

Jackson waltzer (*ju*) maps to Chromosome 11 and is an allele of the *Otx1* gene

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Source of Support: NIH/NCRR grant RR01183 (M. Davisson, PI), NIDCD contract DC62108 (KR Johnson, PI), and NCI Cancer Center Core Grant CA34196

Mutation (allele) symbol: *ju*

Mutation (allele) name: Jackson waltzer

Gene symbol: *Otx1*

Strain of Origin: C57BL/6J

Current strain name: C57BL/6J-*Otx1^{ju}*/GrsrJ

Stock #000531 (jaxmice.jax.org)

Origin and Description

The recessive mutation Jackson waltzer (*ju*) was discovered in a colony of C57BL/6J mice at The Jackson Laboratory in 1961. Homozygotes show circling and head-shaking behavior but are not deaf, and inner ears of *ju/ju* mice lack a lateral semicircular canal and crista (Dickie and Deol, 1966). Cochlear function appears not to be affected in *ju/ju* mutant mice: nine mutants tested at 6-8 weeks of age and six tested at 20- 28 weeks of age exhibited normal ABR thresholds, according to previously described criteria (Zheng et al., 1999). Both sexes of *ju/ju* mice are viable and breed throughout adulthood.

Genetic Analysis

Because *ju* had not been assigned to a chromosome, we undertook to map it by intercrossing F1 hybrids produced from matings of C57BL/6J-*ju/ju* mutants with CAST/Ei mice. Forty-four F2 progeny (88 meioses) with circling phenotypes (genotype *ju/ju*) were analyzed for cosegregation with MIT microsatellite markers distributed throughout the genome. Linkage of *ju* was found with markers on Chr 11, giving the following gene order and recombination distances in centimorgans +/- standard errors: *D11Mit259* - 8.0 +/- 2.9 - [*D11Mit80*, *D11Mit171*, *D11Mit152*, *D11Mit19*, ***ju***] - 2.3 +/- 1.6 - *D11Mit215* - 1.2 +/- 1.2 - *D11Mit186*. These results place *ju* about 10-14 cM from the Chr 11 centromere, very near the map position of the orthodenticle homolog 1, *Otx1*, gene. Mice with targeted ablation of *Otx1* have a phenotype similar to *ju*, including circling and head bobbing behavior and missing lateral semicircular canal and crista of the inner ear (Acampora et al, 1996; Morsli et al, 1999).

Dr. Antonio Simeone, Institute of Genetics and Biophysics, Naples, Italy, kindly provided mice with a targeted mutation of *Otx1* (*Otx1^{tm1Asim}*; Acampora et al., 1996) for a complementation test of allelism with *ju* mutant mice. A homozygous *ju/ju* female mated with a male *Otx1* knockout heterozygote (-/+) produced 6 affected offspring (circling, head tossing) out of a total of 8 progeny. A heterozygous *ju/+* female mated with a male *Otx1* knockout heterozygote (-/+) produced 2 affected pups out of a total of 7

progeny. These negative complementation results coupled with the coincident genetic map positions provide strong evidence for allelism.

Acknowledgements:

We thank Dr. Simeone for his gracious gift of the *Otx1* knockout mice for allele testing and Sandra Gray for maintenance and distribution of the C57BL/6J-*Otx1*^{ju}/GrsrJ strain.

References:

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