Abstract:

The cell surface is covered by different oligosaccharides, which are anchored in the plasmatic membrane by proteins and lipids. Oligosaccharides mediate mutual interactions either between cells or between cells and components of extracellular matrix. Galectins are animal lectins with affinity to oligosaccharides containing β-galactosides. Furthermore, galectins are multifactorial lectins that participate in the regulation and modulation of various biological processes including cell-cell and cell-matrix interactions, cell proliferation and differentiation as well as apoptosis and pre-mRNA splicing. After translation, proteins undergo different structural modifications with direct impact on their function. For example, galectin-3 as possible prognostic marker, well recognize cells of squamos cell carcinomas, is phoshorylated on N-terminus. However, we showed that posttranslational phosphorylation of galectin-3 does not have a direct impact on its binding activity. Another endogenous lectin, galectin-1 is a typical protein of cancer stroma and wound granulation tissue. In this context we also detected, that galectin-1 induces a TGF-β1 independent fibroblast-myofibroblast transition including production of a bioactive fibronectin and galectin-1 rich extracelluar matrix *in vitro*. This knowledge can thus be used to improve both therapy of wound healing and methods used in tissue engineering. It is known that the tumor stroma is able to modulate biological properties of tumors (local aggressivness and metastatic potential). In this thesis we demonstrated biological properties of cancer-associated fibroblast isolated from basal cell carcinoma. We showed that these cancer-associated fibroblasts are able to induce mesenchymal stem-like cell properties in 3T3 mouse fibroblasts. Consecutively, we detected that chemokines, such as CXCL-1, IL-6, and IL-8, produced by tumor stroma participate in the formation of cancer microenvironment essential for carcinoma progression of head and neck squamous cell carcinoma. From this point of view their neutralization might present a new therapeutic approach in cancer treatment. Finally, we may conclude that galectins have modulatory impact on squamos cell carcinoma behavior. In particular, galectin-1 is responsible for the formation of the bioactive tumor stroma environment. We also described several chemokines that participated in cancer cell and tumor-stroma interactions.