Non-immunognic viral capsid carrier having cancer targeting function

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Although protein nanoparticles (PNPs) are able to deliver variable drug agents have shown advantages over synthetic nanomaterials, PNPs have an intrinsic disadvantage that hampers their clinical application, i.e. potential immunogenicity of proteins. In this report, we research a novel method for resolving the immunogenicity problem of PNPs, which is based on the genetic presentation of albumin-binding peptides (ABPs) on the surface of PNP. We inserted ABPs into the surface of hepatitis B virus capsid(HBVC) with preserving native self-assembly function of HBVC. The ABPs effectively gathered human serum albumins around HBVC and significantly reduced both inflammatory response and immunoglobulin titer in live mice compared to ABP-free HBVC. Furthermore, the ABPs made HBVC retained in tumor for much longer period than tumor cell receptor-binding peptides that were also inserted to the HBVC surface, indicating that the ABPs are also capable of enhancing tumor-targeting performance. This platform enables the development of a variety of PNP-based drug delivery carriers with high safety and efficacy.