**Overview**

Also Known As: Nrf2 KO, NRF2-, Nrf2^−

*Nfe2l2^−/−* (NRF2) knockout mice may be useful for studying oxidative stress in the pathogenesis of age-related macular degeneration, diabetes, Parkinson’s disease, and other inflammatory degenerative diseases as well as studies of cancer, multiple sclerosis, liver cirrhosis, atherosclerosis, injury and wound healing, and more.

Donating Investigator

Michael L. Freeman, Vanderbilt University
**GENETIC OVERVIEW**

Genetic Background

N10pN1+N1F11

(2019-12-27 00:00:00)

**Nfe2l2**

Allele Type: Targeted (Null/Knockout)

Gene Symbol: Nfe2l2

Gene Name: nuclear factor, erythroid derived 2, like 2

---

**RESEARCH APPLICATIONS**

Research Tools

Immunology, Inflammation and Autoimmunity Research
Diabetes and Obesity Research
Sensorineural Research
Mouse/Human Gene Homologs
Neurobiology Research
Cancer Research
Cardiovascular Research

---

**BASE PRICE**

Starting at:

$236.78 Domestic price for female 5-week

---

**Details**

**Detailed Description**

In this NRF2 knockout strain, a β-galactosidase (lacZ) reporter followed by a neomycin resistance (neo) cassette replaces exon 5 and part of exon 4 encoding the nuclear factor, erythroid derived 2, like 2 gene (Nfe2l2) gene, abolishing gene function. Homozygotes are viable, fertile, and normal in size. NRF2, a member of the "cap 'n' collar" (CNC) subfamily of the basic region-leucine zipper transcription factors, is a regulator of endogenous antioxidant protection, microglial function, and chronic neuroinflammation. Inactivation of the CNC, DNA binding, and leucine zipper domains in Nrf2-/- mice results in age-related macular degeneration (AMD)-like retinal pathology, spontaneous choroidal neovascularization (CNV), increased sensitivity to toxins, impaired adipogenesis, abnormal mitochondria, and an increase in proinflammatory gene expression in microglia and astrocytes. The donating investigator reports that lacZ failed to generate any detectable β-galactosidase activity.

**Development**

**Control Suggestions**
Genotyping Protocols
Standard PCR: Nfe2l2<sup>tm1Ywk</sup>
Standard PCR: Nfe2l2<sup>tm1Ywk</sup>
Genotyping resources and troubleshooting

Dietary Information
New Diet as of March 2015: Lab Diet® 5K0Q (6% fat)

Breeding Considerations
When maintaining a live colony, homozygous mice may be bred together. Our experience has been that homozygous breeders produced small litters.

Additional Breeding and Husbandry Support

Mating System
Homozygote x Homozygote

Appearance
Black or Agouti*
*contact Technical Information Services via Customer Service for details

Citation
When using the Nrf2<sup>−</sup> mouse strain in a publication, please cite the originating article(s) and include JAX stock #017009 in your Materials and Methods section.

Facility Barrier Level Descriptions
AX12 (Maximum)

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

**Domestic**

Pricing effective for USA, Canada and Mexico shipping destinations

### Live Mouse

<table>
<thead>
<tr>
<th>AGE</th>
<th>SEX</th>
<th>GENOTYPE</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>5 weeks</td>
<td>Female</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
<tr>
<td>6 weeks</td>
<td>Female</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
<tr>
<td>7 weeks</td>
<td>Female</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
<tr>
<td>8 weeks</td>
<td>Female</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
<tr>
<td>9 weeks</td>
<td>Female</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
<tr>
<td></td>
<td>Male</td>
<td>Homozygous for Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;</td>
<td>$236.78</td>
</tr>
</tbody>
</table>

### Related Products and Services

<table>
<thead>
<tr>
<th>Product</th>
<th>Description</th>
<th>PRICE</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frozen Mouse Embryo</td>
<td>B6.129X1-Nfe2l2&lt;sup&gt;tm1Ywk&lt;/sup&gt;/J Frozen Embryo</td>
<td>$2595.00</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.
Licensing Information
Phone: 207-288-6470
Email: TechTran@jax.org

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.

Related Strains

All