The Jackson Laboratory

B6.B10Sn-*Mctp1* ^{dwnd} /Kjn

Stock No: **009690** | deaf wanderer

Congenic, Spontaneous Mutation

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

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retina, indicative of a disruption in the long-range regulation of *Nr2f1* transcription. This strain is valuable for understanding both the function of MCTP1 and the regulation and inner ear-specific function of NR2F1.

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GENETIC OVERVIEW

Genetic Background

000664 C57BL/6J

Generation

Mctp1^{dwnd}

Allele Type	Gene Symbol	Gene Name
Spontaneous (Modified regulatory region)	*Mctp1*	multiple C2 domains, transmembrane 1

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RESEARCH APPLICATIONS

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$2,854.50 Domestic price Cryo Recovery

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Details

Detailed Description

This spontaneous deletion in the sequence of *Mctp1* encompasses exons 11-15, their intervening introns, 7,270 bp of intron 10-11 and 40,908 bp of intron 15-16. This deletion is expected to cause a frameshift and premature stop codon resulting in the loss of the third C2 domain and the two transmembrane helices of MCTP1. However, it is the long-range dysregulation of NR2F1 expression during inner ear development, and not *Mctp1* inactivation, that is believed to be the primary cause of the outward phenotype of *Mctp1*^{dwnd} mutant mice. Mice homozygous for the *Mctp1* deaf wanderer mutation display moderate circling behavior due to inner ear defects, whereas *Mctp1* knockout mice have normal inner ear anatomy and function. The cochlea of *Mctp1*^{dwnd} mutant mice is smaller and shorter than normal, there are extra, disorganized cochlear inner hair cells near the base, an extra row of outer hair cells near the apex, the saccule is smaller than normal and fails to separate fully from the utricle, and the cochleosaccular duct is larger than normal. Auditory brainstem response analysis showed hearing impairment as early as 3 to 4 weeks of age, with thresholds 25-45 dB above those of controls.

RT-qPCR for exons 2-3 of *Mctp1* in extractions from the E16.5 cochlear membranous labyrinth showed approximately 25% of normal levels of expression in deaf wanderer homozygotes. Additionally, RT-qPCR for *Nr2f1* revealed a 50% reduction in expression in the cochlea of deaf wanderer homozygotes, but no change in expression in the retina, consistent with the loss of an auditory-specific enhancer region for *Nr2f1* within the *Mctp1* sequence deleted in deaf wanderer. *Nr2f1* is approximately 1.4 Mb from *Mctp1* on Chromosome 13. Mice homozygous for the Ming-Jer Tsai targeted disruption of *Nr2f1*, which deletes the amino terminus, DNA binding domain, and some of the ligand binding domain of NR2F1 (Tang et al, 2006), also have abnormal cochlear development with regions of supernumerary hair cells consistent with the phenotype of deaf wanderer homozygotes. However, all die neonatally with no swallowing reflex, defects in the ninth cranial ganglion, and further axonal guidance and arborization defects elsewhere. Consistent with the deaf wanderer deletion modifying *Nr2f1* expression, *Mctp1*^{dwnd} +/+ *Nr2f1*$^{tm1.1(KOMP)Mbp}$ transheterozygotes have cochlear hair cell disorganization, excess inner hair cells, an extra row of outer hair cells in the apex region, malformed utricular and saccular macula, and hearing impairment consistent with that found in deaf wanderer homozygotes.

Development

Control Suggestions

Selected References

Genetics

Mctp1^{dwnd}

Disease/Phenotype

- Disease Terms
- Research Areas By Phenotype
- Mammalian Phenotype Terms by Genotype
- References

Technical Support

CONTACT TECHNICAL SUPPORT

Genotyping Protocols
Genotyping resources and troubleshooting

Breeding Considerations

A simple, PCR-based geotyping protocol is presented in Tarchini et al. 2018

Additional Breeding and Husbandry Support

Mating System
Homozygote x Homozygote

Citation
When using the deaf wanderer mouse strain in a publication, please cite the originating article(s) and include JAX stock #009690 in your Materials and Methods section.

Animal Health Reports
Facility Barrier Level Descriptions

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

Pricing & Availability

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