ACETYLCHOLINESTERASE IS INHIBITED BY TRADITIONAL CHINESE MEDICAL PLANTS VIA SYNERGISTIC EFFECTS OF THEIR CHEMICAL COMPOUNDS

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Introduction: Inhibition of acetylcholinesterase (AChE) is a common treatment for Alzheimer's Disease (AD). The therapy with AChE inhibitors (AChEI) is considered to be both symptomatic and disease-modifying; therefore these medications are the first choice for treating AD patients in early stages of the disease.

Aims: Although the potential of natural products as inhibitors of AChE has already been identified, only few studies have focused on a wide screening of herbal medicine as AChEIs. In our study, 81 of the most commonly used Traditional Chinese Medical (TCM) plants were tested for their in vitro inhibitory activity of AChE and their modes of action were explored.

Methods: AChEI activity was analysed with Ellman's colorimetric assay. Identity of the plants was assured by DNA barcoding. Mass spectrometry (MS) was performed to gain insight into the chemical compounds of the TCM plant extracts used.

Results: Four TCM plants showed an apparent inhibitory activity of AChE: Coptis chinensis, Mahonia bealei, Phellodendron chinense and Fallopia multiflora. Both the methanolic extract (IC50=0.031 µg/ml) and aqueous extract (IC50=2.5 µg/ml) of Coptis chinensis showed a stronger AChE inhibition than the already known AChEI galanthamine (IC50=4.33 µg/ml). The mode of action is based on synergistic effects of the chemical compounds contained in these plants.

Conclusion: Some TCM plants inhibit AChE in vitro. Furthermore, the possibility to isolate pure lead compounds or to administer crude extracts as nutriceuticals or as cheap alternative to drugs in third world countries make TCM plants a versatile source of natural inhibitors of AChE.