



National Student Team Contest (first stage)

Task 4. How to watch nanoparticles

Due to the multiple applications of various nanoparticles in biomedical research there is a high need to investigate nanoparticle interactions with cells and to trace absorption of nanoparticles on plasma membrane of cells and to monitor nanoparticles penetration to the cell cytoplasm. You have following techniques: transmission electron microscopy, scanning electron microscopy, atomic force microscopy, scanning ion-conductance microscopy, laser interference microscopy, fluorescent two-photon microscopy. Your aims are to study (a) absorption of nanoparticles on the surface of erythrocytes; macrophages; neurons; epithelial cells and (b) distribution of nanoparticles in cytoplasm of macrophages, neurons and epithelial cells.

1. Which methods will you use in cases (a) and (b) for each cell type. Explain your choice **(1 point)**.
2. What kinds of artefacts can be observed in the proposed studies? **(1 point)**
3. Which method is preferential to study (i) shape and (ii) cytoplasm structure for the each cell type. Explain. **(1 point)**
4. Give the example of the investigation of one of the enumerated cell types using nanoparticles. **(1 point)**

Total – 4 points