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Pharmacotherapy for Alzheimer's disease using wheat germ agglutinin-grafted liposomes with cardiolipin

Yung ' Lou[1] and **Yung-Chih Kuo**[2]
[1]Providence University, China
[2]National Chung Cheng University, China

Curcumin (CRM) and nerve growth factor (NGF) were entrapped in liposomes (LIP) with surface wheat germ agglutinin (WGA) to downregulate the phosphorylation of kinases infor Alzheimer's disease (AD) therapy. Cardiolipin (CL)-conjugated LIP carrying CRM (CRM-CL/LIP) and also that carrying NGF (NGF-CL/LIP) were used with applied to AD models of SK-N-MC cells and Wistar rats after an insult with β-amyloid peptide (Aβ). We found that CRM-CL/LIP inhibited the expressions of phosphorylated p38 (p-p38), p-c-Jun N-terminal kinase, and p-tau protein at serine 202 and prevented neurodegeneration of SK-N-MC cells from neurodegeneration. In addition, NGF-CL/LIP could enhance the quantities of p-neurotrophic tyrosine kinase receptor type 1 and p-extracellular-signal-regulated kinase 5 for neuronal rescue. Moreover, WGA-grafted CRM-CL/LIP and WGA-grafted NGF-CL/LIP significantly improved the permeation of CRM and NGF across the blood–brain barrier, reduced the Aβ plaque deposition and the malondialdehyde level, and increased the percentage of normal neurons and cholinergic activity in the hippocampus of AD rats. Based on the marker expressions and in vivo evidences, the current LIP carriers can be promising drug delivery systems to protect nervous tissue against Aβ-induced apoptosis in the brain duringfor the clinical AD management of AD.

yilou@pu.edu.tw

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