Segment-specific expression of the neuronatin gene during early hindbrain development.

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Abstract

The developing hindbrain is segmented in a series of repetitive bulges called neuromeres or rhombomeres. In the mouse, first molecular evidence for segmentation of the hindbrain came from rhombomeres 3- and 5-specific expression of the Krox-20 gene. The hindbrain segments are linked with the expression of different Hox genes which have a role in patterning the hindbrain and branchial region of the vertebrate head. Here we identified by subtractive hybridization a gene, mouse neuronatin, that is downregulated in P19 embryo carcinoma cells that have undergone a partial differentiation process. Neuronatin encodes putative transmembrane proteins of 54, 55, and 81 amino acids that might serve as protein ligands, cofactors, or small cell adhesion molecules. The neuronatin gene is transiently expressed in rhombomeres 3 and 5 during early hindbrain development and in the floor of the foregut pocket. In addition, expression is observed in the early Rathke's pouch, in the derived adenohypophysis, and in the developing inner ear. During later embryogenesis the neuronatin gene is strongly expressed in the major part of the central and peripheral nervous system. These results suggest that neuronatin participates in the maintenance of segment identity in the hindbrain and pituitary development and maturation or maintenance of the overall structure of the nervous system.

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