



Immunodeficient Animal Models

Nude and SCID

The breeding and maintenance of immunodeficient models in isolator colonies is a highly specialized and extremely important task. Health monitoring needs to be stringent, consistent and thorough because of the high susceptibility to infection that these models possess. Health monitoring test results are available on our website and are included with the delivered crates.

When working with immunodeficient models from Charles River, you can be assured that:

- Animals are produced in semi-rigid and flexible film isolators of varying sizes; currently, more than 1,000 isolators are maintained throughout North America.
- Temperature and humidity are tightly controlled with 24-hour monitoring and backup.
- Feed and bedding are received in vacuum-packed, gamma-irradiated packages.
- Sterilized water is supplied in special one-gallon bags.
- Packages/items are sterilized with CLIDOX® prior to introduction into the isolators.

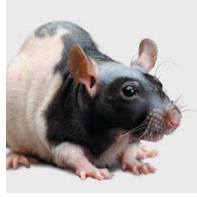
Our customers can rest assured that Charles River immunodeficient research models are produced under the highest quality production processes possible, from conception to delivery. Animals are packed prior to shipping in custom-designed, biosecure crates (Gnoto-safe™).

In addition to offering these high-quality immunodeficient models, Charles River can also help you effectively utilize them. Our Discovery and Imaging Services and Preclinical Services groups have extensive experience employing these models in support of our clients' research and drug development programs and can custom-tailor their services to meet your needs. For more information, please contact our Technical Services department at 1-800-338-9680.

Overview

Immunodeficient research models are extremely useful in a wide range of biomedical research, including infectious disease, immunology and oncology studies. Due to the unique vulnerability that makes these models vital to research, their care and maintenance demands a high level of expertise and technological resources.

At Charles River, we utilize our decades of research model experience, our high level of scientific and technological expertise and our state-of-the-art facilities to ensure that only the highest quality immunodeficient research models are produced for our clients.



Nude Models

CD-1® Nude Mouse

Strain Code: 086 (homozygous), 087 (heterozygous) **Nomenclature:** Crl:CD-1-*Foxn1^{nu}*

Therapeutic Area: Immunology, Oncology, Transplantation **Origin:** Developed from the transfer of the nude gene to a CD-1® mouse through a series of crosses and backcrosses, beginning in 1979 at Charles River. **Characteristics:** Outbred; albino background; hairless; lacks a thymus; unable to produce T-cells, therefore immunodeficient. Heterozygotes are immune-competent and have hair. There is variation in the amount of hair found on the homozygous nude.

NU/NU Mouse

Strain Code: 088 (homozygous), 089 (heterozygous) **Nomenclature:** Crl:NU-*Foxn1^{nu}*

Therapeutic Area: Immunology, Oncology, Transplantation **Origin:** Originated from NIH and was initially thought to be a BALB/c congenic. Later determined that it was not inbred. Maintained as an outbred and not associated with any stock or strain. **Characteristics:** Outbred; albino background; hairless; lacks a thymus; unable to produce T-cells, therefore immunodeficient. Heterozygotes are immune-competent and have hair. There is variation in the amount of hair found on the homozygous nude.

BALB/c Nude Mouse

Strain Code: 194 (homozygous), 195 (heterozygous) **Nomenclature:** CAnN.Cg-*Foxn1^{nu}*/Crl

Therapeutic Area: Immunology, Oncology Transplantation **Origin:** Developed through crosses and backcrosses between BALB/cABom-nu and BALB/cAnNCrj-nu at Charles River Japan. Pedigreed pregnant females of CAnN.Cg-*Foxn1^{nu}*/Crl were received from Charles River Japan in 1985 and rederived. **Characteristics:** Congenic/inbred; albino background; hairless; lacks a thymus; unable to produce T-cells, therefore immunodeficient. Heterozygotes are immune-competent and have hair. There is variation in the amount of hair found on the homozygous nude.

NIH-III Mouse

Strain Code: 201 (homozygous), 202 (heterozygous) **Nomenclature:** Crl:NIH-*Lyst^{bg} Foxn1^{nu} Btk^{xid}*

Therapeutic Area: Immunology, Oncology, Transplantation **Origin:** Most commonly called the NIH-III, model was developed at NIH. In addition to the T-cell deficiency, this model has two other mutations important in regulating the function of the immune system. A natural killer cell mutation, referred to as beige (bg), renders NK cells impaired in the model. The x-linked immune defect (xid) affects the maturation of T-independent B lymphocytes. However, the extent of the T-independent B lymphocyte and NK cell deficiencies in the NIH-III has not been fully established. **Characteristics:** Outbred; light to dark gray pigmented skin; lacks a thymus; triple deficient (T-cell deficient, NK and B-cell impairment). Heterozygotes are immune-competent and have hair. There is variation in the amount of hair found on the homozygous nude.

