Summary

This thesis focuses on nanofibrous materials which are highly promising regarding they application in a modern interdisciplinary scientific field – tissue engineering. Through the years there have been developed various strategies for creating materials usable in tissue engineering. The earliest materials that were made did not allow any cell adhesion on their surfaces (so-called “bioinert” materials), whereas nowadays there is an effort to create hybrid bioartificial organs. Especially in bone tissue engineering do polymeric materials in the form of a nanofibrous network, such as polylactide or polycaprolactone with the addition of inorganic particles (for example nanocrystalic hydroxyapatite), show great potential. Such materials mimic the natural bone tissue and stimulate the adhesion, proliferation and differentiation of cells into desirable a cell type. In the experimental part of this thesis one of these promising nanomaterials was tested for its biocompatibility *in vitro*. Polylactide in the form of nanofibrous networks with 0, 5 and 15 % of nanocrystallic hydroxyapatite was provided by Elmarco s.r.o, Liberec. Human osteoblast-like cells MG 63 were cultivated on these materials for 1, 3 and 7 days. The results show the convenience of hydroxyapatite particles which stimulate the cells to the so-called osteogenic differentiation, and at the same time allow relatively good adhesion and cell proliferation. Polylactide with 5 or 15 % of hydroxyapatite can be considered to be a promising material for bone tissue engineering.