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Abstract Book
Development of anticancer drug transporter on base of gold nanoparticles

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Despite the myriad of achievements in the application of photodynamic therapy (PDT) in oncology, the field continues to require the development of new photosensitizer with improved efficacy and side-effect profiles, search for a more effective route to deliver photosensitizers to deep tissues and targeted cells [1]. Numerous studies (basically in our laboratory) of water soluble meso-pyridyl porphyrins may be considered as a part of preclinical investigation of anticancer drug candidates [2]. On the other hand the gold nanoparticles (AuNPs) are also one of the most effective nanomaterials, having a significant role for the treatment of cancer [3]. We assume that the complexes of porphyrins with AuNPs, which can be formed between the cationic porphyrins and negatively charged gold nanoparticles, will have great potential for PDT, and have the ability to penetrate deep in tissue and will have joint effect on tumor cells. The goal of this work is to study the complex formation of cationic, water soluble porphyrins with AuNPs via spectroscopic methods.

It was shown that the porphyrins have higher affinity to binding with dsDNA functionalized gold nanoparticles. And it depends on the number of dsDNA on AuNPs surface and dsDNA length (i.e. number of base pairs). The functionalized gold nanoparticles were obtained by methods presented in work [4].

The obtained results can be used for the targeted synthesis of pharmacologically active AuNP/porphyrins compounds.

Reference:


Anisotropic Quantum Dots with Rashba spin-orbit coupling

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We have investigated the electronic properties of elliptical quantumdots in a perpendicular external magnetic field, and in the presence of the Rashba spin-orbit interaction. Our work indicates that the Fock-Darwin spectra display a strong signature of Rashba spin-orbit coupling even in a low magnetic field, as the anisotropy of the quantum dot is increased. An explanation of this pronounced effect with respect to the anisotropy is presented. The strong spin-orbit-coupling effect manifests itself prominently in the corresponding dipole-allowed optical transitions and hence is susceptible to direct experimental observation.

References: