ROBERTS,* Rosalinda C., Charles E. RIBAK, Leonard M. KITZES,* and Wolfgang OERTEL,* Department of Anatomy, University of California, Irvine, California and Department of Neurology, Technical University, Munich, West Germany. (Sponsored by Gary M. Peterson). Regional distribution of GABAergic neurons and axon terminals in the brainstem auditory nuclei of the gerbil.

Previous studies have suggested that GABA mediates inhibition within the brainstem auditory system. In the present study the regional distribution of GABAergic somata and axon terminals was evaluated in the gerbil (Meriones unguiculatus). Normal gerbils and those with intraventricular injections of colchicine were anesthetized and perfused with paraformaldehyde. An immunocytochemical method for the localization of glutamate decarboxylase (GAD) was used to identify GABAergic neurons. GAD+ axon terminals and somata are present in all brainstem auditory nuclei in varying densities and patterns. One of the highest densities of GAD+ terminals is found in the dorsal cochlear nucleus, while the ventral cochlear nucleus has somewhat fewer GAD+ terminals.

Within the superior olivary complex, the most impressive concentration of GAD+ terminals and somata appears in the lateral and ventral nuclei of the trapezoid body where the GAD+ somata are intensely stained. The lateral superior olive contains few terminals but has a considerable population of moderately stained GAD+ somata. In contrast, the medial superior olive and the medial nucleus of the trapezoid body contain a moderate amount of terminals and may have a few GAD+ somata. The nuclei of the lateral lemniscus also contain moderate amounts of GAD+ terminals and small numbers of GAD+ somata. The inferior colliculus contains a high density of GAD+ terminals and a population of small and medium-sized GAD+ somata. These data demonstrate a diverse distribution of GABAergic neurons and somata throughout the brainstem auditory nuclei. Our results, taken together with previous physiological and pharamacological data, suggest that some inhibitory functions in the brainstem auditory system may be mediated by GABA.

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