iRGD modified lipid-polymer hybrid nanoparticles loaded Isoliquiritigenin to enhance anti-breast cancer effect and targeting ability

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To improve the poor delivery of Isoliquiritigenin (ISL), a natural anti-breast cancer compound, is essential to promote therapeutic outcome. Herein, a tumor-targeting lipid-polymer hybrid nanoparticle (NP) system modified by tumor-homing iRGD peptides has been developed to enhance ISL anti-breast cancer efficacy. The hybrid NPs were prepared by a modified single-step nanoprecipitation method to encapsulate ISL. By the preparation aspect, iRGD peptides were anchored on the surface by a post-insertion method (ISL-iRGD NPs). The stable lipid-polymer structure of ISL-iRGD NPs with high encapsulation and loading efficiency has been confirmed. By the pharmacological research aspect, the enhanced anti-breast cancer activity of ISL-iRGD NPs was conducted both in vitro and in vivo. Compared to free ISL and non-iRGD modified counterpart, ISL-iRGD NPs showed higher cytotoxicity and cell apoptosis against three types of breast cancer cells. In addition, it would attribute to the higher cellular accumulation mediated by the iRGD-integrin recognition and nano-scale effect. More importantly, based on the active tumor tissue accumulation by iRGD peptides and the prolonged in vivo circulation by the stealth nano-structure, ISL-iRGD NPs displayed higher tumor growth inhibition efficiency in 4T-1 bearing breast tumor mice models. All in all, the constructed iRGD modified lipid-polymer hybrid NPs would provide a promising drug delivery strategy to improve ISL anti-breast cancer efficacy.

Biography

Gao Fei is a PhD student in the University of Hong Kong. His major is Chinese Medicine. His research interest contain the traditional Chinese herbs processing method and the targeting delivery system by advanced nano-tech. He has published more than 30 papers in English and Chinese, which mainly focus on the Traditional Chinese Medicine.

Gao Fei, Oncol Cancer Case Rep 2016, 2:3(Suppl)  
http://dx.doi.org/10.4172/2471-8556.C1.003