**Overview**

**Also Known As:** NSG-(K<sup>b</sup>D<sup>b</sup>)

NSG-(K<sup>b</sup>D<sup>b</sup>) mice are NOD.scid.Il2Rγc ("NSG") animals with knockout alleles of the MHC class I genes (K<sup>b</sup> null and D<sup>b</sup> null). Homozygous NSG-(K<sup>b</sup>D<sup>b</sup>) mice lack murine major histocompatibility complex (MHC) class I and exhibit reduced xenogeneic graft-versus-host disease response (xeno-GVHD) following human peripheral blood mononuclear cells (PBMC) engraftment. These mice may be useful for transplantation studies to investigate the role of MHC class I and central and peripheral tolerance in the xeno-GVHD.

**Donating Investigator**

Dr. Leonard D. Shultz, The Jackson Laboratory

---

**GENETIC OVERVIEW**

**Genetic Background**

<table>
<thead>
<tr>
<th>Allele Type</th>
<th>Gene Symbol</th>
<th>Gene Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Targeted (Null/Knockout)</td>
<td>H2-K1</td>
<td>histocompatibility 2, K1, K region</td>
</tr>
<tr>
<td>Prkdc&lt;sup&gt;scid&lt;/sup&gt;</td>
<td>Prkdc</td>
<td>protein kinase, DNA activated, catalytic polypeptide</td>
</tr>
<tr>
<td>II2rg&lt;sup&gt;tm1Wjl&lt;/sup&gt;</td>
<td>II2rg</td>
<td>interleukin 2 receptor, gamma chain</td>
</tr>
<tr>
<td>H2-D1&lt;sup&gt;tm1Bpe&lt;/sup&gt;</td>
<td>H2-D1</td>
<td></td>
</tr>
</tbody>
</table>

**Generation**

?+N1F17

(2019-06-12 00:00:00)

Live mice available in varying quantities. Ask Customer Service for details.
### RESEARCH APPLICATIONS

- Immunology, Inflammation and Autoimmunity Research
- Research Tools
- Internal/Organ Research
- Virology Research
- Cancer Research
- Cardiovascular Research
- Hematological Research
- Developmental Biology Research

### BASE PRICE

- Starting at:
  - $232.18 Domestic price for male 4-week
  - $2,854.50 Domestic price Cryo Recovery

### Details

- **NSG-(K^b D^b)^null** mice are NOD. *scid.II2Rγc^null* ("NSG"; Stock No. 005557) animals also harboring knockout alleles of the MHC class I genes (K^b null and D^b null). NSG-(K^b D^b)^null females homozygous for all three mutations, and males homozygous for *scid*, homozygous for K^b null, homozygous for D^b null and hemizygous for the X-linked *II2Rγc^null* may be collectively referred to as homozygous NSG-(K^b D^b)^null mice.

Although viable and fertile, homozygous NSG-(K^b D^b)^null mice are immunodeficient: they have no mature T cells or B cells, lack functional natural killer (NK) cells, are deficient in cytokine signaling, and do not express murine major histocompatibility complex (MHC) class I molecules (lack classical MHC class I-region associated (a) heavy chains).
While both homozygous NSG and homozygous NSG-(K$^{b}$D$^{b}$)$^{\text{null}}$ mice readily allow engraftment of human peripheral blood mononuclear cells (PBMC), the MHC class I-deficiency of homozygous NSG-(K$^{b}$D$^{b}$)$^{\text{null}}$ mice attenuates development of the xenogeneic graft-versus-host disease (xeno-GVHD) observed for homozygous NSG animals.

xeno-GVHD is mediated by donor T cell recognition of murine MHC classes I and II. The role of central and peripheral tolerance in development of GVHD was examined in NSG, MHC class I-deficient NSG-(K$^{b}$D$^{b}$)$^{\text{null}}$ and MHC class II-deficient NSG-Ab$^{b}$ (see Stock No. 021885). Following an engraftment protocol using CD34+ hematopoietic stem cells (HSC) from human fetal liver, the human CD45+ cell chimerism was comparable in all three strains. However, the survival of NSG-(K$^{b}$D$^{b}$)$^{\text{null}}$ was significantly reduced.

Similar to other immunodeficient strains, maintaining homozygous NSG-(K$^{b}$D$^{b}$)$^{\text{null}}$ mice in high health status (specific pathogen-free) vivaria promotes overall colony health. If homozygous NSG-(K$^{b}$D$^{b}$)$^{\text{null}}$ animals are maintained in low health barrier rooms, the use of medicated water (e.g., sulfatrim/trimethoprim-sulfa or enrofloxacin/Baytril) is suggested to increase overall colony health.

