

**Public Abstract**

First Name:Xiaoguang

Middle Name:

Last Name:Yang

Adviser's First Name:James

Adviser's Last Name:Lee

Co-Adviser's First Name:

Co-Adviser's Last Name:

Graduation Term:FS 2010

Department:Biological Engineering

Degree:PhD

**Title:BIOPHYSICAL AND PHOTOBIOLOGICAL MODULATIONS ON CELLULAR PATHWAYS IN ALZHEIMER DISEASE**

The overall goal of this thesis work is to study the effects of biomodulations on Alzheimer 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 alpha-secretase-cleaved soluble APP (sAPP $\alpha$ ). Low energy laser at 632.8 nm is able to suppress amyloid-beta peptide (A $\beta$ )-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.