Theranostics -- “See What You Treat and Treat What You See.”

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Positron Emission Tomography (PET) is a well-established and widely utilized molecular imaging technique in both clinical practice and cancer research. Over the past three decades, our ability to non-invasively detect, localize, and manage various cancers has advanced significantly. A major recent development is the integration of diagnostic imaging with therapeutic isotopes—giving rise to theranostics, a powerful approach that enables simultaneous imaging and treatment using the same agent. This presentation will explore both preclinical and clinical applications of cancer-targeting theranostic agents, following the core principle: “see what you treat and treat what you see.”

A key focus of the Lewis Lab has been harnessing the exceptional specificity of antibodies toward cancer biomarkers, positioning immunoglobulins as highly versatile tools in modern medicine. While many unlabeled therapeutic antibodies are already in clinical use, antibody-based PET and SPECT imaging agents are rapidly progressing. Notably, Zirconium-89 (^{89}Zr)-labeled radioimmunoconjugates have demonstrated significant potential in both preclinical and clinical settings. The 78.4-hour half-life of ^{89}Zr aligns well with the prolonged circulation time required for optimal biodistribution of intact monoclonal antibodies, making it ideal for ImmunoPET applications.

This talk will highlight the latest advancements in radiometal-labeled antibody constructs, offering a comprehensive overview of the current state of the field.