AbstractID: 11893 Title: Inorganic Nanoparticles for Molecular Imaging

Nanotechnology, an interdisciplinary research field involving chemistry, engineering, biology, medicine, and more, has great potential for early detection, accurate diagnosis, and personalized treatment of diseases. Molecular imaging refers to the characterization and measurement of biological processes at the cellular and/or molecular level. It can give whole-body readout in an intact system, dramatically decrease the workload and reduce the cost of biomedical research and drug development, provide more statistically relevant results since longitudinal studies can be performed in the same animals, aid in early lesion detection in patients and patient stratification, and help in individualized treatment monitoring and dose optimization.

This talk will exemplify the use of various inorganic nanoparticles for optical imaging, magnetic resonance imaging, computed tomography, and radionuclide imaging. The advantages of nanoplatform-based molecular imaging over conventional approaches will be elaborated. However, several issues, such as biocompatibility, pharmacokinetics, in vivo targeting efficacy, cost-effectiveness, and acute/chronic toxicity, that limit the clinical translation and wide spread use will also be discussed.

Learning objectives:

1. Understand the basics of nanotechnology and molecular imaging
2. Understand the chemistry required for nanoparticle surface modification
3. Understand the pros and cons of inorganic nanoparticles for in vivo imaging.