

## **Abstract**

The application of nanoparticles in the field of theranostics requires knowledge of the specific interaction of nanoparticles with the immune system. One of the first cells with which nanoparticles interact when given to the body are cells of the mononuclear phagocytic system. The aim of this diploma thesis is to prepare an in vitro study that describes the effect of two types of gold and three types of silicon ultra-small nanoparticles on immune cells. Immune cells are presented in the form of primary PBMCs isolated from whole blood, and cells of monocytic cell line THP-1 in the form of monocytes and differentiated macrophages. During the experiments with primary cells, emphasis is placed on maintaining the concept of personalized protein corona. After characterization of the immune cells used, cells are subsequently stimulated with ultra-small nanoparticles and the influence of these nanoparticles on cell metabolism, viability, degree of differentiation and secretion of pro- and antiinflammatory cytokines is monitored. The outcome takes into account further use of the tested nanoparticles in the field of biomedicine.

**Key words:** primary monocytes, cell lines, differentiation, macrophages, cytokines, cytotoxicity