

Iron toxicity in neurodegeneration

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Iron is an essential element for life on earth, participating in a plethora of cellular processes where one-electron transfer reactions are required. Its essentiality, coupled to its scarcity in aqueous oxidative environments, has compelled living organisms to develop mechanisms that ensure an adequate iron supply, at times with disregard to long-term deleterious effects derived from iron accumulation. However, iron is an intrinsic producer of reactive oxygen species, and increased levels of iron promote neurotoxicity because of hydroxyl radical formation, which results in glutathione consumption, protein aggregation, lipid peroxidation and nucleic acid modification. Neurons from brain areas sensitive to degeneration accumulate iron with age and thus are subjected to an ever increasing oxidative stress with the accompanying cellular damage. The ability of these neurons to survive depends on the adaptive mechanisms developed to cope with the increasing oxidative load. Here, we describe