



Effects of congenital hypothyroidism on the morphology of trigeminal motoneuron assessed by the Golgi staining method in rats

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Abstract

Introduction: Appropriate thyroid hormone (TH) levels are essential during the critical period of brain development, which is associated with the growth of axons and dendrites and synapse formation. In rats, oral motor circuits begin to reach to their adult pattern around 3 weeks after birth, the period in which alteration from sucking to biting and chewing occurs (weaning time). Trigeminal motor nucleus (Mo5) as the supplier of nerves that innervate jaw muscles, shows obvious developmental changes during this period. TH may have an important role in these changes.

Methods: Time pregnant female rats received 50 ppm propylthiouracil (PTU) in their drinking water from 16th day of pregnancy, continued to 23rd day post partum, while control group received tap water. Brain stems of 6 male 23-day-old pups in each experimental group were processed for Golgi staining method. Using rotary microtome, brain stem paraffin embedded blocks were cut to 70 micron slices. Mo5 tissue sections were selected for photography and morphological analysis. Cell body measurements were performed using Starter image analyzer software. Modified Sholl's concentric circles technique was used for the morphological analysis of the dendrites.

Results: The results of cell body measurements revealed a significant decrease in the soma size of trigeminal motoneurons in hypothyroid pups. Besides, counting of the dendrites showed that the number of secondary, tertiary and higher order dendrites, but not primary dendrites, showed a significant decrease compared to the normal group.

Conclusion: The important role of thyroid hormone in motoneurons development and neurofilaments formation suggests that congenital hypothyroidism can alter the cell size and dendritic arborization pattern of trigeminal motoneurons.

Key words: hypothyroidism, trigeminal motoneurons, dendrite arborization

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