

Aggregation of silver nanoparticles in presence of bovine serum albumin.

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Introduction

Nanotechnologies have garnered significant attention in the scientific community due to their applications in various areas of medicine. In particular, silver nanoparticles (Ag-NPs) are noteworthy for their antibacterial and surface plasmonic properties, which depend on their shape anisotropy. Understanding the interactions of Ag-NPs with biomolecules in biological systems is essential for the safe use of new treatments involving these materials. For this reason, we study serum albumin (BSA), the most abundant protein in blood, which plays key roles such as regulating pH, solubilizing certain drugs, and transporting pharmaceutical agents. Examining the behavior of nanoparticles with albumin (Ag-NPs/BSA) can provide valuable insights into their pharmacological effects. [1]

Methods

In this work, we have confirmed that the presence of prism-shaped Ag-NPs and spherical Ag-NPs induces changes in the protein structure, that include aggregation. The technologies used include Fourier Transform Infrared Spectroscopy (FT-IR), Small-Angle X-Ray Scattering (SAXS), and Transmission Electron Microscopy (TEM) to study these interactions.

Results

FTIR results have shown slight differences between the BSA spectrum and the Ag-NPs spectrum in band shape, indicating minimal interaction. In contrast, XAS results have revealed strong attractive interactions leading to aggregation. Finally, TEM confirmed the aggregation of nanoparticles in the presence of BSA.[2]

References:

[1] <http://dx.doi.org/10.1016/j.molliq.2016.02.103>

[2] <http://dx.doi.org/10.1016/j.cbi.2016.05.018>