Genomic structure of the adhesion molecule on glia (AMOG, Na/K-ATPase β2 subunit)

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Submitted October 16, 1990 EMBL accession no. X56007

The adhesion molecule on glia (AMOG) has been found to be a new isoform of the β subunit of the Na/K-ATPase (1). AMOG is involved in neuron-astrocyte, but not in astrocyte-astrocyte adhesion and mediates the migration of cerebellar granule cells along the processes of Bergmann glial cells (2). It is predominantly expressed in the mouse cerebellum during development and at adult stages, but is also detectable in other brain regions (3). The gene is localized on chromosome 11 in the mouse (4). Here we report the sequence of the mouse AMOG gene.

The clone G7SH (18 kbp) was isolated from an EMBL 3-C57BL/6J-SalI partial digest genomic library (kindly provided by Dr. W. Wille, University of Cologne) using an AMOG-specific cDNA clone (3). The 7.2 kbp HindIII-SalI fragment of EMBL 3-G7SH including the AMOG gene has been sequenced. The mouse AMOG gene is organized in 7 exons (exon 1, 696 bp; exon 2, 129 bp; exon 3, 105 bp; exon 4, 206 bp; exon 5, 57 bp; exon 6, 100 bp; exon 7, > 783 bp) and 6 introns (intron 1, 1737 bp; intron 2, 314 bp; intron 3, 101 bp; intron 4, 210 bp; intron 5, 800 bp; intron 6, 112 bp). The transcription initiation site (1) of the gene lies 584 bp upstream from the translation initiation site, as determined by primer extension and RNA protection assays (data not shown). The 5′ flanking region contains several putative promoter elements (TATA-box, −29 bp; CAAT-boxes, −139 bp and −243 bp; Sp1-binding sites, −55 bp and −146 bp; 'octamer' sequence, −123). In addition, a second, hypothetical promoter was found, accompanied by a 402 bp long open reading frame (−869 bp to −468 bp) and with appropriate promoter elements (transcription initiation site, −1156 bp; TATA-box, −1185 bp; CAAT-box, −1376 bp). The function of this hypothetical transcription unit is presently not known. Comparison of the mouse AMOG gene with that of the β1 subunit of the human Na/K-ATPase (5) reveals that the first 5 exons code for related protein sequences, while the C-terminal sequences are encoded by 2 exons in AMOG and 1 exon in the human Na/K-ATPase β1 subunit.

ACKNOWLEDGEMENTS

The authors are grateful to Dr. Sergio Gloor and Anne Kohl for many helpful suggestions and discussions and to Schweizerischer Nationalfonds for support.

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Figure 1. Nucleotide sequence of the mouse AMOG gene. Nucleotide residues are numbered in the 5′ to 3′ direction with the numbering beginning at the transcription initiation site of AMOG. Exons are indicated by capital letters. The putative promoter elements are underlined. The translation initiation site and the translation stop signal of AMOG and of the upstream open reading frame are indicated by boxes.