



Applications of Functional Nanomaterials in Tumor Therapy



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Venue : Room 1122, William M W Mong Engineering Building, CUHK

Abstract

Cancer is one of the most serious diseases that threaten human health. It is very urgent to develop advanced technology for cancer diagnosis and therapy. Traditional cancer therapy methods include operation, chemotherapy and radiotherapy etc, which suffer from long treatment period, drug resistance, and big side effect. The newly developed minimally invasive treatment processes such as photothermal (PTT)/photodynamic (PDT)/sonodynamic (SDT) therapy and immunotherapy show great promise for cancer therapy, with advantages of good time-space selection, safe, low toxicity and minor side effects. In this lecture, nanomaterials-based PTT, PDT, SDT and immunotherapy will be discussed. For NIR (laser)-triggered PTT and PDT, we will present metal/semiconductor heterojunction structures to increase photothermal conversion efficacy, Pd/Cu single-atom nano-enzyme to realize mild temperature PTT and double photosensitizers to improve ROS yield and increase the therapy efficacy in PDT. For SDT, we will discuss the design and optimization strategy of sonosensitizers, including defect engineering strategy and heterojunctions route. For immunotherapy, we will present how nanomaterials function in potentiating immune response, including immunogenic cell death (ICD), construction of tumor nanovaccines and pyroptosis adjuvants. Finally, the future challenges for the application of nanomaterials in tumor therapy will be forecasted.

Biography

Dr. Jun Lin, professor, FRSC, and the group leader of luminescent and biomedical materials in Changchun Institute of Applied Chemistry, Chinese Academy of Sciences. His research mainly focuses on luminescent materials for various applications, including photoluminescence and spectral properties of rare earth ions and perovskite QDs for applications in displays and lightening (especially for white LED), as well as multifunctional materials as theranostic agents for biomedical applications. He won Grade -1 Award for Science and Technology Progress of Jilin Province three times (2009, 2014, 2022) and was selected in highly cited researchers in materials science and cross-field in 2014-2023. So far, he has published more than 900 peer-reviewed journal articles with total citations over 80000 times and H index of 147; He also gave more than 100 invited lectures in various kinds of conferences.

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