

PHYSICS & COMPUTER SCIENCE EVENT

*Femtomedicine in Cancer*Discovery of New Antitumor Molecules
for Natural Targeted Chemotherapy and
Radiotherapy of Cancers

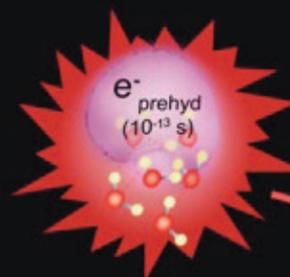
SEMINAR SERIES



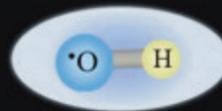
Qing-Bin Lu
University of Waterloo

Dr. Qing-Bin Lu is a Professor in the Department of Physics & Astronomy at the University of Waterloo. He is also cross-appointed to the Departments of Biology and Chemistry. He has held the University Research Chair since 2014.

Reductive DNA damage



VS



Oxidative DNA damage

H₂O

TUESDAY, OCTOBER 20 | 4 PM
N1046, SCIENCE BUILDING

THE CONQUEST OF CANCER continues to pose great challenges to medical science. There is a compelling need for innovative cancer research integrating biomedical sciences with physical sciences in order to ultimately conquer cancer. Femtosecond (fs) ($1\text{fs}=10^{-15}\text{s}$) time-resolved laser spectroscopy (fs-TRLS) is a direct technique to visualize molecular reactions in real time. Femtomedicine (FMD), which fuses fs-TRLS with biomedical sciences, was recently coined to advance fundamental understanding and therapies of human diseases notably cancer. Our studies in FMD have led to the discoveries of a reductive damaging mechanism in DNA and living cells, which may be related to the pathology of diseases, especially cancer, and

of the molecular mechanisms of action of existing anti-cancer agents. These have offered unique opportunities to develop new effective drugs for high-performance therapy of cancer. We have particularly found a new class of non-platinum-based anticancer compounds (called FMD compounds) for natural targeted chemotherapy and radiotherapy of a variety of cancers. Treatments of various cancer cells in vitro and in vivo mouse xenograft models with FMD compounds led to effective chemotherapy and enhanced radiotherapy, while the compounds themselves induced no or little systemic and radiation toxicity. The results also show that FMD can bring breakthroughs in understanding fundamental biological processes and lead to advances in cancer therapy.

FACULTY OF SCIENCE | Department of Physics and Computer Science

Seminar Series Co-ordinators: Ilias Kotsireas, Li Wei and Marek Wartak

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