France	Italy	UK	Canada	Japan	SPF (VAF/Plus®)	SOPF	JAX Strain	Page
129	129S2/SvPasCrl	•	•	•					•	•		33
BALB/cByJ	BALB/cByJ			•					•	•	•	33
BALB/cN	BALB/cAnNCrl	•	•		•	•	•		•			34
C3H/J	C3H/HeOuJ		•						•		•	34
C3H/N	C3H/HeNCrl	•			•	•			•	•		35
C57BL/6J	C57BL/6J		•	•		•		•	•	•	•	35
C57BL/6N	C57BL/6NCrl	•	•	•	•		•	•	•	•		36
CBA	CBA/CaCrl					•			•			37
CBA/J	CBA/J			•				•	•		•	37
DBA/2J	DBA/2J			•					•		•	38
DBA/2N	DBA/2NCrl	•	•		•			•	•			38
FVB	FVB/NCrl	•	•			•			•			39
B6 Albino	C57BL/6N-*Tyr*$^{c\text{-}Brd}$/BrdCrCrl	•			•			•	•			39
SJL Elite	SJL/JOrlIcoCrl	•								•		*
Fox Chase CB17	C.Bka-*Igh*^{b}/IcrCrl	•								•		*
NC	NC/NgaTndCrlj							•				*

40 Hybrid Mice

Model	Nomenclature	United States	Germany	France	Italy	UK	Canada	Japan	SPF (VAF/Plus®)	SOPF	JAX Strain	Page
B6CBAF1/Crl	B6CBAF1/Crl					•			•			40
B6CBAF1/J	B6CBAF1/J			•					•		•	40
B6C3F1/Crl	B6C3F1/Crl	•			•				•			41
B6D2F1/Crl	B6D2F1/Crl	•	•					•	•			41
B6D2F1/J	B6D2F1/J			•					•		•	41
CD2F1	CD2F1/Crl	•			•				•			42
NRMCF1	NMRCF1/Crl			•					•			42
CB6F1	CB6F1/Crl	•	•						•			42

** not listed in the catalogue, C = Cryopreserved*

Fox Chase CB17® is a registered trademark of the Fox Chase Cancer Center

Model	Nomenclature	United States	Germany	France	Italy	UK	Canada	Japan	SPF (VAF/Plus®)	SOPF	JAX Strain	Page
43 Metabolic, Renal, and Cardiovascular Models												
ob/ob	B6.Cg-*Lep*^{ob}/J				•			•	•		•	43
db/db	BKS.Cg-*Dock7*^{m} +/+ *Lepr*^{db}/J				•			•	•		•	43
ApoE	B6.129P2-*Apoe*^{tm1Unc}/J				•			•	•		•	44
NOD	NOD/ShiLtJ				•				•		•	44
45 Inflammation and Immunology Models												
Ly5.1	B6.SJL-*Ptprc*^{a}*Pepc*^{b}/BoyCrl	•			•				•			45
OT I	C57BL/6-Tg(TcraTcrb)1100Mjb/Crl			•						•		45
OT II	C57BL/6-Tg(TcraTcrb)425Cbn/Crl			•						•		45
46 Oncology Models												
Please see list of immunodeficient models below												
46 Central Nervous System Models												
PGP	Crl:CF1-*Abcb*1a^{mds}	•										C
Immunodeficient Models												
Athymic Nude	Crl:NU(NCr)-*Foxn1*^{nu}	•	•			•				•		50
CD-1® Nude	Crl:CD1-*Foxn1*^{nu}	•	•		•	•		•		•		50
Swiss Nude	Crl:NU(Ico)-*Foxn1*^{nu}			•						•		50
NMRI Nude	Crl:NMRI-*Foxn1*^{nu}		•							•		51
BALB/c Nude J	CBy.Cg-*Foxn1*^{nu}/J			•						•	•	51
BALB/c Nude N	CAnN.Cg-*Foxn1*^{nu}/Crl	•	•			•		•		•		51
SCID	CB17/Icr-*Prkdc*^{scid}/IcrIcoCrl	•	•	•		•		•		•		52
SCID Beige	CB17.Cg-*Prkdc*^{scid}*Lyst*$^{bg-J}$/Crl	•	•			•		•		•		52
NOD SCID N	NOD.CB17-*Prkdc*^{scid}/NCrCrl	•				•				•		52
NOD SCID J	NOD.CB17-*Prkdc*^{scid}/J			•				•		•	•	53
NSG®	NOD.Cg-*Prkdc*^{scid} *Il2rg*^{tm1Wjl}/SzJ		•	•		•		•		•	•	53
NRG	NOD.Cg-*Rag1*^{tm1Mom} *Il2rg*^{tm1Wjl}/SzJ					•				•	•	54
Nude Rat	Crl:NIH-*Foxn1*^{rnu}	•	•							•		54
NIH-III	Crl:NIH-*Lyst*$^{bg-J}$-*Foxn1*^{nu}*Btk*^{xid}	•								•		55
Nude Mouse	Crl:NU-*Foxn1*^{nu}	•								•		55
SHC	CB17.Cg-*Prkdc*^{scid}*Hr*^{hr}/IcrCrl	•								•		55
SHO®	Crl:SHO-*Prkdc*^{scid}*Hr*^{hr}	•						•		•		55
Rabbits, Guinea Pigs, Gerbils, Hamsters												
58 Rabbits												
New Zealand White	Crl:KBL(NZW)	•		•					•			58
Chinchilla Bastard	Crl:Crlg(CHB)			•					•			58
59 Guinea Pigs												
Dunkin Hartley	Crl:HA	•		•			•		•			59
Hairless	Crl:HA-*Hr*^{hr}	•							•			59
59 Gerbils												
Gerbils	Crl:MON(Tum)	•			•				•			59
59 Hamsters												
Syrian Hamster	Crl:LVG(SYR)	•							•			59

C = Cryopreserved

Preconditioning Services, Surgery and Contract Services

360 Diagnostics™

Genetically Engineered Models and Services

Resources

Ordering Information

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Tel: +47 6706 2920
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Sweden
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Tel.: +46 8 594 767 80
E-Mail: orders-se@scanbur.com

Finland
SCANBUR
Tel: +358 40 583 2999
E-Mail: orders-fin@scanbur.com

www.scanbur.com

Additional Charges - Specific orders

Our research models are sold within specific weight ranges or at a certain age as given in the catalogue. For specific orders outside the standard weight range or age, additional charges may apply.

Cancellation Policy

Due to both ethical and commercial reasons, Charles River reserves the right to charge for late cancellations or changes to confirmed orders and/or delivery arrangements as follows:

Rodents:

- Standard outbred/inbred strains and standard age/weight ranges (catalogue strains < 8 weeks old):
  - Up to 7 days before shipping date: no charge,
  - 7 days before shipping date: 100% charge.
- Standing orders: 6 weeks notice for cancellation/modification.
- Specific strains and special age/weight ranges and large quantities (dependent on colony size): no cancellation allowed, “Take or pay”.
- Mated/pregnant females (standard strains OFA, CD®, WISTAR, OF1, and CD-1®): no cancellation fee if the order is cancelled before mating. After mating, we will invoice at the list price.

Guinea-pigs:

Cancellation accepted before the guinea-pigs are weaned (2 weeks).

Rabbits:

- Time-mated females:
  - 4 weeks before mating date, we will invoice the price of a 14-week-old animal.
  - 2 weeks before mating date, we will invoice the price of a 16-week-old animal.
  - 1 week before mating date, we will invoice the price of a 18-week-old animal.
  - 1 day before mating date, we will invoice the price of a time-mated female.
- Other rabbits:

Cancellations accepted before rabbits are 10 weeks old, otherwise “take or pay”.

Surgically Altered Models and Biospecimens:

No cancellation allowed “take or pay”.

Research Models

Charles River understands that the quality of their research models has a direct impact on what truly matters to you - your research. With their core programmes - biosecurity, international standardisation, animal welfare and model quality - you can focus on your work while being assured that you are receiving the highest quality and most reliable models for your research. From standard and disease-specific models to surgically altered animals, you can trust Charles River to be an integral part of your research programmes - now and in the future.

Animal Transport

Transportation by Accredited Trucks

Our animal deliveries are made in fully climate-controlled vans and trucks. Some export deliveries are transported by air freight. Transportation costs for animal orders are calculated according to the distance from our sites. Our customer service department can provide you with information regarding the transportation routes and corresponding costs.

Weight Changes During Transport

Orders of animals with a weight specification will be referred to as the **packing weight,** as Charles River will have no control over potential weight changes during transport. We ask that you take this into account when planning your experiments and orders. Based on experience, we have noted that the way transport affects animal weight depends on the strain, sex, age and developmental status of the animals.

However, it is commonly found that rodents should return to their normal weight after an acclimatisation period of 24 to 48 hours after arriving at your facility. This may take a longer period of time for rabbits. This information is presented as guidance only, as weight recovery can also be influenced by the social position of the individual animals within their new hierarchies.

Shipping of Male Mice

Group-housed male mice may show aggressive behaviour, which might negatively impact the well-being of the animals and cause variations in experimental results.

At Charles River, adult male mice are housed in stable groups to minimize the risk of aggressive behaviour. When preparing the animals for shipping, every effort is made not to mix these groups.

Nevertheless mice can show aggressive behaviour after arrival at your facility due to differences in husbandry, new hierarchic structures that need to be established and hierarchy or influences caused by the experiment.

The housing of adult male mice that arrive at your facility from different crates should be avoided.

Strain Characteristics

The various strains bred by Charles River have unique and intrinsic zootechnical and behavioural characteristics that have to be taken into account when ordering the models. For all questions related to strain characteristics, please contact our customer scientific and technical support.

SPF, SOPF, VAF/ Plus® and VAF/Elite® Health Status

Charles River is committed to providing you with high-quality genetically standardized models such as SPF (Specific Pathogen Free) and SOPF (Specific and Opportunistic Pathogen Free) animals which are free of select infectious agents and parasites. The terms SPF and SOPF are more commonly used in continental Europe while, VAF Plus and VAF Elite are more recognisable in the UK and North America.

SPF = VAF Plus and SOPF = VAF Elite; they are based on the same monitoring programmes in terms of agents screened, number and age of animals screened, frequency of testing, and recycling policies.

For further information regarding profiles, microbiological flora or the list of agents included in Charles River Health Surveillance Programme, please visit our website at www.criver.com/info/rm

Time-mated Females

Successful time mating of rodents is confirmed by the detection of positive signs of mating (e.g. the presence of a copulation plug). However, confirmation of mating is not a guarantee of pregnancy. We discourage pregnant animal shipments within the first 4-5 days of gestation, when the embryo implantation generally occurs. Shipping during that period may increase the risk of embryo loss and pregnancy termination.

The day of putting male and female animals in a mating cage is denominated as day “0”.

Stock or strain	Pregnancy Guarantee (Percentage)		
	Time mated and shipped before GD 14	Time-mated and palpated. Shipped at GD 14 and over	Untimed pregnant. Selected by visual observation and palpation. GD 14-17
Outbred rats	90 %	100 %	100 %
Outbred mice	75 %	100 %	100 %
Inbred rats, Inbred mice, specialty mice	Plug guarantee only	75 %	75 %

Please note that we do not guarantee a certain number of embryos or fetuses out of a pregnancy. Since the individual gestation period is subject to biological variation, the exact birth date cannot be guaranteed as such.

Time-mating and subsequent plug-controls are set up according to best practice and experience.

Time-mating of animals (mating or plug-control) falling into a weekend or public holiday will incur additional premium charges on top of our communicated “time-mating” animal price.

On untimed pregnant orders a variation of 3 to 4 days gestation can be expected. Therefore Charles River cannot be held responsible for actual gestation and/or exact day of littering.

Charles River’s protocol is in strict conformance with the Council Regulation (EC) 1/2005 on the protection of animals during transport and related operations.

Age/Weight Correlation Information

Age/weight correlation information is presented throughout this product catalog for each sex of most stocks and strains. The information is specific to the conditions maintained in Charles River barrier production rooms. Weight information related to the JAX™ Mice strains are specific to the conditions maintained in Charles River's barrier production rooms as well. The shaded areas on each chart are the mean weight plus or minus one standard deviation at a given age averaged across all production facilities. This represents approximately 67% of the population, with the remaining 33% falling outside of this weight range. Overlaps in the full range of weights occur between age groups and will be more pronounced in outbred animals.

Weaning

The age of the animals is determined in weeks after weaning. Each strain has its own weaning procedure indicating when this step should take place. By convention, the age of weaning is reported as 3 weeks (corresponding to the designation "21-27 days" on SAP documents). An age of 3 weeks means that the mouse is in its weaning week and does not prejudge its exact age.

Thus, all mice weaned in week N are classified in the age group of 3 weeks (21-27 days) regardless of their actual age. They will then move into the 4 weeks age group (28-34 days) on the Monday of the week N + 1, then in the age group of 5 weeks (35-41 days) on Monday of the week N + 2, and so on.

Aged Animals

Aged animals are available upon reservation from 3 months up to 15 months for specific strains. The animals can be ordered by age ranges of 1 month. Specific strains are available across our European subsidiaries. Contact your local office for more information on pricing and reservations (see page 9).

Humane Care Initiative

Charles River is committed to the humane care of the research animals produced and used in all of its activities. Our Humane Care Initiative supports this core value and is directed by our Animal Welfare and Training group. All Charles River's employees are engaged to this humane care policy: continued education, signature of an ethical commitment, internal audits, and ethical information feedbacks.

Quality Management

ISO 9001 V 2008

Charles River, Research Models and Services Germany (Sulzfeld), Italy (Calco) and UK (Margate) are certified ISO 9001. These certifications apply to all products and services for all the facilities.

SISTEMA DI GESTIONE CERTIFICATO
ITALCERT
UNI EN ISO 9001

SGS

AAALAC

Charles River is proud of the fact that all of our research model breeding and services facilities in Europe (UK, France, Germany and Italy) have received accreditation of their animal care and use programmes from the Association for the Assessment and Accreditation of Laboratory Animal Care (AAALAC) International. Only a handful of commercial breeders in Europe have received this prestigious accreditation.

AAALAC is an internationally recognised, nonprofit organisation that promotes the humane treatment of animals in science through voluntary accreditation and assessment programmes. AAALAC International accreditation is issued to organisations that demonstrate commitment to responsible animal care and use.

Participation in the accreditation process is voluntary and includes a site visit and programme evaluation conducted by the best animal care and use professionals and researchers from around the globe. The AAALAC Council on Accreditation then determines which institutions are to be accredited.

PROUDLY, AN aaalac INTERNATIONAL ACCREDITED PROGRAM

JAX™ Mice and Research Services Provided Through Charles River

The Jackson Laboratory and Charles River, Inc. have a cooperative agreement to provide local supplies of JAX™ Mice to biomedical researchers in Europe, Japan, Korea and Taiwan.

Through this agreement, Charles River serves as the exclusive, authorised, commercial distributor and breeder of JAX™ Mice strains in the countries listed below.

- Albania
- Austria
- Belgium
- Bosnia-Herzegovina
- Bulgaria
- Croatia
- Czech Republic
- Denmark
- Finland
- France
- Germany
- Greece
- Hungary
- Ireland
- Italy
- Japan
- Korea
- Luxembourg
- Macedonia
- Montenegro
- Netherlands
- Norway
- Poland
- Portugal
- Serbia
- Slovenia
- Spain
- Sweden
- Switzerland
- Taiwan
- United Kingdom

SCANBUR is JAX™ subdistributor in Denmark, Sweden, Norway and Finland.

JAX™ Mice are The Gold Standard for Biomedical Research

Used by researchers around the world, JAX™ Mice are the most frequently cited strains in biomedical research publications and are supported by world-renowned scientific and technical staff. JAX™ Mice are produced according to the highest standards of animal health and genetic quality. Charles River provides researchers in Europe and Asia with expedited access to over 11,000 JAX™ Mice strains and hundreds of new mouse models each year. JAX™ Mice strains include commonly used inbred strains as well as thousands of specialised disease models and genetically engineered strains.

JAX™ Mice are The Most Published, Best Characterised Mouse Models

JAX™ Mice have been referenced in more than 30,000 peer reviewed publications. Over 16,000 PubMed references cite use of the authentic JAX™ Mice B6 strain (C57BL/6J, stock number 000664). The JAX™ Mice B6 strain, along with many other JAX™ Mice inbred strains have been fully sequenced as part of the Mouse Genome Project (see: www.sanger.ac.uk/science/data/mouse-genomes-project). The genome sequence data of JAX™ Mice strains will remain relevant over time due to the rigorous genetic quality programs (including the JAX™ patented Genetic Stability Program) used to breed JAX™ Mice Strains. Additional genetic and phenotypic information about JAX™ Mice is publicly available in data resources hosted by The Jackson Laboratory, including Mouse Genome Informatics (informatics.jax.org) and The Mouse Phenome Database (phenome.jax.org).

Only JAX™ Mice Strains bred by Charles River in Europe and Japan are equivalent in genetic quality to those bred by The Jackson Laboratory

Charles River in Europe and Japan breed JAX™ Mice in strict adherence to The Jackson Laboratory's breeding protocols and genetic quality control guidelines. These protocols provide the following benefits:

- Minimise naturally occurring genetic drift by systematically re-infusing breeding colonies with pedigreed mice from The Jackson Laboratory.
- Assure genetic quality through routine use of state-of-the-art genetic quality monitoring methods such as SNP analysis.

Under these conditions, JAX™ Mice strains bred by Charles River are:

- Equivalent in genetic quality to those bred by The Jackson Laboratory.
- Provide the genetic integrity and stable phenotypes needed to support research excellence.

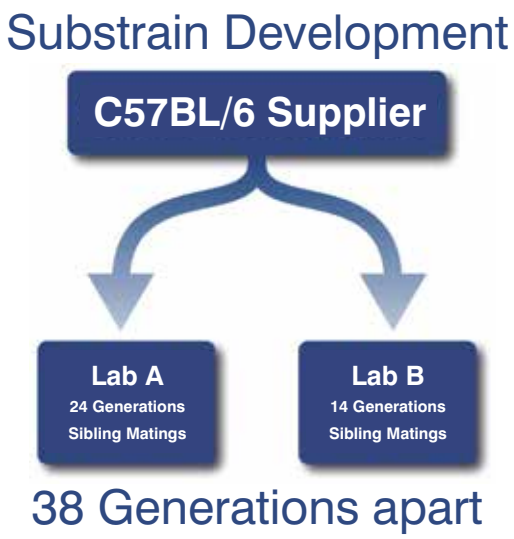
"J" Substrains Differ from Authentic JAX™ Mice Strains Due to Genetic Drift

Over the years, organisations around the world have been maintaining colonies of mouse substrains with JAX™ Mice ancestry ("J" substrains). These "J" substrains differ from JAX™ Mice strains due to the genetic mutations which spontaneously occur and accumulate in mouse breeding colonies over time.

Due to naturally occurring genetic drift, a mouse strain will diverge into a genetically distinct substrain if its breeding colony is separated from the parental breeding colony for more than 20 generations of breeding (i.e., 10 generations in the parent colony plus the 10 that simultaneously pass in the sub-colony*). This divergence can occur within only a few years. Genetic differences between a parental strain and a substrain accumulate with time and at a rate dependent upon the level of quality control at the facilities housing and breeding the mice. These genetic differences often result in phenotype differences between a parental strain and a substrain. Such differences confound interpretation of experimental results especially when comparing results to published research using JAX™ Mice strains.

IMPORTANT NOTE: JAX™ Mice strains bred by Charles River are authentic JAX™ Mice and are NOT genetically drifted "J" substrains.

** For more information on mouse nomenclature and substrain divergence, see http://www.informatics.jax.org/mgihome/nomen/strains.shtml#substrains.*



Genetic Drift White Paper

For further information on genetic drift and how it can impact your studies, please feel free to download the white paper entitled, "Strategies to Minimize Genetic Drift and Maximize Experimental Reproducibility in Mouse Research."

Patented Genetic Stability Program

The JAX™ patented Genetic Stability Program (GSP) effectively prevents cumulative genetic drift, including that caused by copy number variation, in the most popular strains of JAX™ Mice.

The GSP program effectively limits cumulative genetic drift by refreshing The Jackson Laboratory's foundation stocks with cryopreserved pedigree embryos or gametes approximately every five generations. The program was initiated in 2003 (Taft et al. 2006) and is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721.

The Jackson Laboratory's unique, patented GSP has several components: 1) an extensive supply of cryopreserved stock for each strain; 2) isolated foundation colonies, maintained by inbreeding for only five generations before refreshing with cryo-recovered stock; 3) large, independent expansion and production colonies fed directly from pedigreed colonies for distribution through The Jackson Laboratory and through Charles River in Europe and Japan. Importantly, the generations between the cryopreserved stocks and mice produced for distribution are kept to a minimum to prevent the accumulation of mutations that result in genetic drift (http://www.jax.org/gsp).

** The Jackson Laboratory's innovative Genetic Stability Program is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721.*

Importance of Indicating Strain Lineage and History using Proper Strain Nomenclature

Proper mouse strain nomenclature, as established by the International Committee on Standardised Genetic Nomenclature for Mice, provides researchers with essential information about the lineage and history of inter-laboratory transfers of substrains over time.

Using proper strain nomenclature requires including in the strain name all Laboratory Codes (i.e., a unique 2-4 letter code assigned to each investigator or institution) as a means to identify all investigators or institutions which have maintained a strain or substrain.

For a complete list of Laboratory Codes, see:
http://dels.nas.edu/global/ilar/Lab-Codes

Research Services Using JAX™ Mice

Charles River breeding facilities located in Europe and Japan also serve as The Jackson Laboratory's exclusive commercial providers of certain research services using JAX™ Mice bred by Charles River. Services offered include:

- Biospecimen provision
- Cross-breeding
- Custom breeding
- Dedicated supply
- DIO (Diet Induced Obesity) studies
- Health monitoring
- Recovery of cryopreserved embryos
- Surgeries
- Genotyping

Importing JAX™ Mice strains

The Jackson Laboratory is home to over 11,000 JAX™ Mice strains with hundreds of new models added each year. Through The Jackson Laboratory agreement with Charles River, European researchers have access to mouse strains suitable for research applications covering every major therapeutic area.

Importation Process:

- Select a JAX™ Mice strain of interest. Please contact us should you require assistance in making a selection, or more information regarding your chosen strain.
- Request a JAX™ Mice order form from us.
- Upon receipt of the form, we will provide availability details and a price quotation.
- The final steps will be handled by our teams including: Order management, freight processing, documentation for customs purposes, customs and veterinary clearance, taxes and duties.

Our experienced customer service staff aim to make the process as smooth as possible. Please be aware that Charles River will not be responsible for any damages arising while mice are in the care of non-Charles River transport companies (e.g. airlines), and that delays can occur during adverse weather conditions for animal welfare reasons.

Contact Us for Support

Denmark & Southern Sweden (Lund/Malmö)

SCANBUR
Tel: +45 3360 0517
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E-Mail: orders-se@scanbur.com

Finland

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Tel: +358 40 583 2999
E-Mail: orders-fin@scanbur.com

www.scanbur.com

Contact us to discuss your requirements

Note: A Licence Agreement or Material Transfer Agreement (MTA) is required for the use of certain strains.

Educational Information on Mouse Genetics and Strain Nomenclature

Handbook on Genetically Standardized Mice.

See: http://jaxmice.jax.org/handbook-genetically-standardized-mice

JAX Mice Genetic Quality Control Programme.
See: http://www.jax.org/genetic-quality

JAX Mice Genetic Stability Programme.
See: http://www.jax.org/gsp

Educational Resources on Nomenclature for Mouse Strains.
See: https://www.jax.org/nomenclature-tutorial

Published Reference: Taft RA, Davisson M, Wiles MV. 2006 Know Thy Mouse. Trends Genet 22:649-53.

By importing JAX™ models through Charles River, the customer accepts both General Terms and Conditions of Sale of Charles River and The Jackson Laboratory.

Rat Models

Charles River is dedicated to providing you with consistent availability of the highest quality research models globally. Their comprehensive portfolio of outbred, inbred and disease/translational rat models enables you to select the appropriate animal model for your research.

Rat Models - Health Profiles

Charles River is committed to providing you with high-quality genetically standardised models such as SPF (Specific Pathogen Free) and SOPF (Specific and Opportunistic Pathogen Free)*.

The CD® IGS Rat is available from Charles River Europe with an SOPF health status.

