

Opioid receptor gene expression in the rat inner ear

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Opioid peptides have been described in several brain areas and in sensory organs such as the cochlea. The binding of opioid compounds in the cochlea is stereospecific and opioid peptides can affect auditory sensitivity. This indicates that opioid peptides may act as neurotransmitters or neuromodulator in the mammalian cochlea. We hypothesize that opioid receptors are present in this area. The aim of the present study was to examine the expression of μ , δ and κ opioid receptor subtypes in the cochlea. The expression of these opioid receptor subtypes has been determined by reverse transcriptase-polymerase chain reaction (RT-PCR) followed by nested-PCR analysis. Total RNA was extracted from cochlear tissues and cerebral cortex of Sprague-Dawley rats. One tube RT-PCR analysis and nested-PCR was performed with primers specific for nucleotide sequences representing μ , δ and κ opioid receptor subtypes to yield amplification products from small cochlear tissue samples. Amplification of

RNA from rat cerebral cortex (positive control) and rat cochlea with MOR, DOR and KOR primers resulted in products of the predicted length, 564, 356 and 276 bp respectively. The results indicate that all three opioid receptor subtypes μ , δ and κ are expressed in the mammalian cochlea, providing further evidence that opioids possibly function as cochlear neurotransmitters or neuromodulators. However, the role of opioid receptors in regulating the auditory system remains unclear and further studies are necessary to characterize the opioid mechanisms of action in the cochlea and their possible interaction with other neurotransmitter systems.

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