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Verification of the efficacy of targeting peptides linked liposomal nanoparticles for therapy of different cancers

The efficacy of systemic cytotoxic chemotherapy has been widely assessed in patients with advanced hepatocellular carcinoma (HCC). For example, doxorubicin is the most commonly studied chemotherapeutic agent for HCC. However, it has been shown to have a response rate of only 10-20% in clinical trial. In addition, its potential benefit has been reduced by the related adverse effect. So far, the multi kinase inhibitor, sorafenib, is considered to provide survival benefit over supportive care. However, the long-term prognosis of those cancer patients still remains poor. Therefore, in the present experiment, we proposed to use the so-called peptide targeting chemotherapy to overcome the adverse event in the conventional targeted chemotherapy. In order to perform this experiment, we have constructed some specific peptides which can bind specifically to the cancer cells and cancer vascular endothelia by using a phage displayed 12-mer random peptide library. We have obtained 3 different peptides and one control peptide. Each contains 12 amino acids: a. L-peptide: RLLDTNRPLLPY (anti-different cancer cell membrane); b. control peptide: RLLDTNRGGGGG; c. SP-94-peptide: SFSHHTPILP (anti-NPC tumor cell and hepatoma cell membranes) and d. PC5-52-peptide: SVSVGMKPSPRP (anti-tumor endothelia). Those L-peptide (L-P), SP-peptide (SP-P), PC5-52-peptide and a control peptide (C-P) were linked to liposomal iron oxide nanoparticles; and to liposomal doxorubicin (L-D). Using peptide linked liposomal iron oxide, we can localize the peptide targeted tumor cells and tumor endothelia, and then we used those peptides linked liposomal doxorubicin to treat SCID mice bearing different cancer xenografts. Our results showed that when L-P-L-D containing 2mg/kg of SCID mouse body weight was used to treat xenografts bearing SCID mice, the tumor could be well controlled, and no specific adverse event was seen. However, when the control peptide was used to replace the specific peptide, the xenograft size was decreased, but the visceral organs revealed marked apoptotic change. In conclusion, the specific peptides linked liposomal doxorubicin nanoparticles can be used for treatment of SCID mice bearing cancer xenografts with minimal adverse event, especially in the SCID mice species (NGS), which show a remarkable tumor suppression.

Speaker Biography

Chin Tarng Lin was a pathology professor and is an emeritus professor right now at the College of Medicine, National Taiwan University. He has published more than 92 papers and obtained 12 patents and has been invited to give the scientific seminar over 75 times. He has established 10 nasopharyngeal carcinoma cell lines (NPC-TW01to10) and five endometrioid cancer cell lines (OV-TW59-P0 to-P4) in his laboratory. He and his colleague have identified 3 specific peptides to localize their targeted proteins, to identify the cancer xenograft by MRI and to perform peptide-targeted chemotherapy for different cancers with minimal adverse event.

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