Protective Effects of Natural Products Like Curcumin and Centella asiatica Against Amyloid Beta Induced Mitochondrial Dysfunction in Ocular Manifestations of Alzheimer’s Disease

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Alzheimer’s disease (AD) is one of the most common forms of dementia. The progression of AD occurs in the brain as well as in the eye. The retinal pigment epithelial (RPE) cells were recently identified as a major source of amyloid beta synthesis and secretion in the posterior eye. Mitochondria are essential for the normal functions of cells and mitochondrial dysfunction has been implicated in the pathogenesis of Alzheimer’s disease (AD). The natural products like curcumin, and Centella asiatica (CA) are reported to have multiple neuroprotective effects, so they were used in this study to investigate their protective effects if any against amyloid beta induced mitochondrial dysfunction in ocular manifestations of AD. Using human RPE cells, curcumin, CA and amyloid beta, I studied the protective effects of curcumin and CA against amyloid beta. Further, I studied preventive (curcumin/ CA +amyloid beta) and intervention (amyloid beta+curcumin/ CA) effects of curcumin and CA against amyloid beta in RPE cells. Using CCK8 assay we found that cell viability was signi?cantly decreased in amyloid beta treated cells relative to untreated cells. Signi?cantly increased cell viability levels were found in cells treated with curcumin/ CA+amyloid beta relative to amyloid beta incubated cells, suggesting that curcumin/ CA increase cell viability in the presence of amyloid beta. Experiment measuring gene expression of ND1 (subunit 1 of NADH dehydrogenase; part of respiratory chain in mitochondria), and the assays on ROS (reactive oxygen species) and SOD (Super oxide dismutase) also suggested curcumin and CA to have protective effects. These ?ndings suggest that curcumin and CA to be a promising drug molecule to treat AD patients.

Awards Won:
Fourth Award of $500
American Physiological Society: Second Award of $1,000