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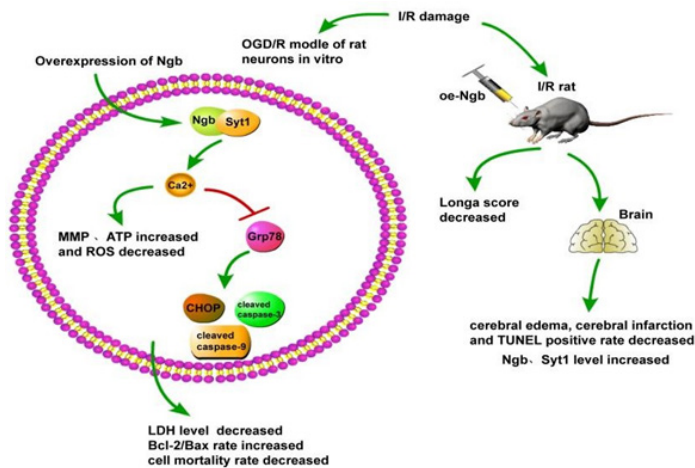
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Protection of neuroglobin against cerebral ischemia/reperfusion injury in rats through mitochondria- and endoplasmic reticulum stress-related apoptosis pathways

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Cerebral ischemia/reperfusion (I/R) injury remains a grievous health threat, and herein effective therapy is urgently needed. This study explored the protection of Neuroglobin (Ngb) in rats with cerebral I/R injury. The focal cerebral I/R rat models were established by Middle Cerebral Artery Occlusion (MCAO) and neuronal injury models were established by Oxygen-Glucose Deprivation/reoxygenation (OGD/R) treatment. The brain injury of rats was assessed. Levels of Ngb, Bcl-2, Bax, endoplasmic reticulum stress (ERS)-related markers, and Syt1 were measured by immunofluorescence staining and Western blotting. The cytotoxicity in neurons was assessed by Lactate Dehydrogenase (LDH) release assay. Levels of intracellular Ca²⁺ and mitochondrial function- related indicators were determined. Binding between Ngb and Syt1 was detected by co-immunoprecipitation. Ngb was upregulated in cerebral I/R rats and its overexpression alleviated brain injury. In OGD/R-induced neurons, Ngb overexpression decreased LDH level and neuronal apoptosis, decreased Ca²⁺ content, and mitigated mitochondrial dysfunction and ERS-related apoptosis. However, Ngb silencing imposed the opposite effects. Importantly, Ngb could bind to Syt1. Syt1 knockdown partially counteracted the alleviation of Ngb on OGD/R-induced injury in neurons and cerebral I/R injury in rats. Briefly, Ngb extenuated cerebral I/R injury by repressing mitochondrial dysfunction and endoplasmic reticulum stress-related apoptosis through Syt1.



Recent Publications

1. Qin Y, Zhang Q, Liu Y (2020). Analysis of knowledge bases and research focuses of cerebral ischemia-reperfusion from the perspective of mapping knowledge domain. *Brain Res Bull.* 156:15-24.
2. Long Y, Yang Q, Xiang Y, et al (2020). Nose to brain drug delivery - A promising strategy for active components from herbal medicine for treating cerebral ischemia reperfusion. *Pharmacol Res.* 159:104795.

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3. Shu J, Huang X, Liao Q, et al(2022). Sevoflurane Improves Hemorrhagic Shock and Resuscitation-Induced Cognitive Impairments and Mitochondrial Dysfunctions through SIRT1- Mediated Autophagy. *Oxid Med Cell Longev.* 2022:9771743.

Biography

Xu Jianping has been engaged in clinical, teaching and scientific research in the Division of Cardiology, The First Affiliated Hospital of Soochow University, China. She presented this study on behalf of Dr. Zhang Lihong. Dr. Zhang has been engaged in clinical, teaching and scientific research in the department of Neurology for 18 years. She is especially good at the diagnosis and treatment of acute and critical cerebrovascular diseases, including intravenous thrombolysis, mechanical thrombolysis and carotid artery stenting therapy for ischemic stroke. Based on the contradiction between good recalibration and poor prognosis in the treatment of ischemic stroke, the study of ischemia-reperfusion injury was proposed. This study provides a theoretical basis for the treatment of ischemia-reperfusion injury in ischemic stroke.

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