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### **Multimodal nanoparticles for medical applications**

Cancer diseases prompt an enormous medical challenge for the highly-developed countries. The increasing life-span and epidemic of civilization-related diseases combined with the ever-decreasing quality of the environment cumulates the exposure risks and potential for cancer development. Currently, cancer-related deaths may for the first time in history become the major cause of death in the developed countries. Furthermore, current diagnostic and therapeutic strategies are inadequate, as they are commonly failing to detect small tumors, metastases and eradicate them. Exponentially growing field for research in the nanomaterials prompts an enormous potential of possible applications of nanoparticles in medicine. We focused on the applications of biocompatible, high-k oxide, Nanoparticles (NPs) in the field of cancer diagnosis and therapy. This work was focused on the potential development of multimodal detection-therapeutic system with dopant-dependent contrasting properties in the magnetic and fluorescent resonance. Mice received suspension of hydrothermally created nanoparticles (10 mg/ml, 0.3 ml/mouse) via gastric gavage. All protocols were according to the EU guidelines and approved by 2/2012 and 13/2015 LEC agreements. Following oral administration, nanoparticles were passively targeted to all tumor tissues most probably by Enhanced Permeation and Retention (EPR) effect. In the lungs NPs were targeted specifically to the areas of metastases making them a highly specific diagnostic tool for cancer in this tissue.

### **Biography**

Michal M Godlewski is currently the Vice-Dean for International Studies at the Faculty of Veterinary Medicine, WULS-SGGW. He manages the Cytometric Laboratory of the Department of Physiological Sciences and Laboratory of Nanotechnology and Nanoengineering in the Veterinary Research Centre/Centre for Biomedical Research of the Department of Large Animal Diseases with Clinic. He is a recognized expert in the field of nanoparticle applications for medicine. In his research he collaborates with 20 scientific institutions and 6 business partners. His recent scientific interest related to the interactions of nanomaterials with living organism and the development of nanoparticles for bio-medical applications. He is author/co-author of 60 papers in the WoS database and over 10 chapters in academic monographies, cited over 500 times.

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