Neurotrophic factor

Are a family of proteins that are responsible for the growth and survival of developing neurons and the maintenance of mature neurons. Recent research has shown that neurotrophic factors promote the initial growth and development of neurons in the central nervous system and peripheral nervous system and that they are capable of regrowing damaged neurons in test tubes and animal models.

Currently, neurotrophic factors are being intensely studied for use in bioartificial nerve conduits because they are necessary in vivo for directing axon growth and regeneration. In studies, neurotrophic factors are normally used in conjunction with other techniques such as biological and physical cues created by the addition of cells and specific topographies. The neurotrophic factors may or may not be immobilized to the scaffold structure, though immobilization is preferred because it allows for the creation of permanent, controllable gradients. In some cases, such as neural drug delivery systems, they are loosely immobilized such that they can be selectively released at specified times and in specified amounts.

Neurotrophic factors are often released by the target tissue in order to guide the growth of developing axons. Most neurotrophic factors belong to one of three families:

see Brain derived neurotrophic factor.

Ciliary neurotrophic factor.

Fibroblast growth factor.

Glial cell derived neurotrophic factor

(1) neurotrophins, (2) glial cell-line derived neurotrophic factor family ligands (GFLs), and (3) neuropoietic cytokines.

Each family has its own distinct signaling family though the cellular responses elicited often do overlap.