Human cellular entry of coronaviruses, including severe acute respiratory syndrome coronavirus-1 (SARS-CoV-1) and -2 (SARS-CoV-2), is dependent on viral spike protein binding to the human ACE2 receptor and on spike protein priming by the serine protease TMPRSS2. As such, these mice may be useful for studying antiviral therapies to coronavirus and the disease outbreak COVID-19.

Donating Investigator

Peter S. Nelson, Fred Hutchinson Cancer Research Center
Details

Detailed Description

*Tmprss2*−/− knock-out mice contain a *loxP*-flanked neo cassette in place of exons 10-13 of the transmembrane protease, serine 2 (*Tmprss2*) gene, abolishing gene function. There is no evidence a protein product is generated from the alternatively-spliced transcript. TMPRSS2 is a membrane associated serine protease, expressed in the epithelium of the human respiratory tract and prostate glands. It has been shown to activate hemagglutinin proteins of human influenza viruses and is implicated in prostate carcinogenesis. Sequence analysis indicates the presence of a truncated *Tmprss2* transcript due to splicing of exon 9 to exon 14. This transcript is present at a 20% reduction compared to the WT transcript, while there is an 80% reduction in the full length transcript compared to WT. The lungs of homozygous *Tmprss2*−/− mice are protected against viral spread, showing only very mild pathogenesis after infection with H1N1 virus. These mice also display reduced body weight loss and mortality after H3N2 infection but to a much lower degree than for H1N1 infected mice. They also show less severe pathogenesis after infection with H3N2 virus. Viral titers are decreased in these mice after infection with both viruses compared to WT mice. No abnormal prostate phenotype is evident. Homozygotes are viable and fertile.

Development

Control Suggestions

Selected References

Genetics

*Tmprss2*tm1Psn
Genotyping Protocols
Standard PCR: Tmprss2
Genotyping resources and troubleshooting

Breeding Considerations
When maintaining a live colony, homozygous mice may be bred together.

Additional Breeding and Husbandry Support
Mating System
Heterozygote x Heterozygote

Citation
When using the Tmprss2 knock-out mouse strain in a publication, please cite the originating article(s) and include JAX stock #026196 in your Materials and Methods section.

Animal Health Reports
Facility Barrier Level Descriptions

• AX9 (Standard)

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

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CRYORECOVERY - DOMESTIC PRICING

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Phone: 207-288-6470
Email: TechTran@jax.org

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