	SPF – Immunocompetent rats	SOPF - Immunocompetent rats
Viruses		
Rat Parvovirus Type 1 (RPV)	•	•
Rat Parvovirus Type 2 (RMV)	•	•
Toolan H1 Virus	•	•
Kilham Rat Virus (KRV)	•	•
Rat coronavirus/sialodacryoadentitis RCV/SDAV	•	•
Rat Theiler Virus (RTV, GDVII)	•	•
Reovirus 3 (REO3)	•	•
Sendai virus (SEND)	•	•
Pneumonia Virus of mice (PVM)	•	•
Mouse Adenovirus (MAV)	•	•
Lymphocytic Choriomeningitis (LCMV)	•	•
Hantaan Virus	•	•
Bacterias		
Tyzzer's Disease (C.PIL)	•	•
Bordetella bronchiseptica	b	•
Corynebacterium kutscheri	•	•
Mycoplasma pulmonis	•	•
Pasteurella pneumotropica	b	•
Pasteurella multocida	•	•
Salmonella spp	•	•
Streptobacillus moniliformis	•	•
Streptococcus pneumoniae	b	•
Helicobacter hepaticus	•	•
Helicobacter bilis	b	•
Helicobacter spp	b	•
Cilia-Associated-Respiratory bacillus	•	•
Pneumocystis spp	•	•
Opportunistic organisms		
Beta Haemotytic Strepto A	c	•
Beta Haemotytic Strepto B	c	•
Beta Haemotytic Strepto C	c	•
Beta Haemotytic Strepto G	c	•
Staphylococcus aureus	c	•
Pseudomonas aeruginosa	c	•
Klebsiella pneumoniae	c	•
Klebsiella oxytoca	c	•
Proteus mirabilis	c	•
Parasites		
E. cuniculi	•	•
Ectoparasite	•	•
Helminth	•	•
Enteric Pathogenic Protozoa	•	•
Other protozoa	c	•

• = excluded agents - b = planned recycle - c = no action

* List of agents for North America may differ from table listed above

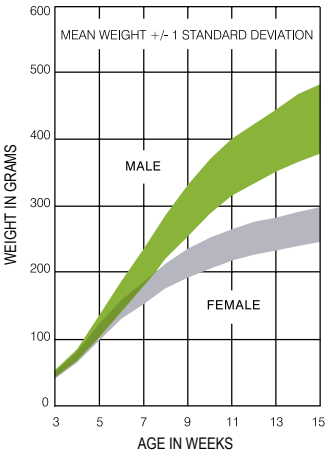
Outbred rats

CD® IGS *(International Genetic Standard)* Rat

Crl:CD(SD)

STRAIN CODE: 001

Weight in Grams
≤50
51-75
76-100
101-125
126-150
151-175
176-200
201-225
226-250
251-275
276-300
>300
Retired breeder
Pregnant / time mated females
Female with litter (males or females)



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: Originated in 1925 by Robert W. Dawley from a hybrid hooded male and a female Wistar rat. Introduced into Charles River in 1950 from Sprague Dawley®. Caesarean derived in 1955 from original Charles River SD colonies to form the nucleus of the currentt CD® stock. Production colonies are developed from the Foundation Colony and managed according to the Charles River International Genetic Standard breeding system. **Coat Colour:** White (Albino). **Research Application:** General multipurpose model, safety and efficacy testing, aging, nutrition, diet-induced obesity, oncology, surgical model.

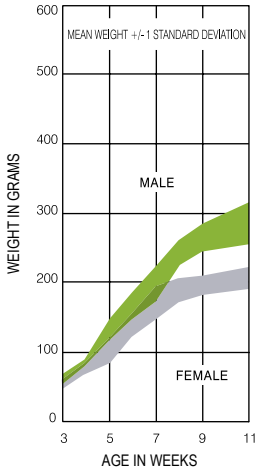
SOPF **Also available with SOPF health status (Srain code: 680).**

Lister Hooded

Crl:LIS

STRAIN CODE: 603

Weight in Grams
<50
50-75
76-100
101-125
126-150
151-175
176-200
201-225
226-250
251-275
276-300
>300
Retired breeder
Pregnant / time mated females
Female with litter (males and females)



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: These rats have taken their name from the Lister Institute, where the stock first originated. From Glaxo to Charles River UK in 1990 and again in 1996. To Charles River Germany in 2007. **Coat Colour:** White with black hood. **Research Application:** Noted for its docility and good breeding performance. Susceptible to audiogenic seizures.

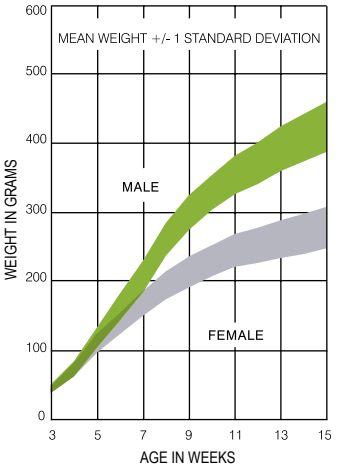
Long Evans Rat

Crl:LE

STRAIN CODE: 006

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)

Origin: Originated by Drs. Long and Evans in 1915 by cross of several Wistar Institute white females with a wild gray male. To Charles River from Canadian Breeding Farm and Laboratories in 1978. Caesarean rederived in 1978. **Coat Colour:** White with black hood; occasionally white with brown hood. **Research Application:** General multipurpose model, behavioral research, diet-induced obesity.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

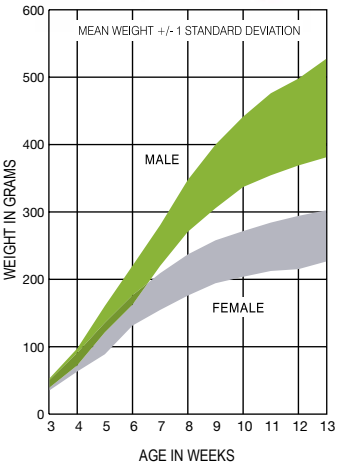
OFA Rat

Crl:OFA(SD)

STRAIN CODE: 623

Weight in Grams
≤50
51-75
76-100
101-125
126-150
151-175
176-200
201-225
226-250
251-275
276-300
> 300
Retired breeder
Pregnant / time mated females
Female with litter (males or females)

Origin: The original strain was composed in 1925 by Robert Worthington Dawley. Carworth Farms obtained it in 1955 and renamed it CFE (Carworth Farms Elias).Transferred to Charles River France in 1967, it then became known as OFA (Oncins France Strain A), in 1968. **Coat Colour:** White (Albino). **Research Application:** Pharmacology, toxicology, teratology, oncology, medicine control, physiology, experimental microbiology, experimental surgery, ethology.



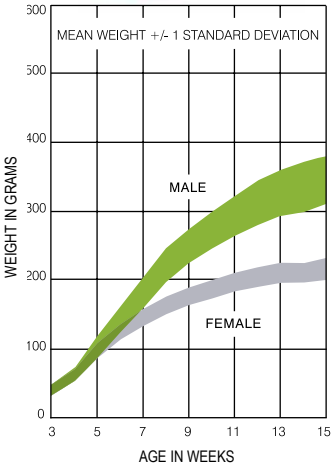
Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Wistar Han IGS *(International Genetic Standard)* Rat

Crl:WI(Han)

STRAIN CODE: 273

Weight in Grams
≤50
51-75
76-100
101-125
126-150
151-175
176-200
201-225
226-250
251-275
276-300
>300
Retired breeder
Pregnant / time mated females
Female with litter (males or females)



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

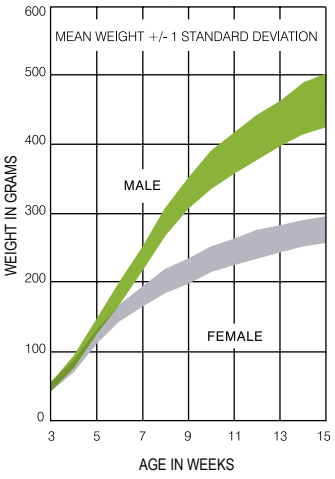
Origin: Rederived by Glaxo Wellcome from Han Wistar stock supplied by BRL. Transferred to Charles River in 1997. Production colonies are developed from the Foundation Colony and managed according to the Charles River International Genetic Standard breeding system. **Coat Colour:** White (Albino). **Research Application:** General multipurpose model, safety and efficacy testing, aging, oncology, surgical model.

Wistar IGS *(International Genetic Standard)* Rat

Crl:WI

STRAIN CODE: 003

Weight in Grams
≤50
51-75
76-100
101-125
126-150
151-175
176-200
201-225
226-250
251-275
276-300
>300
Retired breeder
Pregnant / time mated females
Female with litter (males and females)



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

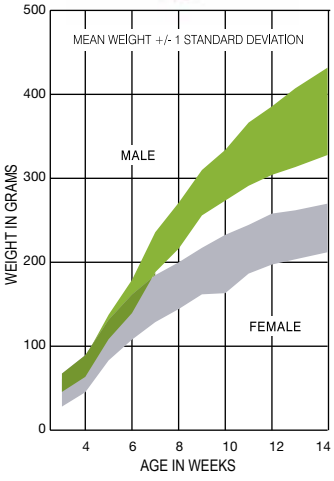
Origin: To Scientific Product Farms Ltd (previous owner of Charles River UK) in 1947 from Wistar Institute. To Charles River USA in 1975 from Charles River UK. Caesarian derived in 1975 to form the nucleus of the current Wistar rat colonies. Production colonies are developed from the Foundation Colony and managed according to the Charles River International Genetic Standard breeding system. **Coat Colour:** White (Albino). **Research Application:** General multipurpose model, infectious disease research, safety and efficacy testing, aging, surgical model.

Wistar Wu Rat

Crl:WI(WU)

STRAIN CODE: 619

Weight in Grams
51-75
76-100
101-125
126-150
151-175
176-200
201-225
226-250
251-275
276-300
>300
Retired breeder
Pregnant / time mated females
Female with litter (males and females)



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: Selection by H.H. Donalson at the Wistar-Institute, USA, at the begining of 20th century. To Glaxo in 1927, continued as inbred. To Nederlands-Institute voor Volksfoending in 1933, to Unilever, Vlaardingen in 1941 and Institut Centraale Proefdierenbedrijf TNO in 1958. Caesarean rederived in 1963. As an outbred to SAVO, Kißlegg in 1975. Caesarean rederived at Charles River in 1987. **Coat Colour:** White (Albino). **Research Application:** General multipurpose model, toxicology, safety and efficacy testing, aging.

Inbred rats

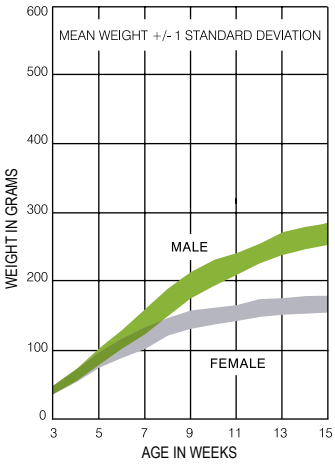
Brown Norway Rats

BN/Crl

STRAIN CODE: 091

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)

Origin: Silvers and Billingham began brother x sister matings with selection for haplotype in 1958 from a brown mutation in a stock of wild rats maintained by King and Aptekman in a pen-bred colony rats trapped from the wild in 1930 by King at the Wistar Institute. To Charles River from Radiobiology Institute, Netherlands in 1976. **Coat Colour:** Non-agouti brown. **Research Application:** Genetic mapping, respiratory inflammation, immunological dysfunction, aging, transplantation research.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Fischer 344 Rats

F344/IcoCrl

F344/DuCrl

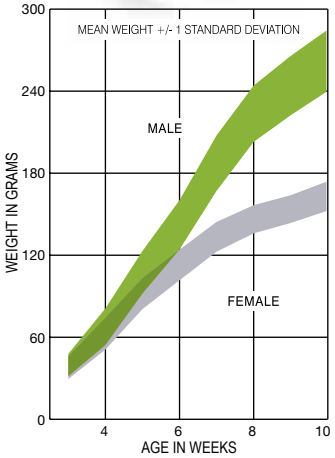
STRAIN CODE: 637

STRAIN CODE: 002

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)

Nomenclature: F344/IcoCrl **Origin:** From mating #344 of rats purchased from a local breeder (Fischer). The colony was originated by M. R. Curtis, Columbia University in 1920. To the Germ-Free Animal Laboratory at CNRS, Gif-sur-Yvette, France from the Lobund Institute, University of Notre-Dame, South Bend, Indiana, U.S.A. Subsequently introduced to Charles River France in 1970 as an axenic colony. **Coat Colour:** Albino. **Breeding Location:** Italy. **Research Application:** General multipurpose model, aging, safety and efficacy testing, surgical model, oncology, nutrition.

Nomenclature: F344/DuCrl **Origin:** From mating #344 of rats purchased from a local breeder (Fischer). Colony originated by M.R. Curtis, Columbia University Institute for Cancer Research, 1920. Dunning at Columbia continued to inbreed to form the strain starting in 1920. Dunning to Charles River in 1960 at F68. Caesarean rederived in 1960. To Charles River Germany in 1987. **Coat Colour:** Albino. **Breeding Location:** Germany, USA. **Research Application:** General multipurpose model, aging, safety and efficacy testing, surgical model, oncology, nutrition.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

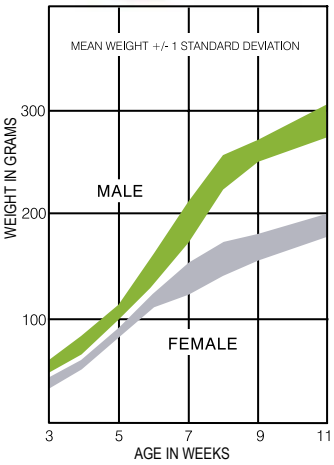
Lewis Rats

LEW/Crl

STRAIN CODE: 004

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)

Origin: Developed by Dr. Lewis from Wistar stock in the early 1950s. To Charles River from Tulane in 1970 at F34. Hysterectomy rederived in 1975. **Coat Colour:** White (Albino). **Research Application:** Transplantation research, induced arthritis/inflammation, experimental allergic encephalitis, STZ-induced diabetes.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

WAG Rats

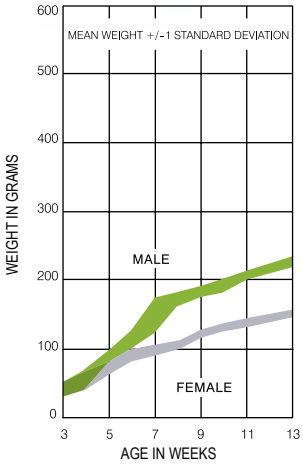
WAG/RijCrl

STRAIN CODE: 638

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)

Origin: A.L. Bacharach, Glaxo Labs., U.K., 1924, from a Wistar stock. To Harrington in 1964 at F83. To MBL-TNO in 1953, after that to REP Institutes TNO, Rijswijk. To Charles River Germany from REP Institutes TNO in 1993. **Coat Colour:** Albino. **Research Application:** General multipurpose model, epilepsy, behavior, immunology.

Breeding colonies for the WAG rat will fluctuate in size depending on current demand. Please contact your local customer service department for pricing and an estimated lead time for delivery.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Disease and Translational Rat Models

(Metabolic, Renal and Cardiovascular Models)

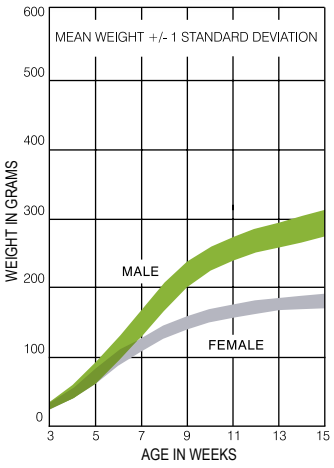
SHR Rats

SHR/NCrl

STRAIN CODE: 007

Age In Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)
70-76 (10 weeks)
Additional week

Origin: To NIH in 1966 from Okamoto at F 13. From an outbred Wistar Kyoto male with marked elevation of blood pressure. To Charles River from NIH in 1973 at F 32. Caesarean derived in 1973. **Coat Colour:** Albino. **Research Application:** Genetic hypertension, hypertensive drug research, ADHD model, safety and efficacy testing.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

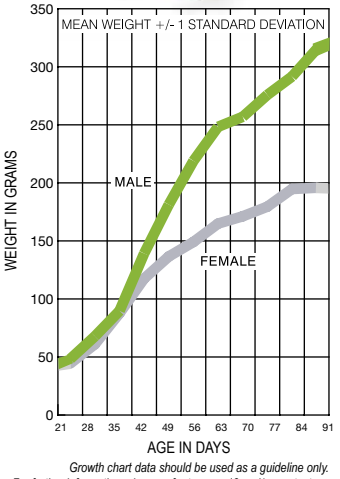
Wistar Kyoto Rats

WKY/NCrl

STRAIN CODE: 008

Age In Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week

Origin: Strain started by Okamoto from outbred Wistar stock at the Kyoto School of Medicine, in 1963. To NIH in 1971. This is the same stock from which the SHR was developed. To Charles River in 1974 at F11. **Coat Colour:** Albino. **Research Application:** Control for the SHR rat, ADHD model.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

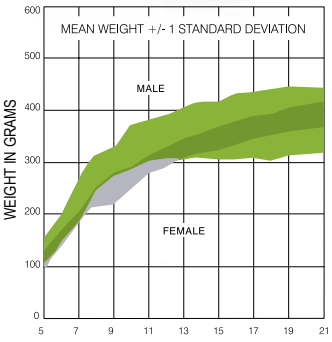
ZDF Rats

ZDF-*Lepr*^{fa}/Crl

STRAIN CODE: 370

Age in Days
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)
70-76 (10 weeks)
Additional week (up to 12 weeks)

Origin: The diabetic trait occured in a colony of outbred Zucker rats at Eli Lilly Research Laboratories, USA, during 1974-1975. Part of this colony was moved to Indiana Universitty Medical School (IUMS) in 1977. Animals with diabetic lineage were identified and rederived in 1981. The inbred line of ZDF rat was established in 1985. To Genetic Models Inc. (GMI) in 1991 and to Charles River in 2001. **Coat Colour:** White with black hood. **Diet:** Purina 5008. **Research Application:** Type 2 diabetes, hyperlipidemia, glucose intolerance, obesity, hyperinsulinemia.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

ZDF Control Information

STRAIN CODE: 380

Lean animals are available as possible controls. The zygosity is fa/+.

It is a condition of sale that customers (or their employees) purchasing or receiving ZDF rats are not permitted to breed or cross breed ZDF rats without the prior written approval of Charles River.

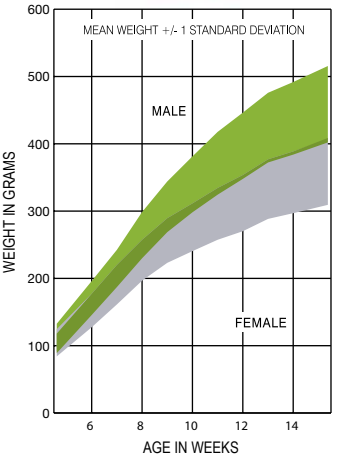
Zucker Rats

Crl:ZUC(Orl)-*Lepr*^{fa}

STRAIN CODE: 691

Age In Days
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)
70-76 (10 weeks)
Additional week (up to 12 weeks)

Origin: The spontaneous mutation “obese” (Fatty) was found in the 13 M rat stock of Sherman and Merck, by Doctor Lois Zucker, Harriet Bird Memorial Laboratory, Stow, Massachusetts 01775, USA, in 1961. The strain was introduced in Orléans at CSEAL, France in 1970; then transferred to Charles River Italy in 1991. **Coat Colour:** Agouti. **Research Application:** Insulin resistance, glucose intolerance, metabolic syndrome, genetic obesity.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Purina 5008 is a trademark of Nestle Purina Petcare Company

Other Metabolic, Renal and Cardiovascular Rat Models Available from Charles River*

• Spontaneously Hypertensive Heart Failure (SHHF) model Rats

Nomenclature: SHHF/MccGmiCrl-*Lepr^{cp}*/Crl. **Research Application:** Heart failure, hypertension, type 2 diabetes, nephropathy, insulin resistance.

STRAIN CODE: 373 (Obese)
374 (Lean +/?)

• ZSF1 Rats

Nomenclature: ZSF1-*Lepr^{fa} Lepr^{cp}*/Crl **Research Application:** Hypertension, type 2 diabetes, hyperlipidemia, nephropathy, metabolic syndrome.

STRAIN CODE: 378 (Obese)
379 (Lean +/?)

It is a condition of sale that customers (or their employees) purchasing or receiving this strain are not permitted to breed or cross breed this strain without the prior written approval of Charles River.

• Zucker Rats

Nomenclature: Crl:ZUC Lepr^{fa} **Research Application:** Insulin resistance, glucose intolerance, metabolic syndrome, genetic obesity.

STRAIN CODE: 185 (Obese)
186 (Lean)

• Stroke Prone Rats

Nomenclature: SHRSP/A3NCrl **Research Application:** Stroke, ADHD model, nephropathy, hypertension, osteoporosis.

STRAIN CODE: 324

*Limited availability, upon reservation from Charles River USA

Cryopreserved Rat Models

- **BDIX**
  Nomenclature: BDIX/CrCrl
- **Copenhagen**
  Nomenclature: COP/CrCrl
- **PCK**
  Nomenclature: PCK/CrljCrl-*Prkhd1*^{pck}/Crl
- **Dahl/Salt Sensitive Rat**
  Nomenclature: SS/JrHsdMcwiCrl
- **SS-13BN Rat**
  Nomenclature: SS-Chr 13BN/McwiCrl
- **Obese Prone CD® Rat**
  Nomenclature: Crl:OP(CD)
- **Obese Resistant CD® Rat**
  Nomenclature: Crl:OR(CD)
- **SHROB**
  Nomenclature: SHROB/KolGmiCrl-Leprcp/Crl
- **Wistar Furth**
  Nomenclature: WF/CrCrl
- **Noble**
  Nomenclature: NBL/CrCrl

Mouse Models

With more than 100 strains of mouse models, Charles River is positioned to provide you with the mouse models you require to meet your programme goals. Their global network of production facilities ensures that you have consistent access to these models, regardless of location.

Mouse Models - Health Profiles

Charles River is committed to providing you with high-quality genetically standardized models such as SPF (Specific Pathogen Free) and SOPF (Specific and Opportunistic Pathogen Free)*.

Immunocompetent Strains Available from Charles River with an SOPF Health Status:

From Europe

Crl:CD1(ICR)
Crl:NMRI(Han)
129S2/SvPasCrl
BALB/cByJ
C3H/HeNCrl
C57BL/6J
C57BL/6NCrl

From North America*€

BALB/cAnNCrl
SJL/JOrlIcoCrl
Crl:SKH1-Hr^{hr}

	SPF – Immunocompetent mice	SOPF - Immunocompetent mice
Viruses		
Minute Virus of Mice (MVM)	•	•
Mouse Parvovirus (MPV)	•	•
Mouse Hepatitis Virus (MHV)	•	•
Mouse Norovirus (MNV)	•	•
Theiler's Murine Encephalomyelitis Virus (TMEV -GDVII)	•	•
Mouse Rotavirus (EDIM)	•	•
Sendai virus (SEND)	•	•
Reovirus 3 (REO3)	•	•
Pneumonia virus of Virus (PVM)	•	•
Mouse Thymic Virus (MTV)	•	•
Mouse Cytomegalovirus (MCMV)	•	•
Hantaan Virus (HANT)	•	•
Lymphocytic Choriomeningitis Virus (LCMV)	•	•
Mouse Adenovirus (MAV 1 & 2)	•	•
K Virus (K)	•	•
Ectromelia virus (ECTRO)	•	•
Polyoma Virus (POLY)	•	•
Lactate Dehydrogenase Virus (LDV)	•	•
Bacterias		
Tyzzer's Disease (CPIL)	•	•
Bordetella bronchiseptica	b	•
Citrobacter rodentium	•	•
Corynebacterium kutscheri	•	•
Mycoplasma pulmonis	•	•
Pasteurella pneumotropica	b	•
Pasteurella multocida	•	•
Salmonella spp	•	•
Streptobacillus moniliformis	•	•
Streptococcus pneumoniae	b	•
Helicobacter hepaticus	•	•
Helicobacter bilis	•	•
Helicobacter typhlonius	•	•
Helicobacter spp, other species	•	•
Cilia-Associated-Respiratory Bacillus	•	•
Opportunistic Organisms		
Staphylococcus aureus	c	•
Pseudomonas aeruginosa	c	•
Klebsiella pneumoniae	c	•
Klebsiella oxytoca	c	•
Pneumocystis spp	c	•
Proteus mirabilis	c	•
Beta haemolytic Streptococcus – Grp A	c	•
Beta haemolytic Streptococcus - Grp B	c	•
Beta haemolytic Streptococcus - Grp C	c	•
Beta haemolytic Streptococcus - Grp G	c	•
Corynebacterium bovis	c	•
Parasites		
Ectoparasites	•	•
Helminths	•	•
Enteric Pathogenic Protozoa	•	•
Other protozoa	c	•
E. cuniculi	•	•

• = excluded agents - b = planned recycle - c = no action

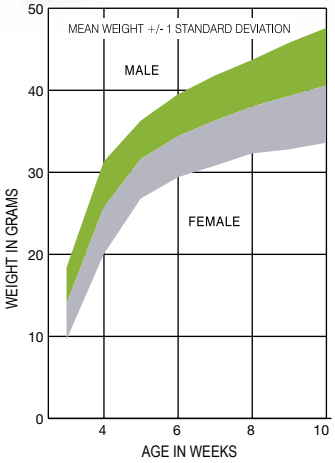
* List of agents for North America may differ from table listed above

Outbred Mice

CD-1® IGS *(International Genetic Standard)* Mice

Crl:CD1(ICR)

Weight in Grams
10-12
12-14
14-16
16-18
18-20
20-22
22-24
> 24 g / (per 2 g)
Retired breeder
Time mated females
Female with litter (males and females)
Pregnant



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: The original group of Swiss mice that served as progenitors of this stock consisted of two male and seven female albino mice derived from a non-inbred stock in the laboratory of Dr. de Coulon, Centre Anticancereux Romand, Lausanne, Switzerland. These animals were imported into the United States by Dr. Clara Lynch of the Rockefeller Institute in 1926. The Hauschka Ha/ICR stock was initiated in 1948 at the Institute for Cancer Research in Philadelphia from "Swiss" mice of Rockefeller origin. To Dr. Edward Mirand of Roswell Park Memorial Institute where they were designated as HaM/ICR. To Charles River in 1959 and hysterectomy rederived that same year. Production colonies are developed from the Foundation Colony and managed according to the Charles River International Genetic Standard breeding system. **Coat Colour:** Albino. **Research Application:** General multipurpose model, safety and efficacy testing, aging, pseudopregnancy, surgical model.

