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Functional proteins promote nanotheranostics

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The poor delivery efficiency of nanoparticles to malignant tissues seriously hinders the development of nanomedicine [1]. Studies show that protein corona on the injected nanoparticles can significantly change the identity of nanoparticles [2]. As such, physiological response (kinetics, toxicity and distribution) will be triggered. Currently, protein-and peptide-based biomimetic nanoparticles have been demonstrated to be an efficient and promising strategy for improved diagnosis and therapy in biomedical field [3]. This strategy is found to be bio-inspired, straightforward and environmentally benign. And it can endow nanoparticles with good stability, excellent biocompatibility, high water solubility, and rich surface functional groups for further conjugation. We did pioneering work on reducing nonspecific binding and phase transfer of quantum dots by using the unique domain and amino acid sequence of albumin bovine serum (BSA) protein under ultrasound condition [4]. Furthermore, BSA protein was used for biomimetic mineralization of nanoparticles for biomedical imaging and therapy [5-7]. Particularly, other functional proteins were explored for bioinspired synthesis of nanoparticles, and the inherent mechanism was preliminarily studied *via* short peptides. These protein or peptide-mediated nanoparticles are coated by proteins or peptides, which drastically eliminate protein coronas. It can be therefore believed that this advanced strategy can promote the advancement of nanotheranostics.

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