# S2-6 Protective Effects of Natural antioxidants on neurodegenration diseases

Baolu Zhao

*State Key Laboratory of Brain & Cognitive Science, Institute of Biophysics, Academia Sinica, Beijing China 100101*
*(Zhaobl@sun5.ibp.ac.cn)*

Tea catechins (TC) are usually expected as scavengers of free radicals. However not all the actions of TC are necessarily beneficial. Here we demonstrated TC could protect PC12 cells against apoptosis caused by 6-OHDP but promote SH-SY5Y cells against apoptosis caused by NO free radicals. We investigated the effects of exposure of PC12 cells to 6-OHDA alone or associated with pre-treatment of TC. Exposure of PC12 cells to 6-OHDA induced a concentration-dependent decrease in cell viability determined by MTT assay and apoptosis of PC12 cells observed by flow cytometry, fluorescence microscopy and DNA fragmentation technique. TC displayed significantly inhibitory effects against PC12 cell death. EGCG and ECG were more effective than TC but EGC, EC and (+)-C were less effective.

The neuroprotective effect of genistein against $A\beta_{25-35}$-induced apoptosis in cultured hippocampal neurons was studied. It was found that $A\beta_{25-35}$-induced apoptosis, indicated by decreased cell viability, neuronal DNA condensation and fragmentation, is associated with the increase of intracellular free $Ca^{2+}$ level, the accumulation of reactive oxygen species (ROS), and the activation of caspase-3. All these phenotypes induced by $A\beta_{25-35}$ are reverted by genistein. Our results further show that at nanomolar level, genistein protects neurons from $A\beta_{25-35}$-induced damages largely via the estrogen receptor (ER)-mediated pathway and at micromolar level, the neuroprotective effect of genistein is mainly mediated by its antioxidative properties.

Flavonoids extracted from Crataegus (CF) on brain ischemic insults were investigated in Mongolian gerbil stroke model. Results showed that pretreatment of the animals with CF decreased ROS, TBARS, and nitrite/nitrate in brain homogenate, increased the brain homogenate antioxidant level in a dose dependent manner. And pretreatment with CF increased the amount of biological available NO. At same time, the content of nitrite/nitrate, increased NO, while oral pretreatment with CF decreased the nitrite/nitrate content in the brain homogenate and increased the biological available NO concentration. iNOS was implied in delayed neuron death after brain ischemic damage and it was found that pretreatment with CF could decrease the protein level of TNF-α and NFκB, and increase the mRNA level of NOS estimated by western blotting and RT-PCR. There were more neurons survived and less cells suffered apoptosis in the hippocampal CA1 region of CF treated animal brain tested.

***References***

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