—Brief data report—

**The Insulin Receptor-Related Receptor (Insrr) Gene Maps to Mouse Chromosome 3**

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Species: Mouse  
Locus name: Insulin receptor-related receptor  
Locus symbol: Insrr  
Map position: Insrr is located on mouse Chromosome (Chr) 3: Centromere-D3Mit199-(13.3 ± 4.4 cM)-D3Mit29-(1.7 ± 1.7 cM)-Insrr-(5.0 ± 2.6 cM)-D3Mit121  
Method of mapping: Insrr was localized by haplotype analysis of 60 intersubspecific backcross progeny derived from mating of (PMA × MSM) F1 × PMA mice.  
Molecular reagents: A 916-bp cDNA fragment of mouse Insrr gene amplified by RT-PCR with specific primers (5'-CGGCTCTTCTGGGCTACGCACT-3' and 5'-CCATGGTGGATGGGAATTACA-3') was labeled by random priming using [α-32P]dCTP. The labeled fragment was used as a probe for Southern blot hybridization to detect restriction fragment length polymorphisms.  
Allele detection: An EcoRI-digested polymorphism was detected in mouse genomic DNA between the PMA and MSM strains by Southern blot hybridization. The probe hybridized to a 21-kb EcoRI fragment in MSM DNA and a 24-kb fragment in PMA DNA.  
Previously determined homologs: Human INSRR gene has been localized on Chr 1q21-q23 by radiation hybrid mapping [9] and rat Insrr gene has been localized on Chr 2 by linkage analysis [2].  
Discussion: The insulin receptor-related receptor (IRR) is the third member of the insulin receptor family that includes insulin receptor (IR) and insulin-like growth factor I receptor (IGFIR) [8]. The expression of the gene encoding IRR (Insrr) has been detected in several tissues including kidney, stomach, and spleen, and fasting causes increased expression of Insrr as well as IR and IGF-IR genes [1]. Recently, the expression of Insrr has also been detected in the β cell of the Langerhans islet [6]. IRR stimulates tyrosine phosphorylation of insulin receptor substrate (IRS)-1 and IRS-2 and the disruption of IRS-2 was reported to cause progressive development of a type 2 diabetic phenotype due to a markedly reduced β cell mass and peripheral insulin resistance [10]. These findings suggested the involvement of IRR in mediating glucose homeostasis.  
The non-obese diabetic (NOD) mouse develops spontaneous autoimmune diabetes, which possesses phenotypes similar to human insulin-dependent diabetes mellitus. Nineteen insulin-dependent diabetes susceptibility (Idd) loci controlling the phenotypes of

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the NOD mouse have so far been mapped on mouse Chrs by linkage analysis of the NOD mice [4]. Although Idd1 and Idd16 were identified as the MHC-linked susceptibility loci on mouse Chr 17 [5], no Idd genes have been definitively identified. In the present study, we mapped the Insrr gene on a region of the mouse Chr 3 between D3Mit29 (42.5 cM from centromere) and D3Mit121 (50.0 cM). Interestingly, one of the Idd loci, Idd10, has been localized on the same location of mouse Chr 3 (48.5 cM) [7] suggesting that Insrr is a candidate gene for Idd10. Furthermore, the human INSRR has been mapped on a region of Chr 1q21 to q23 [9], in which the susceptibility locus for type 2 diabetes has also been localized [3]. These findings suggest that the Insrr gene may play an important role for the susceptibility of type 1 and/or type 2 diabetes.

References