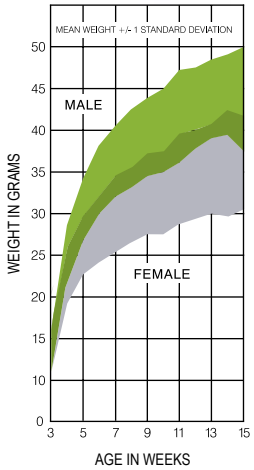
SOPF **Also available with SOPF health status (Strain code: 482)**

NMRI Mice

Crl:NMRI(Han)

STRAIN CODE: 605

Weight in Grams
10-12
12-14
14-16
16-18
18-20
20-22
22-24
> 24 g / (per 2 g)
Retired breeder
Time mated females
Female with litter (males and females)
Pregnant



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: Swiss-type mouse, which Clara Lynch gave to Poiley in 1937. He maintained an inbred line of this animal until the 51st generation, before he transferred it to the Naval Medical Research Institute. Introduced into Charles River in 1979 from the Central Institute for Laboratory Animal Breeding - Hannover (Germany). **Coat Colour:** Albino. **Research Application:** General purpose model, toxicology, teratology, pharmacology (especially in psychopharmacology for behavioral studies) and physiology.

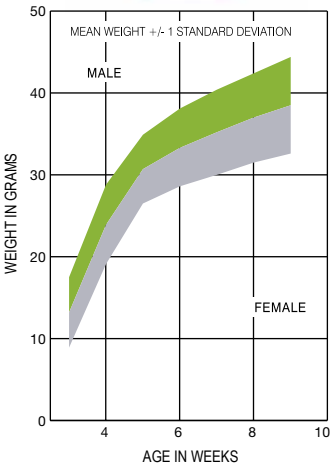
SOPF **Also available with SOPF health status (Srain code: 679)**

OF1 Mice

Crl:OF1

STRAIN CODE: 612

Weight in Grams
10-12
12-14
14-16
16-18
18-20
20-22
22-24
> 24 g / (per 2 g)
Retired breeder
Time mated females
Female with litter (males and females)
Pregnant females



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

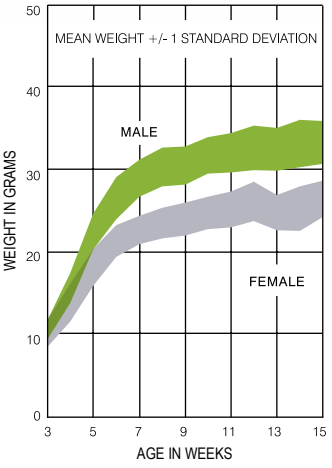
Origin: In 1935,Carworth Farms began to select a line of vigorous and productive mice. Progenitors originating from a colony bred in Missouri were bought and the strain was named CF1 (Carworth Farms strain 1). This strain was introduced at Charles River France in 1967, and it acquired the name OF1 (Oncins France 1). **Coat Colour:** Albino. **Research Application:** Model for general use including toxicology, teratology, pharmacology and physiology.

SKH1 Hairless Mice

Crl:SKH1-*Hr*^{hr}

STRAIN CODE: 686

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: An uncharacterised / non-pedigreed hairless strain of mice was acquired by Temple University from a small commercial supplier in New York City. To Charles River from the Skin and Cancer Hospital, Temple University in 1986. The mouse is euthymic and immunocompetent. **Coat Colour:** Hairless, albino. **Research Application:** Wound healing model, dermatology, safety and efficacy testing.

SKH3 (Crl:SKH3(SKH2)-*Hr*^{hr}) MICE ALSO AVAILABLE ON REQUEST: CONSULT US.

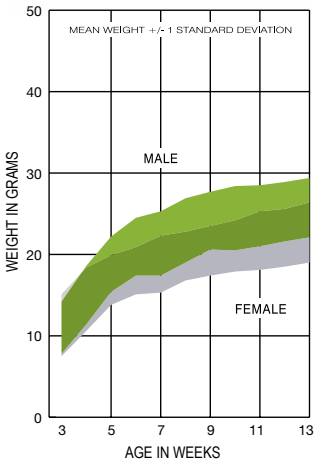
Inbred Mice

129 Mice

129S2/SvPasCrl

STRAIN CODE: 287

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: The 129/Sv inbred strain genotype C-P (wild-type alleles at the "albino" and "pink-eyed dilution" loci) was established by Dr LC Stevens from The Jackson Laboratory. Because of his interest in testicular teratomas which are extremely frequent in the 129 inbred strain, he investigated the effect of certain mouse mutations, which affect the male germ line, on the frequency of these tumors. One of these mutations was "steel" (Sl) which, at the heterozygous state, is responsible for a dilution of the coat colour and a depigmentation of the tail tip. The original 129 inbred strain is homozygous for the two recessive mutations "chinchilla" ($Tyr_{c\text{-}ch}$) and "pink-eyed dilution" (p). Its coat colour is cream. In order to distinguish the effect of the "steel" mutation on the coat colour, Dr Stevens introduced by repeated backcrosses the wild-type alleles at the "albino" and "pink-eyed dilution" loci from the C3H/He inbred strain.This is the reason why the 129/Sv inbred strain, unlike other 129 strains, has an agouti coat colour. Testicular teratomas have an incidence of approximately 1% as this strain does not carry the $Dnd1^{Ter}$ mutation. In the seventies, Dr Stevens introduced the 129/Sv strain to the institut Pasteur in the Laboratory of Dr JL Guenet, where it has been maintained for over 20 years, Charles River France acquired this strain in August 1996. The strain was renamed 129S2 in 1999 after the revision of the international nomenclature. **Coat Colour:** Agouti. **Research Application:** Transgenic/knockout model development, large number of unmyelinated axons in lumbar motor roots.

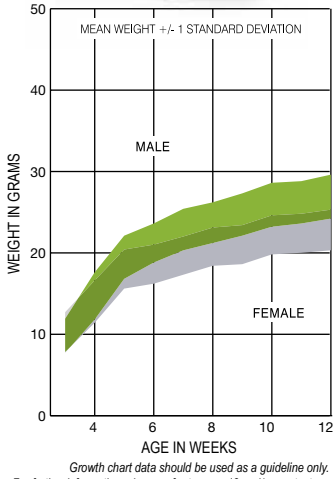
SOPF **Also available with SOPF health status (Srain code: 473)**

JAX™ Mice Strain: BALB/cByJ

BALB/cByJ

STRAIN CODE: 627

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Retired breeder
Time mated females
Female with litter (males and females)
Pregnant



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Albino. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/001026. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-001026. **Research Application:** Oncology, immunology, inflammation, autoimmunity, neurobiology.

The Jackson Laboratory's Genetic Stability Program is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721.

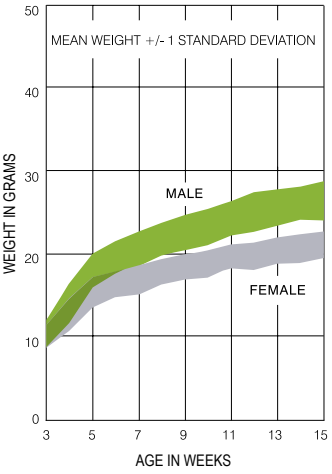
SOPF **Also available with SOPF health status (Srain code: 678)**

BALB/cAnNCrl Mice

BALB/cAnNCrl

STRAIN CODE: 028

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week
Retired breeder
Time mated females
Female with litter (males and females)
Pregnant



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

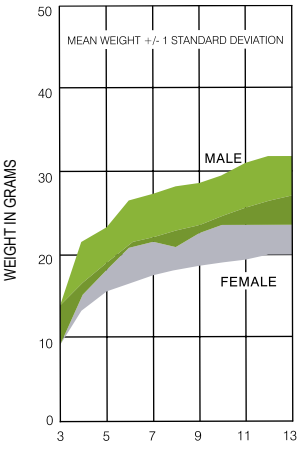
Origin: H.J Bagg developed the "Bagg albino" in 1913 using stock from an Ohio pet dealer. Inbred in 1923 by McDowell. To Snell in 1932 at F26, to Andervont in 1935. To NIH at F72 in 1951. To Charles River USA from NIH in 1974. Caesarian derived in 1975. This strain has been very widely used for in vivo production of monoclonal antibodies by the ascites method because of its haplotype with many hybridoma cell lines (BALB/c mouse melanoma [NS1] fusion products). This mouse is also used frequently for imunisation and B-cell collection. Low incidence of mammary tumors (10-20%). Arteriosclerosis common in both sexes. Male aggression is frequently overestimated. **Haplotype:** H-2^{d}. **Coat Colour:** Albino. **Research Application:** General multipurpose model, hybridoma development, monoclonal antibody production, infectious disease.

JAX™ Mice Strain: C3H/HeOuJ

C3H/HeOuJ

STRAIN CODE: 626

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week
Retired breeder



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

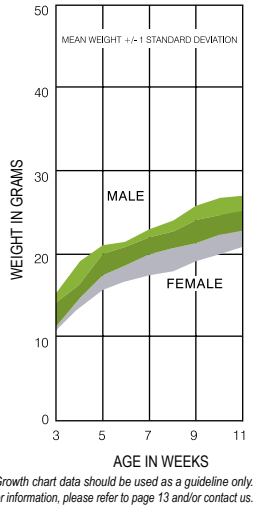
Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Agouti. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/000635. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-000635. **Research Application:** Safety and efficacy testing, oncology, neurological disorders, retinal degeneration.

C3H/HeNCrl Mice

C3H/HeNCrl

STRAIN CODE: 025

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week
Retired breeder
Female with litter (males and females)



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Origin: From a cross of a Bagg albino female and a DBA male by Strong in 1920. A litter of 4 females and 2 males sent to Andervont in 1930; then to Heston at F35. To NIH in 1951 from Heston at F57. To Charles River USA from NIH in 1974. Caesarian derived in 1975. 85% hepatomas at 14 months. This is an MMTV negative strain and hence does not show high incidence of mammary tumours. Resistant to Leishmania infection. High complement activity. Retinal degeneration allele (Pde6b, formely known as rd) is carried on chromosome 5. Mated females are highly susceptible (89%) to cardiac calcinosis. **Haplotype** H-2^{k}. **Coat Colour:** Agouti. **Research Application:** Safety and efficacy testing, oncology, neurological disorders, retinal degeneration.

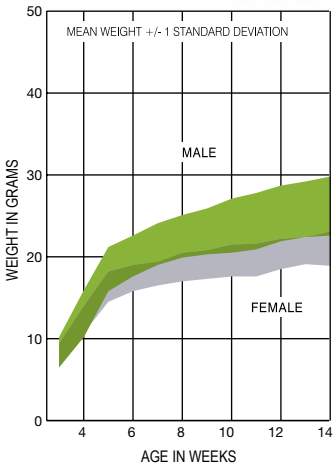
SOPF **Also available with SOPF health status (Srain code: 573)**

JAX™ Mice Strain: C57BL/6J

C57BL/6J

STRAIN CODE: 632

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Retired breeder
Time mated females
Female with litter (males and females)
Pregnant



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Black. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/000664. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-000664. **Research Application:** General multipurpose model, diet-induced obesity, transgenic/knockout model development, safety and efficacy testing, immunology.

The Jackson Laboratory's Genetic Stability Program is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721.

SOPF **Also available with SOPF health status (Strain code: 680)**

Aged models C57BL/6J

C57BL/6J

STRAIN CODE: 632

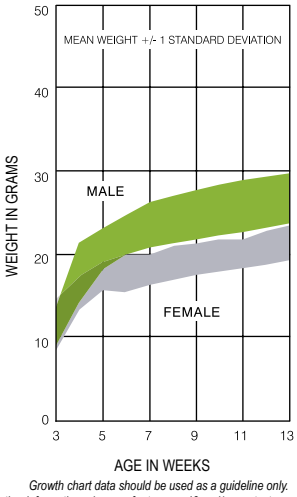
Age in Months
4
5
6
7
8
9
10
11
12
13
14
15

C57BL/6NCrl Mice

C57BL/6NCrl

STRAIN CODE: 027

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Retired breeder
Time mated females
Female with litter (males and females)
Pregnant



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Origin: Developed by C.C. Little in 1921, from a mating of Miss Abby Lathrop's stock that also gave rise to strains C57BR and C57L. To The Jackson Laboratory in 1948 from Hall. To NIH in 1951 from The Jackson Laboratory at F32. To Charles River in 1974 from NIH. Hysterectomy rederived in 1975. **Haplotype** H-2^{b}. **Coat Colour:** Black. **Research Application:** General multipurpose model, diet-induced obesity, transgenic/knockout model development, safety and efficacy testing, immunology.

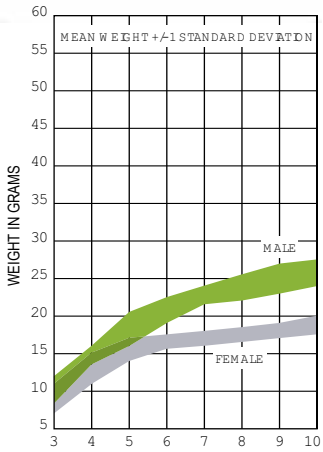
SOPF **Also available with SOPF health status (Strain code: 475)**

CBA Mice*

CBA/CaCrl

STRAIN CODE: 609

Age in Days
Up to 21
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week
Retired breeder
Lactating mouse with litter
Time mated (over 14 day gestation)
Untimed pregnant



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

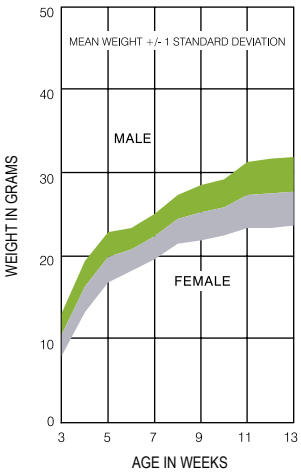
Origin: From a cross of a Bagg albino female and a DBA male by Strong in 1920. The CBA strain was selected for a low mammary tumour incidence. Transferred via The Jackson Laboratory to Haldane and Gruneberg in 1932 To Carter (CBA/Ca) in 1947. The CBA/Ca is the substrain most commonly used in British research. VAF Plus breed stock to Charles River UK from Glaxo in 1992. Absence of lower third molars in about 18%, few skeletal variants, some mammary tumours in breeders. Do not develop antinuclear antibodies or LE cells with aging. **Histocompatibility** H-1^a, H-2^k, H-3. **Coat Colour:** Agouti. **Research Application:** Research applications include brain development, neurochemistry and behavioural studies.

JAX™ Mice Strain: CBA/J

CBA/J

STRAIN CODE: 624

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Retired breeder



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Agouti. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/000656. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-000656. **Research Application:** General purpose strain, diet-induced atherosclerosis, autoimmunity research, internal/organ research, metabolism research.

The Jackson Laboratory's Genetic Stability Program is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721.

JAX™ Mice Strain: DBA/2J

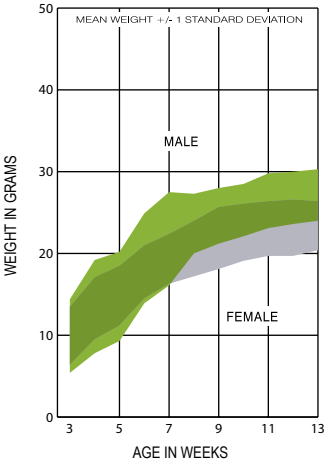
DBA/2J

STRAIN CODE: 625

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Retired breeder
Female with litter (males and females)

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat colour:** Non-agouti dilute brown. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/000671. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-000671. **Research Application:** Safety and efficacy testing, immunology, audiogenic seizures, glaucoma research.

The Jackson Laboratory's Genetic Stability Program is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

The Jackson Laboratory

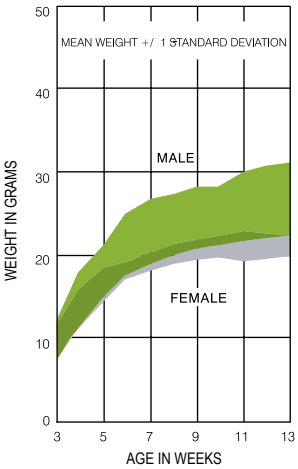
DBA/2NCrl Mice

DBA/2NCrl

STRAIN CODE: 026

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week
Retired breeder

Origin: Developed by C.C. Little in 1909 from stock segregating for coat colour. Oldest of all the inbred strains of mice. In 1929 - 1930 crosses were made between sublines, and several new sublines were established, including the widely used sublines 1 (previously called 12) and 2 (previously called 212). To Mider in 1938. To NIH in 1951 from Mider at F34. To Charles River in 1974 from NIH. Hysterectomy rederived in 1975. **Haplotype** H-2^d. **Coat Colour:** Non-agouti dilute brown.
Research Application: Safety and efficacy testing, immunology, audiogenic seizures.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

FVB Mice

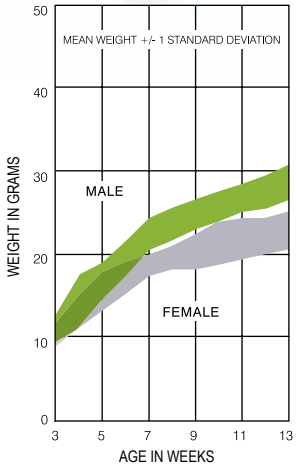
FVB/NCrl

STRAIN CODE: 207

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Retired breeder

Origin: Derived in 1935 from an outbred Swiss colony [N.GP(S)] at NIH. During the early 1970's, established as an inbred strain called Fv1b (sensitive to the B strain of Friend leukemia) at NIH. To Charles River from NIH in 1994. Caesarean derived in 1995. **Haplotype** H-2^{q}. **Coat Colour:** Albino. **Research Application:** Transgenic/knockout model development.

Due to the aggressive nature of these mice, we do reserve the right to send them by original cage cohorts for animal welfare reasons.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

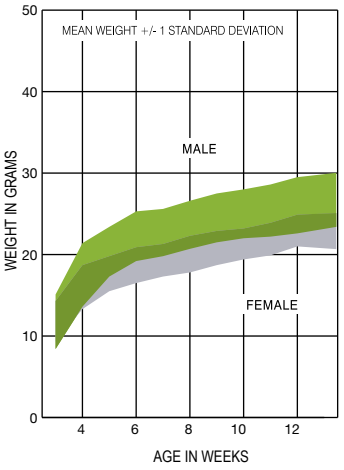
B6 albino Mice

C57BL/6N-*Tyr*$^{c\text{-}Brd}$/BrdCrCrl

STRAIN CODE: 493

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)

Origin: Received by NCI from Dr. Allan Bradley at Baylor College of Medicine in 2000. The B6 albino strain is a spontaneous albino mutant coisogenic C57BL/6 strain. The mice contain a mutation in the tyrosinase gene, and when homozygous for the mutation the coat colour of the mice is albino rather than black. To Charles River US in 2009 from NCI. To Charles River France in 2011. **Haplotype** H2^{b}. **Coat Colour:** White (Albino). **Research Application:** Creation of chimeras with B6N-derived embryonic stem cells.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Additional Models from The Jackson Laboratory

Many additional inbred mouse models are available from The Jackson Laboratory and may be obtained by importation through Charles River. Charles River serves as the exclusive European commercial distributor of The Jackson Laboratory's JAX™ Mice strains.

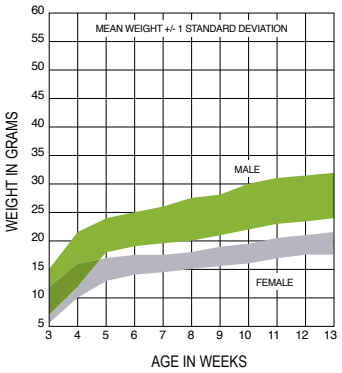
Hybrid Mice

B6CBAF1/Crl*

B6CBAF1/Crl

STRAIN CODE: 616

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)
Additional week



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Origin: First generation (FI) progeny of a cross between female C57BL/6J and male CBA/CaCrl. **Coat Colour:** Agouti. **Research Application:** Uses include hybrid vigor, as a background for deleterious mutations, to create or enhance expression of polygenic diseases, to determine the mode of inheritance, and to provide physiological buffering (present a broader array of responses to various stresses).

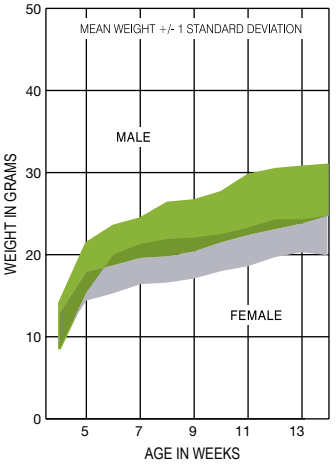
Strain is available to customers in the United Kingdom and Ireland only.

JAX™ Mice Strain: B6CBAF1/J Mice

B6CBAF1/J

STRAIN CODE: 631

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
Additional week (up to 12 weeks)



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

Origin: First generation (F1) progeny of a cross between female JAX™ Mice strain C57BL/6J and male JAX™ Mice strain CBA/J. Both parental strains are maintained in breeding colonies derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Agouti. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/100011. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-100011. **Research Application:** Uses include hybrid vigor, as a background for deleterious mutations, to create or enhance expression of polygenic diseases, to determine the mode of inheritance, and to provide physiological buffering (present a broader array of responses to various stresses).

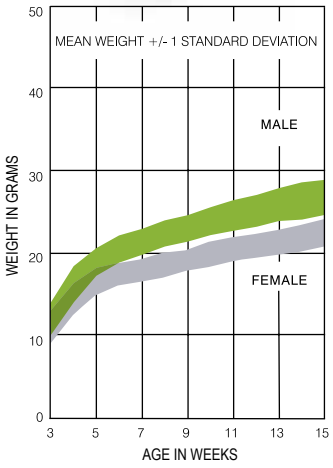
B6C3F1/Crl Mice

B6C3F1/Crl

STRAIN CODE: 031

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Pregnant / time mated females
Female with litter (males and females)

Origin: Mice result from a cross between female C57BL/6NCrl and male C3H/He mice. Contact your local office (see page 9) for additional information. **Coat Colour:** Agouti. **Research Application:** Safety and efficacy testing, transgenic/knockout model development, transplantation research.



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

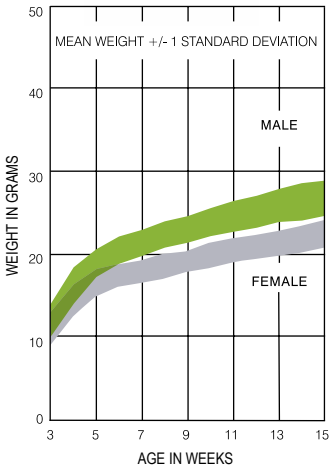
B6D2F1/Crl Mice

B6D2F1/Crl

STRAIN CODE: 099

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
Time mated females
Female with litter (males and females)
Pregnant

Origin: Mice result from a cross between female C57BL/6NCrl and male DBA/2NCrl mice. **Coat Colour:** Black. Contact your local office (see page 9) for additional information. **Research Application:** Safety and efficacy testing, transgenic/knockout model development, transplantation research, behavioral research.



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

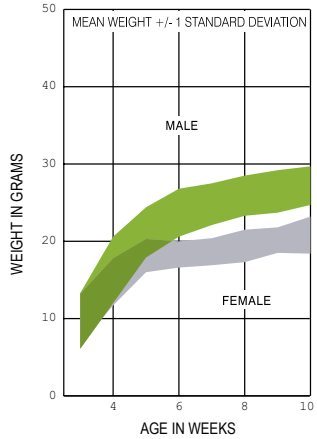
JAX™ Mice Strain: B6D2F1/J

B6D2F1/J

STRAIN CODE: 629

Age in Days
21-27 (3 weeks)
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
Additional week (up to 12 weeks)

Origin: First generation (F1) progeny of a cross between female JAX™ Mice strain C57BL/6J and male JAX™ Mice strain DBA/2J. Both parental strains are maintained in breeding colonies derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Black. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/100006. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-100006. **Research Application:** Safety and efficacy testing, transgenic/knockout model development, transplantation research, behavioral research.



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

The Jackson Laboratory

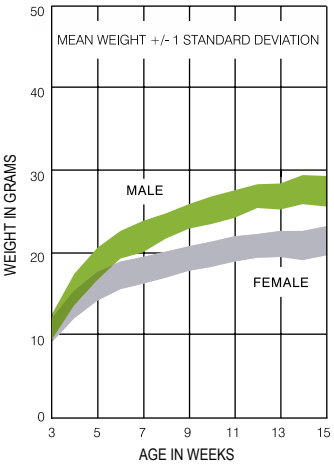
CD2F1/Crl Mice

CD2F1/Crl

STRAIN CODE: 033

Weight in Grams
10-12
12-14
14-16
16-18
18-20
20-22
Additional week

Origin: First generation (F1) progeny of a cross between female BALB/cAnNCrl x male DBA/2NCrl. **Coat Colour:** Brown agouti. **Research Application:** Safety and efficacy testing, transplantation research, monoclonal antibody production.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Other Hybrid Mice Available from Charles River

• NMRCF1/Crl

STRAIN CODE: 636

Nomenclature: NMRCF1/Crl

• CB6F1/Crl

STRAIN CODE: 176

Nomenclature: CB6F1/Crl. **Research Application:** Transplantation research, monoclonal antibody production.

