

# **Nanotechnology in Medical Physics**

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Physics plays an important role in detection, therapy and prognostic of cancer. All the medical imaging modalities that allow the diagnosis and staging of this disease are based on physical principles. The use of ionizing radiation in therapy (radiotherapy) is an important modality of cure and control and quantitative imaging is increasing the database that allows physical modelling of this disease and the inception of artificial intelligence in this area. In radiotherapy new modalities of treatment have been implemented that needs precise dosimetry. One example is gel dosimetry, a truly three-dimensional dosimetric technique based on soft matter where polymer chains, about few nanometers, are formed by ionizing radiation. An example of an end-to-end quality control procedure in a complex radiotherapy treatment using gel dosimetry will be discussed. Another revolutionary perspective in medicine is the use of nanotechnology in diagnostic and therapy. Nanoparticles with different properties can be used to label cancer cells for magnetic detection, enhance magnetic resonance contrast, increase the interaction with ionizing radiation, and produce radioluminescence, among other possibilities. Examples of synthesis, characterization and applications of nanoparticles for diagnosis and therapy in cancer will be given.