Assignment¹ of the human homeobox 11-like 2 gene (HOX11L2) to chromosome 5q34→q35 by radiation hybrid mapping

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¹ To our knowledge this is the first time this gene has been mapped.

Rationale and significance

The homeobox 11L2 gene (HOX11L2, TLX-3, *Rnx*) encodes a transcription factor and constitutes together with the HOX11 (TLX) and HOX11L1 (TLX-1, *Enx*) genes a distinct family of orphan homeobox genes (Kennedy et al., 1991; Roberts et al., 1994; Shirasawa et al., 1997, 2000). In the chick and mouse embryo HOX11L2 is expressed within cranial sensory ganglia, neural crest-derived dorsal root and sympathetic ganglia, as well as in distinct neuronal populations within the hindbrain and the spinal cord (Logan et al., 1998; Shirasawa et al., 2000). Its expression pattern within the developing peripheral and central nervous system suggests that it may be involved in the differentiation of specific neuronal populations as well as in the establishment of neuronal circuitry (Logan et al., 1998). Disruption of the murine homolog of HOX11L2 results in a phenotype resembling that of congenital central hypoventilation syndrome in humans indicating that HOX11L2 is critical for the development of central respiratory structures (Shirasawa et al., 2000). Chromosomal localization of the HOX11L2 gene was carried out as part of its evaluation as a candidate for congenital hypoventilation syndrome.

Materials and methods

The Stanford G3 radiation hybrid panel (Research Genetics) was used for chromosome mapping. Two PCR amplifications were performed using intron-derived primers flanking exon 1 (L1s: 5' GGC GCT CCA TGG CCG

CGC CGT AAC 3' and L1as: 5' CCA GCG ACA CCA AGC CGG TCG GGA GA 3') and exon 3 (L3s: 5' CGG GCT GGG AGG CAG ACG GGT TCT 3' and L3as: 5' CGC CCT GGG GCC TAC TCG GGC TAG 3') of the HOX11L2 gene, respectively. The complete genomic sequence was obtained from an anonymous clone (GenBank accession number AC010454) through blast search using the published cDNA sequence (GenBank accession number AJ223798). PCR amplification was carried using AmpliTaq Gold (Perkin Elmer) according to the manufacturer's instruction at annealing temperatures of 63°C. PCR amplicons were verified by direct sequencing.

Results

PCR amplification of DNA from hybrid clones as well as a human control DNA yielded amplicons of the expected size of 741 and 479 bp for exon 1 and exon 3 of the HOX11L2 gene, respectively. The data vector for both amplicons was as follows: 11010 10000 00001 01000 00000 01000 00010 00000 00000 00000 10000 00000 01000 10000 00000. The data were transmitted to the Stanford Human Genome Center (<http://www-shgc.stanford.edu>) for analysis. The results indicate that the human HOX11L2 gene is linked to SHGC-5539 and D5s425 (lod score 10.31) which map to 5q34→q35 based on the Genome Data Base (www.gdb.org).

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