Junxia Xie et al., J Alzheimers Dis Parkinsonism 2016, 6:6(Suppl)
http://dx.doi.org/10.4172/2161-0460.C1.025

Differences in vulnerability of neurons and astrocytes to hemeoxygenase-1 modulation: Implications for mitochondrial ferritin

Junxia Xie, Xiaojun Yu, Ning Song and Jun Wang
Qingdao University, China

Induction of the antioxidant enzyme hemeoxygenase-1 (HO-1) was observed in both astrocytes and neurons in the substantianigra of patients with Parkinson's disease (PD). In the current study, we investigated whether HO-1 behaves differently between neurons and astrocytes under the condition of neurotoxicity related to PD. The results showed a time-dependent HO-1 upregulation in primary cultured ventral mesencephalon (VM) neurons and astrocytes treated with the mitochondria complex I inhibitor 1-methyl-4-phenylpyridinium (MPP+) or recombinant α-synuclein. However, HO-1 upregulation appeared much later in neurons than in astrocytes. The HO-1 inhibitor zinc protoporphyrin (ZnPP) aggravated MPP+- or α-synuclein-induced oxidative damage in both astrocytes and neurons, indicating that this HO-1 response was cytoprotective. For neurons, the HO-1 activator cobalt protoporphyrin IX (CoPPIX) exerted protective effects against MPP+ or α-synuclein during moderate HO-1 upregulation, but it aggravated damage at the peak of the HO-1 response. For astrocytes, CoPPIX always showed protective effects. Higher basal and CoPPIX-induced mitochondrial ferritin (MtFt) levels were detected in astrocytes. Lentivirus-mediated MtFt overexpression rescued the neuronal damage induced by CoPPIX, indicating that a large MtFt buffering capacity contributes to pronounced HO-1 tolerance in astrocytes. Such findings suggest that astrocyte-targeted HO-1 interventions have potential as a novel pharmacological treatment strategy in PD.

Biography

Junxia Xie is Taishan scholar Distinguished Professor. She is currently the Director of Shandong Provincial Collaborative Innovation Center for Neurodegenerative Disorders and Excellent Innovative Team of Shandong Province. She is the Vice-President of Qingdao University, Chinese Association of Physiological Sciences as well as Chinese Neuroscience Society. She has 7 projects from the NSFC, including 2 key projects and participates in National 973 Project. She has published 150 articles up to now.

jxiaxie@public.qd.sd.cn

Notes: