<table>
<thead>
<tr>
<th>Stock No:</th>
<th>030610</th>
<th>NSG.Cybb[KO], X-CGD NSG</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>CONGENIC, SPONTANEOUS MUTATION, TARGETED MUTATION, ENDONUCLEASE-MEDIATED MUTATION</strong></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**PLACE ORDER**

Typically mice are recovered in 10-14 weeks. Contact Customer Service to place an order or for more information.
Overview

Also Known As: NSG.Cybb(KO), X-CGD NSG

NSG.Cybb(KO) mice are NOD.scid.II2R c^null ('NSG') animals with a Cybb knock-out allele. They are permissive for xenograft/human tumor growth with CYBB-deficiency resulting in defective phagocyte function. This phagocyte-defective X-CGD NSG mouse model allows in vivo assessment of gene and cell therapies using human hematopoietic cell transplants for the treatment of X-linked chronic granulomatous disease (X-CGD). This disease is characterized by defects in the production of microbicidal reactive oxygen species (ROS) by phagocytes. These mice may also be useful for modeling other phagocyte disorders in humanized NSG mouse xenografts.

Of note, The Jackson Laboratory will distribute mice heterozygous for the Cybb knock-out allele.

Donating Investigator

Harry L Maleich, National Institutes of Health (LHD/NIAID/NIH)

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**GENETIC OVERVIEW**

<table>
<thead>
<tr>
<th>Genetic Background</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prkdc^scid</strong></td>
<td></td>
</tr>
<tr>
<td>Allele Type</td>
<td>Gene Symbol</td>
</tr>
<tr>
<td>Spontaneous</td>
<td>Prkdc</td>
</tr>
<tr>
<td><strong>Il2rg^tm1Wjl</strong></td>
<td></td>
</tr>
<tr>
<td>Allele Type</td>
<td>Gene Symbol</td>
</tr>
<tr>
<td>Targeted (Null/Knockout)</td>
<td>Il2rg</td>
</tr>
<tr>
<td><strong>Cybb^em1Hmal</strong></td>
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<tr>
<td>Allele Type</td>
<td>Gene Symbol</td>
</tr>
<tr>
<td>Endonuclease-mediated (Null/Knockout)</td>
<td>Cybb</td>
</tr>
</tbody>
</table>
RESEARCH APPLICATIONS
Research Tools
Internal/Organ Research
Immunology, Inflammation and Autoimmunity Research
Virology Research
Cancer Research
Cardiovascular Research
Hematological Research
Developmental Biology Research

BASE PRICE
Starting at:
$2,595.00 Domestic price Cryo Recovery

VIEW PRICE LIST

Details

Detailed Description

NSG.Cybb[KO] mice, also called X-CGD NSG, are NOD.scid.II2R cnull ("NSG"; Stock No. 005557) animals also harboring the Cybbem1Hm1al knock-out allele (Cybb[KO]), a 235 bp deletion encompassing all of exon 1 and 190 bp of the upstream Cybb promoter).

Females homozygous for all three mutations, and males that are homozygous for scid and hemizygous for the X-linked mutations Cybb[KO] and II2R cnull, may be collectively referred to as homozygous NSG.Cybb[KO] mice.

Although viable and fertile, homozygous NSG.Cybb[KO] mice are immunodeficient: they have no mature T cells or B cells, lack functional natural killer (NK) cells, have reduced numbers of lymphocytes and myeloid dendritic cells, and are deficient in cytokine signaling. They are permissive for xenograft/human tumor growth, with CYBB-deficiency resulting in defective phagocyte function. Specifically, homozygous NSG.Cybb[KO] are defective for production of reactive oxygen species (ROS) by neutrophils and other phagocytes (defective myeloid oxidative killing function), and demonstrate increased susceptibility to spontaneous bacterial and fungal infections with granulomatous inflammation (see maintenance note below).

The publication characterizing homozygous NSG.Cybb[KO] mice (Sweeney et al. 2017 Hum Gene Ther [PMID:28264583]) states that, like NSG mice, the NSG.Cybb[KO] mice could be engrafted with human hematopoietic stem/progenitor cells (HSPCs) to give rise to human CD45+ hematopoietic cells of multiple lineages, including CD13+ myeloid cells, CD14+ monocytes/macrophages, CD19+ B cells, CD56+ NK cells and CD3+ T cells. The donating investigator also reports that, not unexpectedly, busulfan treatment followed by transplantation of human X-CGD patient cells results in a high incidence of infection-associated morbidity (>50%) within 3-6 weeks, although not when the mice are transplanted instead with normal healthy human donor cells.

NSG.Cybb[KO] mice are a phagocyte-defective X-CGD NSG mouse model that allows in vivo assessment of gene and cell therapies using human hematopoietic cell transplants for the treatment of X-linked chronic granulomatous disease (X-CGD). This disease is
characterized by defects in the production of microbicidal ROS by phagocytes. These mice may also be useful for modeling other phagocyte disorders in humanized NSG mouse xenografts.

Maintenance Note: Similar to other immunodeficient strains, maintaining homozygous NSG.Cybb[KO] mice in high health status (specific pathogen-free) vivaria promotes overall colony health. If homozygous NSG.Cybb[KO] animals are maintained in low health barrier rooms, the use of medicated water (e.g., sulfadimethoxine-sulfa or enrofloxacin/Baytril) is suggested to increase overall colony health.