Metabolic, Renal and Cardiovascular Models

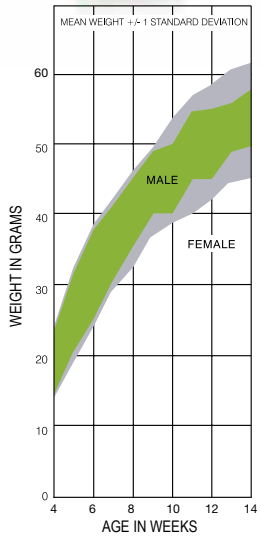
JAX™ Mice Strain: Obese Mice ob/ob

B6.Cg-*Lep*^{ob}/J

STRAIN CODE: 606

Age in Days
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Black. **Control:** Heterozygote or wild type from the colony or C57BL/6J. **DIET:** 5K20 or equivalent. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/000632. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-000632. **Research Application:** Phase I and II type 2 diabetes, obesity research, wound healing.



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

The Jackson Laboratory

JAX™ Mice Strain: Diabetic Mice db/db

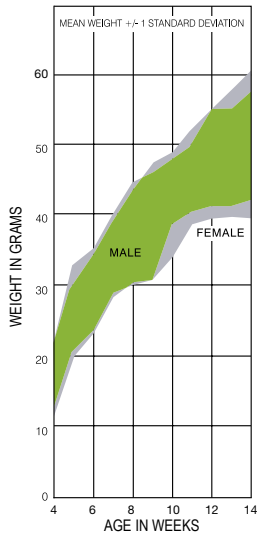
BKS.Cg-*Dock7*^{m}+/+*Lepr*^{db}/J

STRAIN CODE: 607

Age in Days
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Varies by genotype. **Control:** Heterozygote from the colony or Jax™ Mice Stock Number 000662 C57BLKS/J. **DIET:** 5K52 or equivalent. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/000642. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-000642. **Research Application:** Phase I, II, and III type 2 diabetes, obesity research, wound healing.

Coat colour	Misty gene	Leptin Receptor gene	Phenotype
Grey	m/m	+/+ (wildtype)	lean, nondiabetic
Black	m/+	db / +	lean, nondiabetic
Black	+/+	db / db	fatty and diabetic



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

The Jackson Laboratory

JAX™ Mice Strain: ApoE Mice

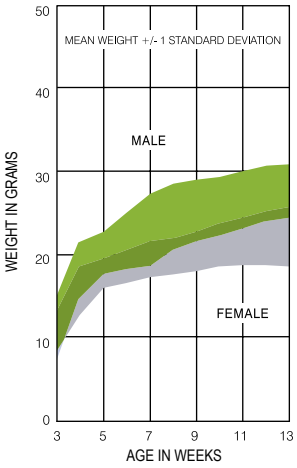
B6.129P2-*Apoe*^{tm1Unc}/J

STRAIN CODE: 622

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Black. **Control:** JAX™ Mice Strain: C57BL/6J. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/002052. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-002052. **Research Application:** Cardiovascular research (atherosclerosis, heart abnormalities, hypercholesterolemia, hypertriglyceridemia, vascular defects).

The Jackson Laboratory's Genetic Stability Program is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721.



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

The Jackson Laboratory

JAX™ Mice Strain: NOD Mice

NOD/ShiLtJ

STRAIN CODE: 613

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** White (Albino). **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/001976. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-001976. **Research Application:** Polygenic model for autoimmune type 1 diabetes.

The Jackson Laboratory's Genetic Stability Program is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721.

The Jackson Laboratory

Additional Models Available from The Jackson Laboratory

Many additional mouse models supporting metabolic and cardiovascular disease research are available from The Jackson Laboratory and may be obtained by importation through Charles River. Charles River serves as the exclusive European commercial distributor of The Jackson Laboratory's JAX™ Mice strains.

Inflammation & Immunology models

• Ly5.1 Mice

B6.SJL-*Ptprc*^{a} *Pepc*^{b}/BoyCrl

STRAIN CODE: 494

Age in Days
28-34 (4 weeks)
Additional Week

Origin: The strain was originally developed at the Sloan Kettering Institute where it was backcrossed on a non-specified C57BL/6 strain. The congenic strain "C57BL/6-Ly5.1" carries the allele of the SJL mouse in the Ptprc gene locus: "Ptprc^{a}" or "CD45.1" or "Ly5.1". Charles River Europe breeds CD45.1 expressing B6.SJL-Ptprc^{a} Pepc^{b}/BoyCrl mice in Italy. **Coat Colour:** Black. **Research Application:** This mouse is primarily used in inflammation and immunological adoptive transfer research.

• OT I

C57BL/6-Tg(TcraTcrb)1100Mjb/Crl

STRAIN CODE: 642

Age in Days
28-34 (4 weeks)
Additional Week

Origin: From the Walter and Eliza Hall Institute, Victoria, Australia, to Charles River France in 2002. These homozygous mice contain transgenic inserts for mouse Tcra-V2 and Tcrb-V5 genes. The transgenic T cell receptor was designed to recognize ovalbumin residues 257-264 in the context of H2Kb and used to study the role of peptides in positive selection and the response of CD8+ T cells to antigen. Like most TCR transgenics, these mice are somewhat immunodeficient. **Coat Colour:** Black. **Research Application:** Immunology, inflammation and autoimmunity research. **SOPF health status**.

• OT II

C57BL/6-Tg(TcraTcrb)425Cbn/Crl

STRAIN CODE: 643

Age in Days
28-34 (4 weeks)
Additional Week

Origin: From the Walter and Eliza Hall Institute, Victoria, Australia, to Charles River France in 2002. These homozygous transgenic mice express the mouse alpha-chain and beta-chain T cell receptor that pairs with the CD4 coreceptor and is specific for chicken ovalbumin 323-339 in the context of I-A b. Homozygous mice are viable and fertile. In these mice there is a four-fold increase in the CD4 to CD8 peripheral T cell ratio, and lymph node T cells demonstrate a dose-dependent proliferative response to the specific ovalbumin ligand. These transgenic mice are useful for studying in vivo T cell biology such as TCR-ligand interactions, T cell activation, thymic selection, cross-presentation of antigens, process of thymic selection and central and peripheral T cell tolerance and induction. **Coat Colour:** Black. **Research Application:** T cell biology research (e.g., TCR-ligand interactions, T cell activation, thymic selection, cross-presentation of antigens, process of thymic selection and central and peripheral T cell tolerance and induction). **SOPF health status**.

Additional Models Available from The Jackson Laboratory

Many additional inflammation and immunology mouse models are available from The Jackson Laboratory and may be obtained by importation through Charles River. Charles River serves as the exclusive European commercial distributor of The Jackson Laboratory's JAX™ Mice strains.

Cryopreserved Mouse Models

- **PGP**

  Nomenclature: Crl:CF1-*Abcb1a*^{mds}.

- **SKH3**

  Nomenclature: Crl:SKH3(SKH2)-*Hr*^{hr}.

Dedicated Supply of JAX™ Mice

As a result of the collaborative agreement between The Jackson Laboratory and Charles River, Charles River's European facilities are able to offer you dedicated supplies of certain JAX™ Mice strains that are typically only available as imported strains or recovered embryos. Contact your local office (see page 9) for additional information.

Immunodeficient Models

Oncology is one of the leading areas of research into new therapeutics. Charles River's global portfolio of high-quality immunodeficient models gives you the benefit of partnering with an industry leader offering an infrastructure capable of advancing your research now and in the future.

Charles River is dedicated to supporting oncology researchers in their quest for a cure. Their unmatched portfolio of *in vitro* and *in vivo* capabilities such as patient derived xenografts, human xenografts, syngeneic, and humanised immunotherapy research models and extensive selection of animal models provides scientists with the tools they need to identify promising compounds and take them to the clinic.

Immunodeficient Models

Due to the challenges inherent in researching and developing anticancer therapeutics, it is important that you have the right tools and resources available to you. To help you identify the best fit for your oncology research, Charles River maintains a portfolio of animal models with varying levels of immunodeficiency and phenotypic characteristics.

Strain	Species	Hair	T cells	B Cells	NK Cells
Athymic Nude	Mouse	NO	NO	YES	YES
CD-1® Nude	Mouse	NO	NO	YES	YES
Nu/Nu Nude	Mouse	NO	NO	YES	YES
Swiss Nude	Mouse	NO	NO	YES	YES
NMRI Nude	Mouse	NO	NO	YES	YES
BALB/c Nude*	Mouse	NO	NO	YES	YES
NIH III	Mouse	NO	NO	NO	Impaired
CB17 SCID	Mouse	YES	NO	NO	YES
SHO®	Mouse	NO	NO	NO	YES
SHC	Mouse	NO	NO	NO	YES
SCID Beige	Mouse	YES	NO	NO	Impaired
NOD SCID*	Mouse	YES	NO	NO	Impaired
NOD SCID gamma (NSG®)*	Mouse	YES	NO	NO	NO
NOD rag gamma (NRG)*	Mouse	YES	NO	NO	NO
Nu/Nu	Rat	NO	NO	YES	YES

* JAX™ Mice Strains

Tools to help find the right Oncology Model

The Core

The CORE (Collection of Oncology Research Experiments) is an online library of peer-reviewed publications designed to help you find the most appropriate research model for your oncology cell lines.

Search through the publications on Charles River's website at: https://www.criver.com/core-library

Xenograft Data

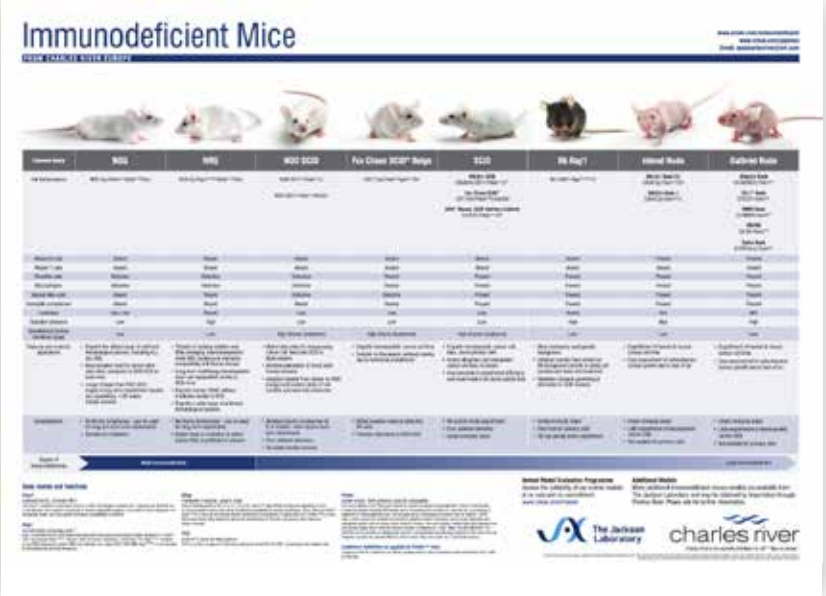
Charles River has compiled xenograft data on the following models in an effort to assist you in expediting your model selection process. Their goal is to continue to expand this data to include other immunodeficient models.

- Athymic Nude Mouse
- Fox Chase SCID™ Mouse (C.B.-17 SCID)
- Fox Chase SCID™ Beige Mouse

Download the data at: www.criver.com/xenograft

Immunodeficient Mouse Model Poster

Request a complimentary printed poster listing the range of JAX™ and Charles River immunodeficient mice bred in Europe, with information on features, degree of immunodeficiency and gene functions. Request a poster at orders-dk@scanbur.com



Discovery Services

Charles River offers early research and proof-of principle pharmacology studies in relevant animal models of human diseases to assist your efficacy evaluations. Check out oncology phamacology models.

Athymic Nude Mice

Crl:NU(NCr)-*Foxn1*^{nu}

STRAIN CODE: 490 (Homozygous)
491 (Heterozygous)

Age in Days
Homozygous nu/nu 28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Heterozygous nu/+ 4 weeks

Origin: This immunodeficient nude mouse originated from NIH and was originally thought to be a BALB/c congenic. It was later determined that it was not inbred and is therefore maintained as an outbred. It is not associated with any stock or strain. The animal lacks a thymus, is unable to produce T cells, and is therefore immunodeficient. To Charles River from NCI in 2010. **Coat Colour:** Hairless, albino background. **Research Applications:** Tumor biology and xenograft research.

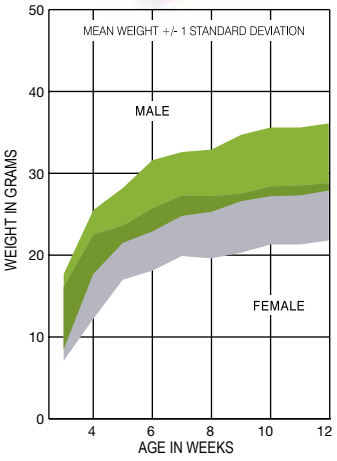
CD-1® Nude

Crl:CD1-*Foxn1*^{nu}

STRAIN CODE: 086 (Homozygous)
087 (Heterozygous)

Age in Days
Homozygous nu/nu 28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Heterozygous nu/+ 4 weeks

Origin: Developed from the transfer of the nude gene to a CD-1® mouse through a series of crosses and back-crosses, beginning in 1979 at Charles River, Wilmington, MA. The animal does not have a thymus and is therefore unable to produce T-cells and is consequently immunodeficient. **Coat Colour:** Homozygotes: hairless, unpigmented. Heterozygotes: haired, albino. **Research Applications:** Tumor biology and xenograft research.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

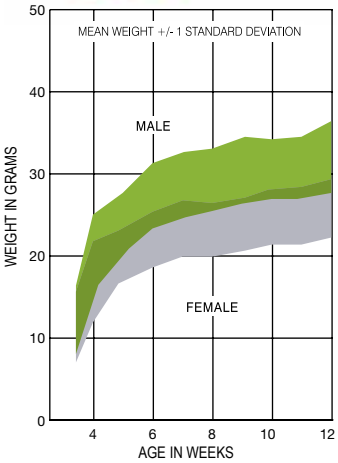
Swiss Nude

Crl:NU(Ico)-*Foxn1*^{nu}

STRAIN CODE: 620 (Homozygous)
664 (Heterozygous)

Age in Days
Homozygous nu/nu 28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Heterozygous nu/+ 4 weeks

Origin: The mutation ocurred in 1962, in a colony of albino outbred mice maintained at the Ruchill Hospital in Glasgow. In 1966, Flanagan gave the first detailed description of this mutant. It was not until 1968, however, that it was first noticed that the thymus was missing (Pantelouris EM). These nude mice originate from the Swiss strain. In 1974, The Gustave Roussy Institute (Villejuif, France) obtained the mice from Dr Carl Hansen's department at the NIH, Bethesda, MD, USA. The first pairs were introduced into Charles River France in 1976. **Coat Colour:** Homozygotes: hairless, unpigmented. Heterozygotes: haired, albino. **Research Applications:** Tumor biology and xenograft research.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

NMRI Nude

Crl:NMRI-*Foxn1*^{nu}

STRAIN CODE: 639 (Homozygous)
663 (Heterozygous)

Age in Days
Homozygous nu/nu 28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Heterozygous nu/+ 4 weeks

Origin: The first nude mouse appeared at the Virus Laboratory, Ruchill Hospital in Glasgow in 1962 in Dr. N.R. Grist's laboratory. Dr. Grist sent the mutation to Edinburgh for investigation. The mutation arose in a closed but not deliberately inbred albino stock. The genetics of the mutant nude mouse was studied at the institute of Animal Genetics Edinburgh. Absence of thymus was described by Pantelouris (1968). In December 1968, Dr. Rygaard obtained two heterozygous pairs (nu/+) from the Institute for Animal Genetics in Edinburgh, Scotland. Due to poor viability and fertility of the nude mice obtained from Glasgow, Dr. Rygaard decided to transfer the gene to another genetic background. He chose the NMRI outbred strain as the background and soon had a very productive breeding system. **Coat Colour:** Hairless, albino background. **Research Applications:** Oncology.

BALB/c-Nude Mice

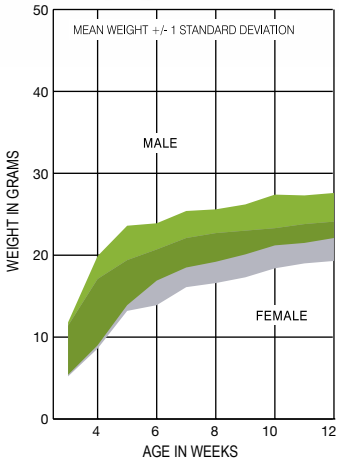
CAnN.Cg-*Foxn1*^{nu}/Crl
JAX™ Mice Strain: CByJ.Cg-*Foxn1*^{nu}/J

STRAIN CODE: 194 (Homozygous), 195 (Heterozygous)
STRAIN CODE: 633 (Homozygous), 657 (Heterozygous)

Age in Days
Homozygous nu/nu 28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 12 weeks)
Heterozygous nu/+ 4 weeks

Nomenclature: CAnN.Cg-*Foxn1*^{nu}/Crl **Origin:** Developed through crosses and backcrosses between BALB/cABom-nu and BALB/cAnNCrj-nu at Charles River Japan (CRJ). Pedigreed pregnant females of BALB/cAnNCrj-nu were received from CRJ in 1985. This mouse is inbred, and genetic monitoring results confirm it to be a BALB/c nude. It also lacks a thymus and is therefore T-cell deficient. **Coat Colour:** Homozygotes: hairless, unpigmented. Heterozygotes: haired, albino. **Breeding Location:** Germany, USA, UK.

Nomenclature: CByJ.Cg-*Foxn1*^{nu}/J **Origin:** The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Homozygotes: hairless, unpigmented. Heterozygotes: haired, albino. **Breeding Location:** France.
Strain Characteristics: For comprehensive strain information, see the strain data sheet at jax.org/strain/000711. **Research Applications:** Tumor biology and xenograft research.



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

Strain: CByJ.Cg-*Foxn1*^{nu}/J

The Jackson Laboratory

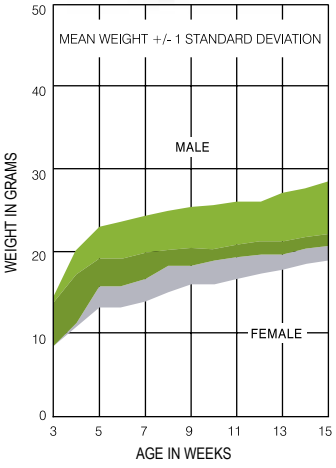
SCID Mice

CB17/Icr-*Prkdc*^{scid}/IcrIcoCrl

STRAIN CODE: 236

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week (up to 10 weeks)

Origin: The scid autosomal recessive mutation, was detected in 1980 by MJ Bosma and his group in an inbred strain (C.BKa-Igh^{b}/Icr also known as C.B-17) of specific pathogen free mice at the Fox Chase Cancer Center, Philadelphia, PA, USA. Mice homozygous for the scid mutation, hereafter designated SCID mice, were established as a coisogenic partner strain of the normal C.B-17 strain. In 1989, Charles River France obtained SCID mice under licence from FCCC. **Coat Colour:** Albino. **Research Applications:** Tumor biology and xenograft research.



Growth chart data should be used as a guideline only. For further information, please refer to page 13 and/or contact us.

SCID Beige

CB17.Cg-*Prkdc*^{scid}*Lyst*$^{bg-J}$/Crl

STRAIN CODE: 250

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
Additional week

Origin: A congenic mouse that possesses both genetic autosomal recessive mutations SCID and beige. This mouse was developed by Croy, et al. at the University of Guelph by an intercross of C.B-17 SCID/SCID to C57BL/6 bg/bg mice. To Charles River USA in 1993 and to Charles River Germany in 2007. To Charles River UK in 2015. **Coat Colour:** White (Albino). **Research Applications:** Tumor biology and xenograft research.

NOD *SCID* Mice*

NOD.CB17-*Prkdc*^{scid}/NCrCrl

STRAIN CODE: 394

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)
Additional week

Origin: The SCID mutation has been transferred onto a non-obese diabetic background. Animals homozygous for the SCID mutation have impaired T and B cell lymphocyte development. The NOD background additionally results in deficient natural killer(NK)cell function. To Charles River in 2003 from NIH. To Charles River UK in 2009. **Coat Colour:** Albino. **Research Applications:** Tumor biology and xenograft research.

JAX™ Mice Strain: NOD *SCID*

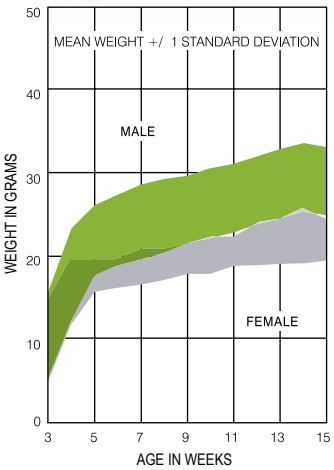
NOD.CB17-*Prkdc*^{scid} /J

STRAIN CODE: 634

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** Albino. **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/001303. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-001303. **Research Applications:** Tumor biology and xenograft research.

The Jackson Laboratory's Genetic Stability Program is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721.



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

The Jackson Laboratory

JAX™ Mice strain: NOD *SCID* gamma (NSG®) Mice

NOD.Cg-*Prkdc*^{scid} *Il2rg*^{tm1Wjl}/SzJ

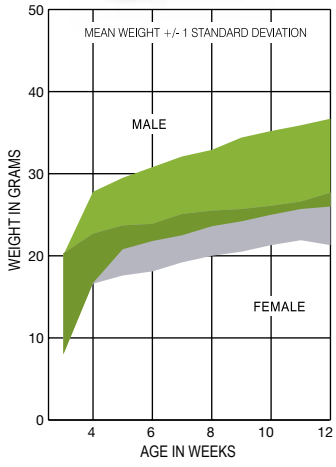
STRAIN CODE: 614

Non-profit research institutions require an MTA, and commercial organizations require a license prior to shipping. The commercial license incurs an additional fee.
Please contact your local Charles River office for further information regarding terms and conditions.

Age in Days
21-41 (3-5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)
70-76 (10 weeks)

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality program to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice Strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** White (albino). **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/005557. For physiological strain data, see Mouse Phenome Database at jax.org/mpd-005557. **Research Applications:** Oncology, immunology, virology research, xenograft/transplant host (outstanding utility in the studies of islet transplantation, hematopoietic stem cells and cancer stem cells).

The Jackson Laboratory's Genetic Stability Program is covered by 2009 US patent 7,592,501 and 2012 US patent 8,110,721



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Data derived from Charles River weight studies

The Jackson Laboratory

JAX™ Mice Strain: NOD rag gamma (NRG) Mice

NOD.Cg-*Rag1*^{tm1Mom} *Il2rg*^{tm1Wjl}/Szj

STRAIN CODE: 688

Non-profit research institutions require an MTA, and commercial organizations requirea license prior to shipping.
The commercial license incurs an additional fee.
Please contact your local office for further information regarding terms and conditions.

The Jackson Laboratory

Age in Days
21-41 (3-5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)
70-76 (10 weeks)

Origin: The breeding colony for this strain is derived from and systematically reinfused with pedigreed JAX™ Mice stock obtained from The Jackson Laboratory. Charles River adheres to The Jackson Laboratory's breeding protocols and genetic quality programme to maintain this breeding colony. Mice from this colony are genetically equivalent to those bred by The Jackson Laboratory and are considered authentic JAX™ Mice strains, which are designated with a 'J' as the final letter in the strain nomenclature. JAX™ Mice strains are for internal research use only and should not be propagated for distribution or sale. **Coat Colour:** White (albino). **Strain Characteristics:** For comprehensive strain information, see the strain data sheet at jax.org/strain/007799. **Research Applications:** Cancer Research, immunology, inflammation and autoimmunity research, hematological research, internal/organ research. More resistant to irradiation and genotoxic drugs than mice with a SCID mutation in the DNA repair enzyme Prkdc.

Nude Rats

Crl:NIH-*Foxn1*^{mu}

STRAIN CODE: 316 (Homozygous)
118 (Heterozygous)

Age in Days
28-34 (4 weeks)
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
Additional week

Origin: The NIH nude rat was developed in 1979/80 through a series of matings involving 8 inbred rat strains. To Charles River USA from the NIH Animal Genetic Resources. Caesarian derived in 2001. This athymic model shows depleted cell populations in thymus-dependant areas of peripheral lymphoid organs. **Coat Colour:** Homozygotes: White, black or black and white, hairless. Heterozygotes: White, black or black and white, haired. **Research Applications:** Tumor biology, immunology, and xenograft research.

Other Immunodeficient Models Available from Charles River

• NIH-III Mouse

Nomenclature: Crl:NIH-*Lyst*^{bg} *Foxn1*^{nu} *Btk*^{xid}
Research Applications: Tumor biology and xenograft research.

STRAIN CODE: 201 (Homozygous)
202 (Heterozygous)

• NU/NU Mouse

Nomenclature: Crl:NU-*Foxn1*^{nu}
Research Applications: Tumor biology and xenograft research.

STRAIN CODE: 088 (Homozygous)
089 (Heterozygous)

• *SCID* Hairless Congenic (SHC) Mice

Nomenclature: CB17.Cg-*Prkdc*^{scid}*Hr*^{hr}/IcrCrl
Research Applications: Tumor biology and xenograft research.

