# Galactosylated Polymer/Gold nanorods Nanocomposites for Sustained and Pulsed Chemo-photothermal Treatments of Hepatocarcinoma

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In this work, we propose a rational design of a hybrid nanosystem capable of locally delivering high amount of hydrophobic anticancer drugs (sorafenib or lenvatinib) and heat (hyperthermia) in a remote-controlled manner. We combined in a unique nanosystem the excellent NIR photothermal conversion of gold nanorods (AuNRs) with the ability of a specially designed galactosylated amphiphilic graft copolymer (PHEA-g-BIB-pButMA-g-PEG-GAL) able to recognize hepatic cells overexpressing ASGPR receptor on their membranes, thus giving rise to smart composite nanosystem for NIR-triggered chemo-phototherapy of hepatocarcinoma. Drug loaded hybrid nanoparticles were prepared by nanoprecipitation method, obtaining nanoparticles of about 200 nm and drug loadings of 9.0 and 5.4% w/w for sorafenib and lenvatinib, respectively. These multifunctional nanosystems have shown to convert NIR radiation into heat and release loaded drugs in a remote-controlled manner. Then, the biocompatibility and synergistic effects of chemo-phototherapy combination, as well the receptor-mediated internalization were evaluated by in vitro test on HepG2, HuH7 and NHDF. The results indicate that the proposed nanoparticles can be considered as virtuous candidates for an efficient and selective dual-mode therapy of hepatocarcinoma.


**Biography**

Salvatore Emanuele Drago is a post-Doc at the University of Palermo (Palermo, Italy). He received his master degree in Pharmaceutical Chemistry and Technology from the University of Palermo (Italy) and his doctoral degree in Molecular and Biomolecular Science from the University of Palermo (Italy). Salvatore Emanuele Drago has co-authored 8 peer-reviewed original articles published in international journals. His fields of expertise include the development of nanostructured delivery systems for drug and gene, for the treatment of cancer and lung diseases.

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