T_3 AND T_4-INDUCED HYPERPHOSPHORYLATION OF CYTOSKELETAL PROTEINS FROM CEREBRAL CORTEX AND CEREBELLUM OF RATS DURING DEVELOPMENT

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It is largely described that thyroid hormones (TH) play important roles in brain development through classical genomic mechanisms. However, little is known about nongenomic effects of T_3 and T_4 on cytoskeletal proteins during development. The aim of this study was to investigate the effect of TH on phosphorylation of intermediate filament (IF) proteins (neurofilament subunits, vimentin and glial fibrillary acidic protein) in slices of cerebral cortex and cerebellum from 10-, 15- and 35-day-old rats. Results showed that 1 μM T_3 and 0.1 μM T_4 were not able to alter total immunocontent of the IF proteins in tissue homogenate after 30 min of hormone exposure. However, they altered the IF phosphorylation during development. T_3 and T_4 increased the phosphorylation of the proteins studied in slices of both cerebral cortex and cerebellum from 10- and 35-day-old rats. However, in 15-day-old animals, T_3 induced hyperphosphorylation of cytoskeletal proteins only in cerebellum slices, while T_4 increased the phosphorylation of cytoskeletal proteins only in cerebral cortex. These results demonstrate a rapid nongenomic action of T_3 and T_4 on the phosphorylating system associated to the IF proteins in a tissue-specific and a developmentally-regulated manner in the brain, providing a further support for the involvement of TH on the modulation of the cytoskeleton and its relevance during normal brain development.

Supported by: CNPq, FAPERGS
Keywords: phosphorylation; thyroid hormones; cytoskeleton; cerebral cortex; cerebellum.