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Exploring the Role of Monoamine Oxidase Activity in Aging and Alzheimer's Disease

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Abstract

Monoamine oxidases (MAOs) are a family of flavin adenine dinucleotide-dependent enzymes that have a crucial role in the metabolism of neurotransmitters of the central nervous system. Impaired function of MAOs is associated with copious brain diseases. The alteration of monoamine metabolism is a characteristics feature of aging. MAO plays a crucial role in the pathogenesis of Alzheimer's disease (AD), a progressive neurodegenerative disorder associated with an excessive accumulation of amyloid-beta (A β) peptide and neurofibrillary tangles (NFTs). Activated MAO plays a critical role in the development of amyloid plaques from A β as well as the formation of the NFTs. In the brain, MAO mediated metabolism of monoamines is the foremost source of reactive oxygen species formation. The elevated level of MAO-B expression in astroglia has been reported in the AD brains adjacent to amyloid plaques. Increased MAO-B activity in the cortical and hippocampal regions is associated with AD. This review describes the pathogenic mechanism of MAOs in aging as well as the development and propagation of Alzheimer's pathology.

Keywords: Alzheimer's disease.; MAO; aging; amyloid β ; neuroinflammation; oxidative stress; tau.

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