Interactions between biomaterials and cells play an important role in tissue engineering. It has been repeatedly shown that the cell behaviour strongly depends on physical and chemical properties of the material surface.

In our study we focused on materials used for the construction of bone implants and replacements to support cell adhesion, growth and osteogenic diferenciation and to lead to an integration between an implant and a bone tissue.

First we tested an influence of different micrpattern of fullerens' C60 and composites' C60/Ti films to adhesion of bone cells MG 63, their initial spreading, growth, viability and formation of cytosceletal protein actin. Some of these films were additionally iradiated with Au+ ions, which led to the conversion of some C60 molcules into amorphous carbon (a-C). We confirmed that pattern influenced the distribution of cells without decrease viability. Thus, the production of patterns could be used to direct cell adhesion.

In the second study, we also observed the influence of the thickness of coated layer. We found that more selective cell growth can be achieved by depositing of thicker fullerens' film.

Our study with osteoblast-like MG 63 cells cultured on PLGA films revealed, that surface coated with chosen components of extracellular matrix (colagen I and chondroitin sulfate) improved their adhesion, growth and differentiation.

The aim of last work was to develop a periadvetitial drug delivery system consisting of a of polyester silk mesh, coated with a degradable copolymer purasorb loaded with sirolimus. The release and the influence of antiproliferating drug to growth and viability of vascular smooth muscle cells was investigated. The meshes with different concentration of sirolimus decreased the proliferation of smooth muscle cells after 14 days of cultivation.