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Reactive Oxygen Species in Neurodegenerative Disorders

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Progressive brain cell death and neuronal loss, which impede motor or cognitive function, are hallmarks of neurodegenerative disorders which includes Alzheimer's disease, Parkinson's disease and Huntington's disease. These conditions are a major source of health issues, particularly for the ageing population. Chemically reactive molecules called reactive oxygen species (ROS) have been linked to the aetiology of neurodegenerative disorders. They serve crucial roles in mediating cellular functions like inflammation, cell survival, and stressor responses as well as numerous diseases like cardiovascular conditions, muscular dysfunction, allergies, and malignancies.

ROS are known to be formed spontaneously inside the biological system. High ROS concentrations can cause oxidative stress (OS), which is the breakdown of the equilibrium between pro-oxidant and antioxidant levels, and cell death because of their reactivity. Despite the fact that high levels of OS are frequently found in the brains of patients with neurodegenerative illnesses, accumulating evidence suggests that ROS may play a vital role in the complicated pathogenesis of the neurodegenerative diseases. Although oxidative stress and interactions with mitochondria may not be the cause of neurodegenerative illnesses, they are likely to accelerate disease development.

Given the crucial roles OS plays in neurodegenerative illnesses, controlling ROS levels may be a promising therapeutic approach to delay neurodegeneration and relieve its symptoms. Numerous substances with antioxidant qualities, such as glutathione (GSH), vitamin C, vitamin E, and coenzyme Q10, have been investigated in this regard for their ability to lessen neurodegenerative symptoms; nevertheless, the results are conflicting. The molecular aetiology of neurodegeneration is not fully understood at this time. To find new and dependable treatments, further research that examines the effects of ROS in diverse neurodegenerative illnesses may be essential.