# Application of SPIONs with Attached Antibodies for the Selective Capture of Human Melanoma Cells in a Stationary System

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## Abstract:

Epithelial-to-mesenchymal transition (EMT), a process through which epithelial tumor cells acquire mesenchymal phenotypic properties, contributes to both metastatic dissemination and therapy resistance in cancer. The new researches indicate that nonepithelial tumors, including melanoma, can also gain mesenchymal-like properties that increase their metastatic propensity and decrease their sensitivity to therapy. Despite the dynamic progress of medicine, cancer diseases are one of the most important causes of premature mortality among people around the world. However, the primary cause of death in neoplastic diseases is not primary tumors but metastases to other organs caused i.a. by tumor cells circulating in the blood.

The aim of our research is to develop a method of magnetic capture of circulating tumor cells directly from the bloodstream using surface-modified superparamagnetic iron oxide nanoparticles (SPIONs).

Study was carried out on human melanoma cell lines Lu1205 and WM 793. To visualize interaction with cells, the particles were fluorescently labeled with rhodamine B isothiocyanate. The obtained nanoparticles were characterized physiochemically (size, zeta potential, crystal structure), magnetically and visualized using STEM. Biological tests were performed for melanoma cell line. The cytotoxicity of the particles was examined by the MTT assay, the activity of the selected proteins was checked by the Western Blot method, the interaction of the nanoparticles with the cells was imaged using a confocal microscope.

Cell uptake studies with the use of SPION with N-cadherin (~85%), confirm the specificity of the method with the possibility of using it in a biological system.

## Keywords:

Melanoma, SPION, EMT, N-cadherin.