NMR study on interaction of silver nanoparticles with biothiols

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Introduction of nanoparticles (NPs) to biological environments results in the formation of the so-called “biomolecular corona” – a layer of adsorbed biomolecules on the surface of NPs. The composition and nature of corona and its impact on pharmacodynamics and pharmacokinetics of thusly-modified NPs is a major question in nanomedicine. In this study, we employed nuclear magnetic resonance (NMR) to evaluate interaction of silver NPs with glutathione (GSH), an important biothiol. The selected silver NPs were functionalized with three distinct coatings - non-ionic polyvinylpyrrolidone (PVP), positively charged poly-L-lysine (PLL), and negatively charged sodium bis(2-ethylhexyl)sulfosuccinate (AOT). The experiments involved exposing different silver NPs to GSH, analysis of size and surface charge by light scattering technique and tracking the change in NMR spectra of GSH.