Diploma thesis abstract

Determination of albumin conformational changes at interaction with nanodiamonds by means of Raman spectroscopy

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Nanodiamonds are promising materials for biomedical applications due to reported low toxicity and high biocompatibility. It is presumed that for experimental and future clinical applications, nanodiamonds will be administered into the organism via the blood circulation system. In this regard, the interaction of nanodiamonds with blood components needs to be thoroughly studied. In this work possible structural changes of albumin (the main protein of blood) due to *in vitro* interaction with the carboxylated nanodiamonds and nanodiamond films are considered with the aid of Raman microspectroscopy. Study of the interaction of albumin with nanodiamond films showed that the drying of the protein solution on the surface of the nanodiamond film may lead to the crystallization of albumin. It was found, that the protein secondary structure, structure of disulfide bridges and tyrosine doublet remains almost unchanged at such interaction. Also the interaction of albumin with 100 nm carboxylated nanodiamonds was studied. The spectroscopic data indicate significant conformational changes of albumin that can be due to its interaction with nanodiamonds. A possible decrease in the functional activity of albumin related to the conformational changes must be taken into account in the *in vivo* applicatioans.