

# An immunohistochemical study of opioid receptor subtypes in the rat cochlea

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Opioid peptides are one group of neuro-transmitter candidates that have been identified in the cochlea. The inhibition of opioid antagonists could lead to changes in auditory function at the level of the cochlea. A previous study has reported that stereospecific opioid binding sites were found in cochlear homogenates, implying that opioid receptors might be present in the cochlea. However, opioid receptor subtypes have not ever been localized in the cochlea. Therefore, the purpose of the present study was to examine the presence and the distribution of opioid receptors in the rat cochlea by immunohistochemical technique. To assess the possible existence of opioid receptors in the rat cochlea, guinea pig antiserum raised against mu opioid receptor and rabbit antiserum raised against delta opioid receptor were applied to cochlear sections of Male Sprague-Dawley rats. We observed that both  $\mu$ - and  $\delta$ -opioid receptor-like immunoreactivities were in the cytoplasm of the inner and outer hair cells of the organ of Corti. However, there were differences in distribution and pattern of both

receptors at the other areas of the cochlea. The  $\delta$ -opioid receptors located clearly at bipolar cells of the spiral ganglion, the interdental cells of the upper part of the limbus, and the outer sulcus cells and their root processes in the spiral ligament. The  $\mu$ -opioid receptors were not well localized at the limbus, and spiral ligament whereas they were demonstrated around the bipolar cells of the spiral ganglion. The present data, together with previous results, indicate that opioid receptors are located in the rat cochlea, and suggest that opioid receptors may play a role in modulating auditory processes, possibly by regulating neurotransmitter release within the cochlea. However, the mechanism of opioid receptors in regulating auditory function is currently unclear and needs further study.

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