

ABSTRACT

Identification of QTLs for voluntary running activity in mice for the CBA/J and DBA/2J mouse strains

Our goal is to understand the genetic factors related to voluntary running activity. Voluntary running activity in humans and mice is known to be a heritable behavioral trait. The genetic factors influencing voluntary running activity may be associated with human diseases, such as obesity. Therefore, identifying these factors may not only further our understanding of the behavior at the molecular level but also better our understanding of related disorders. We have found that CBA/J and DBA/2J inbred mouse strains have different voluntary running activities. We used quantitative trait locus (QTL) analyses to locate the genetic loci responsible for this difference. As a quantitative trait, we measured voluntary running activities in the parental mouse lines, their F₁, and F₂ progeny. We also identified genetic markers distinguishing CBA/J and DBA/2J alleles. We genotyped 176 F₂ mice. We performed QTL analyses to identify loci associated with the phenotype. We identified significant QTLs on chromosomes 5 and 6 (LOD scores=3.697 and 5.047). We identified interactions between loci on chromosomes 3 and 6 (LOD score=6.737) and between loci on chromosomes 5 and 6 (LOD scores=8.063). In this study, we identified multiple loci influencing voluntary running activity in mice, providing a guideline for future identification of responsible genes.

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