

Nanotheranostics with gold nanoparticles applied to Radiotherapy

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Introduction

- ❖ Radiotherapy (RT) is one of the most used approaches in patient's treatment with prostate cancer (PCa).¹
- ❖ However, this therapeutic approach have some limitations and nanotechnology can help to overcome these problems.² Efficiently, metallic nanoparticles have been extensively exploited in biomedical field and among them, gold nanoparticles (AuNPs) have been used to improve RT (figure 1).³ Additionally, AuNPs can also be used to deliver some therapeutic agents inside tumors cells, such as miRNAs.⁴

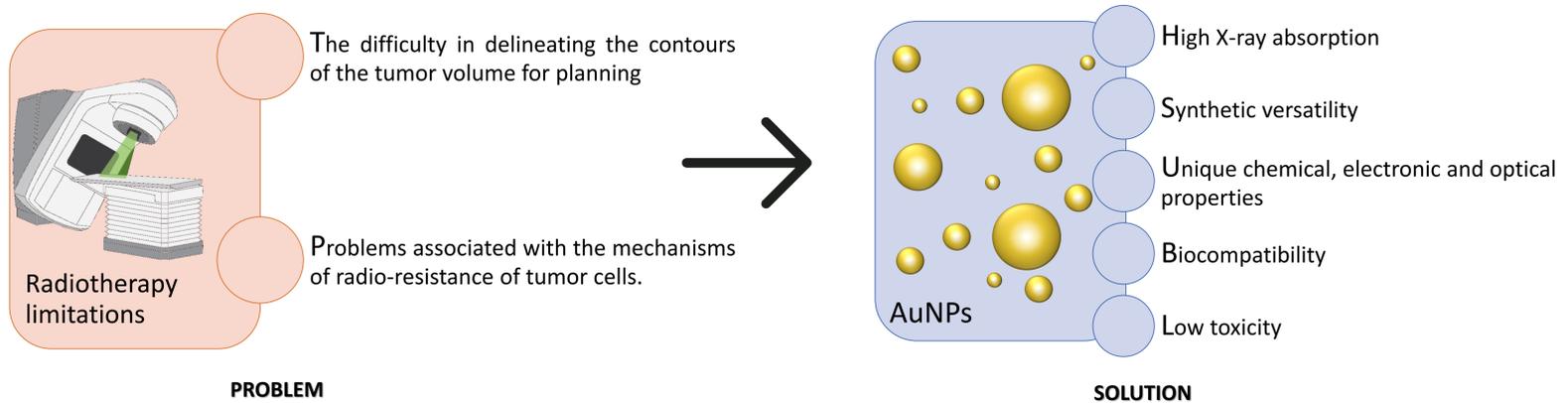
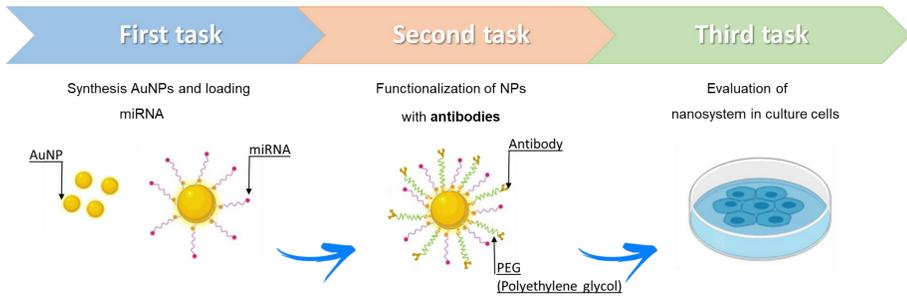


Figure 1 –Potential application of AuNPs to overtake some limitations of RT

Main GOAL

- The aim of this project consists in develop a nanosystem capable to optimize the diagnosis by computed tomography (CT) in the planning phase of RT treatment and simultaneously to improve the radiosensitization of PCa cells.