STRAIN CODE: 488

• *SCID* Hairless Outbred Mice (SHO®)

Nomenclature: Crl:SHO-*Prkdc*^{scid} *Hr*^{hr}
Research Applications: Tumor biology and xenograft research.

STRAIN CODE: 474

Immunodeficient Models Available from The Jackson Laboratory

Many additional immunodeficient mouse models are available from The Jackson Laboratory and may be obtained by importation through Charles River. Charles River serves as the exclusive European commercial distributor of The Jackson Laboratory's JAX™ Mice strains.

Dedicated Supply of JAX™ Mice

As a result of the collaborative agreement between The Jackson Laboratory and Charles River, Charles River's European facilities are able to offer you dedicated supplies of certain JAX™ Mice strains that are typically only available as imported strains or recovered embryos. Please contact us for more information (see page 9).

Rabbit, Guinea Pig, Gerbil and Hamster

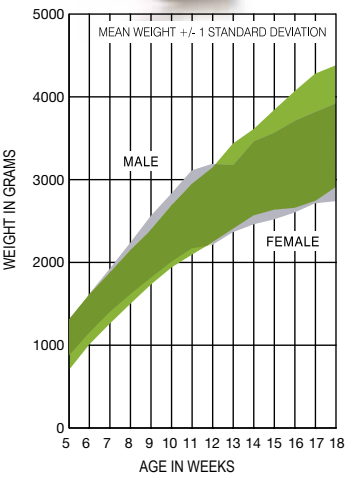
Because most diseases cause a wide range of complications, their study is complex and often requires research programmes to take a multidisciplinary approach. Therefore, aside from mouse and rat models, Charles River also provide other species of research models in order to support your programme requirements.

New Zealand White - Rabbits

Crl:KBL(NZW)

STRAIN CODE: 052

Age in Days
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)
70-76 (10 weeks)
77-83 (11 weeks)
84-90 (12 weeks)
91-97 (13 weeks)
98-104 (14 weeks)
105-111 (15 weeks)
112-118 (16 weeks)
119-125 (17 weeks)
126-132 (18 weeks)
133-139 (19 weeks)
Time mated females
Social pair (up to 12 weeks)



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: To Charles River Canada in 1991 from Kitayama Breeding Laboratories, Japan. To Charles River France in 1999. **Coat Colour:** Albino. **Research Application:** General multipurpose model.

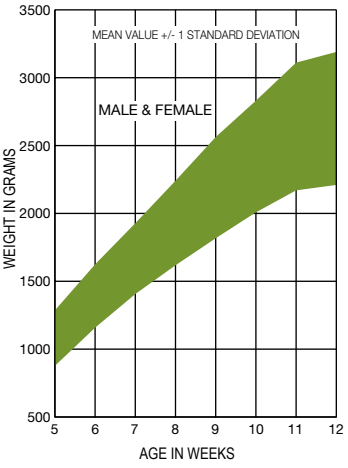
Custom breeding of GM rabbits, immunisation and genealogical data available on request

Chinchilla Bastard - Rabbits

Crl:Crlg(CHB)

STRAIN CODE: 602

Age in Days
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)
63-69 (9 weeks)
70-76 (10 weeks)
77-83 (11 weeks)
84-90 (12 weeks)
91-97 (13 weeks)



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: Pure Chinchilla stock obtained by Charles River Germany from Boehringer Ingelheim Biberach in 1977. Charles River Germany bred F1 hybrids called CHB (Chinchilla Bastard - progeny of Chinchilla-KBL crossing) until 2012. **Coat Colour:** Grey-black. **Research Application:** Ophtalmology.

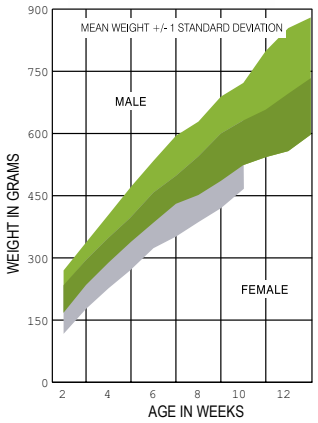
Charles River France breeds Chinchilla Bastard rabbits (progeny of CHB-KBL crossing) thanks to revitalization of cryopreserved Chinchilla sperm. Chinchilla Bastard rabbits have pigmented eyes. Please contact your local customer service department for an estimated lead time for orders.

Dunkin Hartley - Guinea Pigs

Crl:HA

STRAIN CODE: 051

Weight in Grams
≥ 200
201-250
251-300
301-350
351-400
>400



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Nomenclature: Crl: HA ORIGIN To Charles River in 1968 from Medical Research Council, Mill Hill. Caesarian derived in 1969.
Coat Colour: Albino. **Research Application:** General multipurpose model, surgical model.

Other Model Available from Charles River

• Hairless Guinea Pig

STRAIN CODE: 161

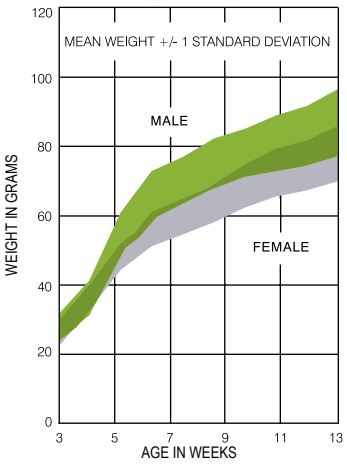
Nomenclature: Crl:HA-Hr^{hr}
Research Application: Dermatology.
Limited availability, upon reservation from Charles River USA.

Gerbils

Crl:MON(Tum)

STRAIN CODE: 243

Age in Days
35-41 (5 weeks)
42-48 (6 weeks)
49-55 (7 weeks)
56-62 (8 weeks)



Growth chart data should be used as a guideline only.
For further information, please refer to page 13 and/or contact us.

Origin: The stock was obtained from Tumblebrook Farms in 1995. Rederived in 1996. **Coat Colour:** Predominantly agouti with some black. **Research Application:** General multipurpose model.

Other Model Available from Charles River

• Syrian Hamsters - Hamsters

STRAIN CODE: 049

Nomenclature: Crl:LVG(SYR)
Research Application: General multipurpose model.
Limited availability, upon reservation from Charles River USA.

Preconditioning Services

Preconditioning services can help alleviate the space, time and labor costs involved with refining a model to meet your unique research requirements. Whether you are looking for animals fed a special diet, altered through surgery or reared to a certain age, Charles River has the state-of-the-art animal facilities, professional animal care and robust model selection to deliver study-ready animals right to your door.

Preconditioning Services

Charles River Preconditioning Services allow researchers to save valuable resources by purchasing animals ready to use for your research. Charles River offers preconditioning studies from standardised to highly individualised protocols to suit your requirements. For further information or a quotation, please contact us.

Feeding Studies / Surgical and Chemical Manipulations

Charles River offers customised preconditioned models in accordance with the objectives/requirements of your experiments.

Models can be pre-fed with special diets to induce obesity, hypertension, stroke or other conditions. Charles River can advise you on the selection of the appropriate diet depending on the model.

Charles River offers specific disease induction by injection or irradiation (e.g. diabetes induced by streptozotocin injection, pristanisation...).

Physiological modifications or specific diseases can be induced by surgical manipulation upon request, see page 64.

Pre-ID™ Services

Quite often you require more than just the animal model. As part of Charles River's preconditioning services, they offer animal identification services.

Description	Mice	Rats	Guinea Pigs	Rabbits
Somark Labstamp®	•			
Ear tag	•			
Microchip	•	•	•	
Ear notch	•	•		
Tattoo	•		•	•

Please note that some Pre-ID™ services listed in this table may be not available from all of European breeding sites. Please enquire.

Aging Studies

In some models, disease conditions develop only as the animal ages. Charles River can hold and care for the animals in a barriered preconditioning room and deliver them to you as needed.

In addition, Charles River also offer 'off the shelf' aged models. Please enquire for availability (see page 3).

Aged Animals	Age
JAX™ Mice strain C57BL/6J	Up to 15 months*

* Older ages available through a special breeding contract in our transgenic services (breeding in isolator).

Therapeutic Field	Induced Model	Surgically Induced Model	Contract Research Service
Metabolic and Cardiovascular	Type 1 or 2 Diabetes (Rat / Mouse) Diet Induced Obesity Models • C57BL/6 DIO Mouse • CD® DIO Rat • Obese Prone Rat STZ Injection	Left Coronary Artery Ligation (Myocardial infarction) Ischemia/perfusion*	Custom Diet Administration • High Fat / Energy Diet • Cholesterol Diet • Cafeteria Diet Organ / Tissue Collection
Nephropathy and Hypertension	Diet Induced Models • Dahl/Salt Sensitive Rat • Stroke Prone Rat	Renal Failure Model (Unilateral or 5/6 Nephrectomy) Ischemia/perfusion	Custom Diet Administration • High Salt Diet Organ/Tissue Collection
Gerontology and Neurodegeneration	Aged Animals	Parkinson's Model (6-OH Induction)	Custom Aging Organ / Tissue Collection Histopathology
Endocrinology	Aged Animals	Ovariectomy Hysterectomy / Castration	Custom Aging Custom Diet Administration Compound Administration
ADME & PK		Vascular Catheterizations Non Vascular Catheterizations	Compound Administration Intermediate / End Point Blood Sampling Clinical Observation Organ collection

Surgery Services

Charles River offers a variety of surgical services on mice and rats at their various locations across Europe. Their surgical procedures are developed in-house and subject to approval by their ethics committee and by the French Ministry of Research and Innovation (APAFIS authorization). The procedures are performed by trained surgical technicians under the supervision of veterinary staff, with regular quality control checks.

Standard surgical procedures are performed on CD® rats, Lewis rats, Lister Hooded rats, OFA, Wistar rats, Wistar Han rats, CD-1® mice, NMRI mice and OF1 mice according to animal specificities in terms of sex, age, and weight.

Catheterisation

		Rats	Mice
Vascular Catheters			
Carotid artery		•	•
Double jugular vein		•	
Femoral artery		•	
Femoral vein		•	•
Jugular vein		•	•
Jugular vein and femoral vein		•	
Portal vein (through mesenteric vein) - For infusion only		•	
Non-Vascular Catheters			
Bladder catheterization		•	
Double catheterization duodenum - bile duct		•	
Gastrointestinal catheterization (Colon, Caecum, Duodenum, Ileum, Jejunum, Stomach) - For infusion only		•	
Intraperitoneal catheterization - For infusion only		•	
External Catheter Access Systems			
PinPort™		•	•
VAB (Vascular Access Button)	One channel	•	
	Dual channel	•	
VAH (Vascular Access Harness)	One channel	•	•
	Dual channel	•	
	Double channel incl.connector for bile duct	•	

Charles River can combine two vascular catheterizations or a non-vascular catheterisation with a vascular catheterisation.

PinPort™ is a trademark of Instech Laboratories, Inc., Plymouth Meeting, Pennsylvania, USA.

Excision Surgery*

	Rats	Mice
Adrenalectomy	•	•
Hypophysectomy	•	
Orchidectomy (castration)	•	•
Ovariectomy	•	•
Parathyroidectomy	•	
Partial hepatectomy (70%)	•	
Splenectomy	•	•
Thyroidectomy with parathyroid implant	•	
Thyro-parathyroidectomy	•	
Vasectomy	•	•

*SHAM upon request. Excision surgery can be combined with catherization.

Disease models*

	Rats	Mice
Arthritis (Freund's Adjuvant)	•	
Bile duct ligation	•	
Myocardial infarction (left coronary artery ligation)	•	•
Nephrectomy 2/6	•	
Nephrectomy 5/6	•	
Parkinson's disease (chemical induction)	•	
Unilateral nephrectomy	•	•

*SHAM upon request.

Neurological Procedures

	Rats	Mice
3rd ventricle cannulation - For infusion only	•	
Bilateral subdiaphragmatic vagotomy	•	
Double intralateral ventricle cannulation* - For infusion only	•	
Intrathecal Catheter	•	
Intracisternal Catheter	•	
Single ventricle cannulation* - For infusion only	•	•

*Sterotaxic data provided by customer.

Device Implantations*

	Rats	Mice
Blood pressure + Electrocardiogram sensor (BP + ECG)	•	
Blood pressure sensor (BP)	•	
Electrocardiogram sensor (ECG)	•	
Electromyogram sensor (EMG)	•	•
Electroencephalogram sensor (EEG)	•	•
Electromyogram + Electroencephalogram sensor (EMG + EEG)	•	•
Hormonal Pellets	•	•
Temperature sensor	•	•

*Telemetry implants are to be provided by the customer.

Training

- Customised Training Sessions : Charles River offers specific training programmes that meet exactly your requirements and aim to provide you with the good practices of surgery and peri operative care technics. Topics include: anesthesia, analgesia, asepsis, peri operative care, surgical procedures.
- Charles River and **Professor René Rémie** are combining their expertise to offer surgery training courses combining lectures with "hands-on" exercises to ensure that you receive the most comprehensive training experience.

Customised Surgical Procedures

Many of Charles River's specialised surgical offerings were developed based on customer demand. If you are interested in a surgically altered model that is not listed on the previous pages, please contact us to discuss the development of a customised procedure (see page 3).

On-site Surgery

Charles River offers surgical procedures performed by our surgeons at your site. Quotations are established individually for each project depending on the complexity and the number of procedures to be performed. Please consult us (see page 3).

From Surgery to Protocol

Surgically prepared animals are available as 'ready-to-use models' for your research protocols. Charles River can also manage many aspects of your *in vivo* protocols, by:

- compound administration
- collecting blood for your pharmacokinetic studies
- collecting many body fluids such as CSF, urine,…
- performing specific clinical observations and organ collection.

Please contact us to discuss your project and see how Charles River could help you design and perform your protocols (see page 3).

Biospecimens

Tissues and Organs

Charles River is able to supply normal tissues and organs from various species. Specimens are frozen at -30°C after sampling then stored at -80°C. Freezing with liquid nitrogen is available on request. Specimens are shipped in insulated dry ice igloos.

RATS & MICE

Adrenals - Bladder - Bones - Brain - Colon - Eyes - Fat Tissue - Jejunum - Heart - Ileum - Kidneys - Liver - Lungs - Muscles - Oesophagus - Ovaries - Pancreas - Pituitary - Gland- Prostate - Salivary Gland - Stomach - Skin - Spinal Cord - Spleen - Tail - Testis – Thymus - Thyroid - Trachea - Uterus - Vessels.

GUINEA PIGS & RABBITS: Upon request

Please enquire for availability of other biospecimens

Blood Products

Blood, serum and plasma can be collected from various species including rodents, rabbits, chickens and turkeys.

Collection of blood, serum and plasma

Serum samples are collected in dry sterile tubes, or by using a coagulation accelerator.
Blood and plasma are collected in sterile tubes containing an anticoagulant.
After centrifugation, serum and plasma are packaged in tubes of different capacities.

Standard anticoagulants:

- Lithium-heparin (15 UI heparin/ml blood)
- Sodium-heparin
- Potassium-EDTA K3 or K2 (1,6 mg/ml blood)
- Sodium citrate solution (0.5ml citrate solution/ml blood)
- Alsever's solution 25% or 50%

Transport of blood, serum and plasma

Serum and plasma are stored at -20°C after collection and usually transported with dry ice. Blood is transported at +4°C.
Blood products will be transported by our own delivery trucks. Transportation charges are calculated according to the destination and the means of transport used.

Mice, Rats and Guinea Pigs

Product	Species
Blood	Rat, Outbred
	Rat, Inbred
	Mouse, Outbred
	Mouse, Inbred
	Guinea Pig
Plasma or serum	Rat, Outbred
	Rat, Inbred
	Mouse, Outbred
	Mouse, Inbred
	Guinea Pig

Blood, serum and plasma can be collected from various species including hen, turkey and rabbits. Please consult us.

Other Fluids

Cerebrospinal Fluid, milk (per ml), faeces and urine (per ml) available from various species.

Antibody Production

Charles River offers monoclonal and polyclonal antisera production in a variety of species, such as mice, rats, rabbits, guinea pigs, chicken, sheep, and goats. Projects can be customized to client-specific requirements or follow Charles River standard protocols. Routes of injection are dependent on species of animal used but include: intradermal (ID), subcutaneous (SC), intramuscular (IM), intravenous (IV), and intraperitoneal (IP).

Monoclonal Antibody Production Services

Charles River develops and produces monoclonal antibodies by production of hybridomas. They offer standard or customized development and production services based on client needs.

Production Steps	
Immunization and harvesting of B cells	
Hybridoma generation (mice and rats only)	Fusion to immortal B cells
	Analysis and selection of antibody
Obtainment of Antibodies	Subcloning
	Production of cell culture supernatant
	Purification of monoclonal antibodies
	Labeling of monoclonal antibodies

Polyclonal Antibody Production Services

Charles River offers polyclonal antibody production services such as antigen synthesis, purification, and analysis. In addition, they can design studies in terms of number of immunizations, duration, sample bleeds, analysis, etc. to meet each individual customer's needs.

Production Steps
Antigen design, synthesis, and conjugation
Immunization and blood harvest
Serum isolation
Titer determination by ELISA
Purification of serum antibodies (isolation of total immunoglobulin fraction by chromatography or isolation of antigen specific antibodies with affinity matrices
Labeling of polyclonal antibodies
Fragmentation of antibodies – production of mouse Fab or F(ab)-2 fragments
Specific assay development

Pharmaceutical Quality Control (Biological Tests)

Charles River offers a set of tests conducted in compliance with Good Manufacturing Practices in our Pharmaceutical Facility (authorised by the French Health Authorities since 2004).

Sample preparation

All types of preparation can be performed (raw materials and drug products or medical devices): Weighing, dilution, cold or hot extraction, autoclaving ...

Sample preparation	Custom protocol

In vivo Pyrogen testing

Tests are performed in a protected area including two housing rooms, one sample preparation room and one testing room. This is equipped with a fully integrated test management system, from temperature recording to interpretation of the results, in compliance with the European, US, Russian, Chinese and Japanese Pharmacopoeias (other Pharmacopoeias on request). Tests are performed using rabbits that are bred in SPF units on the same site.

In vivo Pyrogen test	Preliminary test and test on 3 rabbits

Abnormal toxicity test, Systemic injection test, Safety tests

The Charles River test unit includes housing rooms and a laboratory. Tests are performed in compliance with the European, US, Russian, Chinese and Japanese Pharmacopoeais (other Pharmacopoeais on request) using SPF mice and Guinea pigs sourced from Charles River barrier rooms.

Abnormal toxicity test, Systemic injection test, Safety tests	
Mouse	Custom protocol
Mouse + Guinea pig	Custom protocol

Biological Activity testing

Tests are conducted in Charles River's Immunology and Cell Culture Laboratories. Testing methods include: ELISA, electro-immunodiffusion, and cell-based assays. For other methods, please contact us

Biological activity testing	Custom protocol
Cell culture and banking	Custom protocol

Other biological testing

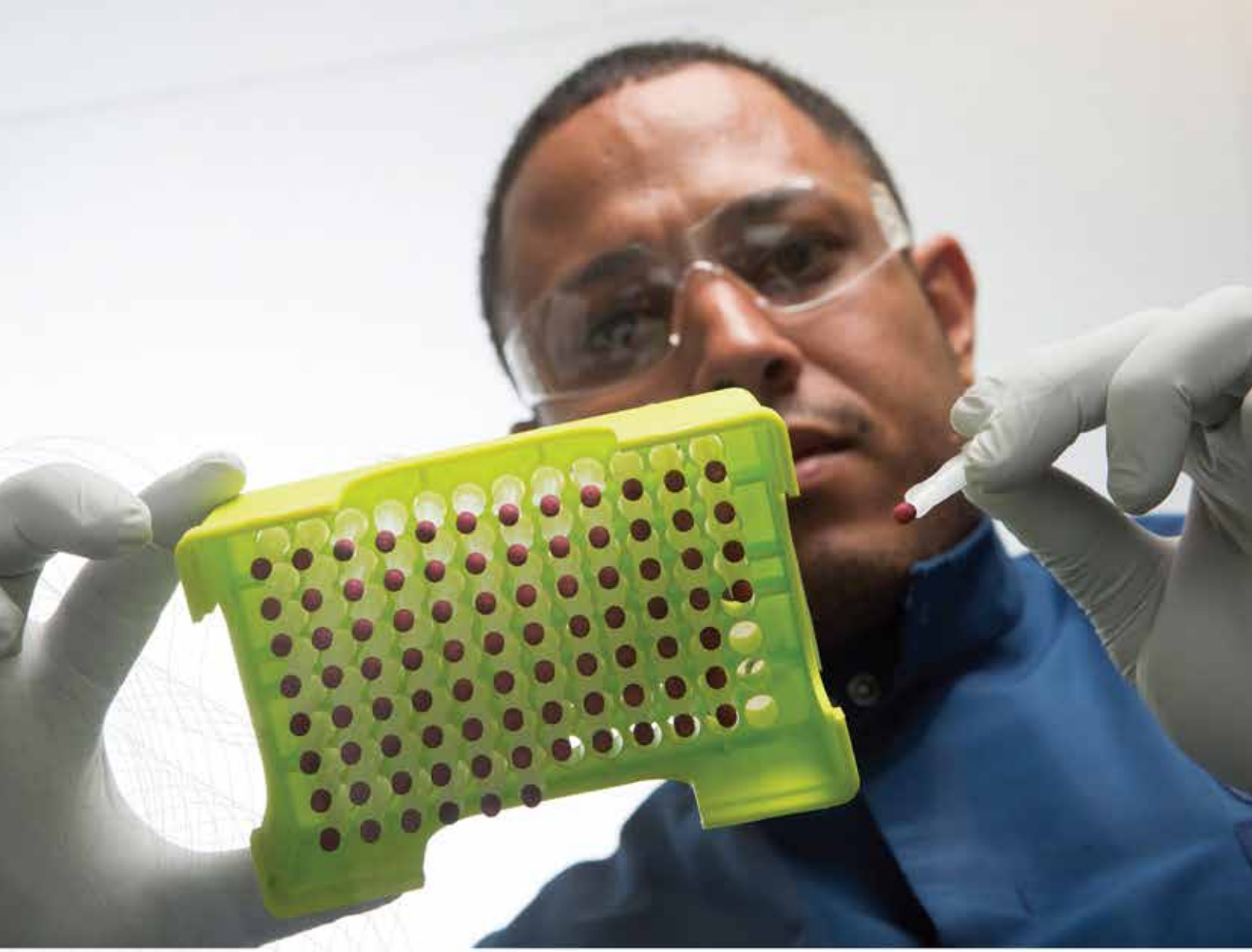
All biological tests (haemolysis test, potency tests) described in any Pharmacopoeia or Sponsor references can be performed. Species used are: rabbit, rat, mouse and Guinea pig. Please contact us for further information.

Biological testing	Custom protocol

Insuling testing

Tests are performed in compliance with Russian Pharmacopoeia using rabbits sourced from Charles River barrier rooms. Glucose cloning from rabbits blood samples and statistical analysis are performed by Charles River.

Prolonged action of insulin products
Method for determination of the biological activity of insulin



360 Diagnostics™

Charles River 360 Diagnostics™ is the only comprehensive partner that offers solutions from prevention to resolution. Through innovations like the HemaTIP™ Microsampler, Laboratory Testing Management® (LTM™), MALDI-TOF for microbial identification, and Exhaust Air Dust (EAD®) testing with our PCR Rodent Infectious Agent (PRIA®) panels, Charles River can manage your animal health surveillance programme effectively and efficiently. To learn more visit www.criver.com/dx

Charles River's goal is to identify and incorporate the most analytically sensitive and specific technologies available in order to provide the most accurate and reproducible results. They perform rigorous research and development prior to the introduction of any new assay or technology and implement standard operating procedures to ensure that your samples yield the correct results. For details regarding services and reagents, including testing platforms, technology and sample submission, please contact us (see page 3).

Diagnostic Laboratory Locations

Charles River has multiple diagnostic laboratories to provide a local, convenient option to you. They receive live animals and samples for diagnostic testing at all of their laboratories:

- North America (Massachusetts and California, US)
- Europe (France)
- Asia (Japan)

The same techniques and technologies are implemented at all of our diagnostic sites worldwide, giving you confidence that they will provide the consistent results that you have come to expect from Charles River.

Complimentary Shipping Materials

Charles River provides International Air Transport Association (IATA)-compliant sample and animal shipping containers (sample shipping materials, shipping labels and containers, live-animal shippers, etc.).

Consultation and Education

Since health concerns vary greatly with facility size and research type, Charles River's Professional and Technical staff members can provide one-on-one consultation and educational presentations on topics, including but not limited to:

- Routine and quarantine health surveillance programme design or refinement, including FELASA recommendations
- Results interpretation
- Prevalent infectious agents, outbreak detection and management
- Technical training for users of serology reagents and LTM™

Submission Forms

In order to expedite the submission process, ensure the safety of Charles River staff, and adhere to regulations, they wish to remind you to please sign the Health Hazards Declaration Form, which includes the presence of zoonotic or class 2 agents as mentioned on the Submission Form.

Research Animal Health Surveillance

- PRIA (PCR Rodent Infectious Agent) panels for Mouse, Rat, Gerbil, Rabbit, Hamster, Guinea pig
- Health monitoring, serology, microbiology and additional tests for: Mouse, Rat, Gerbil, Rabbit, Hamster, Guinea pig, Zebrafish

Cell Line and Research Biologics Screening

PCR Panels to screen for:

- Rodent infectious agents
- Human infectious agents

Cell Line Examination and Report (CLEAR) Panel to detect cell line contamination

Environmental Monitoring

- Microbial/bioburden testing for water, feed and bedding
- Surface testing

Health Data Management

- Laboratory Test Management (LTM™)

LTM™ is Charles River's online, interactive order entry and results management system that centralises your health and genetic testing programmes into one virtual location. Use LTM™ to search for tests and sample submission information, create and track orders, as well as archive and trend your testing results. To learn more, visit www.criver.com/ltm for details.

