CHEMICAL AND PHYSICAL CHARACTERIZATION OF NANOPARTICLES

The aim of investigation

In a blood stream nanoparticles can be degrade or strongly interact with proteins those events can effectively prevent nanoparticles to penetrate through cell membranes. Even nanoparticles will be successfully delivered to the cell they have to overcome cell membrane. Cell membranes themselves influence distribution and transport of internalized nanoparticles. Briefly described factors which can influence on drug transportation in a blood stream and cells show why it is important to investigate and understand interactions between nanoparticles and proteins or lipid model membranes. The other motive for this type of study is understanding mechanism of toxic effect observed during cytotoxicity tests. It has been proofed that toxic effect observed for nanoparticles can be correlated with the influence of dendrimers on cell membrane properties and integrity. After synthesis of nanoparticle it is important to characterize their properties like size, Zeta potential, fluorescence properties as well as investigate their interaction with proteins, nucleic acids and lipid model systems (model of cell membrane).

Methodology which can be used

At the Department of Biology we are equipped with several instruments which allow us to do characterization of nanoparticles:

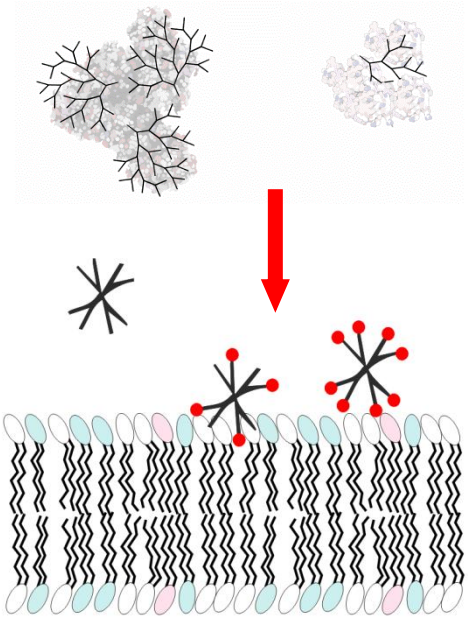
Nanosizer – characterization of size and Zeta potential of nanoparticles;

Micro Differential Scanning Calorimetry (mDSC) – changes in a thermal stability of proteins, changes in a properties of lipid model membranes;

Micro Izothermal Titration Calorimetry (mITC) – interaction between nanoparticles and biological models (proteins, nucleic acids) or drugs;

Spectrofluorimeter – fluorescence properties of nanoparticles, interaction with proteins, nucleic acids and lipid model membranes;

Circular Dichroism (CD) Spectrometer – changes in a secondary structure of protein and nucleic acid during interaction with nanoparticle.



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