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Mitochondrial dysfunction and Alzheimer's disease: Role of Miro protein

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Alzheimer's disease (AD) is one of the most common neurodegenerative diseases characterized by memory loss and cognitive impairment due to the accumulation of amyloid-beta 42 (Aβ42) plaque and the formation of neurofibrillary tangles (NFT) made up of hyperphosphorylated Tau protein in the brain. This disease has emerged as a global health concern due to the significantly increased number of AD patients across the globe (~50 million people worldwide). Till date AD has no permanent cure, this is because still several pathophysiological mechanisms underlying AD are still not well understood. Several studies have suggested that altered mitochondrial biogenesis plays a crucial role in the onset of neurodegenerative diseases including AD. It has been also shown that abnormality in mitochondrial structure, function and improper axonal transport is the first step of the development of AD and related pathologies. Miro, a Rho GTPases and mitochondrial outer membrane protein forms a major protein complex with Milton, an adaptor protein and motor protein and mediates mitochondrial axonal transport. In AD, an abnormal mitochondrial function and altered axonal transport has been reported but the possible genetic interaction between Miro and AD associate genes (Appl, Aβ42, and Tau) is not well studied. Herein, we have demonstrated that the Miro gene genetically interacts with AD-associated genes Appl, Aβ42, and Tau in Drosophila.

Recent Publications

1. Panchal K. Tiwari AK. (2021). Miro (mitochondrial Rho GTPase), a key player of mitochondrial axonal transport and mitochondrial dynamics in neurodegenerative diseases. Mitochondrion. 56:118-135. (Elsevier)
2. Bhatt M, Pandey SS, Tiwari AK, Tiwari BS. (2021). Plastid mediated Singlet Oxygen in Regulated Cell Death. Plant Biology. (Wiley)
3. Panchal K, Tiwari AK. (2020). Miro, a Rho GTPase genetically interacts with Alzheimer's disease-associated genes (Tau, Aβ42 and Appl) in Drosophila melanogaster. Biology Open. 9 (9); (The Company of Biologist)

Biography

Anand K Tiwari is from Institute of Advanced Research; India has expertise in working with Drosophila model for Alzheimer's disease (AD). His research work in the area improves understanding of Alzheimer's disease and its interacting partners. His recent work will help in designing the therapeutic target for AD and related pathologies.

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