

BIOPHYSICAL AND PHOTOBIOLOGICAL MODULATIONS ON CELLULAR PATHWAYS IN ALZHEIMER'S DISEASE

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ABSTRACT

The overall goal of this thesis work is to study the effects of biomodulations on Alzheimer's disease (AD) related cellular pathways, using biophysical and photobiological methods, including secretory phospholipase A₂, various fatty acids treatments and low energy light irradiation. By increasing membrane fluidity in neuronal cells, secretory phospholipase A₂ and unsaturated fatty acids with 4 or more double bonds are able to increase the secretion of neuroprotective and neurotrophic α -secretase-cleaved soluble APP (sAPP _{α}). Low energy laser at 632.8 nm is able to suppress amyloid- β peptide (A β)-induced oxidative and inflammatory responses in primary astrocytes, suggesting it has neuroprotective effects against oxidative stress and inflammation in AD. This thesis work provides insights into potential therapeutic treatments and prevention of AD.