

Neuroprotective properties of nitric oxide and S-nitrosoglutathione.

關壯卿

Rauhala P;Andoh T;Chiueh CC

Abstract

Oxidative stress and apoptosis may play an important role in the neurodegeneration. The present paper outlines antioxidative and antiapoptotic mechanisms of nitric oxide and S-nitrosothiols, which could mediate neuroprotection. Nitric oxide generated by nitric oxide synthase or released from an endogenous S-nitrosothiol, S-nitrosoglutathione may up-regulate antioxidative thioredoxin system and antiapoptotic Bcl-2 protein through a cGMP-dependent mechanism. Moreover, nitric oxide radicals have been shown to have direct antioxidant effect through their reaction with free radicals and iron-oxygen complexes. In addition to serving as a stabilizer and carrier of nitric oxide, S-nitrosoglutathione may have protective effect through transnitrosylation reactions. Based on these new findings, a hypothesis arises that the homeostasis of nitric oxide, S-nitrosothiols, glutathione, and thioredoxin systems is important for protection against oxidative stress, apoptosis, and related neurodegenerative disorders.