RNU Nude Rat

Strain Code: 316 (homozygous), 118 (heterozygous) **Nomenclature:** Crl:NIH-*Foxn1^{nu}*

Therapeutic Area: Immunology, Oncology, Transplantation **Origin:** Developed beginning in 1979 through a series of matings in which the Rowett nude gene was added and backcrossed into eight inbred rat strains. To Charles River from the NIH Animal Genetic Resources and caesarean rederived in 2001. **Characteristics:** Outbred; coat color - white, black, black & white. This athymic, which is T-cell deficient, model shows depleted cell populations in thymus-dependent areas of peripheral lymphoid organs. Heterozygotes are immune-competent and have hair. There is variation in the amount of hair found on the homozygous nude.



SCID (Severe Combined Immunodeficiency) Models

SCID Hairless Outbred (SHO™) Mouse

Strain Code: 474 Nomenclature: Crl:SHO-*Prkdc^{scid} Hr^{hr}*

Therapeutic Area: Immunology, Oncology, Transplantation **Origin:** Produced by Charles River Research Models in 2007 by inter-crossing the Crl:HA-*Prkdc^{scid}* and Crl:SKH1-*Hr^{hr}* stocks, resulting in a double-homozygous model exhibiting the SCID and hairless phenotype.

Characteristics: Outbred; albino background; hairless. Severe combined immunodeficiency (autosomal recessive mutation) affects both B and T lymphocytes. Normal natural killer (NK) cells, macrophages and granulocytes.

SCID Hairless Congenic (SHC™) Mouse

Strain Code: 488 Nomenclature: CB17.SKH-*Prkdc^{scid} Hr^{hr}*/Crl

Therapeutic Area: Immunology, Oncology, Transplantation **Origin:** Produced by Charles River Research Models in 2008-2009 by intercrossing the two mutations and applying marker-assisted accelerated backcrossing (MAX-BAX®) for five generations to ensure that the background is fully defined. **Characteristics:** Congenic/inbred; albino background; hairless; double homozygote. The SCID mutation (*Prkdc^{scid}*) affects both B and T lymphocyte development. Normal natural killer (NK) cells, macrophages and granulocytes.

Fox Chase SCID® Congenic Mouse

Strain Code: 236 Nomenclature: CB17/Icr-*Prkdc^{scid}*/IcrlcoCrl

Therapeutic Area: Immunology, Oncology, Transplantation **Origin:** Developed in 1980 by Bosma and associates in BALB/c-*Igh^b* (C.B-17/Icr) mice at Fox Chase Cancer Center in Philadelphia, PA. To Charles River in 1991 from an Iffa Credo foundation colony. SCID mice possess a genetic autosomal recessive mutation (*scid*) that has been mapped to the centromeric end of chromosome 16. **Characteristics:** Congenic/inbred; albino background. The SCID mutation (*Prkdc^{scid}*) affects both B and T lymphocyte development. Normal natural killer (NK) cells, macrophages and granulocytes.

Fox Chase SCID® Beige Mouse

Strain Code: 250 Nomenclature: CB17.Cg-*Prkdc^{scid} Lyst^{bg}*/Crl

Therapeutic Area: Immunology, Oncology, Transplantation **Origin:** 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 in 1993. **Characteristics:** Congenic/inbred; albino background. A congenic mouse that possesses both of the genetic autosomal recessive mutations: SCID (*Prkdc^{scid}*) and beige (*Lyst^{bg}*). The SCID mutation affects both B and T lymphocyte development. The beige mutation results in impaired natural killer (NK) cells.

NOD SCID Mouse

Strain Code: 394 Nomenclature: NOD.CB17-*Prkdc^{scid}*/NcrCrl

Therapeutic Areas: Immunology, Oncology, Transplantation **Origin:** SCID mutation (*Prkdc^{scid}*) was transferred onto a non-obese diabetic (NOD) background. To Charles River in 2005 from the Frederick Cancer Research and Development Center. **Characteristics:** Inbred; albino background. Animals homozygous for the SCID mutation on the NOD background have impaired T- and B-cell lymphocyte function and lack NK function and the ability to stimulate complement activity. This model does **not** develop Type 1 diabetes.



Charles River Immunodeficient Models

Strain	Hair	T-Cells	B-Cells	NK Cells	Complement
CD-1 [®] Nude	No	No	Yes	Yes	Yes
NU/NU	No	No	Yes	Yes	Yes
BALB/c Nude	No	No	Yes	Yes	Yes
NIH III Nude	No	No	No	Impaired	Yes
RNU Nude Rat	No	No	Yes	Yes	Yes
SHO [™]	No	No	No	Yes	Yes
SHC [™]	No	No	No	Yes	Yes
CB17 SCID [®]	Yes	No	No	Yes	Yes
SCID [®] Beige	Yes	No	No	Impaired	Yes
NOD SCID	Yes	No	No	Impaired	No



**For more information, please contact our
Technical Services department at 1-800-338-9680.**