View our Resources for the NSG mouse model, including discussion forum, immunodeficient model comparison, and categorized, up-to-date references.
Genotyping Protocols
Standard PCR: H2-D1 Alternate3
Probe: Il2rg-PROBE
End Point Analysis: Prkdc End Point
Standard PCR: Il2rg
Standard PCR: H2-K1alternate2
Standard PCR: H2-D1
Probe: H2-K1 Probe Alternate5

Genotyping resources and troubleshooting
Dietary Information
LabDiet® 5K52 formulation (6% fat)

Breeding Considerations
NSG-(K^b D^b )^{null} females homozygous for all three mutations, and males homozygous for scid, homozygous for K^b null, homozygous for D^b null and hemizygous for the X-linked Il2Rγc^{null} may be collectively referred to as homozygous NSG-(K^b D^b )^{null} mice. When maintaining a live colony, homozygous NSG-(K^b D^b )^{null} females may be bred with homozygous NSG-(K^b D^b )^{null} males.

Homozgyous NSG-(K^b D^b )^{null} mice are immunodeficient. As such, and similar to other immunodeficient strains, maintenance in high health status (specific pathogen-free) vivaria promotes overall colony health. If homozygous NSG-(K^b D^b )^{null} animals are maintained in low health barrier rooms, the use of medicated water (e.g., sulfatrim/trimethoprim-sulfa or enrofloxacin/Baytril) is suggested to increase overall colony health.

Additional Breeding and Husbandry Support

Mating System
See "Breeding Considerations"

Appearance
Albino
Related Genotype: A/A Tyr^c/Tyr^c

Citation
When using the NSG-(K^b D^b )^{null} mouse strain in a publication, please cite the originating article(s) and include JAX stock #023848 in your Materials and Methods section.

Animal Health Reports
Facility Barrier Level Descriptions

AX12 (Maximum)

Pricing & Availability
Available

Live mice available in varying quantities. Ask Customer Service for details.

Domestic Pricing for
Commercial & For-Profit
Not-For-Profit & Academic

Pricing effective for USA, Canada and Mexico shipping destinations

<table>
<thead>
<tr>
<th>AGE</th>
<th>SEX</th>
<th>GENOTYPE</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>4 weeks</td>
<td>Female</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$274.05</td>
</tr>
<tr>
<td>4 weeks</td>
<td>Male</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Hemizygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$232.18</td>
</tr>
<tr>
<td>5 weeks</td>
<td>Female</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$274.05</td>
</tr>
<tr>
<td>5 weeks</td>
<td>Male</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Hemizygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$232.18</td>
</tr>
<tr>
<td>6 weeks</td>
<td>Female</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$274.05</td>
</tr>
<tr>
<td>6 weeks</td>
<td>Male</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Hemizygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$232.18</td>
</tr>
<tr>
<td>7 weeks</td>
<td>Female</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$274.05</td>
</tr>
<tr>
<td>7 weeks</td>
<td>Male</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Hemizygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$232.18</td>
</tr>
<tr>
<td>8 weeks</td>
<td>Female</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$274.05</td>
</tr>
<tr>
<td>8 weeks</td>
<td>Male</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Hemizygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$232.18</td>
</tr>
<tr>
<td>9 weeks</td>
<td>Female</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$274.05</td>
</tr>
<tr>
<td>9 weeks</td>
<td>Male</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Hemizygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$232.18</td>
</tr>
<tr>
<td>10 weeks</td>
<td>Female</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$274.05</td>
</tr>
<tr>
<td>10 weeks</td>
<td>Male</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Hemizygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$232.18</td>
</tr>
<tr>
<td>11 weeks</td>
<td>Female</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$274.05</td>
</tr>
<tr>
<td>11 weeks</td>
<td>Male</td>
<td>Homozygous for Prkdc&lt;sup&gt;scid&lt;/sup&gt;, Homozygous for H2-K1&lt;sup&gt;tmBpe&lt;/sup&gt;, Homozygous for H2-D1&lt;sup&gt;tmBpe&lt;/sup&gt;, Hemizygous for Il2rg&lt;sup&gt;tmWjl&lt;/sup&gt;</td>
<td>$232.18</td>
</tr>
</tbody>
</table>
Frozen Mouse Embryo

NOD.Cg-Prkdc<scid> H2-K1<tm1Bpe> H2-D1<tm1Bpe> Il2rg<tm1Wjl>

$259.00

Additional Use Restrictions Apply

12 weeks Female
Homzygous for Prkdc<scid>, Homzygous for H2-K1<tm1Bpe>, Homzygous for H2-D1<tm1Bpe>, Homzygous for Il2rg<tm1Wjl>

$274.05

12 weeks Male
Homzygous for Prkdc<sup>add</sup>, Homzygous for H2-K1<tm1Bpe>, Homzygous for H2-D1<tm1Bpe>, Homzygous for Il2rg<tm1Wjl>

$232.18

Cryorecovery - Domestic Pricing

<table>
<thead>
<tr>
<th>SERVICE/PRODUCT</th>
<th>DESCRIPTION</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cryo Recovery</td>
<td>Homozygous for Prkdc&lt;scid&gt;, Heterozygous for H2-K1&lt;tm1Bpe&gt;, Heterozygous or wildtype for H2-D1&lt;tm1Bpe&gt;, X linked Homozygous females and wildtype males, 1 pair minimum</td>
<td>$2,854.50</td>
</tr>
</tbody>
</table>

Payment Terms and Conditions

Terms are granted by individual review and stated on the customer invoice(s) and account statement. These transactions are payable in U.S. currency within the granted terms. Payment for services, products, shipping containers, and shipping costs that are rendered are expected within the payment terms indicated on the invoice or stated by contract. Invoices and account balances in arrears of stated terms may result in The Jackson Laboratory pursuing collection activities including but not limited to outside agencies and court filings.

