These Caveolin 1 knock-out mice show hyperproliferative and vascular abnormalities. Homozygotes display lipid metabolism and uptake disruption with elevated serum triglycerides and free fatty acid levels, and reduced leptin levels. Young mutant mice exhibit characteristics of Alzheimer's disease. This mutant mouse strain may be useful in studies of vesicular and cholesterol trafficking, signal transduction, neurodegeneration and tumorigenesis.

Note that this allele is also available on a C57BL/6J congenic background (Stock No. 007083).

Donating Investigator

Michael P. Lisanti, The Albert Einstein College of Medicine
Mice that are homozygous for the targeted mutation are viable, fertile and do not display any gross physical abnormalities. Mutant mice exhibit exercise intolerance when challenged and are slightly hyperphagic. No gene product (protein) is detected by Western blot analysis in adipose, lung and heart tissues or in cultured mouse embryonic fibroblasts (MEFs). A decrease in the level of co-expressed caveolin-2 protein is immunodetected. At age 4-5 months, mutant mice are often smaller than their wildtype littermates. By one year of age, mutant mice weigh 5 to 7 grams less than wildtype, and are resistant to diet-induced obesity. Progressive adipose pathology results in reduced white adipose tissue with abnormally small adipocytes and enlarged, hyperplastic brown adipose tissue. Homozygotes display lipid metabolism and uptake disruption with elevated serum triglycerides and free fatty acid levels, and reduced leptin levels. Isolated aortic tissue segments have a diminished vasoconstriction response to the alpha-1-adrenergic receptor agonist, phenylephrine, and an enhanced vasorelaxation response to acetylcholine. Histological examination of lung tissue from mutant mice shows thickened alveolar septa, hypercellularity, reduced alveolar spaces and increased density of basement membranes and reticulin fibers. Further immunohistochemical examination of lung tissue shows an increased number of endothelial cells. Mutant derived MEF cells proliferate two times faster and are denser at confluence as indicated by growth curves and cell cycle analysis. Electron microscopy analysis reveals a complete absence of caveolae (plasmalemmal vesicles) in endothelial cells. In vitro studies measuring uptake of fluorescently-labeled albumin and in vivo studies following uptake of gold-conjugated albumin demonstrate caveolar endocytosis impairment.

Young (3-6 month old) mutant mice exhibit multiple characteristics of Alzheimer's disease pathologies including increased amyloid beta and tau deposits, neurodegeneration, astrogliosis and decreased cerebrovascular volume. The neuronal aging found in the hippocampi of young mutant mice resembles that found in aged (> 18 months of age) wild-type mice. The donating investigator noted diminished reproductive performance as the backcross to C57BL/6J background progressed.
**Cav1<sup>tm1Mis</sup>**

## Disease/Phenotype

### Disease Terms

### Research Areas By Phenotype

### Mammalian Phenotype Terms by Genotype

### References

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### Technical Support

**Genotyping Protocols**

**Standard PCR:** Cav1alternate1  
**Genotyping resources and troubleshooting**

**Dietary Information**

LabDiet® 5K52 formulation (6% fat)

**Breeding Considerations**

When maintaining a live colony, these mice can be bred as homozygotes. The donating investigator noted diminished reproductive performance as the backcross to C57BL/6J background progressed and backcrossed to a 129S6/SvEv background for 1 generation. The mice are now maintained as homozygotes and are primarily a mix of 129 and C57BL/6, but a minor contribution from the SJL background (contributed from the originating ES cell line) should not be discounted. Coat color expected from breeding: Black and Agouti.

**Additional Breeding and Husbandry Support**

**Mating System**

Homozygote x Homozygote

**Citation**

When using the Cav-1 KO mouse strain in a publication, please cite the originating article(s) and include JAX stock #004585 in your Materials and Methods section.

**Animal Health Reports**

**Facility Barrier Level Descriptions**

- FGB29 (Standard)
Pricing & Availability

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

Available

Domestic
Pricing effective for USA, Canada and Mexico shipping destinations

Live Mouse

<table>
<thead>
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<th>AGE</th>
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<td>Female</td>
<td>Homozygous for Cav1&lt;sup&gt;tm1Mls&lt;/sup&gt;</td>
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<td>Male</td>
<td>Homozygous for Cav1&lt;sup&gt;tm1Mls&lt;/sup&gt;</td>
<td>$278.00</td>
</tr>
</tbody>
</table>

Related Products and Services

| Frozen Mouse Embryo | STOCK Cav1<sup>tm1Mls</sup>/J Frozen Embryos | $2595.00 |

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