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Albumin-gold nanorods based core-shell nanoplatforms for cancer theranostics

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Over the past two decades, the rapid development of albumin- and gold nanostructures-based nanoplatforms offer promising solutions to address numerous scientific difficulties in cancer research such as drug delivery, tumor targeting and cancer therapy. In this study, a hybrid system (NR@SA) was designed for theranostic nanomedicine through chemically cross-linking of serum albumin (SA) shell outside the core of gold nanorod (Au NR). A tremendous amount of anticancer drugs, doxorubicin (DOX) could also be encapsulated inside the SA shell via physical adsorption during the formation of NR@SA:DOX. Our results demonstrated that the SA shell exhibited a great impact on the photoacoustic signal generation, leading to a strong contrast enhancement in photoacoustic imaging of tumor cells. Delivered NR@SA:DOX with higher DOX loading exhibited greater killing efficacy while the photothermal effect induced by the near-infrared laser irradiation also greatly improved the therapeutic efficacy of DOX against tramp-C1 prostate carcinoma *in vitro* and *in vivo*. These findings suggest that the development of core-shell nanoplatform, NR@SA is highly promising as an integrated theranostic nanoagent for further clinical applications.

Biography

Hsien Ting Chiu has completed his Bachelor's degree from National Tsing Hua University at the Department of Biomedical Engineering and Environmental Sciences in 2012. He is now a PhD student in National Tsing Hua University in the Department of Biomedical Engineering and Environmental Sciences. His research is focused on nanomaterial design for cancer application.

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