

Chocolate-like 2 Jackson (*chtl^{2J}*), a possible remutation of the *Rab38* gene

Richard M. Samples, Patricia F. Ward-Bailey, Leah Rae Donahue, Roderick T. Bronson, and Muriel T. Davisson

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Mutation (allele) symbol: *chtl^{2J}*

Mutation (allele) name: chocolate-like 2 Jackson

Gene symbol: *chtl^{2J}*

Strain of origin: B6.*V-Lep^{ob}*/J

Current strain name: B6(V)-*chtl^{2J}*/GrsrJ

Stock #005565 (jaxmice.jax.org)

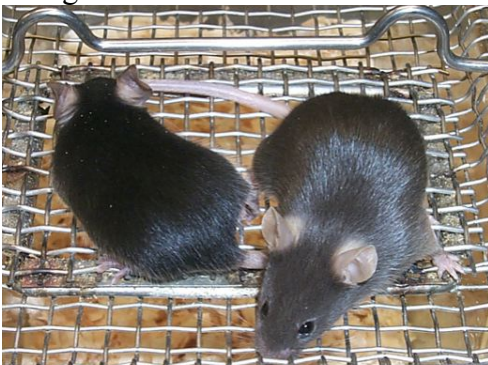
Phenotype categories: coat color

Abstract

A new spontaneous, recessive mutation causing a coat color dilution has been mapped to Chromosome 7, in the region where *Rab38^{cht}* is positioned. Direct tests for allelism were performed with both chocolate (*cht*) and chocolate-like (*chtl*) and the results, while indicating interaction, were inconclusive in both tests (see below). This remutation has been named chocolate-like 2 Jackson.

Origin and Description

This recessive mutation was discovered by Paula Damon in a production colony of B6.*V-Lep^{ob}* mice (stock #000632) at the Jackson Laboratory on February 12, 1997. Mice homozygous for the *chtl^{2J}* mutation are recognized by a diluted coat color that appears chocolate brown. This color dilution also lightens the eyes, feet, ears, and tail of affected animals. Both sexes breed and the affected animals live a normal lifespan. The *Lep^{ob}* has not been seen for 25 generations and is believed to be bred out of the C57BL/6J background strain.



A homozygous B6(V)-*chtl^{2J}*/J mouse is shown on the right and a control heterozygous littermate is shown on the left. Both are 47 days of age.

Genetic Analysis

Using our standard mapping protocols an intercross between B6(V)-*chtl*^{2J}/J and CAST/Ei/J F1 hybrids was set up and generated 65 affected animals for linkage analysis. The *chtl*^{2J} mutation maps to mouse Chromosome 7 distal to *D7Mit230* (at 24.5cM) and proximal to *D7Mit43* (at 64 cM). A previously described mutant named chocolate (*Rab38*^{cht}) which has a similar phenotype to this new mutant, maps in this interval (at 46 cM) on Chromosome 7.

A direct test for allelism with mice carrying the chocolate (*cht*) mutation was performed by mating a female, homozygous for the new mutation, to a homozygous male from the C57BL/6J-*Rab38*^{cht}/J (stock #000976) colony. This mating produced 30 progeny in 4 litters. All of the F1s produced were not black but look close to the diluted color of the new mutation. When F1s are mated together, two shades of the chocolate color are seen. Some progeny look like the homozygotes of the new mutation, and others like the homozygous C57BL/6J-*Rab38*^{cht}/J mice.



A female C57BL/6J-*Rab38*^{cht}/J mouse on the left and a B6(V)-*chtl*^{2J}/J male on the right, showing the similarity in coat color of the two strains.

A second direct test for allelism with mice carrying the chocolate-like (*chtl*) mutation was performed by mating a female homozygote from the B6(129P2)-*Nos2*^{tm1Lau} *chtl*/J strain to a male homozygote from the B6(V)-*chtl*^{2J}/J strain. From this cross, the 30 F1 animals produced had a dark grey color. When two of the grey F1s were mated together they produced 6 black and 4 dark grey progeny. Both tests for allelism were considered inconclusive because the F2s produced in both tests resulted in two coat colors, and while indicating some interaction between the new mutation and the chocolate mutation, does not prove that the new mutation is a remutation to chocolate.

Pathology

No histopathological screen was performed.

Hearing as assessed by auditory brain stem response testing (ABR)² of 8 mutants and 5 controls at 3 weeks, 3 months, 6 months and 8 months of age was determined to be

normal for all, except for one 8 month old mutant that had severe hearing loss. A cross section of the ear of this same mutant mouse had fluid in the middle ear, and no cochlea or hair cell structure was seen.

Discussion

We report here a new coat color mutation that maps to Chromosome 7 in the same chromosomal position as the *Rab38^{cht}* and *cht1* genes.

Acknowledgements

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References

Mouse Genome Database (MGD) Mouse Genome Informatics Project, The Jackson Laboratory, Bar Harbor, Maine. World Wide Web (2005) (www.informatics.jax.org)

² **ABR thresholds** in mice are determined using a semi-automated computer system (Intelligent Hearing Systems, Miami, Florida). Subdermal needle electrodes are inserted at the vertex and ventrolaterally to both ears of anesthetized mice. Specific auditory stimuli from 10-100 dB SPL are delivered binaurally through plastic tubes from high frequency transducers. ABR thresholds are obtained, in an acoustic chamber, for clicks and for 8, 16, and 32 kHz pure-tone pips.