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INNER EAR PHENOTYPE OF Dlx-5 KNOCKOUT MICE.

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Dlx gene family members are transcription factors that are homologues of the Drosophila distaless gene. Inner ears of Dlx-5 knockout mice (Acamppora et al 1999, Depew et al 1999) lack the anterior and posterior semicircular canals. The lateral canal is reduced in size and the endolymphatic duct is also affected. Dlx-5 is expressed in the otic cup at 8.5 days postconitum (8.5 dpc) but its expression pattern at later stages has not been reported. To further investigate the role of Dlx-5 in inner ear development we studied the expression of this gene in the developing mouse inner ear using in situ hybridization and analyzed the inner ear phenotype of Dlx-5 knockout mice using the paint-filling technique.

As previously reported, Dlx-5 expression was initiated at 8.5 dpc in the otic cup and at 10.5 dpc it was in the dorsal part of the otocyst. At 11.5 dpc, Dlx-5 was expressed in the endolymphatic duct, the outer margins of canal outpockets, and in close proximity to the three presumptive cristae and the macula utriculi. Only weak expression was found in the cochleosaccular region at this stage. At 15.5 dpc, Dlx-5 remained expressed in the endolymphatic duct. It was also expressed in the outer margin of the three semi-circular canals and non-sensory regions of the ampullae and utricle. No expression was found in the cochlea and saccule. Paint-filled inner ears of Dlx-5 mutants showed similar defects as previously reported with absence of anterior and posterior canals, a rudimentary endolymphatic duct, a reduced lateral canal and an enlarged cochlea. Paraflin sections showed the absence of anterior and posterior cristae, and rudimentary lateral cristae, maculae utriculi and sacculi. Future study will focus on correlating expression pattern of Dlx-5 with its mutant phenotype.

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