

Molecular imaging and nanotechnology in cancer biology and therapeutics: Towards in vivo cancer biomarker imaging

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Molecular imaging is paving the way in understanding living systems in health and disease in their native state. The fuel for molecular imaging is the rapid advances in cell and molecular biology, genomics and proteomics as well as significant advances in the imaging science and nanotechnology. The Center for Molecular Imaging at VCU utilizes various imaging technologies (PET/CT, SPECT/CT, MRI/MRS and Optical Imaging), to study progression of tumorigenesis and the working of therapies within the intact in vivo environment. It is envisioned that the targeted imaging approach will facilitate and more importantly validate development of in vivo biomarkers specific to particular cancers.

The seminar will cover molecular and nanotechnology imaging research in cancer biology and therapeutics and the development of in vivo tumor biomarkers. The emphasis is on marrying molecular imaging with nanotechnology and how this combination is being exploited in nano-based imaging and potential therapeutics. Research in hybrid probe development for tumor and microenvironment targeting is a focus of this multimodality research. These platforms are being exploited for targeted imaging, drug delivery and potential image guided surgery and nanotherapy. Translational Molecular imaging of tumor microenvironment, including metabolism, cell death, angiogenesis, proliferation and hypoxia will be demonstrated. Molecular imaging of cell homing within the context of adoptive immune-based therapy will also be presented.

Biography

Dr. Zweit is a professor of Radiology, Radiation Oncology, Molecular Pathology, and Biochemistry & Molecular Biology. He is also the Director of the Center for Molecular Imaging at Virginia Commonwealth University Medical Center. He leads an inter-disciplinary and inter-collaborative molecular imaging research program that emphasizes multi-modality approaches to study biochemical and biological pathways in vivo. Professor Zweit's research interests include the development of paradigms for molecular imaging and nanotechnology strategies for preclinical and clinical translational research in cancer biology and therapeutics.

He is internationally recognized for his work in molecular imaging of cancer drug development, and conducted the "world's first" Molecular PET Imaging clinical trial of Anti-angiogenic therapy in cancer patients (Journal National Cancer Institute 2002).

Professor Zweit serves as an advisor on a number of committees, including the Cancer Research UK Pharmacodynamic and Pharmacokinetic Technologies Advisory Committee (Journal National Cancer Institute, 2006). He serves on the review body of a number of funding organizations, both in Europe and North America. He has supervised a total of 24 MSc, MD and PhD theses. He has published more than 100 peer reviewed articles, over 250 conference abstracts, and 6 review articles and book chapters.

Professor Zweit obtained his PhD and DSc from the University of Manchester Medical School. Prior to that, He studied for an MSc degree in PET Pharmacology. He received his Nuclear Medicine training at the John F. Kennedy Medical Centre in New Jersey, and attended advanced Nuclear Medicine training at the Brooklyn Hospital in New York. As an Undergraduate, he obtained his Bachelor of Science degree, in Radiation Biophysics, with a Biochemistry double major, from the University of Kansas.

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