Health Monitoring (HM) Programmes

Charles River offers several testing options that can either reduce or completely remove the use of sentinels from your health surveillance programmes. Below is an outline of alternative, hybrid and traditional health monitoring programmes.

Alternative (Sentinel-Free) Programmes

Charles River offers Exhaust Air Dust (EAD®) PCR testing as an alternative approach to screening the health of your animal colonies. The increased sensitivity and specificity of this sampling method enables them to detect viruses, bacteria and parasites by screening ventilated caging systems and other environmental surfaces. This approach not only reduces or eliminates the need for sentinels, but it also increases the probability of detecting those infectious agents that are not readily detected by sentinels exposed to soiled bedding. Any of their standard PRIA® panels can be used or customized to more specifically meet your needs.

Rack Type	Sampling Level	Sample Types Options
Individually ventilated cages (IVC)	Rack-level	EAD® swab* Pre-filter media Rack collection device** Direct***
Individually ventilated cages (IVC) with cage-level filtration	Cage-level	Cage filter media Direct***
Static-top filter cages	Rack-level	Direct***
Conventional open-top cages	Rack-level	Environmental swab**** Direct***

** E.g., plenum swab, pre-filter swab and/or exhaust hose swab. ** Caging manufacturer sample collection device. *** E.g., fecal pellets, body swab, oral swab*
***** Swab various surfaces that are in contact with resident animals.*

Hybrid programmes

Hybrid programmes allow for a combination of alternative (environmentally-based) samples to be submitted in combination with direct animal (antemortem) samples such as fecal pellets, body swabs and oral swabs, as well as sentinel serology.

Rack Type	Sampling Level	Sample Types Options
Individually ventilated cages (IVC)	Mixed	Blood/serum Direct** EAD® swab* Rack or cage filter media Cage swab
Static-top filter cages	Mixed	Blood/serum Direct** Cage swab
Conventional open-top cages	Mixed	Blood/serum Direct** Environmental swab***

** E.g., plenum swab, pre-filter swab and/or exhaust hose swab. ** E.g., fecal pellets, body swab, oral swab. *** Swab various surfaces that are in contact with resident animals.*

Traditional Whole-Animal Programmes

Whole animals can be submitted for a Health Monitoring (HM) protocol - samples will be collected in our necropsy laboratory and will be screened for the presence of infectious agents. Also, services offered as part of a HM protocol are available individually - samples can be collected at your facility and directly submitted to our laboratory for testing. Custom testing is available upon request.

Shipping crates containing hydration, food and bedding. Crate delivery. Animal pickup service available on request.

Protocol	Species	Serology*	PCR**	Microbiology***	Parasitology	Pathology
HM Standard	Mouse, rat, g. pig, and rabbit	Tracking Performed on nu/+ for Sentinel Programmes		Upper respiratory and gastrointestinal tracts included Performed on nu/nu for Sentinel Programmes	ndoparasite and ectoparasite exams included Performed on nu/nu for Sentinel Programmes	Gross necropsy with collection of organs in case of lesion (histology upon request)
HM Assessment	Mouse, rat, hamster, g. pig, rabbit, and gerbil	Assessment	*Helicobacter & Lawsonia* (Hamster only)			
HM Plus	Mouse and rat	Assessment Plus Performed on nu/+ for Sentinel Programmes	*Helicobacter*			
HM Quarterly FELASA****	Mouse, rat, g.pig, and rabbit	FELASA Quarterly Performed on nu/+ for Sentinel Programmes	*Helicobacter*			
HM Annually FELASA****	Mouse, rat, hasmter, g.pig, and rabbit	FELASA Annually Performed on nu/+ for Sentinel Programmes	*Helicobacter*			
Custom Protocol	Mouse, rat, hamster, g. pig, rabbit, and gerbil					

** For a full list of serology agents, please see pages 83-88 - ** In addition to the included PCR tests, samples can be collected and screened for the agent(s) of your choice (e.g. Mycoplasma pulmosis) for an added fee. -*
**** For more information on the Microbiology please see page 89. **** FELASA compliant, without opportunistic agents (available upon request)*

HM Protocol pricing includes all tests indicated in the table above. Once you are ready to submit animals, visit LTM™ to create your order online. Prices are available on request, please consult us.

PRIA® (PCR Rodent Infectious Agent) Panels

Detect viruses, bacteria and parasites in principal animal by screening non-invasive samples with a PRIA® Panel. Up to 10 samples (e.g. one fecal pellet each from 10 animals) can be combined and submitted as one pool for PCR testing for no additional charge. View the following pages for the list of agents in each panel. Once you are ready to submit samples, visit LTM™ to create your order online.

	Sample Type				
Mouse and Rat PRIA® Panels	**Fecal Pellets**	**Body Swab**	**Oral Swab**	**Lung**	**EAD® Swab or Environmental Sample**
Prevalent PRIA®	•	•	•	••	•
Prevalent (Immunodeficient) PRIA®	•	•	•	••	•
Fecal PRIA®	•				
Surveillance Plus PRIA®*	•	•	•	••	•
FELASA Basic PRIA® (3-month)	•	•	••		•
FELASA Complete PRIA® (Annual)	•	•	•		•
Bacteria PRIA®	•	•	•		•
Environmental Prevalent PRIA®	••	••	••		•
Environmental Surveillance Plus PRIA®	••	••	••		•
Environmental Complete Mouse/Rat PRIA®	••	••	••		•

*• Required sample type •• Add for increased sensitivity. *Lung is required for Rat Surveillance Plus PRIA® and may be added for increased sensitivity for Mouse Surveillance Plus PRIA®.*

Mouse PRIA® Panels - Direct Animal, Exhaust Air Dust (EAD®), and Environmental Sampling

	Prevalent	Prevalent (Immunodeficient)	Fecal*	Surveillance Plus	FELASA Basic (3-Month)	FELASA Complete (Annual)	Bacteria-Only
Viruses							
Mouse parvoviruses (MVM/MPV)	•	•	•	•	•	•	
Murine norovirus (MNV)	•	•	•	•	•	•	
Mouse coronavirus (MHV)	•	•	•	•	•	•	
Murine rotavirus (MRV/EDIM)	•	•	•	•	•	•	
Mouse theilovirus (TMEV, GDVII)	•	•	•	•	•	•	
NEW Murine chapparvovirus (MCPV)		•					
Adenovirus type 1 & 2 (MAV-1 & MAV-2)			•	•		•	
Reovirus type 1, 2, 3, 4			•	•		•	
Pneumonia virus of mice				•		•	
Sendai virus				•		•	
Ectromelia (mousepox)			•	•		•	
Lymphocytic choriomeningitis virus			•	•		•	
Astrovirus 1 & 2**							
New World hantavirus**							
Bacteria							
Helicobacter	•	•	•	•	•	•	•
Citrobacter rodentium			•	•		•	•
Mycoplasma pulmonis				•		•	•
Streptobacillus moniliformis			•	•		•	•
*Rodentibacter heylii***	•	•	•	•	•	•	•
*Rodentibacter pneumotropicus***	•	•	•	•	•	•	•
Clostridium piliforme			•	•		•	•
CAR *Bacillus*				•			•
Pseudomonas aeruginosa				•			•
Salmonella			•	•		•	•
Campylobacter			•	•			•
Bordetella bronchiseptica				•			•
Bordetella pseudohinzii			•	•			•
Corynebacterium kutscheri			•	•		•	•
Corynebacterium bovis		•	•	•			•
Staphylococcus aureus		•	•	•			•
Streptococcus pneumoniae		•	•	•	•	•	•
Klebsiella pneumoniae		•	•	•			•
Klebsiella oxytoca		•	•	•			•
Beta hemolytic *Streptococcus* group A				•	•	•	•
Beta hemolytic *Streptococcus* group B		•	•	•	•	•	•
Beta hemolytic *Streptococcus* group C			•	•	•	•	•
Beta hemolytic *Streptococcus* group G			•	•	•	•	•
Proteus mirabilis		•	•	•			•
*Leptospira***							
*Francisella tularensis***							
Parasites/Protozoa/Fungi							
Fur mites (*Myobia, Myocoptes, Radfordia*)	•	•		•	•	•	
Pinworms (*Aspiculuris, Syphacia*)	•	•		•	•	•	
Giardia			•	•	•	•	
Spironucleus muris	•	•	•	•	•	•	
Cryptosporidium			•	•	•	•	
Entamoeba	•	•	•	•	•	•	
Pneumocystis	•	•		•			
Demodex		•		•			
Tritrichomonas	•	•		•			

** Direct Animal sampling only. ** Available as a wild rodent add-on. ***Formerly classified as Pasteurella pneumotropica (Heyl & Jawetz)*

Rat PRIA® Panels - Direct Animal, Exhaust Air Dust (EAD®), and Environmental Sampling

	Prevalent	Fecal	Surveillance Plus	FELASA Basic (3-Month)	FELASA Complete (Annual)	Bacteria-Only
Viruses						
Rat polyoma virus (RatPyV2)			•			
Rat parvoviruses (H-1, KRV, RPV, RMV)	•	•	•	•	•	
Rat coronavirus (RCV, SDAV)	•	•	•	•	•	
Rat theilovirus (RTV)	•	•	•	•	•	
Adenovirus type 1 & 2 (MAV-1 & MAV-2)		•	•		•	
Reovirus type 1, 2, 3, 4		•	•		•	
Pneumonia virus of mice			•	•	•	
Sendai virus			•		•	
Seoul (hantavirus)		•	•		•	
New World hantavirus*						
Bacteria						
Helicobacter	•	•	•	•	•	•
Mycoplasma pulmonis			•	•	•	•
Streptobacillus moniliformis		•	•		•	•
*Rodentibacter heylii***	•	•	•	•	•	•
*Rodentibacter pneumotropicus***	•	•	•	•	•	•
Clostridium piliforme		•	•	•	•	•
CAR *Bacillus*			•		•	•
Pseudomonas aeruginosa			•			•
Salmonella		•	•		•	•
Campylobacter		•	•			•
Bordetella bronchiseptica			•			•
Corynebacterium kutscheri		•	•			•
Staphylococcus aureus		•	•			•
Streptococcus pneumoniae		•	•	•	•	•
Klebsiella pneumoniae		•	•			•
Klebsiella oxytoca		•	•			•
Beta hemolytic *Streptococcus* group A			•	•	•	•
Beta hemolytic *Streptococcus* group B		•	•	•	•	•
Beta hemolytic *Streptococcus* group C		•	•	•	•	•
Beta hemolytic *Streptococcus* group G		•	•	•	•	•
Proteus mirabilis		•	•			•
*Leptospira**						
*Francisella tularensis**						
Parasites/Protozoa/Fungi						
Fur mites *(Myobia, Myocoptes, Radfordia)*	•		•	•	•	
Pinworms *(Aspiculuris, Syphacia)*	•		•	•	•	
Giardia		•	•	•	•	
Spironucleus muris	•	•	•	•	•	
Cryptosporidium		•	•	•	•	
Entamoeba	•	•	•	•	•	
Pneumocystis	•		•		•	

** Available as a wild rodent add-on. **Formerly classified as Pasteurella pneumotropica (Heyl & Jawetz).*

Rabbit PRIA® Panels - Direct Animal Sampling*

	FELASA Basic (3-Month)	FELASA Complete (Annual)	Surveillance Plus
Viruses			
Murine rotavirus (MRV/EDIM)	•	•	•
Lymphocytic choriomeningitis virus			•
Rabbit picobirnavirus			•
Rabbit hepatitis E virus			•
Bacteria			
Helicobacter			•
*Rodentibacter heylii***			•
*Rodentibacter pneumotropicus****			•
Clostridium piliforme	•	•	•
CAR *Bacillus*		•	•
Pseudomonas aeruginosa			•
Salmonella		•	•
Bordetella bronchiseptica	•	•	•
Staphylococcus aureus			•
Lawsonia			•
Pasteurella multocida	•	•	•
Treponema paraluiscuniculi			•
Parasites/Protozoa/Fungi			
Pinworms (*Passalurus ambiguus*)	•	•	•
*Francisella tularensis***			
Cryptosporidium	•	•	•
Entamoeba			•
Encephalitozoon cuniculli	•	•	•
Eimeria coccidia			•

** Fecal pellets, body swab and oral swab required for all rabbit and gerbil PRIA® panels. ** Available as an add-on assay. ***Formerly classified as Pasteurella pneumotropica (Heyl & Jawetz).*

Gerbil PRIA® Panels - Direct Animal Sampling*

	Surveillance Plus
Viruses	
Murine rotavirus (MRV/EDIM)	•
Sendai virus	•
Lymphocytic choriomeningitis virus	•
Bacteria	
Helicobacter	•
*Rodentibacter heylii***	•
*Rodentibacter pneumotropicus***	•
Pseudomonas aeruginosa	•
Salmonella	•
Bordetella bronchiseptica	•
Staphylococcus aureus	•
Streptococcus pneumoniae	•
Klebsiella pneumoniae	•
Klebsiella oxytoca	•
Beta hemolytic *Streptococcus* group B	•
Beta hemolytic *Streptococcus* group C	•
Beta hemolytic *Streptococcus* group G	•
Pasteurella multocida	•
Parasites/Protozoa/Fungi	
Fur mites	•
Pinworms	•
Giardia	•
Spironucleus muris	•
Cryptosporidium	•
Entamoeba	•

** Fecal pellets, body swab and oral swab required for all rabbit and gerbil PRIA® panels. **Formerly classified as Pasteurella pneumotropica (Heyl & Jawetz).*

Hamster PRIA® Panels - Direct Animal Sampling*

	FELASA Basic (3-Month)	FELASA Complete (Annual)	Surveillance Plus
Viruses			
Parvovirus (HPV/MVM/MPV)			•
Murine rotavirus (MRV/EDIM)			•
Reovirus type 1, 2, 3, 4			•
Pneumonia virus of mice			•
Sendai virus	•	•	•
Lymphocytic choriomeningitis virus	•	•	•
Polyoma virus			•
Bacteria			
Helicobacter		•	•
*Rodentibacter heylii***	•	•	•
*Rodentibacter pneumotropicus***	•	•	•
Clostridium piliforme		•	•
Pseudomonas aeruginosa			•
Salmonella		•	•
Campylobacter			•
Bordetella bronchiseptica			•
Corynebacterium kutscheri		•	•
Corynebacterium bovis			•
Staphylococcus aureus			•
Streptococcus pneumoniae			•
Klebsiella pneumoniae			•
Klebsiella oxytoca			•
Beta hemolytic *Streptococcus* group A			•
Beta hemolytic *Streptococcus* group B			•
Beta hemolytic *Streptococcus* group C			•
Beta hemolytic *Streptococcus* group G			•
Proteus mirabilis			•
Pasteurellaceae			•
Lawsonia			•
Pasteurella multocida			•
Parasites/Protozoa/Fungi			
Fur mites	•	•	•
Pinworms	•	•	•
Giardia	•	•	•
Spironucleus muris	•	•	•
Cryptosporidium	•	•	•
Entamoeba	•	•	•
Encephalitozoon cuniculli			•
Demodex	•	•	•

** Fecal pellets, body swabs and oral swabs required for all hamster PRIA® panels. **Formerly classified as Pasteurella pneumotropica (Heyl & Jawetz).*

Guinea Pig PRIA® Panels - Direct Animal Sampling*

	FELASA Basic (3-Month)	FELASA Complete (Annual)	Surveillance Plus
Viruses			
Murine rotavirus (MRV/EDIM)			•
Reovirus type 1, 2, 3, 4			•
Sendai virus	•	•	•
Lymphocytic choriomeningitis virus			•
Guinea pig adenovirus	•	•	•
Guinea pig cytomegalovirus		•	•
Guinea pig PIV 3	•	•	•
Bacteria			
Helicobacter			•
Mycoplasma pulmonis			•
Streptobacillus moniliformis		•	•
*Rodentibacter heylii***			•
*Rodentibacter pneumotropicus***			•
Clostridium piliforme		•	•
Pseudomonas aeruginosa			•
Salmonella		•	•
Campylobacter			•
Bordetella bronchiseptica	•	•	•
Corynebacterium kutscheri	•	•	•
Staphylococcus aureus			•
Streptococcus pneumoniae	•	•	•
Klebsiella pneumoniae			•
Klebsiella oxytoca			•
Beta hemolytic *Streptococcus* group A	•	•	•
Beta hemolytic *Streptococcus* group B	•	•	•
Beta hemolytic *Streptococcus* group C	•	•	•
Beta hemolytic *Streptococcus* group G	•	•	•
Pasteurella multocida			•
Parasites/Protozoa/Fungi			
Giardia	•	•	•
Spironucleus muris	•	•	•
Cryptosporidium	•	•	•
Entamoeba	•	•	•
Encephalitozoon cuniculli		•	•

** Fecal pellets and oral swabs required for all guinea pig PRIA® panels. **Formerly classified as Pasteurella pneumotropica (Heyl & Jawetz).*

Serology Profiles

Charles River's primary serology testing method is the Multiplexed Fluorometric ImmunoAssay® or MFIA®. Additionally, they utilize other methods such as the Indirect Fluorescent Antibody Test (IFA), Enzyme-Linked Immunosorbent Assay (ELISA) and Western Blot to confirm questionable or positive results, as well as to screen select rare agents. Blood or diluted serum samples collected at your facility can be submitted directly to their laboratory for testing. Once you are ready to submit samples, visit LTM™ to create your order online.

Mouse Serology Profiles

Agent*	Parvovirus	Prevalent	Tracking	Assessment	Assessment Plus	FELASA Quarterly	FELASA Annual
MPV**	•	•	•	•	•	•	•
MVM	•	•	•	•	•	•	•
Generic parvovirus NS-1	•	•	•	•	•	•	•
MHV**		•	•	•	•	•	•
MNV		•	•	•	•	•	•
TMEV (GDVII)		•	•	•	•	•	•
EDIM (ROTA-A)		•	•	•	•	•	•
SEND			•	•	•		•
PVM			•	•	•		•
REO			•	•	•		•
MPUL			•	•	•		•
LCMV				•	•		•
MAV-1 & MAV-2**				•	•		•
ECTRO				•	•		•
K				•	•		
POLY				•	•		
MCMV					•		
HTNV (HANT)					•		
ECUN					•		
CARB					•		
MTLV					•		
PHV					•		
LDV					•		
CPIL							•
Sample suitability control: tissue	•	•	•	•	•	•	•
Sample suitability control: anti-mouse IgG	•	•	•	•	•	•	•
System suitability control: mouse IgG	•	•	•	•	•	•	•

** Agent abbreviations are defined in the Glossary of Terms.*
*** Multiple assays are included. MPV: several recombinant viral coat proteins (VP2) to detect seroconversion to MPV-1, MPV-2 and MPV-5. MHV: a recombinant MHV nucleocapsid (N) protein and two highly purified whole-viral lysate antigens. MAV: highly purified recombinant antigens to both FL and K87.*

The HemaTIP™ blood microsampler simplifies the blood collection process by placing the media on the tip of an easy-to-hold stylus.
The tip only needs to touch the blood, and its super-absorptive matrix media wicks the sample in 3-6 seconds.To learn more, go to www.criver.com/hematip

Rat Serology Profiles

Agent*	Parvovirus	Prevalent	Tracking	Assessment	Assessment Plus	FELASA Quarterly	FELASA Annual
RatPyV2 (Rat polyomavirus)					•		
RPV	•	•	•	•	•	•	•
H-1	•	•	•	•	•	•	•
KRV	•	•	•	•	•	•	•
RMV	•	•	•	•	•	•	•
Generic parvovirus NS-1	•	•	•	•	•	•	•
SDAV		•	•	•	•	•	•
RTV		•	•	•	•	•	•
PCAR		•	•	•	•		•
SEND			•	•	•		•
PVM			•	•	•	•	•
REO			•	•	•		•
MPUL			•	•	•	•	•
LCMV				•	•		
MAV-1 & MAV-2				•	•		•
HTNV (HANT)					•		•
ECUN					•		
CARB					•		•
IDIR (ROTA-B)					•		
CPIL						•	•
Sample suitability control: tissue	•	•	•	•	•	•	•
Sample suitability control: anti-rat IgG	•	•	•	•	•	•	•
System suitability control: rat IgG	•	•	•	•	•	•	•

* *Agent abbreviations are defined in the Glossary of Terms.*

The HemaTIP™ blood microsampler simplifies the blood collection process by placing the media on the tip of an easy-to-hold stylus.
The tip only needs to touch the blood, and its super-absorptive matrix media wicks the sample in 3-6 seconds.To learn more, go to www.criver.com/hematip

Hamster* Serology Profiles

Agent**	Assessment	FELASA Quarterly	FELASA Annual
SEND	•	•	•
PIV-5	•		
PVM	•		
REO	•		
LCMV	•	•	•
ECUN	•		
CPIL			•
Sample suitability control: tissue	•	•	•
Sample suitability control: anti-hamster IgG	•	•	•
System suitability control: hamster IgG	•	•	•

** Applicable for golden Syrian hamsters only. Other strains should be screened using the serology profile for Miscellaneous Rodent Species.*
*** Agent abbreviations are defined in the Glossary of Terms.*

The HemaTIP™ blood microsampler simplifies the blood collection process by placing the media on the tip of an easy-to-hold stylus.
The tip only needs to touch the blood, and its super-absorptive matrix media wicks the sample in 3-6 seconds.To learn more, go to www.criver.com/hematip

Guinea Pig Serology Profiles

Agent*	Assessment	FELASA Quarterly	FELASA Annual
SEND	•	•	•
PIV-5	•		
PVM	•		
REO	•		
LCMV	•		
ECUN	•		•
PIV-3	•	•	•
MPUL	•		
CPIL			•
GAV	•	•	•
GpCMV			•
Sample suitability control: tissue	•	•	•
Sample suitability control: anti-guinea pig IgG	•	•	•
System suitability control: guinea pig IgG	•	•	•

** Agent abbreviations are defined in the Glossary of Terms.*

The HemaTIP™ blood microsampler simplifies the blood collection process by placing the media on the tip of an easy-to-hold stylus.
The tip only needs to touch the blood, and its super-absorptive matrix media wicks the sample in 3-6 seconds.To learn more, go to www.criver.com/hematip

Rabbit Serology Profiles

Agent*	Tracking	Assessment	FELASA Quarterly	FELASA Annual
ECUN	•	•	•	•
CARB	•	•		•
TREP	•	•		
CPIL		•	•	•
PIV-1		•		
PIV-5 (PIV-2)		•		
REO		•		
ROTA		•	•	•
LCMV		•		
TOXO		•		
RHDV			•	•
MYXO**				
Sample suitability control: tissue	•	•	•	•
Sample suitability control: anti-rabbit IgG	•	•	•	•
System suitability control: rabbit IgG	•	•	•	•

** Agent abbreviations are defined in the Glossary of Terms.*
*** Available as an add-on*

The HemaTIP™ blood microsampler simplifies the blood collection process by placing the media on the tip of an easy-to-hold stylus.
The tip only needs to touch the blood, and its super-absorptive matrix media wicks the sample in 3-6 seconds.To learn more, go to www.criver.com/hematip

Gerbil and Miscellaneous Rodent* Serology Profiles

Agent**	Gerbil Tracking	Gerbil Assessment	Rodent Assessment
LCMV	•	•	•
CPIL	•	•	
MHV		•	•
REO		•	•
SEND		•	•
PVM		•	•
MVM		•	•
ROTA		•	•
PIV-2		•	•
PIV-3		•	•
HTNV (HANT)		•	•
PHV		•	•
ECUN			•
Sample suitability control: tissue	•	•	•

** For applicable species (e.g., Armenian hamster, cotton rat, peromyscus, ground squirrel), contact Charles River.*
*** Agent abbreviations are defined in the Glossary of Terms.*

The HemaTIP™ blood microsampler simplifies the blood collection process by placing the media on the tip of an easy-to-hold stylus.
The tip only needs to touch the blood, and its super-absorptive matrix media wicks the sample in 3-6 seconds.To learn more, go to www.criver.com/hematip

Microbiology Culture

This service can be used in conjunction with an environmental monitoring (e.g., feed, bedding, water) or animal health surveillance programmes, and diagnostic evaluation. Live animals, samples (e.g., swabs, transport media), and organisms for identification can be collected at your facility and submitted directly to Charles River's laboratory for testing. Biochemical analysis (VITEK II) are used for efficient and accurate identification of pure single colonies from culture. See below for a list of agents. Once you are ready to submit samples, visit LTM™ to create your order online.

