

Nanomaterials and Nanomedicine for Cancer Theranostics

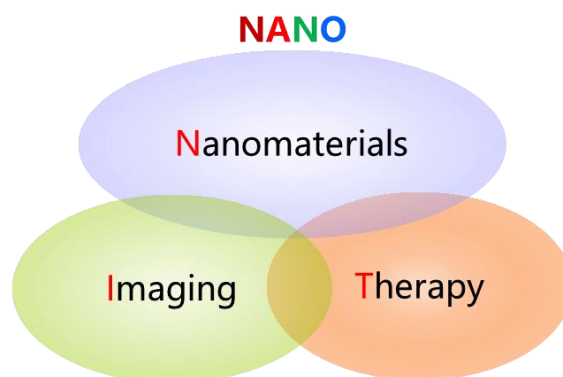
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DOI: 10.5185/vpoam.2021.0178

Graphical Abstract



Cancer Precision Phototherapy:

(Precision, Real-time, High-efficiency, Safety)

Abstract

The precision nanomedicine significantly relies on the development of multifunctional nanomaterials to integrate cancer targeting, imaging, therapeutics and immune regulation. We report here near-infrared single molecular probe and nanoprobe for tumor microenvironment responsive multimodality imaging including in-situ click-labelling strategy, moreover, we intriguingly design oxygen nanocarriers and biomimetic drug delivery systems including a series of HSA/cancer cell/NK cell/T cell membrane-camouflaged nanoparticles, and realize cancer-targeting photo/sonotherapy including photodynamic therapy (PDT), photothermal therapy (PTT), and sonodynamic therapy (SDT). These multifunctional nanovectors show the great virtues in cancer homing and targeting, immune enhancement and regulation, and combination therapy. The resulted treatment will significantly suppress and even eradicate the cancer growth, inhibit the distance cancer and

cancer metastasis. Such well-defined nanoparticles and nanorobots for smart drug delivery system would greatly improve the cancer-targeting theranostics with biodegradable control-releasing materials, precision drug delivery, real-time imaging in vivo, high-efficiency and safety therapy strategy.

Keywords: Nanomaterials, nanomedicine, biomimetic, molecular imaging, cancer theranostics.

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Biography of Presenting Author



Lintao Cai, Professor of CAS “Hundred Talents Program”, AIMBE Fellow, Director of Institute of Biomedicine and Biotechnology, Shenzhen Institutes of Advanced Technology, Chinese Academy of Sciences (CAS). He received his Ph.D. degree in Physical Chemistry from Xiamen University in 1995. From 1999 to 2001, he was sponsored by Japan Society of the Promotion of Science (JSPS) and worked as Research Fellow in Institute of Scientific and Industrial Research at Osaka University. He joined the Center for Nanoscale Science and Technology at Rice University in 2001 and Department of Electrical Engineering at the Pennsylvania State University between 2002 and 2007. Dr. Cai's research work focuses on nanomaterials and nanomedicine to

explore in vivo molecular imaging nanoprobe, smart drug delivery system and tumor-targeted phototherapy. He has 190 publications in peer reviewed Journals with H index 52 and 9600 citations. He is a Fellow of the American Institute for Medical and Biological Engineering-AIMBE Fellow, a Council Member of Chinese Chemical Society (CCS).

Citation of Video Article

Vid. Proc. Adv. Mater., Volume 2, Article ID 210178 (2021)

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