Ming-Jun Tsai et al., J Nanomed Nanotechnol 2016, 7:4(Suppl)
http://dx.doi.org/10.4172/2157-7439.C1.037

Development of temperature-sensitive PEGylated nanostructured lipid carrier for co-delivery of gemcitabine and Baicalein against A549 cell line

Ming-Jun Tsai[a] and **Yi-Hung Tsai**[b]
[a]China Medical University Hospital, Taiwan
[b]Kaohsiung Medical University, Taiwan

Gemcitabine hydrochloride is a nucleoside analog that phosphorylated by deoxycytidine kinase to active form inhibiting cellular DNA synthesis. It is widely used to treat solid tumors including colon, lung, pancreatic, breast, bladder and ovarian cancers. Baicalein (5,6,7-trihydroxyflavone) is a flavonoid derived from the root of Scutellaria Baicalensis Georgi, a medicinal plant traditionally used in Asian medicine. Baicalein is well known as a 12/15-lipoxygenase and Xanthine oxidase inhibitor for treatment of inflammation, hypertension, cardiovascular diseases, neuronal cell damage and bacterial infections. This study was designed to investigate whether combination therapy with gemitabine hydrochloride and baicalein enhances antitumor efficacy in A549 cell line. In cytotoxicity study, we found combined gemcitabine hydrochloride and baicalein on A549 cell line showed low IC_{50} that implied gemcitabine hydrochloride and baicalein might display synergistic antitumor effect. In order to co-delivery of gemcitabine hydrochloride and baicalein simultaneously to cancer cell, we used nanostructure lipid carrier as drug vehicle and added functional moieties to increase antitumor efficacy. The results showed that the E.E.% of gemcitabine hydrochloride and baicalein was increased by adding vitamin E in the formulation. The average size of carrier was decreased by adding PEG-25 stearate. In the cell uptaken by A549 cell line, the formulation with the multi-functional modification had better tumor inhibition than the original formulation.

Biography

Ming-Jun Tsai graduated from School of Medicine, Chung Shan Medical University and finished his PhD program from Cheng-Kung University. Dr. Ming-Jun Tsai is now the Chief of Department of Neurology, China Medical University-An Nan Hospital and the Assistant Professor of China Medical University, Taichung, Taiwan. Dr. Tsai focused on the research of drug delivery in clinical diseases. He has published more than 20 papers in drug delivery in clinical diseases, especially in neurologic diseases including stroke and parkinson's diseases.

D22570@mail.cmu.edu.tw

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