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Amla enhances autophagy and modulates beta amyloid metabolism in an *in vitro* model of Alzheimer's disease

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Alzheimer's disease (AD) is a progressive, fatal neurodegenerative disease characterized by extensive neuronal loss associated with increased accumulation of the beta amyloid (Aβ) protein. Reducing production, preventing aggregation and improving clearance of Aβare areas of active research in the development of therapeutic agents to ameliorate neurodegeneration in AD. The Indian plant amla (Emblicaofficinalis), commonly known as Indian gooseberry, has widely been utilized in traditional Ayurvedic medicine preparations in the treatment of a variety of disease conditions including cardiovascular disease and diabetes: accumulating evidence also suggests that amla may be beneficial in AD. Amla exhibits antioxidant, anti-inflammatory, and anti-apoptotic mechanisms and more recently has been shown to modulate autophagy; a vital protein degradation pathway involved in the clearance of damaged organelles and aggregate proteins in cells. Our own recent in vitro work shows that amla extract enhances autophagy and modulates accumulation of proteolytic products of Amyloid precursor protein (APP) such as APP-C terminal fragments (C99, C83). Amla treatment (50-300 µg/ml) induced a dose-dependent increase in autophagic flux, as measured by Western blotting utilizing an LC3 directed antibody as an autophagosome marker. At similar concentrations, amla treatment also reduced accumulation of APP C-terminal fragment levels by 33 to 77%. However, no significant changes were observed in APP levels, indicating that amla did not alter APP production. Overall, our findings suggest that amla may confer beneficial effects through modulating autophagy and Aβ metabolism, and warrants further investigation as a potential therapeutic agent in AD.

Biography

Elham Teimouri is a PhD candidate based at Edith Cowan University in Western Australia, working on a project investigating the utility of nutraceutical compounds as potential therapeutic agents in Alzheimer's disease. Elham is supervised by Professor Ralph Martins, Dr Stephanie Rainey-Smith, Prashant Bharadwaj and Associate Professor Giuseppe Verdile. At the time of writing, Elham has published one peer-reviewed scientific publication with an additional three in preparation.

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