**Overview**

Also Known As: APP/PS1

APP/PS1 are double transgenic mice expressing a chimeric mouse/human amyloid precursor protein (Mo/HuAPP695swe) and a mutant human presenilin 1 (PS1-dE9), both directed to CNS neurons. Both mutations are associated with early-onset Alzheimer's...
disease. These mice may be useful in studying neurological disorders of the brain, specifically Alzheimer's disease, amyloid plaque formation and aging.

Donating Investigator
Dr. David R Borchelt, University of Florida

GENETIC OVERVIEW

<table>
<thead>
<tr>
<th>Genetic Background</th>
<th>Generation</th>
</tr>
</thead>
<tbody>
<tr>
<td>000664 C57BL/6J</td>
<td>N8?+N39</td>
</tr>
<tr>
<td></td>
<td>(2020-03-19 00:00:00)</td>
</tr>
</tbody>
</table>

Tg(APPswe,PSEN1dE9)85Dbo

<table>
<thead>
<tr>
<th>Allele Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transgenic (Inserted expressed sequence, Humanized sequence)</td>
</tr>
</tbody>
</table>

RESEARCH APPLICATIONS

Neurobiology Research

Details

Detailed Description

APP/PS1 are double transgenic mice expressing a chimeric mouse/human amyloid precursor protein (Mo/HuAPP695swe) and a mutant human presenilin 1 (PS1-dE9), both directed to CNS neurons. Both mutations are associated with early-onset Alzheimer's disease. The "humanized" Mo/HuAPP695swe transgene allows the mice to secrete a human A-beta peptide. Both the transgenic peptide and holoprotein can be detected by antibodies specific for human sequence within this region (Signet Laboratories' monoclonal 6E10 antibody). The included Swedish mutations (K595N/M596L) elevate the amount of A-beta produced from the transgene by favoring processing through the beta-secretase pathway. This "humanized" Mo/HuAPP695swe protein is immunodetected in whole brain protein homogenates. The transgenic mutant human presenilin protein (PS1-dE9), which in high levels displaces detectable endogenous mouse protein, is also immunodetected in whole brain protein homogenates. The donating investigator reports that transgenic mice develop beta-amyloid deposits in brain by 6 to 7 months of age. Between 6 and 15 months of age, mice exhibit a gender-based disparity in beta-amyloid burden. Females develop a 5-fold ($A\beta_{42}$) and 10-fold ($A\beta_{40}$) increase in beta-amyloid deposits in the cerebellum by 15 months as compared to males. Accumulation of plaques is more abundant in the molecular layer than in the granular layer. In the cortex, the beta-amyloid burden is increased in both sexes in parallel (Ordonez-Gutierrez et al. Jnl Alz Dis 2016).

APP/PS1 hemizygotes on a C57BL/6J-congenic background (Stock No. 005864) exhibit seizure activity. Specifically, hemizygous mice on the C57BL/6 background (N9B6) exhibit a high incidence of seizures, as detected by video-EEG. 25% of transgenic mice, 3 to 3.5 months in age, exhibit at least 1 seizure. By 4.5 months of age, seizure incidence increases to 55%. In mice with seizures a
10-15% mortality is reported on the congenic (N9) C57BL/6 background. In these mice, sudden deaths occur at any age but peak around 3-4 months (Minkeviciene et al. J Neurosci. 2009). At 17-18 weeks of age, hemizygous mice on the congenic C57BL/6J background (N13) exhibit epileptiform discharges as detected by video-EEG. Mortality was 38% (6/16) and some mutant mice experienced spontaneous seizures during the experiments. Antiepileptic drugs (carbamazepine, phenytoin, valproate) reduce the frequency of spontaneous electrographic epileptiform discharges (Ziyatdinova et al. Epilepsy Res 2011).

In contrast, APP/PS1 hemizygotes on a C57BL/6;C3H genetic background (see Stock No. 004462) do not exhibit any seizure phenotype.

In an attempt to offer alleles on well-characterized or multiple genetic backgrounds, alleles are frequently moved to a genetic background different from that on which an allele was first characterized. This is the case for the C57BL/6J-congenic background (Stock No. 005864). It should be noted that the phenotype could vary from that originally described. We will modify the strain description if necessary as published results become available.
Genotyping Protocols
Probe: Generic APP Version 2 Probe
Standard PCR: Tg(PSEN1)
Standard PCR: Generic Tg(APP)
Standard PCR: Generic Human PSEN1 cDNA Multiplex1
Standard PCR: Tg(PSEN1)
Standard PCR: Tg(APPswe,PSEN1dE9)85Dbo-Chr9
Probe: Tg(APPswe,PSEN1dE9)85Dbo-Chr9 Probe
Separated PCR: Meo2cre
Probe: Mapt-Probe
Genotyping resources and troubleshooting

Breeding Considerations
When maintaining a live colony, C57BL/6J females are bred to hemizygous male mice. Hemizygous females and males appear to die prematurely. While the donating investigator indicates aggressive behavior has been observed (particularly for transgenic males) and transgenic females can exhibit suboptimal mothering of litters, no such complications have been observed in our colonies at The Jackson Laboratory.

Additional Breeding and Husbandry Support
Mating System
C57BL/6J (000664) x Hemizygote

Citation
When using the APP/PS1 mouse strain in a publication, please cite the originating article(s) and include MMRRC stock #34832 in your Materials and Methods section.

Animal Health Reports
Facility Barrier Level Descriptions

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

Additional Use Restrictions Apply
NOT AVAILABLE TO COMPANIES OR FOR COMMERCIAL USE
Strain(s) not available to companies or for-profit entities.

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
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

By Allele

By Gene

By Collection

All Related Strains