Gold Nanoparticles for Image-Guided Delivery of Pt(IV) Prodrugs

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The rapid advance of nanotechnology plays a pivotal role in the design of new strategies for cancer diagnosis and treatment. In this field, gold nanoparticles (AuNPs) have emerged as attractive tools due to their appealing physico-chemical properties. Additionally, AuNPs can also be explored as multifunctional platforms for targeted-delivery of radionuclides and chemotherapeutic drugs for theranostic applications. Herein, we will report on the synthesis, characterization and biological evaluation of AuNPs stabilized with a DOTA-based chelator for coordination of medically relevant trivalent radiometals (e.g. ^{67}Ga, ^{111}In, ^{177}Lu)[1], decorated with a bioactive peptide (bombesin (BBN) analog or substance P (SP) derivative) recognizing the gastrin releasing peptide receptor (GRPr) or the NK1 receptor overexpressed in GBM cells, and carrying Pt(IV) prodrugs. Some of the SP-containing AuNPs were also labeled with ^{125}I profiting from the presence of a Tyr residue in the peptide sequence. The studies included the assessment of cellular uptakes and cytotoxic activity in GBM U87, T98G or U373 cells for the designed multifunctional nanoparticles, aiming to assess their suitability for targeted chemoradiotherapy of glioblastoma.

[1] F. Silva, A. Zambre, M. P. C. Campello, L. Gano, I. Santos, A. M. Ferraria, M. J. Ferreira, A. Singh, A. Upendran, A. Paulo and R. Kannan, *Bioconjugate Chemistry*, 2016, **27**, 1153-1164.

Acknowledgements: This work is supported by Fundação para a Ciência e Tecnologia (projects PTDC/MED-QUI/29649/2017 and UID/Multi/04349/2019).