Short Communication/Kurze Mitteilung

Synaptogenesis of the Efferent Vestibular Nerve Endings of the Cat: Ultrastructural Study*

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Summary. The maturation of the innervation of the sensory hair cells of the cristaie ampullaires was studied in the newborn cat. The essential characteristics of the adult are already present in the type II cells at this age. The type I cells on the contrary reveal different degrees of maturation. It was observed that in the immature stages the efferent endings which were already filled with synaptic vesicles were in direct contact with the membrane of the sensory cell. The nerve chalice as it settles into place breaks this contact and simultaneously a synapse is created between the efferent endings and the afferent chalice.

Key words: Maturation — Vestibular System.

Since the first studies revealed the existence of an efferent system in the labyrinth (Petroff, 1955; Wersäll, 1956; Engström, 1958; Rasmussen and Gacek, 1958) this system has been discovered in numerous species. (For a review of the bibliography see Klinke and Galley, 1974.) The efferent innervation of the bottle shaped type I cells is different from that of type II cells: the former has axodendritic efferent synapses and the latter type has axosomatic efferent synapses.

With the exception of Nakai (1970) on the rabbit, electron microscope studies are few. Our paper describes a very particular aspect of the synaptogenesis of the efferent system in the newborn cat.

Methods

Six newborn kittens were used for this study and as a mean of comparison two kittens of age 2 days and two adults. They were anesthetized with pentobarbital (30 mg/kg) and perfused with a 3% solution of Merck glutaraldehyde in a phosphate buffer. The receptors were then removed and fixed in a 2% osmium tetroxyde solu-

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Fig. 1–6. (Legend see page 185)