

Nitric oxide a molecular switch for cell death/survival in brain aging and degeneration

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Nitric oxide (NO) the gaseous free radical, synthesized by NO Synthase (NOS), is a potent messenger in inter- and intracellular signalling acting through stimulation of guanylyl cyclase (GC) and cGMP regulated protein kinase G (PKG). The excessive synthesis of NO and its interaction with superoxide radical $O_2^{\cdot-}$ leads to cell damage and death under different pathological conditions including brain ischemia, Parkinson and Alzheimer diseases.

The authors studied expression and activity of distinct NOS isoforms in different brain parts during aging and ischemia reperfusion injury. Their data indicate aged-related enhancement of NO synthesis in all investigated brain parts (hippocampus, brain cortex, cerebellum and striatum). It has been evidenced that the neuronal nNOS, which activity depends on its phosphorylation status, is responsible for higher NO synthesis in aged brain (24 months old). The observed changes of the expression of regulation of nNOS mRNA and eNOS mRNA in brain of ageing animals may be adaptive mechanisms that protect the brain against enhancement of enzyme synthesis.