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Meis2 is required for inner ear formation and proper morphogenesis of the cochlea

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Meis genes have been shown to control essential processes during development of the central and peripheral nervous system. Here we have defined the roles of the Meis2 gene during vertebrate inner ear induction and the formation of the cochlea. Meis2 is expressed in several tissues required for inner ear induction and in non-sensory tissue of the cochlear duct. Global inactivation of Meis2 in the mouse leads to a severely reduced size of the otic vesicle. Tissue-specific knock outs of Meis2 reveal that its expression in the hindbrain is essential for inner ear induction. Inactivation of Meis2 in the inner ear itself leads to an aberrant coiling of the cochlear duct. By analyzing transcriptomes obtained from Meis2 mutants and ChIPseq analysis of an otic cell line we define candidate target genes for Meis2 which may be directly or indirectly involved in cochlear morphogenesis. Taken together, these data show that Meis2 is essential for inner ear formation and provide an entry point to unveil the network underlying proper coiling of the cochlear duct.