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Ganglioside Stimulation of Nerve Growth Factor Synthesis in Cultured Rat Schwann Cells.

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To investigate effects of gangliosides on nerve growth factor (NGF) synthesis/secretion by Schwann cells, we obtained Schwann cells from dorsal root ganglia of one-day old Wistar rats and cultured them with various concentrations of a mixed ganglioside comprising GMI, GD1a, GD1b, and GT1b. NGF synthesis was evaluated by the measurement of NGF concentration in the conditioned medium using an enzyme immunoassay. In the continuous presence of 10^{-8} M gangliosides, the NGF concentration in the medium showed a four fold increase on the 4th day, and it then decreased by the 8th day. The present results indicate that gangliosides promote the production/synthesis of NGF by Schwann cells.

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Highly Sensitive Enzyme Immunoassay for β -Nerve Growth Factor (NGF): A Tool for Measurement of NGF Level in Rat Serum.

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A sensitive two-site enzyme immunoassay (EIA) system was established for mouse β nerve growth factor (NGF) isolated from mouse submaxillary gland. Our EIA system is based on the sandwiching of antigen between anti-mouse β NGF antibody IgG coated on a polystyrene plate and biotinylated anti-mouse β NGF antibody IgG. The bound antibody complex was quantified with streptavidine linked- β -D-galactosidase. With this system NGF concentrations as low as 0.02 pg/well could be measured reproducibly. The sensitivity of this EIA system permitted the quantification of endogenous immunoreactive β NGF in rat serum. The mean level in serum of male rats (153.2 pg/ml) was found to be almost the same as that of female rats (127.6 pg/ml).

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Stimulatory Effect of 4-Alkylcatechols and Their Diacetylated Derivatives on the Synthesis of Nerve Growth Factor.

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A series of 4-alkylcatechols and 1,2-diacetoxy-4-alkylbenzenes were chemically synthesized for *in vitro* evaluation as stimulators of NGF synthesis. All compounds were proven to be potent in stimulating NGF synthesis in L-M cells and mouse astroglial cells. In a series of 4-methylcatechol and 4-ethylcatechol severely affected viability and cell adhesive properties. In a series of 1,2-diacetoxy-4-alkylbenzenes, the concentrations required for the maximal effect and the effective ranges of concentrations were higher than those in the 4-alkylcatechol series, and the cell adhesive properties or viabilities were not affected.