[J. Neurochem., **63**, 326-332 (1994)] [Lab. of Molecular Biology]

Correlative regulation of nerve growth factor level and choline acetyltransferase activity by thyroxine in particular regions of infant rat brain.

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Effects of thyroxine (T_4) on nerve growth factor (NGF) level and choline acetyltransferase (ChAT) activity of rat brains were investigated. Repetitive intraperitoneal administration of T_4 caused increase in both NGF level and ChAT activity in the frontal cortex, septum, hippocampus, and striatum and decreases in the cerebellum in 2-day-old rats. T_4 was effective on the postnatal rats only up to day 11. These results suggest that T_4 plays a role in the developmental regulation of NGF level and ChAT activity in a region- and/or stage-specific manner.

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Prolonged expression of *c-jun* proto-oncogene by alkylcatechol followed by elevation of NGF mRNA in cultured astrocytes.

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The *c-jun* mRNA expression in cultured mouse astrocytes was pronounced and long-lasting after 4-methycatechol (MC) treatment, which was much further enhanced by coadministration of phorbol 12-myristate 13-acetate (PMA). The result that the expression profile of *c-jun* mRNA resembled to that of NGF mRNA suggests that the increase in *c-jun* mRNA is responsible for the subsequent increase in NGF mRNA after MC treatment. The cotransfection of mouse astrocytes with expression plasmids of *c-fos* and/or *c-jun* and NGF promoter gene showed that simultaneous expression of both *c-fos* and *c-jun* genes was needed to enhance NGF promoter activity. These suggest that alkylcatechol induces NGF mRNA by means of transient induction of *c-fos* mRNA and long-lasting induction of *c-jun* mRNA.

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Cellular localization of nerve growth factor-like immunoreactivity in adult brain: Quantitative and immunohistochemical study.

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To elucidate the role and mechanism of action of nerve growth factor (NGF) in the adult central nervous system, we investigated the localization of NGF-like immunoreactivity in adult rat brain, both quantitatively and immunohistochemically, using polyclonal anti-NGF IgG. The NGF-like immunoreactivity was found in the cell bodies, dendrites and axons, not only in the cerebral cortex, hippocampus and basal forebrain, but also in the diencephalon, brain stem and cerebellum. The population of neurons with NGF-like immunoreactivity was limited, but unexpectedly widespread, and the density of these cells correlated well with the content determined by an enzyme immunoassay.