

Folate-targeted gold nanorods for effective combined photothermal–chemotherapy of osteosarcoma

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Folate-targeted gold nanorods (GNRs) are here proposed as selective theranostic agents for osteosarcoma treatment. An amphiphilic polysaccharide based graft-copolymer, henceforth named INU-LA-PEG-FA, and an amino derivative of the α,β -poly(N-2-hydroxyethyl)-D,L-aspartamide functionalized with folic acid (PHEA-EDA-FA), have been synthesized to act as coating agents for GNRs. The obtained polymer-coated GNRs were characterized in terms of size, shape, zeta potential, chemical composition, aqueous stability. They protected the anticancer drug nutlin-3 in human plasma and were able to deliver it efficiently in different physiological media. The ability of the proposed systems to selectively kill tumour cells was tested on U2OS cancer cells expressing high levels of FRs and compared with normal human bronchial epithelial cells (16HBE) and human dermal fibroblasts (HDFa). Moreover, was demonstrated the property of the nanosystems of efficiently controlling drug release upon NIR laser irradiation and of acting as an excellent hyperthermia agent as well as Two Photon Luminescence imaging contrast agents¹. The proposed folate-targeted GNRs have also been tested in terms of chemotherapeutic and thermoablation efficacy on tridimensional (3-D) osteosarcoma models.

1. Book Newell B et al (2012) *J Eur J Med Chem.* 48: 330–7