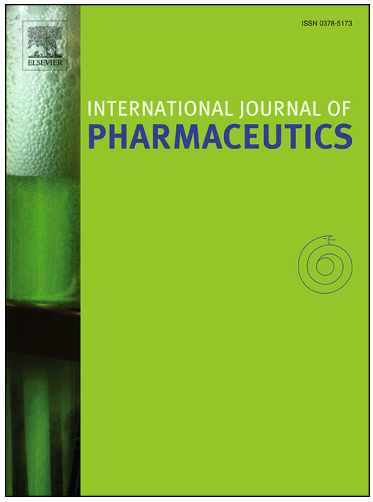

Honokiol nanoparticles based on epigallocatechin gallate functionalized chitin to enhance therapeutic effects against liver cancer

Peixiao Tang, Qiaomei Sun, Hongqin Yang, Bin Tang, Hongyu Pu, Hui Li

PII: S0378-5173(18)30288-6
DOI: https://doi.org/10.1016/j.ijpharm.2018.04.060
Reference: IJP 17467

To appear in: *International Journal of Pharmaceutics*

Received Date: 25 December 2017
Revised Date: 9 April 2018
Accepted Date: 27 April 2018

Please cite this article as: P. Tang, Q. Sun, H. Yang, B. Tang, H. Pu, H. Li, Honokiol nanoparticles based on epigallocatechin gallate functionalized chitin to enhance therapeutic effects against liver cancer, *International Journal of Pharmaceutics* (2018), doi: https://doi.org/10.1016/j.ijpharm.2018.04.060

Honokiol nanoparticles based on epigallocatechin gallate functionalized chitin to enhance therapeutic effects against liver cancer

Peixiao Tang, Qiaomei Sun, Hongqin Yang, Bin Tang, Hongyu Pu, and Hui Li*

College of Chemical Engineering, Sichuan University, Chengdu 610065, P. R. China.

Abstract: This study aims to design a novel nano-sized anticancer drug delivery system that can enhance the therapeutic effects of the loaded drug. With this idea in mind, this work reported the design and characterization of epigallocatechin-3-gallate (EGCG) functionalized chitin (CH) derivative, and its application in nano-drug delivery system. The EGCG-functionalized CH (CE) polymer was firstly prepared and characterized. The nanoparticles (NPs) of CE-loaded honokiol (HK), which was prepared by ionic crosslinking, exhibited a size of 80 nm, zeta potential of +33.8 mV, and spherical morphology. The antitumor activity of the CE-HK NPs *in vitro* and *in vivo* was investigated and compared to free HK. As a result, the CE-HK NPs can effectively inhibited cell proliferation of HepG2 cell by inhibiting more cells in the G2/M phase and decreasing mitochondrial membrane potential. The CE-HK NPs (40 mg/kg) inhibited tumor growth by 83.55% ($p < 0.05$), which was far higher than the 30.15% inhibition of free HK (40 mg/kg). The proposed delivery system exhibits better tumor selectivity and growth reduction both in *vitro* and in *vivo*, and does not induce any side effects. Therefore, the CE-HK NPs may act as an effective delivery system of liver cancer agent HK.

Keywords: EGCG, honokiol, nanoparticles, liver cancer, synergistic effects

* Author to whom correspondence should be addressed. Tel.: +86 028 85405149; Fax: +86 028 85401207; Electronic mail: lihuilab@sina.com (Hui Li).