Molecular imaging-guided photothermal/photodynamic therapy against tumor by iRGD-modified indocyanine green nanoparticles

Fei Yan, Hao Wu, Hongmei Liu, Zhiting Deng, Hong Liu, Wanlu Duan, Xin Liu, Hairong Zheng

PII: S0168-3659(15)30301-1
DOI: doi: 10.1016/j.jconrel.2015.12.050
Reference: COREL 8049

To appear in: *Journal of Controlled Release*

Received date: 7 December 2015
Accepted date: 26 December 2015

Please cite this article as: Fei Yan, Hao Wu, Hongmei Liu, Zhiting Deng, Hong Liu, Wanlu Duan, Xin Liu, Hairong Zheng, Molecular imaging-guided photothermal/photodynamic therapy against tumor by iRGD-modified indocyanine green nanoparticles, *Journal of Controlled Release* (2015), doi: 10.1016/j.jconrel.2015.12.050

Molecular imaging-guided photothermal/photodynamic therapy against tumor by iRGD-modified indocyanine green nanoparticles

Fei Yan [a, b, 1], Hao Wu [a, 1], Hongmei Liu [a, *], Zhiting Deng [b], Hong Liu [c], Wanlu Duan [d], Xin Liu [a], Hairong Zheng [a, b, *]

[a] Department of Ultrasonography, The Third Affiliated Hospital of Southern Medical University (Academy of Orthopedics · Guangdong Province), Guangzhou, 510630, China.

[b] Paul C. Lauterbur Research Center for Biomedical Imaging, Institute of biomedical and Health Engineering, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences, Shenzhen, 518055, China

[c] The Department of Echocardiography, Clinical Center of Reproductive Medicine; First Affiliated Hospital of Nanjing Medical University, Nanjing, 210029, China.

[d] Ultrasound Department, Guangzhou General Hospital, Guangzhou Command, Guangzhou, 510630, China

*Correspondence to: Dr. Hongmei Liu and Dr. Hairong Zheng. Shenzhen Institutes of Advance Technology, Chinese Academy of Science, 1068 Xueyuan Avenue, Shenzhen University Town, Shenzhen, P. R. China 518055. Tel: +86 755 86392284; Fax: +86 755 96382299; Email address: hr.zheng@siat.ac.cn, lmeihong@fimmu.com.

[1] These two authors equally contributed to this work.

ABSTRACT

Multifunctional near-infrared (NIR) nanoparticles demonstrate great potential in tumor theranostic applications. To achieve the sensitive detection and effective phototherapy in the early stage of tumor genesis, it is highly desirable to improve the targeting of NIR theranostic agents to biomarkers and to enhance their accumulation in tumor. Here we report a novel targeted multifunctional theranostic nanoparticle, internalized RGD (iRGD)-modified indocyanine green (ICG) liposomes (iRGD-ICG-LPs), for molecular imaging-guided photothermal therapy (PTT) and photodynamic therapy (PDT) therapy against breast tumor. The iRGD peptides with high affinity to αvβ3 integrin and effective tumor-internalized property were firstly used to