

Editorial

HSA-Based Drug Development and Drug Delivery Systems

Modern chemotherapy drugs have some disadvantages such as poor selectivity, adverse side effects, drug resistance. Clinicians also face the challenge on how to select the right drug and dose for patients at the right time. Clearly, the status quo exacerbates the urgency on developing novel drugs and changing strategies of treatment of disease.

Human serum albumin (HSA) is the most abundant extracellular protein in the plasma and tissue fluids that binds and transports exogenous drugs. HSA binding seriously affects the efficacy and pharmacokinetics of drugs, usually accompanied by drug safety and drug - drug interactions. Therefore, the interaction compound and HSA are one of the important factors considered in design and development of drugs. Using cutting-edge methods, techniques to predict and clarify the binding characteristics of lead drug and HSA will lay an important foundation for screening new drug candidate compounds. Interestingly, we could also design prodrug based on special activity of HSA.

HSA has unparalleled advantages relative to other drug carriers: (1) renewable, non-toxic, non-antigenic, biocompatible, biodegradable, with good tolerance and mucosal adhesion (2) having a high stability, and strong drug carrying capacity, suitable for a variety of hydrophilic and hydrophobic drugs, and unrestricted mode of administration (3) HSA nanoparticles greatly increased bioavailability of the drugs (4) having a number of amino acid side chains with reactive functional groups, including hydroxyl, amino, carboxyl and sulfhydryl, which are convenient to conjugate the targeting molecule by chemical modification. Thus, albumin-based drug delivery system is popular to exploit for drug targeting improvement, reduced toxicity and overcoming drug resistance, which may provide clinicians a new strategy to treat cancer patients: carrying out target therapy.

Furthermore, taking advantage of the physiological functions of HSA, HSA fusion proteins can also been applied to co-deliver several different types of drugs to one tumor cell for synergistic cytotoxicity, completely destroying cancer cells through multi-targets therapy technique. Meanwhile, more and more imaging probes have been conjugated or fused with HSA/HSA nanoparticle for molecular imaging, molecular therapeutics and image-guided therapy.

Therefore, we formed a multidisciplinary team of international experts discussing all the most relevant topics in this special issue. This issue is constituted of three parts. The first part mainly reviewed the properties of HSA, and interactions of drugs with HSA/modified HSA [1-7]. The second part reviewed the progress and technology of HSA/HSA nanoparticle and HSA fusion protein for drug delivery and therapy [6, 8-10]. The third part reviewed the advance of HSA/HSA nanoparticle for molecular imaging [9, 11].

In conclusion, HSA is very charming and is worthwhile to extensively study. We would like to thank the contributors to this special issue for their participation. We hope that this special issue will be helpful to promote a number of researchers to take up HSA-based research, and improve HSA application in pharmaceutical industry.

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