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Rosmarinic acid and curcumin-loaded polyacrylamide-cardiolipin-poly(lactide-co-glycolide) nanoparticles with conjugated 83-14 monoclonal antibody to protect β-amyloid-insulted neurons

Yung-Chih Kuo and He-Cheng Tsai
National Chung Cheng University, Taiwan

Polymeric nanoparticles (NPs) combined with lipids can have profound effects on treatment efficacy in patients with neurological disorders such as Alzheimer's Disease (AD). We developed polyacrylamide (PAAM)-cardiolipin (CL)-poly(lactide-co-glycolide) (PLGA) NPs grafted with surface 83-14 Monoclonal Antibody (MAb) to carry Rosmarinic Acid (RA) and Curcumin (CUR). This drug delivery system was used to cross the Blood-Brain Barrier (BBB) and enhance the viability of SK-N-MC cells insulted with β-Amyloid (Aβ) deposits. Experimental evidence revealed that an increase in the concentration of 83-14 MAb enhanced the permeability coefficient of RA and CUR using the nanocarriers. The levels of phosphorylated p38 and phosphorylated τ-protein at serine 202 in degenerated SK-N-MC cells were in the order: Aβ>(Aβ+RA-CUR)>(Aβ+83-14 MAb-RA-CUR-PAAM-PLGA NPs)>(Aβ+83-14 MAb-RA-CUR-PAAM-CL-PLGA NPs)≈control. The viability of SK-N-MC cells reduced with time and CL in 83-14 MAb-RA-CUR-PAAM-CL-PLGA NPs advantaged Aβ-targeted delivery of RA-CUR. These results evidenced that the current 83-14 MAb-RA-CUR-PAAM-CL-PLGA NPs can be a promising pharmacotherapy to permeate the BBB and reduce the fibrillar Aβ-induced neurotoxicity.

Biography

Yung-Chih Kuo is a Professor at National Chung Cheng University, Taiwan. His research interests are focused on biomaterials, nanomedicine, tissue engineering, blood-brain barrier, cancer therapy, nerve regeneration, spinal cord injury and stroke treatment and Alzheimer's and Parkinson's disease therapy. He has authored over 140 SCI journal papers. He is a Fellow of Royal Society of Chemistry, UK and an Honor Member of Phi Tau Phi Society. He has also won Prof. Yen-Ping Shih Award in 2017; Best Paper Award in 2016 and 2008; Prof. Tsai-Teh Lai Award in 2015; Special and Talented Scholar Award in 2013 and Outstanding Research Award in 2013.

chmyck@ccu.edu.tw

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