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Characterization of protein absorption on gold nanoparticles by scattering correlation spectroscopy

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Gold nanoparticles (GNP) are of great interest for several applications in nanomedicine, especially in imaging and sensing, drug delivery and photothermal therapy. In the case of therapy by nano vector or hyperthermia therapy, GNP interacts with blood proteins after injection. This interaction induced coating of GNP by proteins namely protein corona. The GNP physicochemical properties like: size, shape and surface charge affect directly the structure and composition of the protein corona. To understand this interaction, protein corona has been explored for different size, shape of GNP, with several techniques, like UV-Vis spectroscopy, zeta potential and especially, correlation spectroscopy. Recently, scattering correlation spectroscopy (SCS) is one of the most used techniques for GNP characterization. The SCS technique is based on the temporal analysis of the scattered intensity fluctuations and the correlation curve is directly related to the hydrodynamic radius of GNP, to their diffusion coefficient, concentration and shape. The SCS is very sensitive to GNP morphology and brightness since the scattering intensity depends on the GNP volume. The characterization of protein corona by SCS technique will be presented for different sized GNP with different shapes (spheres, urchins and flowers), in presence of different concentrations of proteins (albumin, lysozyme and hemoglobin), at very low concentrations (\sim pM) and with very high precision. Such results show how protein cover gold nanoparticle (amount, conformation) and the specific adsorption of this protein according to shape and size of gold nanoparticles.

Biography

Hanane Moustouai completed her degree in Chemistry from Institut Galilée, University Paris 13, Villetaneuse, France. Since June 2015, she is a PhD student under the supervision of Doctor Nadia Djaker and Doctor Jolanda Spadavecchia of Laboratory CSPBAT, University Paris 13, France. Her research interests include "The synthesis of gold nanoparticles using biocompatible surfactant and study their toxicity in biological media by spectroscopy method".

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