ENCAPSULATION OF QUANTUM DOTS IN COMPLEXES OF POLYELECTROLYTES

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Nanocapsules are perfect candidates for drugs delivery systems as they can protect active ingredients from harsh biological environment. Additionally, their small size and targeting possibility reduces side effect of the treatment [1]. Quantum dots (QDs) are stable, fluorescent nanocrystals, which can be tracked in a tissue by luminescence but they are toxic to cells. Encapsulation of QDs in complexes of biocompatible polyelectrolytes should prevent their in vivo toxicity [2].

Two different polyelectrolyte couples were used to form complexes: biocompatible poly-L-lysine hydrobromide (PLL) as polycation in a pair with biocompatible, anionic poly-D-glutamic acid sodium salt (PGA), and commonly used cationic poly(allyamine hydrochloride) (PAH) together with anionic poly(sodium styrene sulfonate) (PSS). Then, negatively charged CdTe quantum dots were embedded in complexes of polyelectrolytes (PAH/CdTe, PSS/PAH/CdTe, PLL/CdTe, PGA/PLL/CdTe). The obtained hybrid structures were studied by dynamic light scattering in order to determine their size and zeta potential. Fluorescent properties of complexes containing QDs were examined with spectrofluorimeter. Afterward, they were deposited on negatively charged mica surface and imaged by atomic force microscope. The cytotoxicity of CdTe nanoparticles, polyelectrolyte complexes and the complexes encapsulating nanoparticles, was estimated with flow cytometry in respect of their influence on the B-LCL cell line proliferation and unspecific binding to PBMC cells.

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