

Cell Uptake Study of Drug and DNA Loaded Gold Nanoparticles

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Gold nanoparticles (AuNPs) have been widely studied for medical purposes due to their biocompatibility and functionalization easiness, for instance. Nevertheless, in order to improve these parameters, polymers have been employed as gold nanoparticles coating, particularly the polyethylene glycol (PEG) is one of the most popular coatings. Currently, there are several studies which use PEGylated gold nanoparticles as drugs or DNA delivery systems for treatment of some diseases. Hereby, it is important to use some markers which allows the quantification of cell uptake. pIRES2-EGFP is a plasmid DNA (pDNA) which produces, after transfection, a fluorescent molecule which stains the cell and can be observed with fluorescence microscopy. In addition, there are some fluorescent drugs, for instance, the atorvastatine which is a drug for cholesterol synthesis inhibition. In this work, the study of cell uptake of DNA and atorvastatine loaded PEGylated gold nanoparticles was performed by using Human Embryonary Kidney cell culture (HEK 293), the transfection and cell uptake efficiency was determined by means of fluorescence microscopy. Gold nanoparticles were synthesized with Turkevich method and then functionalized by adding 1 ml of 1 μ M NH_2 -PEG-SH solution and stirred for 30 minutes. The results show that PEGylated gold nanoparticles loaded with the pDNA have a transfection efficiency of 52.29% and the atorvastatine with the particles has a cell uptake of 69.39%, this evidence that this kind of particles could be used for DNA or drug delivery in many medical applications.