The effect of glial cell line-derived neurotrophic factor in fibrin glue on developing dopamine neurons.

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Abstract:

Glial cell line-derived neurotrophic factor (GDNF), a member of the transforming growth factor-beta superfamily, promotes the survival, morphological differentiation, and high-affinity dopamine (DA) uptake of cultured nigral DA neurons. In order to test potential methodology for peptide delivery in vivo, GDNF-containing fibrin glue balls (8 mug/ball) were incorporated with pieces of fetal ventral mesencephalon (E15) and transplanted into the anterior chambers of sympathetically denervated adult rats. Five weeks after grafting, the numbers of TH-positive neurons and the nerve fiber density were significantly higher in the ventral mesencephalic grafts treated with GDNF-containing glue balls than in those treated with vehicle. In addition, the laminin and GFAP immunoreactivities were similar between the two groups. These data support the concept that GDNF is a potent trophic factor for DA neurons in vivo and suggest that fibrin glue may provide a unique and safe means to permit prolonged delivery of trophic molecules to CNS tissues.