High-Z Metal Nanoparticles Radiosensitizers for Enhanced Cancer Radiation Therapy

Dr. Marcelino Barboza Flores

Contact: Marcelino.barboza@unison.mx

Departamento de Investigación en Física, Universidad de Sonora, México.

Abstract.

Preclinical and early clinical studies indicate that nanomaterials with high atomic number (Z) have achieved great success in cancer radiotherapy by enhancing radiation damage to cancer tissue and reducing side effects in healthy tissue. The X-ray radiation enhancing effect is due to high absorption of X-rays, along with the emission of secondary electrons and fluorescence photons. The enhanced high-energy radiation can directly cause DNA damage, and interaction with tissue may produce reactive oxygen species (ROS) affecting the DNA, ultimately causing tumor cell necrosis or apoptosis. This talk presents some advances in high-Z metal-based nanoparticles, including Au, Bi, Gd, and other high-Z metal-organic structures. New approaches are required to develop highly efficient, low cytotoxicity, good biocompatibility, and easy functionalization of nano-radiosensitizer frameworks for the clinical translation of high-Z radiosensitizers in radiotherapy.

Dr. Marcelino Barboza-Flores is a full-time professor and researcher at the Universidad de Sonora, México. He obtained his M.Sc. from the National Autonomous University of México (1977) and his Ph.D. in Physics from New York University (1988). He is recognized for founding the Center for Research in Physics and the M.Sc./Ph.D. graduate Physics programs at the Universidad de Sonora. He has received the distinction of National Researcher Emeritus from the National System of Researchers SNII (Conahcyt, México). He is currently involved in synthesizing and performing TL/OSL characterization of micro and nanostructured materials, including strontium and calcium aluminates, HPHT/CVD micro and nanodiamonds. He has published over 186 research papers in international scientific journals.