

# Protection by neuroglobin expression in brain pathologies

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Astrocytes play an important role in physiological, metabolic, and structural functions, and when impaired, they can be involved in various pathologies including Alzheimer, focal ischemic stroke, and traumatic brain injury. These disorders involve an imbalance in the blood flow and nutrients such as glucose and lactate, leading to biochemical and molecular changes that cause neuronal damage, which is followed by loss of cognitive and motor functions. Previous studies have shown that astrocytes are more resilient than neurons during brain insults as a consequence of their more effective antioxidant systems, transporters, and enzymes, which made them less susceptible to excitotoxicity. In addition, astrocytes synthesize and release different protective molecules for neurons, including neuroglobin, a member of the globin family of proteins. After brain injury, neuroglobin expression is induced in astrocytes. Since neuroglobin promotes neuronal survival, its increased expression in astrocytes after brain injury may represent an endogenous neuroprotective mechanism. Here, we review the role of neuroglobin in the central nervous system, its relationship with different pathologies, and the role of different factors that regulate its expression in astrocytes.

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Astrocytes

Brain injury

Mitochondria

Neuroglobin

Neuroprotection

cytochrome c

messenger RNA

neuroglobin

nitric oxide

reactive oxygen metabolite

Alzheimer disease

antioxidant activity

apoptosis

astrocyte

astrocytosis

blood brain barrier

brain damage

brain disease

brain hypoxia

brain ischemia

human

mitochondrion

nerve degeneration

neuroprotection

nonhuman

oxidative stress

Parkinson disease

perception deafness

protein expression

Review

traumatic brain injury