DREXEL UNIVERSITY
Materials Science and Engineering
College of Engineering

Department of Materials Science and Engineering,

PhD Candidacy Examination

June 25th, 2024, at 11:00 am (EST)
Location: Bossone 302

Tumor Microenvironment-Responsive Linkers in Nanoparticle-Based Drug Delivery Systems

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Abstract:

Over the past few decades, nanoparticle-based drug delivery systems (DDSs) have emerged as effective carriers for anti-cancer drugs, significantly reducing the serious side effects associated with chemotherapy. With appropriate functionalities, these DDSs can prolong the blood circulation time of hydrophobic drugs, enhance drug accumulation at tumor sites through the enhanced permeation and retention (EPR) effect, and achieve precise targeting of tumor cells. However, conventional DDSs face challenges of uncontrolled drug release, limiting their overall antitumor efficacy. Recently, tumor microenvironment (TME) responsive nanoparticle-based DDSs have shown promise in achieving controlled drug release and improved therapeutic outcomes. This presentation will review TME-responsive nanoparticle-based DDSs for targeted drug delivery. Key TME signals for triggering drug release, such as low pH, high levels of glutathione (GSH), high levels of reactive oxygen species (ROS), over-expressed enzymes, elevated ATP levels, and hypoxia, will be discussed. Various TME-responsive linkers and their applications in nanoparticle-based DDSs will also be examined.