P27 Effects of gold nanoparticles, protected by self-assembling mixtures of ligands, on eukaryotic cells and model membranes.

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Self-assembled monolayers (SAM) on NPs stabilize the gold core and improve NP functionality, thus becoming useful for applications in nanotechnology, biology, chemistry and medicine. Accordingly, studying how these nano-sized materials interact with model membranes and eukaryotic cells opens a wide range of applications from diagnostics to therapeutic agents. In this contribution we investigated the role of surface ligand arrangement and composition on the interaction with lipid bilayers and on cellular toxicity for two SAM-protected gold NPs featuring 'Striped' or 'Janus' morphology, respectively. Cellular effects were probed using colorimetric and flow cytometric assays, with reference cell lines such as human B-chronic leukaemia, and lung-derived lymphoblast or carcinoma cells, exposing them at increasing NP concentrations and times. Apoptotic and necrotic effects on cell lines were analysed using fluorescent probes emitting at different $\lambda_{EM,}$ reporting on cell membrane integrity, as well as mitochondrial activity and membrane polarization. Results were supported by differential interference contrast (DIC) and confocal microscopy.

Furthermore, the binding capacity between NPs and model membranes was investigated using Surface Plasmon Resonance (SPR) technique, by first immobilizing liposomes (composed of DOPC or DPPC) on the sensor chip and then flowing increasing NP concentrations. The results confirmed that both NPs are able to bind the liposomes considered; in addition, it was possible to differentiate the behavior of the two NP systems, as a result of the different organization of ligands on the shell.

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