Upper Respiratory Culture	Mouse	Rat	Rabbit	Gerbil	Hamster	Guinea Pig
Bordetella bronchiseptica	•	•	•	•	•	•
Corynebacterium kutscheri	•	•	•	•	•	•
Klebsiella oxytoca	•	•	•	•	•	•
Klebsiella pneumoniae	•	•	•	•	•	•
Pasteurella multocida	•	•	•	•	•	•
*Rodentibacter heylii**	•	•	•	•	•	•
*Rodentibacter pneumotropicus**	•	•	•	•	•	•
Pseudomonas aeruginosa	•	•	•	•	•	•
Staphylococcus aureus	•	•	•	•	•	•
Streptococcus beta hemolytic (A,B,C,G)	•	•	•	•	•	•
Streptococcus pneumoniae	•	•	•	•	•	•
Proteus mirabilis	•	•	•	•	•	•
Other bacteria upon request	•	•	•	•	•	•

** Formerly classified as Pasteurella pneumotropica (Heyl & Jawetz).*

Gastrointestinal Tract Culture	Mouse	Rat	Rabbit	Gerbil	Hamster	Guinea Pig
Citrobacter rodentium	•					
Klebsiella oxytoca	•	•	•	•	•	•
Klebsiella pneumoniae	•	•	•	•	•	•
Pseudomonas aeruginosa	•	•	•	•	•	•
Salmonella	•	•	•	•	•	•
Other bacteria upon request	•	•	•	•	•	•

Additional Microbiology Services*

Abscess/lesion culture
Aerobic culture

** Euthanasia and collection fees may apply with live animal submissions.*

Environmental Monitoring*

Microbial/bioburden (count)
Sterility (+/- determination)

** Sample types include water, rodent feed, and rodent bedding. Subculture identifcation per colony upon request.*

Surface Testing

Environmental swab (culture) for rodent pathogens
Surface swab (culture) for relative count (genus identification)
RODAC® plate count
RODAC® plate count with identification

RODAC® is a registered trademark of Becton, Dickinson and Company.

Parasitology, Pathology and Other Services

RODENT AND RABBIT PARASITOLOGY

Samples (e.g. feces, swabs or tapes) collected at your facility can be submitted directly to the Charles River laboratory for testing. Once you are ready to submit samples, visit LTM™ to create your order online.

Sample Type	Test
Feces*	Fecal concentration centrifugation (FCC)
	Cryptosporidium PCR
	Entamoeba PCR
	Giardia (*G. lamblia, G. muris*) PCR
	Spironucleus muris PCR
	Tritrichomonas PCR
Fur swab*	Fur mite PCR
	Demodex PCR
Feces, anal and/or fur swab*	Custom parasitology PCR panel
	Pinworm PCR
Tape	Tape test for ectoparasites
	Tape test for endoparasites
Live animal	Direct exam for ectoparasites
	Direct exam for endoparasites
	Wet mount for protozoa

**Up to 8 samples for FCC and 10 samples for PCR can be pooled and tested as a single group with one result reported.*

PATHOLOGY

As part of a HM protocol, gross lesions are collected for histopathology at no additional charge. Further, Charles River offers full-service diagnostic histopathology, either with live-animal submission or by direct submission of fixed tissues, paraffin blocks or slides. Charles River offers histologic evaluation of tissues from multiple species, complete tissue processing and slide preparation, and routine or specialised staining techniques, as well as contract slide preparation and evaluation. Contact Charles River for details and pricing.

OTHER SERVICES AVAILABLE

- Simian (Nonhuman Primate) Health Surveillance*
- Ferret Health Surveillance*
- Serology Reagents for In-House Animal Health Surveillance (MFIA reagents, ELISA reagents, IFA reagents)

** Tests performed in Charles River USA.*

Zebrafish Health Surveillance

Charles River offers zebrafish health surveillance for the research community.

Service	Test Name	Includes	Sampling Unit
Multiple Services	HM Plus	Necropsy, histopathology workup, aerobic culture, PCR for common infectious agents	See LTM™ for details
Histopathology	Processing (with H&E Stain)	Trim, embed, create slides and H&E staining	Per fish
	Special Staining	Multiple special stains available upon request	Per fish
	Pathologist Interpretation	Pathologist interpretation of stained slides	Per fish
Infectious Disease PCR	Mycobacterium Panel	*Mycobacterium abscessus, M. chelonae, M. fortuitum, M. haemophilum, M. marinum, M. peregrinum*	Per pool of up to 5 fish
	Basic Panel	Mycobacterium panel, *Aeromonas hydrophila, Pseudocapillaria tomentosa, Pseudoloma neurophilia*	Per pool of up to 5 fish
	Surveillance Plus Panel	Modified Basic Panel, *Edwardsiella ictaluri, Flavobacterium columnare, Ichthyophthirius multifillis, Infectious pancreatic necrosis virus, Infectious spleen and kidney necrosis virus Piscinoodinium pillulare, Pleistophora hyphessobryconis, Saprolegina branchydanis*	Per pool of up to 5 fish
	Custom Panel	Visit LTM™ to select from list of zebrafish pathogen assays	Per pool of up to 5 fish
	Single Agent Test	Visit LTM™ to select from list of zebrafish pathogen assays	Per pool of up to 5 fish

Cell Line and Research Biologics Screening

Charles River's CLEAR (Cell Line Examination and Report) PCR Panels are performed non-GXP; this service is available for research purposes only. Once you are ready to submit samples, visit LTM™ to create your order online.

PCR Panels to Screen Cell Lines and Research Biologics for Rodent Infectious Agents

Agent	Mouse Essential Panel	Rat Essential Panel	Mouse/Rat Comprehensive Panel
Murine Norovirus (MNV)	•		•
Mouse parvoviruses* (MPV 1-5, MVM)	•		•
Mouse hepatitis virus (MHV)	•		•
Murine Chapparvovirus (MCPV)	•		•
Reovirus (Type 1 & 3) (REO)	•	•	•
Lymphocytic choriomeningitis virus (LCMV)	•	•	•
Lactate dehydrogenase-elevating virus (LDV)	•	•	•
Murine rotavirus [EDIM (ROTA-A)]	•		•
Theiler's murine encephalomyelitis virus (TMEV [GDVII])	•	•	•
Mousepox (Ectromelia) (ECTRO)	•		•
Hantavirus hantaan (HANT)	•		•
Hantavirus seoul (SEO)		•	•
Polyoma virus (POLY)	•	•	•
K virus (K)			•
Adenovirus type 1 & 2 (MAV-1 & MAV-2)	•	•	•
Mouse cytomegalovirus (MCMV)			•
Mouse thymic virus (MTLV)			•
Pneumonia virus of mice (PVM)			•
Sendai (SEND)	•	•	•
Rat cytomegalovirus (RCMV)		•	•
Rat theilovirus (Theiler's-like virus of rats [RTV])		•	•
Rat parvoviruses* (RPV, KRV, RMV, H-1)		•	•
Rat rotavirus [IDIR (ROTA-B)]		•	•
Rat coronavirus (RCV, SDAV)		•	•
Corynebacterium bovis	•	•	•
Mycoplasma (genus) (including *Acholeplasma laidlawii*)	•	•	•
Mycoplasma pulmonis	•	•	•
Vesi Virus	•		•
Positive template control	•	•	•
Negative template control	•	•	•
Spike inhibition control	•	•	•
Nucleis acid recovery control (NARC)	•	•	•

** Strain determination assays are performed on all positive results.*

Contamination CLEAR

Detect contamination of cell lines with cells of another species.

Item
Stand-Alone Service
Add to any Rodent or Human CLEAR Panel or *Mycoplasma* PCR

PCR Panels to Screen Cell Lines and Research Biologics for Human Infectious Agents

Agent	Human HEP/HIV	Human Essential	Human Comprehensive
Polyomavirus (John Cunningham virus)		•	•
Polyomavirus (BK virus)		•	•
Herpesvirus type 6		•	•
Herpesvirus type 7		•	•
Herpesvirus type 8		•	•
Parvovirus B19		•	•
Epstein-Barr virus		•	•
Hepatitis A virus	•	•	•
Hepatitis B virus	•	•	•
Hepatitis C virus	•	•	•
Papillomavirus type 16		•	•
Papillomavirus type 18		•	•
Human T-lymphotropic virus (1 & 2)		•	•
Human cytomegalovirus		•	•
Human immunodeficiency virus type 1	•	•	•
Human immunodeficiency virus type 2	•	•	•
Adeno-associated virus		•	•
Human foamy virus		•	•
Corynebacterium bovis	•	•	•
Mycoplasma (genus) (including *Acholeplasma laidlawii*)	•	•	•
Lymphocytic choriomeningitis virus (LCMV)			•
Hantavirus hantaan			•
Hantavirus seoul			•
Herpes simplex 1		•	•
Herpes simplex 2		•	•
Spike inhibition control	•	•	•
Nucleic acid recovery control (NARC)	•	•	•
Positive template control	•	•	•
Negative template control	•	•	•

Microbiome Diagnostic Services

Comprehensive Germ-Free Colony Health Screening

The single most important specification for germ-free mouse colonies is that they remain free of bacteria. Charles River offers and recommends that both culture-dependent and culture-independent screening methods be used to assure that even fastidious bacteria that are difficult to isolate are detected. Fecal pellets collected per our recommended specifications can be submitted for all methods of germ-free monitoring described below. For a more complete assessment, whole animals, antemortem samples or environmental samples can also be submitted to Charles River's laboratory for standard health monitoring procedures. Charles River's health monitoring experts are available to provide guidance on establishing a routine germ-free assessment programme specific to your colony and research.

Anaerobic and Aerobic Culture. We use state-of-the-art anaerobic chambers, not canister methods, to provide the most sensitive isolation procedures for fastidious obligate anaerobic bacteria, which may take up to 10-12 days to grow. Fecal pellets submitted for culture can also be screened for motile bacteria by wet mount analysis, a culture independent method.

16S Ribosomal RNA PCR. This PCR screening, a culture independent method, uses broadly reactive PCR primers to detect all bacterial phyla. The assay and technology used for this assay prevents false-positive detection commonly caused by other PCR detection methods.

Services	Tests
Germ-Free Testing	Anaerobic and aerobic culture of fecal pellets or isolator samples with identification via MALDI-TOF
	Motility testing by wet mount analysis of cecum (live animal only), feces or swab
	Mycotic (i.e. fungal) culture of cage/isolator swab with identification
	16S ribosomal RNA PCR of feces
Environmental Monitoring	Necropsy with histology of gross lesions
	Aerobic culture of upper respiratory and gastrointestinal tracts with identification via MALDI-TOF mass spectrometry
	Anaerobic culture of cecal contents with identification via MALDI-TOF mass spectrometry
	Serologic viral antibody detection
	PCR Rodent Infectious Agent (PRIA®) testing of postmortem, antemortem, and environmental sampling for viral, bacterial, and fungal/parasitic agents

16S Next Generation Sequencing (NGS)

16S Next Generation Sequencing (NGS) analysis provides a snapshot of the bacteria colonizing the intestinal tract of your research mice using GI contents or fecal pellets. 16S NGS analysis is an important part of routine monitoring of your research colonies' microbiome to verify that custom or complex bacteria consortia remain stable. 16S NGS can also be used for microbiome investigations that require monitoring of control and treatment groups before, during and after experiments. The relative abundance of bacteria at multiple taxonomical levels is provided for each sample so that increases and decreases in bacteria abundance can be determined. A provided standard report compares samples or treatment groups using Alpha and Beta Diversity Analysis.

Genetically Engineered Models and Services

Charles River has taken pride in being a comprehensive provider of integrated services, including customized breeding programmes, quarantine space, genetic testing, rederivation, IVF and cryopreservation.

They developed a custom-designed software solution called ICM™ (Internet Colony Management) for both project and vivarium management. Tablet computers and RFID are used to capture data and colony information in real time, instantly providing full visibility of activities with easy online access. To learn more or to view a video of the system in action, visit www.criver.com/icm.

Colony Management

With Charles River's revolutionary Internet Colony Management System (ICM™), you will have 24-hour access to review real time data and direct action within your colony from anywhere, while their project management team provides comprehensive support to help you achieve your study goals.

Charles River breeding facilities located in Europe also serve as The Jackson Laboratory's exclusive commercial providers of certain research services using JAX™ Mice. Services offered include mouse embryology services and contract breeding of specialised JAX™ Models. For more information regarding services related to importation of specialised JAX Mice strains, please visit website www.criver.com/jaxmice.

Quarantine Services

Dedicated, isolator-based space reserved for assessing the health profile of animals coming from outside institutions. Charles River offers several different standard quarantine options and can develop custom protocols to meet animal facility requirements. Please contact Charles River to discuss these custom options.

Service	Description	Estimated Time Line
PRIA® Quarantine	Up to 10 mice	4 weeks
Standard Quarantine	18 cages isolator, including complete health report	11 weeks

Breeding Services

Charles River offers space for holding, breeding, and developing genetically engineered colonies. All colonies are assigned a dedicated project manager and clients are granted access to our innovative Internet Colony Management (ICM) system. ICM provides a two-way communication portal with real-time data access, a comprehensive suite of colony management tools, and a complete historical record of all colonies housed at Charles River. Breeding Services are invoiced monthly depending on the real number of cages needed.

Customised projects can include:

- Husbandry
- Mating
- Weaning
- Animals identification
- Biopsies
- Health monitoring controls
- Dedicated Project Manager

Charles River can also house your harmful phenotype lines and set up required actions including special diets, enrichment, and more.

Embryology Services

Charles River's European embryology lab is one of the largest in the world with more than 20 years of experience in the manipulation of mouse and rat preimplantation embryos. Their knowledgeable team uses the latest technologies including laser assisted IVF and CRISPR/Cas9 transgenesis to offer a wide range of services and industry-leading performance to their clients.

Charles River also serves as The Jackson Laboratory's exclusive commercial providers of certain research services using JAX™ Mice. Services offered include mouse rederivation, cryorecovery and line amplification services.

The Jackson Laboratory

Mouse Embryology

Rederivation

Rederivation by embryo transfer eliminates unwanted parasites, viruses, bacteria and other opportunistic agents from research colonies.

Service	Description	Objective / Deliverables
Rapid rederivation	Transgenic x wildtype Or transgenic x transgenic	2 visibly pregnant females, no Health Monitoring report
Standard rederivation	Transgenic x wildtype Or transgenic x transgenic	At least 3 SOPF breeding pairs or 10 mice with Health Monitoring report

Options: Biopsies and genotyping of animals upon reception at our facilities

Cryopreservation

Cryopreservation of sperm and/or embryos creates a cost-effective backup for live animal colonies in the event of a microbial contamination, catastrophic accident or natural disaster, and/or the cessation or alteration of genetic expression in later generations. Cryopreservation also provides an alternative to maintaining live animals for strains that are not currently being used, but may serve a purpose in the future. Charles River's flexible service portfolio can be adapted to your specific needs, with the benefit of saving both significant cage space and animal care resources, while allowing better management of the active colonies being used for your research.

Service	Description	Objective/Deliverables
	EMBRYOS	
Embryos cryopreservation	HE x Wildtype	300 frozen embryos including QC1
	HO x Wildtype	150 frozen embryos including QC1
	HE x HE	200 frozen embryos including QC1
	All other matings	150 frozen embryos including QC1
Embryos Quality Controls	QC1: **standard** *in vitro* quality control	Thawing of embryos and monitoring of *in vitro* development to 4-cell stage
	QC2: **optional** *in vivo* quality control, replaces QC1 if selected	Thawing of embryos and reimplantation into 2 recipient females for birth check
	SPERM	
Sperm cryopreservation	Freezing and pooling of sperm collected from 2 males with the same genotype	About 15 straws including QC1
Sperm Quality Controls	QC1: **standard** *in vitro* quality control	IVF and monitoring of generated embryos development to 2-cell stage
	QC2: **optional** *in vivo* quality control	IVF and transfer of generated embryos into 2 recipient females for birth check
	STORAGE	
Embryo and sperm Cryostorage	Storage of straws in liquid nitrogen	Storage in 2 geographically distant locations

Cryorecovery

While cryopreserving your valuable genetically engineered animals is an important part of protecting your research against unforeseen events, having the ability to recover live animals from the frozen stock quickly and efficiently is equally critical to safeguarding your lines. At Charles River, their skilled embryology laboratory have the techniques and equipment to successfully recover frozen embryos or sperm with short timelines. Their extensive experience combined with advanced technology such as laser-assisted in vitro fertilization give you peace of mind that you can obtain live animals from your cryopreserved embryos or sperm exactly when you need them.

Service	Description	Objective / Deliverables
Embryos and sperm cryorecovery	Biological material frozen and stored at Charles River	All SOPF mice with at least 3 breeding pairs or 10 mice
	Biological material from institutions outside Charles River	All SOPF mice

Combined Services

Save money by combining embryology services such as rederivation or revitalization and cryopreservation. Charles River will design the appropriate combination of services and pricing to respond to your specific needs. Please consult us.

Assisted Reproduction

Charles River continually invests in innovations and in sophisticated IVF techniques so animals can be produced more quickly and in greater quantities than with traditional methods. A main criterion for successful IVF is the use of sperm with acceptable motility and concentration. In the case of low quality sperm, laser assisted IVF is utilized to increase fertilization rates and, ultimately increase the number of live offspring returned to you. For this procedure an XYClone™ laser is used to create an aperture in the zona pellucida of each oocyte, providing means for spermatozoa with low fertilizing ability to penetrate the oocyte. This technique greatly enhances the fertilization efficiency of many genetically engineered lines and could stand as a vital tool in the rescue of valuable strains.

Service	Description	Objective/Deliverables
Rapid expansion of colony	IVF from frozen or fresh sperm and reimplantation of generated embryos into recipients females	On demand
Line rescue	Laser assisted IVF from frozen or fresh sperm and reimplantation of generated embryos into recipients females	All SOPF pups
Sperm phenotyping	Computer Assisted Sperm Analysis (CASA)	Report detailing sperm concentration, global motility, progressive motility and sperm morphology

All animals are delivered with a full health monitoring report.

Embryo Kits

Charles River has designed tools to facilitate a model creation process at your facility. By offering ready-to-use embryos, the BlastoKit® allows transgenesis laboratories to simplify blastocyst production for ES cell injection. Step-by-step instructions make it easy to do it yourself, guiding you through our proven process.

	Description	Objective / Deliverables
BlastoKit®: C57BL/6N, B6 Albino (C57BL/6N-*Tyr*$^{c-Brd}$/BrdCrCrl), BALB/C-AnNCrl	Small: 400 embryos	10 straws containing frozen morulae
	Large: 1600 embryos	40 straws containing frozen morulae
BlastoKit® : other strains	Please ask for further information	According to customer needs

Mouse Embryo Assay

The mouse embryo assay (MEA) is currently the most widely used bioassay to test for toxicity and functionality of media and devices used in medically assisted procreation. The Charles River group utilizes fresh one or two-cell embryos to perform this service. The embryos are collected and incubated in the culture media to be tested. Alternatively, the culture media can be exposed to the device for a predetermined amount of time.

After exposure, the embryos are then cultured for approximately 72-96 hours in a defined and tested culture medium and scored for embryo development until blastocyst stage. Exposure conditions to test media or devices are defined in collaboration with the customer. Tests are conducted by the Charles River embryology team which has over 20 years of experience in manipulation of preimplantation embryos.

Rat Embryology

Rederivation

Rederivation can eliminate unwanted parasites, viruses, bacteria and other opportunistic agents from research colonies.

Service	Description	Objective / Deliverables
Rapid rederivation	Transgenic x Wildtype Charles River	2 visibly pregnant females, no Health Monitoring report
Standard rederivation	Transgenic x Wildtype Charles River Or transgenic x transgenic	At least 2 SOPF breeding pairs or 5 rats with Health Monitoring report

Options: Biopsies and genotyping of animals upon reception at our facilities.

Cryopreservation

Cryopreservation of sperm and/or embryos creates a cost-effective backup for live animal colonies in the event of a microbial contamination, catastrophic accident or natural disaster, and/or the cessation or alteration of genetic expression in later generations. Cryopreservation also provides an alternative to maintaining live animals for strains that are not currently being used, but may serve a purpose in the future. Charles River's flexible service portfolio can be adapted to your specific needs, with the benefit of saving both significant cage space and animal care resources, while allowing better management of the active colonies being used for your research.

Service	Description	Objective/Deliverables
	EMBRYOS	
Embryo cryopreservation	HE x Wildtype	300 frozen embryos including QC1
	HO x Wildtype	150 frozen embryos including QC1
	HE x HE	200 frozen embryos including QC1
	All other matings	150 frozen embryos including QC1
Embryos Quality Controls	QC1: **standard** *in vitro* quality control	Thawing of embryos and monitoring viability
	QC2: **optional** *in vivo* quality control, replaces QC1 if selected	Thawing of embryos and reimplantation into 2 recipient females for birth check
	STORAGE	
Cryostorage embryo	Storage of straws in liquid nitrogen	Storage of samples in 2 geograpically distant locations

Cryorecovery

While cryopreserving your valuable genetically engineered animals is an important part of protecting your research against unforeseen events, having the ability to recover live animals from the frozen stock quickly and efficiently is equally critical to safeguarding your lines. At Charles River, our skilled embryology laboratory has the techniques and equipment to successfully recover frozen embryos or sperm within reduced timeline. Charles River's extensive experience combined and advanced technology gives you the peace of mind that you can obtain live animals from your cryopreserved embryos exactly when you need them.

Service	Description	Objective / Deliverables
Embryos cryorecovery	Cryorecovery from embryos frozen and stored at Charles River	SOPF animals with at least 2 breeding pair or 5 rats
	Cryorecovery from embryos from external institutions	All SOPF rats

Microinjection Services

Charles River can help you bridge the gap from *in vitro* to *in vivo* models thanks to its new microinjection laboratory located in Europe. Their dedicated team will prepare and inject your ES cells or genetic material (DNA, CRISPR, ES recombinant clones). Choose the appropriate package described below and provide us your biological material to receive your SOPF mice.

Service	Description	Deliverables
	ES cells	
ES Cell injection Package I	Expansion of ES cells for injection and freezing ES cells injected into ~80 embryos Reimplantation into SOPF foster female Husbandry • Weaning	All SOPF chimeric animals Technical report
ES Cell injection Package II	Package I + Breeding to F1 generation (includes biopsies for genetic testing)	All SOPF transgenic animals Technical report
Options	Customised genotyping of offspring	Technical report
	Aneuploidy screening (total or partial) in ES clones (Giemsa or ddPCR)	Technical report
	Customised ES cell genetic characterisation (PCR and/or Southern blot)	Technical report
	CRISPR	
CRISPR injection Package I	Injection into 200 embryos C57BL/6N Reimplantation into SOPF foster females Husbandry • Weaning • Biopsies for genetic testing	All SOPF transgenic animals Technical report
CRISPR injection Package II	Package I + Breeding to F1 generation (includes biopsies for genetic testing)	All SOPF transgenic animals Technical report
Options	Customised genotyping of offspring	Technical report
	Off target analysis on F1 animals	Technical report
	Other genetic backgrounds available on request	
	DNA	
Package I Plasmid or BAC	Injection up to 500 embryos C57BL/6N Reimplantation into SOPF foster females Husbandry • Weaning • Biopsies for genetic testing	All SOPF transgenic animals Technical report
Package II	Package I + Breeding to F1 generation (includes biopsies for genetic testing)	All SOPF transgenic animals Technical report
Options	Customised genotyping of offspring	Technical report
	Other genetic backgrounds available on request	

All animals are delivered with a full health monitoring report.

CRISPR/Cas9 used under licenses to granted and pending US and international patents from The Broad Institute and ERS Genomics Limited.

Genetic Testing Services

Full-service porfolio of DNA based testing provides details on the genetic background of your models, enabling you to make informed decisions about your breeding programmes and research. Charles River's cloud-based Laboratory Testing Management system, LTM™, lets you easily schedule sample submissions and view results online for seamless communication with their lab.

