Although initially thought to be important primarily in neural development, a number of trophic proteins have been found to have neuroprotective and neuroregenerative activity in the adult central nervous system, particularly for midbrain dopamine neurons (MDN).

Neurorestoration is potentially feasible for MDN since there is an initial loss of phenotype for these neurons in Parkinson's disease (PD) rather than neuronal death. There is a considerable recent literature on trophic properties of TGF-β superfamily proteins for MDN's, including glial cell derived neurotrophic factor (GDNF), neurturin, and bone morphogenetic proteins (BMPs). This paper will review studies with the factors listed above, as well as describe more recent studies with two newly described trophic proteins, MANF and CDNF. Data will be presented from various animal models of PD suggesting that these trophic proteins may eventually lead to PD therapeutics in man. In addition, some data on small molecules with neuroprotective properties (AP(4)A, retinoic acid and vitamin D(3)) will also be described [1)].

1)
Airavaara M, Voutilainen MH, Wang Y, Hoffer B. Neurorestoration. Parkinsonism Relat Disord. 2012 Jan;18 Suppl 1:S143-6. doi: 10.1016/S1353-8020(11)70045-1. Review. PubMed PMID: 22166416; PubMed Central PMCID: PMC3245378.