

Interaction between hexon protein from Adv 5 and pegylated-icosahedral gold nanoparticles

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Understanding the interaction of proteins with gold nanoparticles is vital to the development of new detection methods, delivery drugs or vaccines. In particular, the control over the type of interaction (covalent or non-covalent) between gold nanoparticles (AuNPs) and proteins present in viruses can represent a great advance in this context. For this reason, this work evaluates the effectiveness of attachment of hexon protein from Adv 5 at icosahedral AuNPs. For this purpose, a new protocol for the modification of icosahedral AuNPs (which are covered with CTAB from the synthesis) with PEGs has been developed, obtaining totally stable pegylated-AuNPs. As it can be seen in the Figure 1, the icosahedral AuNPs were coated with different types of polyethylene glycols (PEGs) such as methoxy-PEG-thiol (mPEG-SH) and thiol-PEG-amine (SH-PEG-NH₂). When mPEG-SH was used, hexon protein interacted with AuNPs through hydrophobic and therefore reversible forces. On the contrary, when icosahedral AuNPs were modified with SH-PEG-NH₂ and subsequently with glutaraldehyde, imine groups were formed between the NH₂ residues of the Hexon protein and the glutaraldehyde. The resulting NPs were characterized by TEM, UV-vis, DLS, IR, and XPS.

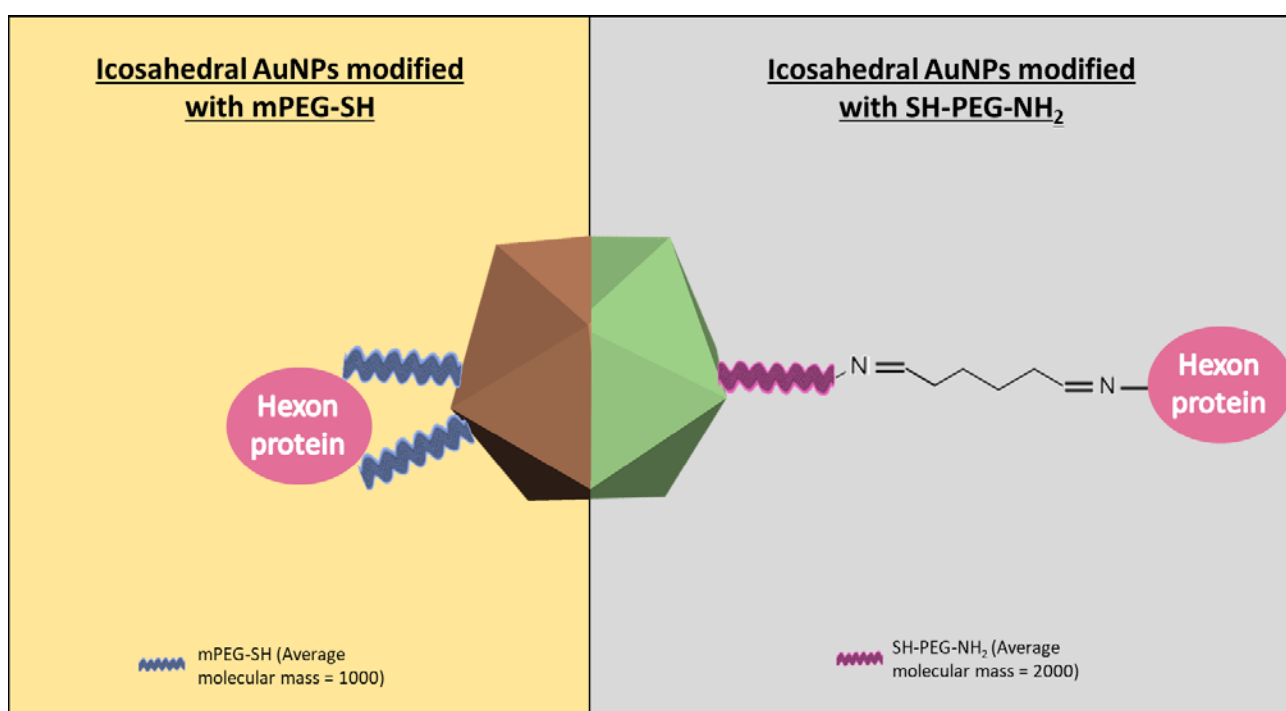


Figure 1: Covalent and non-covalent attachment of hexon protein to pegylated icosahedral AuNPs.