Genotyping

Service	Description
Standard PCR*	Single PCR (1 allele)
	Double PCR (2 alleles)
	Triple PCR (3 alleles)
PCR with restriction digest	e.g. SCID, NOD
qPCR	Zygosity testing in transgenic lines
Single SNP assay	Single Nucleotide Polymorphism Testing

Relative Copy Number Determination

Service	Description
qPCR	Relative quantitation of transgenes

Absolute Copy Number Determination

Service	Description
qPCR	Absolute quantitation of transgenes using calibration row

Assay Set Up & Development

Service	Description
Assay set up for standard & qPCR	PCR set up with protocol information provided by customer
Standard PCR assay development	Design of a new PCR assay
qPCR assay development	Design of a new qPCR assay

Background Strain Characterisation

Service	Description
MAX-BAX® Speed Congenics	Marker assisted accelerated backcrossing
384 SNP	Completed background analysis panel
128 SNP	C57BL/6 substrain panel
SNP QC	32 marker assay for contamination detection

Expression Testing

Service	Description
Expression testing	RNA expression testing

Strain Specific Genetic Variation

Service	Description
Disease Model Testing	NOD, SCID, *Foxn1* testing

* For more than 3 alleles, please consult us

Resources

Glossary of Terms

Agent	Abbreviation	Family/Order	Subfam/Genus	Host Species*
Adenovirus	MAV, RAD	Adenoviridae	Mastadenovirus	M, R
Aleutian disease virus	ADV	Parvoviridae	Amdovirus	F
Cilia-associated respiratory bacillus	CARB	Unclassified	Unclassified	M, R, Rb
Clostridium piliforme	CPIL	Clostridiaceae	Clostridium	M, R, Rb, F
Distemper virus	CDV	Paramyxoviridae	Morbillivirus	F
Ectromelia virus (Mousepox)	ECTRO	Poxviridae	Orthopoxvirus	M
Eimeria	EIM	Eimeriidae	Eimeria	Rb
Encephalitozoon cuniculi	ECUN	Pleistrophoridiae	Encephalitozoon	M, R, GP, H, Rb
Encephalomyocarditis virus	EMCV	Picornaviridae	Cardiovirus	M, R
Epizootic catarrhal enteritis	ECE	Coronaviridae	Unclassified	F
Guinea pig adenovirus	GAV	Adenoviridae	Mastadenovirus	GP
Guinea pig cytomegalovirus	GpCMV	Herpesviridae	Betaherpesvirus	GP
Hantaan	HANT	Bunyaviridae	Hantavirus	M, R
Infectious pancreatic necrosis virus	IPNV	Birnaviridae	Aquabirnavirus	Z
Infectious spleen and kidney necrosis virus	ISKNV	Iridoviridae	Megalocytivirus	Z
Influenza A virus	INFA	Orthomyxoviridae	Influenzavirus A	F
Kilham rat virus	KRV	Parvoviridae	Parvovirus	R
Lactate dehydrogenase-elevating virus	LDV/LDH	Arteriviridae	Arterivirus	M
Ljungan virus	LV	Picornaviridae	Parechovirus	R
Lymphocytic choriomeningitis virus	LCMV	Arenaviridae	Arenavirus	M, R, GP, H
Minute virus of mice	MVM	Parvoviridae	Parvovirus	M
Mouse cytomegalovirus	MCMV	Herpesviridae	Betaherpesvirus	M
Mouse hepatitis virus	MHV	Coronaviridae	Coronavirus	M
Mouse parvovirus	MPV-1/-2/-5	Parvoviridae	Parvovirus	M
Mouse pneumonitis virus	K	Polyomaviridae	Polyomavirus	M
Mouse thymic virus	MTLV	Herpesviridae	Unclassified	M
Murine norovirus	MNV	Caliciviridae	Norovirus	M
Murine Rotavirus	MRV/EDIM	Reoviridae	Rotavirus	M
Mycoplasma arthritidis	MARTH	Mycoplasmataceae	Mycoplasma	M, R
Mycoplasma pulmonis	MPUL	Mycoplasmataceae	Mycoplasma	M, R
Myxomatosis virus	MYXO	Poxviridae	Leporipoxirus	Rb
Parainfluenza virus (type 1)	PIV-1	Paramyxoviridae	Respirovirus	Rb
Parainfluenza virus (type 2)	PIV-2	Paramyxoviridae	Rubulavirus	Rb
Parainfluenza virus (type 3)	PIV-3	Paramyxoviridae	Respirovirus	GP
Parvovirus NS-1	NS-1	Parvoviridae	Parvovirus	M, R
Pneumocystis carinii	PCAR	Pneumocystidaceae	Pneumocystis	R
Pneumonia virus of mice	PVM	Paramyxoviridae	Pneumovirus	M, R, GP, H
Polyoma virus	POLY	Polyomaviridae	Polyomavirus	M
Prospect Hill virus	PHV	Bunyaviridae	Hantavirus	M
Rabbit adenovirus	RbAV	Adenoviridae	Mastadenovirus	Rb
Rabbit hemorrhagic disease virus	RHDV	Caliciviridae	Lagovirus	Rb
Rabbit rotavirus	ROTA	Reoviridae	Rotavirus	Rb
Rat coronavirus/sialodacryoadentitis virus	RCV, SDAV	Coronaviridae	Coronavirus	R
Rat cytomegalovirus	RCMV	Herpesviridae	Betaherpesvirus	R
Rat minute virus	RMV	Parvoviridae	Parvovirus	R
Rat parvovirus	RPV	Parvoviridae	Parvovirus	R
Rat rotavirus (infectious diarrhea of infant rats)	ROTA-B/IDIR	Reoviridae	Rotavirus	R
Rat theilovirus (Theiler's-like virus of rats)	RTV	Picornaviridae	Theilovirus	R
Reovirus	REO	Reoviridae	Orthoreovirus	M, R, GP, H
Rabbit picobirnavirus	RPBV	Picobirnaviridae	Picobirnavirus	Rb
Sendai virus	SEND	Paramyxoviridae	Respirovirus	M, R, GP, H
Seoul virus	SEO	Bunyaviridae	Hantavirus	M, R
Simian virus 5	PIV-5	Paramyxoviridae	Rubulavirus	GP, H
Theiler's murine encephalomyelitis virus	TMEV (GDVII)	Picornaviridae	Cardiovirus	M, R
Toolan's H-1 virus	H-1	Parvoviridae	Parvovirus	R
Toxoplasma gondii	TOXO	Sarcocystidae	Toxoplasma	Rb
Treponema paraluis-cuniculi	TREP	Spirochaetales	Treponema	Rb

** Species: M = mouse, R = rat, GP = guinea pig, H = hamster, Rb = rabbit, F = ferret, Z = zebrafish*

Agent	Abbreviation	Family/Order	Subfam/Genus	Host Species
Hepatitis A	HEP-A	Picornaviridae	Hepatovirus	Simian
Herpes B virus	HBV	Herpesviridae	Alphaherpesvirus	Simian
Herpes virus papio-2	HVP-2	Herpesviridae	Alphaherpesvirus	Simian
Lymphocryptovirus	LCV	Herpesviridae	Lymphocryptovirus	Simian
Macaque (Rhesus) rhadinovirus	RRV	Herpesviridae	Rhadinovirus	Simian
Malaria (Plasmodium)	MAL	Plasmodiidae	Plasmodium	Simian
Measles virus	MV	Paramyxoviridae	Morbillivirus	Simian
Simian agent 8	SA-8	Herpesviridae	Simplexvirus	Simian
Simian cytomegalovirus	SCMV/CMV	Herpesviridae	Cytomegalovirus	Simian
Simian foamy virus	SFV	Retroviridae	Spumavirus	Simian
Simian immunodeficiency virus	SIV	Retroviridae	Lentivirus	Simian
Simian rotavirus	SA-11	Reoviridae	Rotavirus	Simian
Simian T-lymphotropic virus	STLV	Retroviridae	Deltaretrovirus	Simian
Simian type D retrovirus	SRV	Retroviridae	Betaretrovirus	Simian
Simian varicella virus	SVV	Herpesviridae	Varicellovirus	Simian
Simian virus 40	SV-40	Polyomaviridae	Polyomavirus	Simian
Trypanosoma cruzi (Chagas Disease)	*T. cruzi*/CHA	Trypanosomatidae	Trypanosoma	Simian

General Terms & Conditions of Sale
("Terms and Conditions")

Charles River Laboratories Research Models and Services, Germany GmbH and Charles River Biopharmaceutical Services, GmbH ("Charles River") will provide the products ("Products") and services ("Services") described in the Charles River acknowledgement, quotation, protocol, or statement of work ("SOW") and Charles River's customer ("Customer") will purchase the Products and Services pursuant to the specifications contained in the SOW and in accordance with these Terms and Conditions. These Terms and Conditions will also apply to all future purchases of Products and Services by Customer.

1. Binding Character
1.1 All sales and or purchases of Products and Services are (a) governed by these Terms and Conditions and (b) made expressly conditioned upon Customer's acceptance of these Terms and Conditions.
1.2 No other document attempting to negate or otherwise modify the terms hereof, including any purchase order or request for proposal or any deviating or supplementing standard terms and conditions of Customer, will be binding upon Charles River unless expressly agreed to Charles River in writing. Instead these Terms and Conditions, including any special terms and conditions set forth separately as supplemented by any applicable provisions of Applicable Law, shall exclusively govern the sale of Products and Services by Charles River. This also applies if Charles River delivers Products or provides Services despite being aware of conflicting or additional standard terms and conditions of Customer.

2. Provision of the Products and Conduct of the Services
2.1 Charles River will adhere to all laws, rules and regulations applicable to the provision of the Products and the conduct of the Services at the place of performance ("Applicable Law").
2.2 If an amendment to the SOW requires additional or different work on the part of Charles River, Charles River may agree to conduct such work and will be paid an amount mutually agreed to by the parties. Deviations from the SOW may be made in an emergency without Customer's approval, provided that Charles River use commercially reasonable efforts to obtain Customer's verbal approval, which will be subsequently confirmed by Customer in writing. The parties acknowledge that during the course of performing the Services in accordance with the SOW, additional costs may be incurred by Charles River as a result of procedural changes, which do not amount to, or require a change in, the SOW, but which are deemed necessary by Charles River to successfully perform the Services, and which could not be foreseen at the time of the preparation of the SOW. If such procedural change occurs, Charles River will advise Customer prior to implementation and solicit Customer's agreement as to the necessity and additional cost thereof. If Charles River is unable to contact Customer in advance, Customer agrees that in order to maintain the integrity of the Services, Charles River may proceed accordingly, and be entitled to recover such additional costs from Customer upon presentation of an explanation of such procedural changes and the necessity thereof.
2.3 Charles River's offers are without obligation. Unless expressly confirmed by Charles River in writing, any indicated delivery dates or indicated lead times do not constitute fixed date transactions within the meaning of §323 para. 2 No. 2 German Civil Code (BGB) or §376 German Commercial Code (HGB). Any deliveries are "ex works" (Incoterms 2010) at Charles River's premises unless expressly agreed otherwise with Customer in writing. Place of performance and delivery is at Charles River's premises.

3. Restrictions on Use and Breeding
3.1 Customer understands that Charles River engages in a comprehensive health monitoring, bioexclusion and quality control program. Customer agrees the results of this program only provide retrospective information relating to the timing and effectiveness of sampling and that Charles River's program is not a substitute for customer's own health monitoring and bioexclusion practices. Charles River does not warrant the Products will be free of infectious agents or other defects at time of delivery. Charles River will provide assistance for monitoring and testing to Customer upon written request subject to the availability of such assistance and Customer paying the standard fees for such assistance.
3.2 Products will be used by Customer in a safe manner and in accordance with all Applicable Laws. Customer agrees and will ensure that all animals purchased from Charles River, descendants of those animals derived by inbreeding or crossbreeding, including unmodified derivatives of those animals or their descendants ("Models") will not be: (i) used for any purpose other than the internal research of Customer in compliance with Applicable Law, (ii) bred (for sale or otherwise) or provided to any third party for any use, or (iii) provided to any agent or other third party to provide breeding or other services, unless Charles River provides Customer with prior written authorization. For safety reasons, Customer will not, without the prior written consent of Charles River, return Products or shipping containers to Charles River.
3.3 The purchase of any Products conveys to Customer the non-transferable, non-sublicensable, non-exclusive right to internally use the Product and the components of the Products only in research conducted by Customer and specifically in accordance with the SOW. Customer cannot sell or otherwise transfer or make available to a third party the Products or their components or the Services for Commercial Purposes. "Commercial Purposes" means any activity for cash or other consideration including, but not limited to:
(1) use of the Products or their components or materials made using the Products or their components in manufacturing, or to provide a service, information or data, or for clinical, therapeutic, diagnostic or prophylactic purposes or (2) resale of the Products or their components or materials made using the Product or its components, except by licensed distributors of Charles River, whether or not resold for use in research. The foregoing limitations are required by Charles River given the nature and sensitivity of the Products and Services provided by Charles River. To the extent that Charles River owns or controls (with the right to sublicense) patent rights or other intellectual property rights applicable to the Products or their intended use, those rights are licensed to Customer on a limited, revocable, non-exclusive, non-transferable and non-sublicensable basis only for the internal uses expressly permitted above and solely for the Products purchased. If Customer fails to comply with the foregoing limitations, in addition to any other remedies available to Charles River, the right of use granted under the preceding sentence will automatically terminate.

4. Compensation
4.1 Unless otherwise agreed to by the parties, prices will be as per the price list on the day of dispatch, and they do not include applicable taxes, packaging, insurance or shipment expenses. The price list may be reviewed by Charles River annually. Customer will pay Charles River as set forth in the SOW. All invoices are due and payable thirty (30) days from the date of the invoice without any deductions and Customer agrees to pay all invoices submitted. Customer will not withhold payment, assert a right of retention or set off any counterclaims unless Customer's counterclaims have been finally adjudicated by a competent court or have been acknowledged by Charles River in writing. All amounts not paid by Customer when due will accrue interest from the applicable due date until paid, at the highest rate permitted under Applicable Law. Charles River may also elect to cease or suspend the supply of the Products, any work on the Services or withhold required reports or other deliverables if Customer does not make payments when due and payable.
4.2 All applicable termination, delay or cancellation fees will be set forth in the current Research Models and Services catalog.
4.3 If in the judgment of Charles River, Customer's financial condition is precarious or there has been a materially adverse change in Customer's financial condition, Charles River will have the right to demand payment or other assurances which it deems adequate before providing any Products and Services.

5. Test Article
5.1 Customer will provide Charles River with sufficient amounts of compounds, materials, animals, substances, devices and protocols meeting relevant specifications, including health and genetic data ("Test Articles") with which to perform the Services. Customer will provide Charles River with complete and accurate data to apprise Charles River of the identity, strength, purity, stability, composition or other characteristics, proper storage and safe handling requirements of the Test Articles, including a Material Safety Data Sheet or equivalent documentation. Customer will certify to Charles River that the methods of synthesis, fabrication, or derivation of the Test Article have been documented. All costs associated with shipping the Test Articles to Charles River will be the responsibility of Customer, and Charles River will not be responsible for any loss, damage or destruction of the Test Articles while in transit. All Test Articles and Products used in connection with the Services will remain the property of Customer.

6. Reports
6.1 Charles River will keep complete and accurate records of the status and progress of the Services if, and as required by, the SOW. Charles River will furnish a report or data containing information as specified in the SOW. All reports will be prepared in the standard format of Charles River.
6.2 Neither Charles River nor Customer will publish any report or data prepared for Customer by Charles River without the prior written consent of the other party, which will not be unreasonably withheld.
6.3 If Charles River provides electronic access to the data, records, reports and other documentation and Customer elects to use such electronic access, the use of such electronic access will be governed by Charles River's standard access terms and conditions which are available on request.

7. Inspections
7.1 Upon reasonable advance written notice and during regular business hours, Charles River will permit Customer to visit the Charles River facilities where the Services are performed to monitor Charles River's performance of the Services, in compliance with Charles River's biosecurity measures, taking into account Charles River's business requirements and ensuring an uninterrupted course of business at Charles River's premises.
7.2 Charles River will notify Customer as soon as practical in the event of any regulatory inspection of Charles River's facilities that directly impact the Services provided to Customer.

8. Ownership
8.1 Any inventions, techniques and intellectual property, technology, commercial and industrial secrets, regardless of whether patented or registered, for providing the Products or performing the Services are, and will remain, Charles River's exclusive property including, but not limited to, present and future documentation, scientific and technical data, test procedures and other information that is owned or licensed by Charles River and is not developed hereunder. Charles River will have the right to use concurrent control data as part of its general historical database. Any data, discoveries or inventions developed or generated, which directly relate to any information or materials provided by Customer hereunder including, without limitation, new data, uses, processes or compositions will be the exclusive property of Customer. Charles River agrees to assist Customer in securing any patents, copyrights or other proprietary rights in such data, discoveries or inventions, and to perform all acts that may be reasonably required to vest in Customer all right, title and interest in such data, discoveries or inventions, and Charles River will be compensated at its standard rates for such assistance. All costs and expenses associated with establishing Customer's rights therein will be Customer's responsibility.

9. Archiving

9.1 All reports and supporting documentation resulting from the Services are Customer's property ("Materials"). Except as otherwise set forth in the SOW, and if requested in writing by Customer, Charles River will retain the Materials for a period of one year following the date of any final report, or for such shorter period as may be required by Applicable Law. At the end of such period, Charles River will contact Customer to determine disposition of the Materials as follows: (a) extended storage of the Materials; (b) return of the Materials to Customer at Customer's expense or (c) disposal of Materials at Customer's expense. If Customer requests Charles River to continue to store the Materials and Charles River agrees, the cost for storage of the Materials will continue to be invoiced to Customer at Charles River's then current rates. If Customer fails to give such instructions, Charles River will notify Customer, and if instructions are not forthcoming within thirty (30) days of said notification, Charles River will have the option of continuing to store the Materials or returning the Materials to Customer at Customer's expense. Customer will be liable for storage charges until the Materials are returned to Customer. While the Materials are in transit to Customer, all risk of loss or exposure to the Materials will be borne by Customer.
9.2 If the Materials require special storage requirements, additional charges for storage will be assessed and invoiced to Customer. Invoices will be issued annually in advance and are due and payable upon receipt.

10. Warranties

10.1 Customer warrants that it owns all rights, title and interest in the Test Articles furnished to Charles River and the intellectual property related thereto, and that Charles River's use of the Test Articles does not infringe any third party rights.
10.2 Subject to section 3, Charles River warrants that the Products and Services will conform to the specifications contained in the SOW and Applicable Law at the time of delivery. Charles River does not warrant or represent that the results of the Services will be acceptable to any regulatory or governmental agency to which they are presented nor that the results of the Services will enable Customer to further develop, market or otherwise exploit the Test Articles or any other product or service.
10.3 Customer will, without undue delay, examine all Products upon delivery and will give prompt notice of any defects. Charles River will be entitled to immediately inspect any defects and/or, at its election, to have a third party perform such inspection. Any warranty claims must be made in writing to Charles River within ten (10) business days after the Products are delivered or the completion of Services, after which time the Products or Services will be deemed finally accepted unless a defect was not and could not be discovered by the required careful inspection upon delivery. Charles River will be entitled, at its election, to correct or replace the defective Product or Service or to refund the purchase price. The delivery of a defective Product or Service will not constitute a violation of a material contractual obligation by Charles River.
10.4 Risk of loss and title to the Products will pass to Customer once the
Products leave Charles River's facility or are delivered to a common carrier, as applicable.
10.5 The limitations period for warranty claims is 12 months.

11. Limitation of Liability

11.1 Charles River will not be liable for penalties or liquidated damages or for special, indirect, consequential punitive, exemplary or incidental damages of any type or kind (including, without limitation, lost profits) regardless of whether any such losses or damages are characterized as arising from breach of contract, breach of warranty, tort, negligence, strict liability or otherwise, even if Charles River is advised of the possibility of such losses or damages, or if such losses or damages are foreseeable.
11.2 Charles River's liability, regardless of the form of action, will be limited to actual and foreseeable damages and will not exceed the total price paid for the Products or Services pursuant to which such liability arises. This will also apply to claims for compensation for fruitless expenditures. Charles River will not be liable for any damages arising from, or in connection with, any decision by Customer or any third party to further research, develop or market the Test Articles or any derivative or product or service related thereto, or the use made of the Products, Services or Test Articles derivative or service related thereto.
11.3 In the case of a delay in delivery for which Charles River is responsible,
Charles River's maximum liability is limited to an amount of 5% of the value of the delivery affected by the delay.
11.4 The limitations period for any claims of Customer is 12 months unless
mandatory statutory provisions require a longer period of limitation.
11.5 The limitations of liability contained in this section 11 will not apply to (a) any damages that are attributable to gross negligence or willful misconduct of Charles River or its vicarious agents, (b) any culpable damages to a person's life, body or health, (c) any foreseeable damages that are caused by a culpable violation of a material contractual obligation by Charles River or its vicarious agents, and (d) mandatory statutory liability of Charles River under the German Product Liability Act.
11.6 To the extent that the liability of Charles River is excluded or limited under this section 11, the same exclusion or limitation also applies to the liability of Charles River's affiliates.

12. Indemnities

12.1 Customer will defend, indemnify, save and hold harmless Charles River and its parent, subsidiaries and affiliates and their respective directors, officers, employees and agents from and against any claims, demands, suits, actions, causes of action, losses, damages, fines and liabilities, including reasonable professional fees arising out of or in connection with or attributable to (a) the research, development, manufacture, distribution, use, sales or other disposition by Customer, or any distributor, collaborator, customer, sublicensee, representative or agent of Customer, of the Test Articles and/ or any other substances upon which the Services were performed or any use made of the Products, or (b) any infringement of any third party's patent or other intellectual property rights or unauthorized use or misappropriation of its know-how or trade secrets, or (c) Customer's gross negligence or willful misconduct, or breach of this agreement or (d) personal injury related to contact with the Products during visits to Charles River's facilities or after delivery of the Products to Customer, and will pay any costs and damages which, by final judgement, after exhaustion of all reasonable appeals, may be assessed against them.

13. Insurance

13.1 Each party will have insurance sufficient to cover its interest or potential liabilities hereunder including, but not limited to, worker's compensation, if applicable, and comprehensive general liability.

14. Confidentiality

14.1 In the course of providing the Products or performing the Services, Charles River and Customer may exchange proprietary and confidential information. The parties will identify, in writing, such information as confidential and/or proprietary. If a party intends to disclose confidential information to the other party orally, the disclosing party will (i) alert the other party of the confidential nature of the disclosure prior to the disclosure and (ii) provide written notice to the other party of the confidential nature and contents of such disclosure within ten (10) days of the original disclosure. Each party will use its commercially reasonable efforts to maintain such information in confidence and will employ reasonable and appropriate procedures to prevent its unauthorized publication or disclosure unless required by Applicable Law to disclose such information. Neither party will use the other party's proprietary and/or confidential information for any purpose other than in performance of this Agreement. The obligations of confidentiality set forth in this Section will survive termination or expiration of this Agreement for a period of five (5) years.
14.2 The confidentiality provisions in this Section will not apply to any part of such information, which (i) is known to the receiving party at the time it was obtained from the disclosing party; (ii) is acquired by receiving party from a third party, and such third party did not obtain such information directly or indirectly from the disclosing party under obligation not to disclose; (iii) is or becomes published or otherwise in the public domain other than by violation of this Agreement by the receiving party; (iv) is independently developed by the receiving party without reference to or reliance upon the information provided by the disclosing party; or (v) is required to be disclosed by the receiving party to comply with applicable laws or governmental regulations; provided that the receiving party provides prompt written notice of such disclosure to the disclosing party and cooperates with the disclosing party's reasonable and lawful actions to avoid and/or minimize the extent of such disclosure.

15. Termination

15.1 Unless otherwise specified in the SOW, Customer will have the right to terminate the SOW at any time without cause upon thirty (30) days prior written notice to Charles River. In the event of such termination, Charles River will be paid for all Products provided or Services rendered through the effective date of termination, together with any additional expenses incurred in connection with the shutdown of the Services including, without limitation, any irrevocably committed costs and any cancellation or termination fee set forth in the SOW.
15.2 Either party may terminate these Terms and Conditions or SOW, as applicable, at any time upon thirty (30) days prior written notice to the other party, for material breach of the Terms and Conditions by the other party if such breach is not remedied to the non-breaching party's reasonable satisfaction within the thirty (30) day notice period.
15.3 Upon termination, neither party will have any further obligations, except that (i) the liabilities accrued through the date of termination and (ii) the obligations which by their terms survive termination, including the applicable confidentiality, record keeping, regulatory compliance, intellectual property and indemnification provisions of these Terms and Conditions, will survive termination.

16. Force Majeure

16.1 Except with respect to the payment of any amount due hereunder, neither party will be considered in default of the performance of any obligation hereunder to the extent that the performance of such obligation is prevented or delayed by fire, flood, earthquake, hurricane, explosion, disease, contamination, strike, acts of terrorism, war, insurrection, embargo, government requirement, civil or military authority, animal activism, act of God, or any other event, occurrence or condition which is not caused, in whole or in part, by that party, and which is beyond the reasonable control of that party.

17. Governing Law and Dispute Resolution

17.1 These Terms and Conditions and any dispute arising from or in connection with the sale of the Products and/or Services are governed by, and will be construed in accordance with, German law, excluding the United Nations Convention on the International Sale of Goods and without regard to any choice of law principle that would dictate the application of the law of another jurisdiction.
17.2 The parties will attempt to resolve through negotiations any controversy, claim, or dispute arising out of or in connection with these Terms and Conditions or their validity. If the negotiations are not successful, the controversy, claim, or dispute will be submitted to third party mediation upon terms reasonably acceptable to the parties. If such claim, controversy or dispute is not resolved through mediation, upon written demand of either party, the claim, controversy or dispute will be submitted to arbitration. Such arbitration will take place in Munich, Germany, will be conducted in English, and will proceed in accordance with the Arbitration Rules of the German Institution of Arbitration (DIS) without recourse to the ordinary courts of law. A record and transcript of the proceedings will be maintained. Any award will be made in writing and in reasonable detail, setting forth the findings of fact and conclusion of law supporting the award. The determination of a majority of the panel of arbitrators will be the decision of the arbitrators, which will be binding regardless of whether one of the parties fails or refuses to participate in the arbitration. The arbitrators will decide on the recovery of the costs of the arbitration, and statutory attorneys' fees.

18. JAX™ Mice

18.1 The sale by Charles River of JAX™ Mice will be governed by the terms and conditions of The Jackson Laboratory, which can be found at https://www. jax.org/about-us/legal-information/terms-and-conditions-of-product-use.

19. Miscellaneous

19.1 All notices from one party to the other will be in writing. Notices will be sent
by internet transmission, overnight courier, or certified mail, return receipt requested. All notices will be effective upon receipt.
19.2 The business relationship of Charles River to Customer is that of an
independent contractor and not of a partnership, joint venture, employer, agent or any other kind of relationship.
19.3 These Terms and Conditions, and the rights and obligations hereunder, may not be assigned or transferred by either party without the prior written consent of the other party.
19.4 These Terms and Conditions together with the SOW set forth the entire agreement and understanding between the parties, superseding any and all previous statements, negotiations, documents, agreements and understandings, whether oral or written, as to the subject matter hereof.
19.5 In the event that any one or more of the provisions contained in these Terms and Conditions is held to be invalid, illegal or unenforceable in any respect, that invalidity, illegality or unenforceability will not affect any other term or condition, and all other terms and conditions will remain in full force and effect.
19.6 Any modification or waiver of these Terms and Conditions will require written form. This written form requirement also applies to a waiver or modification of the written form requirement itself.

20. Intellectual Property

SCANBUR

Improving Life Sciences

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