

Gold nanoparticle-membrane interactions: Implications in biomedicine

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There has been an increase in the research towards the use of nanoparticles as a promising tool for nanomedicine, from imagenology, drug and gene delivery, to phototherapy. Little is known regarding the interaction between nanoparticles and cell membranes despite its importance to achieve an efficient therapy avoiding adverse effects, such as cytotoxicity and accumulation in undesired targets. Gold nanoparticles have demonstrated to be a perfect candidate to use in biological systems because of their dimension, ease of characterization, biocompatibility, and ability to conjugate to different compounds, such as active peptides. There are different biophysical properties such as: shape, size, conjugation, surface charge and ligand arrangement that affect gold nanoparticle-membrane interactions. In this review we will analyze how these properties are involved in the mechanisms of interaction with membranes and the internalization pathways of gold nanoparticle systems into cells. A new appr