

Neurodegenerative Diseases - Alzheimer's and Parkinson's

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Alzheimer's and Parkinson's are neurodegenerative diseases in which cell damage and degeneration is seen in certain specific areas of the brain. In Parkinson's disease nerve cells slowly degenerate in the part of the mid-brain (the substantia nigra layer of the basal ganglia) that controls movement, resulting in progressive loss of muscular co-ordination and balance. In Alzheimer's disease brain cells degenerate, brain mass shrinks and characteristic neurofibrillary tangles and neural plaques are seen post mortem.

Increasing lines of evidence suggest that mitochondrial damage plays a key role in Parkinson's, Alzheimer's and some other neurodegenerative diseases (1-5). This, in turn, increases the generation of reactive oxygen species and the onset of oxidative stress, leading to oxidative damage and programmed cell death. At the same time, glutathione homeostasis is disturbed (6-9). In one study, glutathione levels were reduced by 40% in the substantia nigra in early stage Parkinson's disease (7). These levels fall even much further in later stages, the magnitude of reduction in glutathione seeming to parallel the severity of the disease (9). The lowered glutathione values and increased oxidative stress are thought to be responsible for the loss of dopamine-producing cells in the substantia nigra in Parkinson's disease patients (7,8).

The use of antioxidants, particularly glutathione, for the treatment of neurodegenerative diseases is an obvious consideration (6-9). In an in vitro study, glutathione was shown to protect human neural cells from apoptosis i.e. cell death, induced by dopamine (8). Sechi et al. showed that intravenous injection of glutathione was effective in reducing symptoms (42% decline in disability) in early Parkinson's disease patients and possibly retarded the progression of the disease (9). Other treatment options to increase brain concentrations of glutathione are better choices for long-term treatment. Banaclocha has reviewed the putative usefulness of N-acetyl cysteine for this purpose in the treatment of Parkinson's, Alzheimer's and other age-associated neurodegenerative diseases (1). Immunocal is an even better choice than this drug, being entirely non-toxic and proven to raise intracellular glutathione (10).

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