Hexon-modified icosahedral gold nanoparticles as surrogates for adenovirus

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We present the preparation of surrogate adenovirus particles, which comprises generating icosahedral gold nanocores functionalized with a polyethylene glycol (PEG) layer, and subsequently decorated with hexon protein – the most abundant surface protein of Adenovirus Serotype 5 (Adv 5). Thus, this study addresses three highlight aspects: 1) The preparation of gold nanoparticles (AuNPs) with perfect icosahedral shape in a size range similar to the dimensions of Ad 5; 2) the development of a protocol ensuring homogeneous surface coverage of AuNPs with different types of functional PEGs; and 3) both covalent and non-covalent anchoring of hexon protein at the surface of pegylated icosahedral AuNPs.
The potential of the hexon-modified icosahedral AuNPs to act as surrogates for Adv 5 was evaluated by studying their interaction with a hexon protein-selective polymer. Only AuNPs with hexon protein on their surface bound to this selective polymer as real Adv 5 is expected to do, demonstrating that they are available to be used as surrogate synthetic viruses.