The donating investigator reports that maintaining their NSG.Cybb[KO] colony in their specific pathogen-free mouse vivaria with sulfatrim antibiotic was not sufficient to prevent increased morbidity (due to spontaneous bacterial and fungal infections), and their NSG.Cybb[KO] mice had significantly decreased survival compared to NSG.Cybb[HET] and wildtype NSG mice. To decrease morbidity, they suggest handling the homozygous NSG.Cybb[KO] mice before other mouse lines in the same room, as well as routine changing of homozygous NSG.Cybb[KO] mouse cages prior to doing so for other mouse lines in the same room. They also recommend use of microisolator cages or other barrier facilities.

View our Resources for the NSG mouse model, including discussion forum, immunodeficient model comparison, and categorized, up-to-date references.
Genotyping Protocols
End Point Analysis: Prkd<sup>scid</sup>, End Point
SEPARATED MELT: Cybb<sup>em1Hmal</sup>, Alternate1
Probe: II2rg<sup>tm1Wjl</sup> - PROBE
Genotyping resources and troubleshooting

Breeding Considerations
When maintaining a live colony, females homozygous for scid (Prkd<sup>scid</sup>), heterozygous for Cybb<sup>em1Hmal</sup> (Cybb[KO]) and homozygous for II2R<sup>cnull</sup> may be bred with NSG males homozygous for scid, wildtype at the X-linked Cybb locus and hemizygous for the X-linked II2R<sup>cnull</sup> (i.e., Stock No. 005557).

The Jackson Laboratory will not distribute mice homozygous for the Cybb knock-out allele at this time.

Females homozygous for all three mutations, and males that are homozygous for scid and hemizygous for the X-linked mutations Cybb<sup>em1Hmal</sup> and II2R<sup>cnull</sup> may be collectively referred to as homozygous NSG.Cybb[KO] mice.

Homozygous NSG.Cybb[KO] mice are immunodeicient. As such, and similar to other immunodeicient strains, maintenance in high health status (specific pathogen-free) vivaria promotes overall colony health. If homozygous NSG.Cybb[KO] animals are maintained in low health barrier rooms, the use of medicated water (e.g., sulfadimethoxime-sulfa or enrofloxacin/Baytril) is suggested to increase overall colony health.

Of note, the donating investigator reports that maintaining their NSG.Cybb[KO] colony in their specific pathogen-free mouse vivaria with sulfadimethoxime antibiotic was not sufficient to prevent increased morbidity (due to spontaneous bacterial and fungal infections), and their NSG.Cybb[KO] mice had significantly decreased survival compared to NSG.Cybb[HET] and wildtype NSG mice. To decrease morbidity, they suggest handling the homozygous NSG.Cybb[KO] mice before other mouse lines in the same room, as well as routine changing of homozygous NSG.Cybb[KO] mouse cages prior to doing so for other mouse lines in the same room. They also recommend use of microisolator cages or other barrier facilities.

Also see additional NSG housing information.
Additional Breeding and Husbandry Support

Mating System
+/+ sibling x Hemizygote
Homozygous for Prkd<sup>scid</sup> x Heterozygous for Cybb<sup>em1Hmal</sup> x Homozygous for II2rg<sup>tm1Wjl</sup> x Homozygous for Prkd<sup>scid</sup>
Wildtype for Cybb<sup>em1Hmal</sup> x Hemizygous for II2rg<sup>tm1Wjl</sup>

Citation
When using the NSG.Cybb[KO] X-CGD NSG mouse strain in a publication, please cite the originating article(s) and include JAX stock #0030610 in your Materials and Methods section.

Animal Health Reports
Production of mice from cryopreserved embryos or sperm occurs in a maximum barrier room, G200

Pricing & Availability

Typically mice are recovered in 10-14 weeks. Contact Customer Service to place an order or for more information.

Domestic International
Pricing effective for USA, Canada and Mexico shipping destinations

Cryorecovery - Domestic Not-For-Profit & Academic Pricing
We will fulfill your order by providing at least two carriers for each strain ordered. The total number, sex, and genotypes provided will vary, although typically 8 or more animals are provided. **Please check genotypes which will be recovered.** While the genotypes of all animals produced will be communicated to you prior to scheduling shipment, the genotypes of animals provided may not reflect the mating scheme and genotypes described in the strain description. **Animals are typically ready to ship in 11-14 weeks.** If a second recovery is required to produce the minimum number of animals, then delivery time would increase to approximately 25 weeks. If we fail to produce animals of the correct genotype, you will not be charged. We cannot guarantee the reproductive success of mice shipped to your facility. If the mice are lost after the first three days (post-arrival) or do not produce progeny at your facility, a new order and fee will be necessary.

Cryorecovery to establish a **Dedicated Supply** for greater quantities of mice. Mice recovered can be used to establish a dedicated colony to contractually supply you mice according to your requirements. Price by quotation.

**Related Products and Services**

| Frozen Mouse Embryo | $2,595.00 per straw or vial |

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Terms of Use

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**Related Strains**

- All
- By Allele
- By Gene