The Jackson Laboratory's Genotype Promise

The Jackson Laboratory has rigorous genetic quality control and mutant gene genotyping programs to ensure the genetic background of JAX® Mice strains as well as the genotypes of strains with identified molecular mutations. JAX® Mice strains are only made available to researchers after meeting our standards. However, the phenotype of each strain may not be fully characterized and/or captured in the strain data sheets. Therefore, we cannot guarantee a strain's phenotype will meet all expectations. To ensure that JAX® Mice will meet the needs of individual research projects or when requesting a strain that is new to your research, we suggest ordering and performing tests on a small number of mice to determine suitability for your particular project.

Terms Of Use

Terms Of Use

General Terms and Conditions

Questions About Terms Of Use

Additional Use Restrictions Apply

Research institutions require an MTA, companies require a (no fee) commercial use agreement prior to shipping.
JAX® Mice, Products & Services Conditions of Use

"MICE" means mouse strains, their progeny derived by inbreeding or crossbreeding, unmodified derivatives from mouse strains or their progeny supplied by The Jackson Laboratory ("JACKSON"). "PRODUCT(S)" means biological materials supplied by JACKSON, and their derivatives. "SERVICES" means projects conducted by JACKSON for other parties that may include but are not limited to the use of MICE or PRODUCTS. "RECIPIENT" means each recipient of MICE, PRODUCTS, or SERVICES provided by JACKSON including each institution, its employees and other researchers under its control. MICE or PRODUCTS shall not be: (i) used for any purpose other than internal research, (ii) sold or otherwise provided to any third party for any use, or (iii) provided to any agent or other third party to provide breeding or other services. Acceptance of MICE, PRODUCTS or SERVICES from JACKSON shall be deemed as agreement by RECIPIENT to these conditions, and departure from these conditions requires JACKSON's prior written authorization.

No Warranty

MICE, PRODUCTS AND SERVICES ARE PROVIDED "AS IS". JACKSON EXTENDS NO WARRANTIES OF ANY KIND, EITHER EXPRESS, IMPLIED, OR STATUTORY, WITH RESPECT TO MICE, PRODUCTS OR SERVICES, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE, OR ANY WARRANTY OF NON-INFRINGEMENT OF ANY PATENT, TRADEMARK, OR OTHER INTELLECTUAL PROPERTY RIGHTS.

Credit for PRODUCTS or SERVICES

In case of dissatisfaction for a valid reason and claimed in writing by a purchaser within ninety (90) days of receipt of, PRODUCTS or SERVICES, JACKSON will, at its option, provide credit or replacement for the PRODUCT received or the SERVICES provided; JACKSON makes no other representations and this shall be the exclusive remedy of the purchaser.

Please note specific policy for live mice.

Animal Care and Use for SERVICES

Consistent with the requirement for a written understanding regarding animal care and use, the JACKSON Animal Care and Use Committee will review the animal care and use protocol(s) associated with any SERVICES to be performed at JACKSON, and JACKSON shall have ultimate responsibility and authority for the care of animals while on site or in JACKSON custody.

No Liability

In no event shall JACKSON, its trustees, directors, officers, employees, and affiliates be liable for any causes of action or damages, including any direct, indirect, special, or consequential damages, arising out of the provision of MICE, PRODUCTS, or SERVICES, including economic damage or injury to property and lost profits, and including any damage arising from acts or negligence on the part of JACKSON, its agents or employees. Unless prohibited by law, in purchasing or receiving MICE, PRODUCTS, or SERVICES from JACKSON, purchaser or recipient, or any party claiming by or through them, expressly releases and discharges JACKSON from all such causes of action or damages, and further agrees to defend and indemnify JACKSON from any costs or damages arising out of any third party claims.

MICE, PRODUCTS or SERVICES are to be used in a safe manner and in accordance with all applicable governmental rules and regulations.

The foregoing represents the General Terms and Conditions applicable to JACKSON’s MICE, PRODUCTS or SERVICES. In addition, special terms and conditions of sale of certain MICE, PRODUCTS, or SERVICES may be set forth separately in JACKSON web pages, catalogs, price lists, contracts, and/or other documents, and these special terms and conditions shall also govern the sale of these MICE, PRODUCTS and SERVICES by JACKSON, and by its licensees and distributors.

Acceptance of delivery of MICE, PRODUCTS or SERVICES shall be deemed agreement to these terms and conditions. No purchase order or other document transmitted by purchaser or recipient that may modify the terms and conditions hereof, shall be in any way binding on JACKSON, and instead the terms and conditions set forth herein, including any special terms and conditions set forth separately, shall govern the sale of MICE, PRODUCTS or SERVICES by JACKSON.
Did you find what you were looking for?

- Yes  - No