Abstract

Glycobiology represents a very progressive subject of cell biology. Protein-saccharide interactions play not only supporting and cell organization role, but they also represent medium for information storage and its decoding. Galectins, group of animal lectins (saccharide-binding proteins), which have selective affinity to ß-galactosides, are multifactorial molecules. They participate in cell-cell and cell-matrix interaction, transmembrane signaling, apoptosis, pre-mRNA splicing and are also present in various types of carcinomas. High expression of galectin-1 has been detected in cancer stroma originated from squamous cell epithelium. In the previous study we established that the fibroblasts - myofibroblasts transition, apart from the known TGF-beta, is also induced by galectin-1. We compared relationship between galectin-1 expression, presence of myofibroblasts and gene expression in tissue samples from patients with head and neck squamous cell carcinoma. Cancer stroma with myofibroblasts was rich in galectin-1 expression in comparison with stroma without myofibroblasts. Moreover, we used microarray analysis (ILLUMINA) to compare the whole genome transcriptome from samples with and without presence of galectin-1. High expression of galectin-1 in tissue samples corresponded with expression of selective genes (*MAP3K2*, *TRIM23, PTPLAD1*, *FUSIP1*, *SLC25A40* a *SPIN 1*) representing markers of poor prognosis for the patients with this type of tumor. The biological function of galectin-9 is still not well known. In this thesis we also looked at presence of galectin-9 in relation with expression of differentation cell markers such as keratin-14 and keratin-19. Cells from the basal layer of epithelium always expressed galectin-9 although the cancer tissue was negative. Most abundant cell types in cancer stroma are cancer associated fibroblasts (CAF). Illumina transcriptoma analysis showed that 560 genes are expressed differently in normal fibroblasts compared to CAF. Two selected proteins, BMP-4 and IGF-2, are able to change the fenotype of normal keratinocytes which acquired cancer cell-like properties. In this context, we used transwell membrane system to look at biological activity of CAF under influence of normal and cancer cells during a long time period. Expression of inflammation chemokines IL-8, CXCL-1 by CAF was continual in contrast with normal fibroblasts which was just temporary.

Finally, we may conclude that relation between biological activity of cancer stroma and expression of genes is important in progression of head and neck squamous cell carcinoma.

Key words: galectin, cancer associated fibroblasts, tumor stroma