Methodology



Results

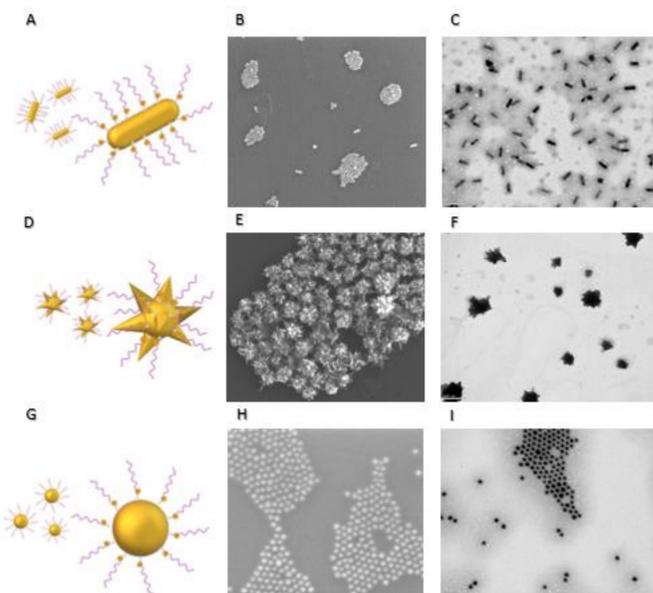


Figure 2 – (A, D, G) Scheme of AuNPs with PEG, gold nanorods (AuNPsr), gold nanostars (AuNPst) and spherical gold nanoparticles (AuNPsp). (B, E, H) Scanning electron microscope (SEM, 200000x), AuNPsr and AuNPst scale of 500 nm and AuNPsp scale of 100nm). (C, F, I) Transmission electron microscopy (TEM, 150000x) scale of 100 nm) images of AuNP with PEG

PC3 cell line

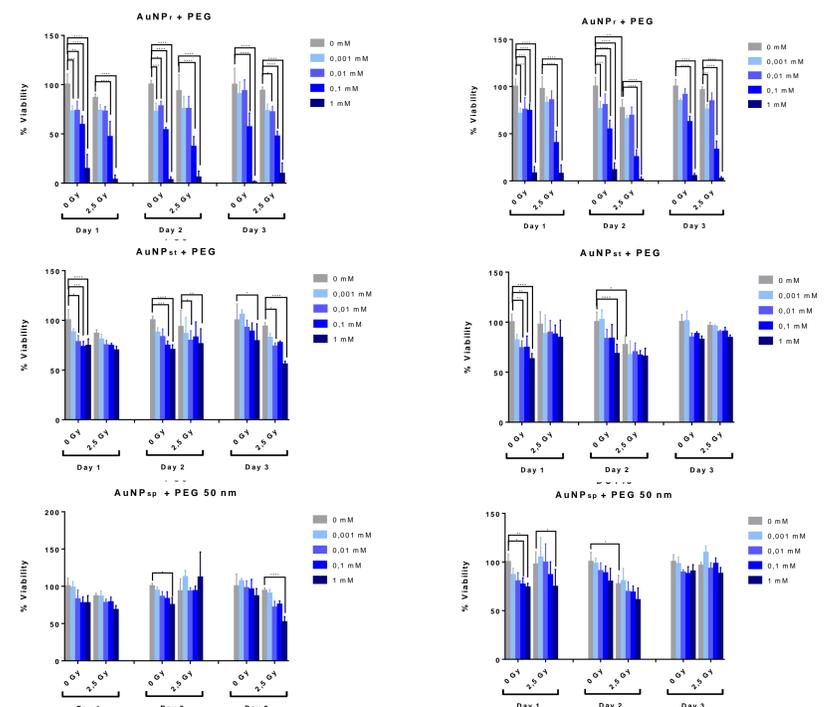


Figure 3 – Effect of shape of AuNPs on cellular viability in two different PCa cell lines after radiotherapy treatment

General considerations

- ❖ This project will contribute to improve the tumor radiosensitivity by merging two existing approaches, miRNAs therapy and AuNPs.
- ❖ Until know, by itself, AuNPs influence cellular viability of cell in the analysed cells. Also, our results showed that diverse shapes are have a different effect on cellular viability of PCa cell lines.

Acknowledgments

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