Nanoparticles in radiation therapy

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Radiotherapy, the main non-invasive method for cancer treatment, remains limited by the damages leading to the healthy tissues. A new strategy currently developed is to enhance the biological efficiency of the beam at the tumor by using heavy atoms as radio-enhancers [1]. The main work of the team is to develop new nanoagents and characterize their effects when combined to different medical radiations. In particular, the team developed an expertise in synthesizing platinum-based NPs nanoparticles using green chemistry (patent: FR1900008). Moreover combination of nanoagents with particle therapy, an alternative superior to conventional x-ray treatments, is a specificity focus of our studies. Our group already demonstrated that high-Z NPs (based on platinum but also gadolinium) strongly increase electron boost and the induction of lethal damage at molecular scale [2, 3] as well as tumor cell killing when combined to different radiations [4] [5] [6]. More recently, the team improved the synthesis to produce multimodal nanoagents that improve radiation effect but also are able to be detected by different techniques of cellular or medical imaging.

In summary, the team continues to develop competitive treatment strategies that could in the future contribute to lower side effects of radiation therapies and improve comfort of the patient, as well as fight against radioresistant cases.

References:

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