Galanin receptor 1 gene (Galar1) is tightly linked to the myelin basic protein gene on Chromosome 18 in mouse

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Species: Mouse
Locus name: Galanin receptor 1
Locus symbol: Galar1
Map position: Chromosome (Chr) 18 at 55 cm

Method of mapping: The interspecies backcrosses (M. spreus × C57BL/6J)F1 x M. spreus and M. spreus × C57BL/6J)F1 x C57BL/6J (Jackson Lab Backcross Panels BSS and BSB) consisted of 94 animals each.

Data deposit information: MGD-JNUM-38577

Molecular reagent: A 1.59-kilobase (kb) rat cDNA containing the entire coding region for galanin receptor 1.

Method of allele detection: A TaqI restriction fragment length polymorphism (RFLP) was detected by the presence of a 6.5-kb and 2.5-kb genomic DNA fragment in M. spreus and by 7.1-kb and 2.8-kb fragments in C57BL/6J.

Previously identified homologs: Human GALNR1 was mapped to 18q23 by fluorescence in situ hybridization [1] and by physical mapping [2].

Discussion: Galanin receptor (GALNR1) is a G-protein coupled receptor linked to voltage gated calcium channels [3–5]. The GALNR1 ligand is galanin, a 29-amino acid neuropeptide widely distributed in the central and peripheral nervous systems of numerous species [6]. Galanin controls endocrine and exocrine pancreatic secretions, regulates intestinal motility, modulates behavioral, cognitive, and sensory functions, and may modulate growth hormone secretion [7].

Despite strong evidence of extensive homology between mouse and human Chr 18, only seven human chromosome 18q loci have been comparatively mapped in these two species. To localize the mouse Galn1 gene, we analyzed the segregation of an RFLP in DNAs derived from the offspring of The Jackson Lab BSS and BSB backcross panels [10]. Figure 1A shows a TaqI RFLP detected with a rat galanin receptor cDNA probe, consisting of 6.5-kb and 2.5-kb M. spreus genomic DNA fragments and 7.1-kb and 2.8-kb C57BL/6J genomic fragments. Haplotype analysis of the backcross panel data showed no recombinants between Mbh and Galn1, indicating complete linkage between these two genes. Tight linkage between MBP and GALNR1 is also observed on human Chr 18q based on co-location of these two genes on YAC clones 809_B_4 and 776_F_5 [2]. The region around MBP has been implicated as a region involved in the growth hormone insufficiency phenotype of patients with Chr 18q-syndrome [2,8,9]. By correlating genotype with phenotype in affected children, it should be possible to determine whether GALNR1 or MBP is responsible for specific 18q-syndrome phenotypic features.

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References