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Topographical organization of projections in brainstem auditory nuclei

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The cochlear nucleus (CN) sends fibers directly or via the nuclei of the medial (MSO) lateral (LSO) superior olive and of the lateral lemniscus (NLL) indirectly to the central nucleus of the inferior colliculus (CNIC). The aim of the present study was to determine the distribution of the afferent terminals on postsynaptic sites in the auditory nuclei.

In our experiments microinjections of BDA and HRP were administered with iontophoresis into the auditory nuclei. After adequate survival time the sections were processed according to immunocytochemical protocols and examined in light and electronmicroscope.

Following anterograde tracer injections into the CN labelled terminals with round vesicles, making multiple asymmetrical synapses on the soma and principal dendrites oriented towards the side of injection were observed in the ipsilateral LSO and in the MSO of both sides. In the NLL the labelled terminals were in contact with dendrites without any preference to their direction. In the CNIC the labelled fiber bundles were making synaptic contact with both soma and proximal dendrites. Injections into the MSO and LSO revealed fine labelled fibers establishing asymmetrical synaptic contact with the peripheral dendrites in the NLL and CNIC. In combined experiments the labelled ascending terminals were in synaptic engagement with both the labelled relay and unlabelled interneurons with similar distribution. The descending fibers from the CNIC had preference for the soma and proximal dendrites of neurons in the lower auditory relay nuclei.