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Astrocyte iron metabolism is involved in the nigral iron accumulation in Parkinson's disease

Jun Wang and Junxia Xie

Medical College of Qingdao University, China

Nigral iron accumulation plays a key role in Parkinson's disease (PD). It is worth attention that unlike neurons and other glia cells, astrocytes have few iron deposit. Our previous results show that 6-hydroxydopamine (6-OHDA) up-regulates iron import and down-regulates iron export in nigral dopaminergic neurons, thus leading to cellular iron accumulation. While 6-OHDA promotes iron traffic in astrocytes by up-regulating both iron import and export, thus avoiding iron deposit. Therefore, astrocytes may be "iron pump". Then, if the enhanced iron traffic in astrocytes is the source of iron accumulated in dopaminergic neurons? What is the mechanism of the enhanced iron traffic in astrocytes? In this study, we found that 6-OHDA that may be produced by auto-oxidation in dopaminergic neurons, promoted iron traffic in astrocytes by the activation of hypoxia-inducible factors (HIFs) in astrocytes. In addition, it was HIF-2 α , but not HIF-1 α that regulated the iron transport in astrocytes. The study is to explore the mechanisms of iron metabolism in astrocytes and its role in the nigral iron accumulation in PD, thus providing insight into the control of astrocytes function to protect neurons as therapeutic strategies of PD.

junwangqdu@163.com