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Presents

Seminar series – Drug Delivery and Translational Medicine

**Polymer-based Platinum(IV) Prodrugs and Their Future Development
Directions**

by

Prof. Haihua Xiao

Professor, Institute of Chemistry of the Chinese
Academy of Sciences, China

Date: 30 August 2024 (Friday)

Time: 10:00 a.m. – 11:00 a.m.

Venue: Zoom Seminar

Zoom Link: <https://hku.zoom.us/j/98601891765>

Meeting ID: 986 0189 1765

Password: 839677



Abstract:

Platinum-based drugs have achieved great clinical success, but their toxic side effects and drug resistance limit their further applications. To this end, a series of new platinum(IV) prodrugs and their polymer-based delivery systems have been developed. It is generally believed that these delivery systems can deliver platinum(IV) prodrugs to tumor sites and release platinum(II) specifically in tumor cells, further playing a key anticancer role. However, the distribution, metabolism, cellular uptake, and subcellular organelle distribution of platinum(II) drugs, platinum(IV) prodrugs, and their nanoparticles are significantly different, and their molecular mechanisms could be totally different but remains unknown till far. To this end, we propose a new concept of "Nanomedomics" to explore the differences in the molecular mechanisms of platinum(II) drugs, platinum(IV) prodrugs, and their nanoparticles.

Moreover, as cancer cells are constantly evolving, the treatment modality and therapeutic doses should be dynamically adjusted based on the tumor evolution kinetics and dynamics which result in cancer proliferation, resistance, and metastasis. Therefore, combined multimodal therapeutic methods are necessary to prevent a specific mutation and gradually control the remission of the tumor. Previous studies have demonstrated that multi-functional nanocarriers could deliver a variety of effective anticancer agents, such as chemotherapeutic drugs, drug sensitizers, peptides, proteins, antibodies, and nucleic acids through physical encapsulation, chemical conjugation, or electrostatic interactions into a single nanomaterial. The unique properties of nanomedicines provide a possible solution to tackle dynamically and constantly evolving tumors. This would change the application of nanomedicines from a current "static treatment" to a "dynamic treatment", allowing a strategic, purposed and precise treatment of mutating tumors in the future.

Bio:

Professor Haihua Xiao received his PhD degree from the Changchun Institute of Applied Chemistry of the Chinese Academy of Sciences (2012). He went to the University of Notre Dame (2012-2014) and Massachusetts Institute of Technology (2014-2017) to do his postdoctoral research. At the end of 2017, he returned to China and joined the Institute of Chemistry, Chinese Academy of Sciences as a professor. He became a Furong Scholar in Hunan Province (2021), a leader of the National Overseas High Level Youth Talent Program, and a chief scientist of the National Key Research and Development Program (2022). For more than 10 years, Prof. Xiao focused his research on biomedical materials and biosafety materials, especially on the development of drug delivery systems for metal-based drugs such as platinum(IV) prodrugs. So far, Prof. Xiao has published >150 articles in high-impact journals including Nat Biomed Eng, Prog Polymer Sci, Nat Commun, J Am Chem Soc, Angew Chem Int Ed, Nano Lett, etc. with 9000 citations and an H-index of 55.

Moderator: Prof. Weiping Wang, Associate Professor, Department of Pharmacology and Pharmacy & Dr. Li Dak-Sum Research Centre, The University of Hong Kong
For enquiries, please contact Ms. Esther Ng at +852 3917-9123 or esther09@hku.hk

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