

Recoil Wobbler 4 Jackson, A New Remutation to Recoil Wobbler on Chromosome 10

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Mutation (allele) symbol: *Grm1*^{rcw-4J}

Mutation (allele) name: recoil wobbler 4 Jackson

Gene symbol: *Grm1*

Strain of origin: C57BL/6J

Current strain name: C57BL/6J-*Grm1*^{rcw-4J}/GrsrJ

Stock #:006009 (jaxmice.jax.org)

Phenotype categories: neurological

Abstract

The new recoil wobbler 4 Jackson (*rcw*^{4J}) remutation displays the same phenotypic characteristics as the original recoil wobbler (*rcw*) mutation and the subsequent remutations *rcw*^{2J} and *rcw*^{3J}. An abnormal auditory brain stem response wave pattern in mutants indicates a neuronal pathway defect.

Origin and Description

The spontaneous, recessive, recoil wobbler 4 Jackson remutation was discovered by Justin Brouty in a production colony of C57BL/6J (Stock # 000664) at the Jackson Laboratory in 2004. Mice homozygous for the *rcw*^{4J} mutation are recognizable at two weeks of age by a slightly smaller size and an ataxic gait in which they wobble from side to side. The homozygous mutants live a normal lifespan and heterozygote matings generate the expected number of mutants in litters produced. Female homozygous *rcw*^{4J} mice may breed but usually fail to raise their pups. Male *rcw*^{4J} homozygotes usually don't breed. Of two homozygous females and two homozygous males sent for routine pathological screening, no obvious lesions were found to explain the breeding failure. This colony is maintained by homozygous females mated to normal littermates or by progeny test.

Genetic Analysis

In order to determine the mode of inheritance of this new mutation two females homozygous for the new mutation were mated to a C57BL/6J male (Stock #000664). This cross produced no affected progeny, but when the progeny were intercrossed 3 affected mice were produced out of 16 born (with 6 missing, unclassifiable), proving a recessive mode of inheritance for the new mutation.

Based on the phenotype similarity of this new mutation to the previously described recoil wobbler (*rcw*) mutation, a direct test for allelism was set up by mating a female homozygous for this new mutation to a male heterozygote B6(129X1)-*rcw*^{2J}/J (stock # 005271). This cross produced 2 affected recoil wobbler mice out of 19 born with one found dead (unclassifiable) confirming allelism with the *rcw* gene.

Pathology

A routine pathological screen of 4 mutants and 2 control littermates showed no lesions.

Auditory brain stem response (ABR) testing on four mutants and 2 controls showed controls having normal hearing and mutants having normal thresholds but abnormal pattern waves with longer latency, indicating a neuron pathway defect.

The eyes of the same two controls and 4 mutants were examined with an ophthalmoscope and determined to be normal. Electroretinogram (EGR) tests on 1 mutant was normal.

Discussion

A direct test for allelism confirmed that the new *rcw*^{4J} mutation is a remutation to the original recoil wobbler mutation. DNA will be available from the Jackson Laboratory DNA Resource.

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