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## EMERGING MATERIALS AND NANOTECHNOLOGY

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**Gold-based emerging nanomaterials for imaging and experimental cancer therapy**Anton Liopo<sup>1,2</sup>, Katherine I Requejo<sup>2</sup>, Khaled Habiba<sup>1</sup> and Sunil Krishnan<sup>1</sup><sup>1</sup>University of Texas, USA<sup>2</sup>Rice University, USA

Gold nanoparticles of different shape and size have been designed and applied as contrast-enhancing agents for various imaging techniques: optical coherence tomography, fluorescence imaging, optical microscopy, photoacoustic imaging and sensing; and recently, for experimental cancer therapy as enhancers of thermal and radiation modes. In this presentation, we are focusing on different sides of gold nanorods (GNRs) applications, as well as their synthesis, functionalization, and specific targeting. The role of GNRs in comprehensive cancer diagnostics and treatment was analyzed and created the novel GNRs' modifications of wide-ranging aspects ratio, size with high yield and quality. The GNRs were assessed by their toxicity for altered categories, such as amount of gold, surface area, optical density of their solutions and number of particles. GNRs have been reviewed as contrast agents with near-infrared absorption as highly efficient transformers of light energy into heat. Here, we present the use of GNRs as plasmonic nanoparticles for selective photothermal therapy of human acute and chronicle leukemia cells using a near-infrared laser. We have investigated GNRs as potential enhancers of radiotherapy. We have demonstrated high impact of external surface chemistry, role of molecules size and thickness of surfactant layer for damage of cancer cells by electromagnetic radiation. GNRs were evaluated as theranostic agents for imaging, photothermal and radiation modalities. The results may impact pre-clinical GNRs' applications, molecular imaging, and quantitative sensing of biological analytes.

**Biography**

Anton Liopo has completed his PhD degree from the Institute of Physiology the National Academy of Science (NAS), Belarus. He later joined the Institute of Biochemistry of NAS of Belarus as Senior Scientist, Associate Professor, and eventually the Director of Government Program. After moving to the United States, he obtained trainings in Molecular Biology in Department of Internal Medicine and Nanotechnology of Center for Biomedical Engineering at the University of Texas, Medical Branch at Galveston. He worked as lead Scientist for Nanobiotechnology Program in TomoWave Laboratories Inc. Currently, he is doing investigations in Center for Radiation Oncology Research, UT MD Anderson Cancer Center, where he is aiming on novel nanocomposites for enhancement of cancer radio-therapy and he is also a Visiting Scientist in Department of Chemistry of Rice University. He is a regular reviewer and Member of several Editorial Boards of scientific journals and has more than 75 peer-reviewed publications, including monograph, book chapters and patents.

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