

## CLINICAL SPECIFICATIONS

### NEUROTROPHINS

#### Function:

Neurotrophin (NT) is a family of proteins belonging to a class of growth factors. NTs induce the survival, development, and function of neurons and are capable of signaling particular cells to survive, differentiate, or grow. They work in the peripheral and central nervous systems to encourage the growth and differentiation of new neurons and synapses.

#### Associated With:

Multiple sclerosis<sup>1</sup>  
 Systemic lupus erythematosus<sup>2</sup>  
 Allergic asthma<sup>3</sup>  
 Allergy<sup>3</sup>  
 Testicular trauma<sup>4</sup>

**Known Cross-Reactions:** Beta Nerve Growth Factor;<sup>5</sup> A $\beta$ <sub>42</sub> peptide<sup>6</sup>

#### Clinical Significance:

Neurotrophin (NT) is essential for the development of both the neural-crest-derived peripheral nervous system and the central nervous system.<sup>7</sup> Indeed, after focal cerebral ischemia, NTs are highly expressed as damaged tissue is regenerated.<sup>8</sup> NTs support motor neuron survival. Motor neuron diseases include spinal muscular atrophy and amyotrophic lateral sclerosis. Due to the vital role NTs play in the protection of neurons, infusion therapies utilizing NTs have been implemented in a variety of neurological disorders including Alzheimer's disease (AD) and Parkinson's disease with varying degrees of success.<sup>reviewed in 9</sup> Inflammatory processes and responses to proinflammatory mediators are potent inducers of neurotrophin release by nerve cells and a wide range of immune system components, including mast cells, macrophages, T cells, B cells and NK cells.<sup>reviewed in 3</sup> Neurotrophins not only affect nerve cells, they can also interfere with allergy-related immune cell functions including mast cell degranulation, T-helper 2 cytokine synthesis, antibody production from B cells, and eosinophil survival.<sup>reviewed in 3</sup> In a recent study, Vojdani and Vojdani showed that antibody made against amyloid beta (A $\beta$ <sub>42</sub>) peptide reacted strongly with nerve growth factors, including n eurotrophins.<sup>6</sup> Due to cross-reactivity with amyloid beta peptide,<sup>6</sup> patients with circulating antibodies to NTs may be at greater risk for AD and other neurological disorders when the blood-brain barrier is breached.

#### References:

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