Dermatan sulfate (DS) which is a member of the complex carbohydrates group, is widespread in the extracellular space of animal tissues, being covalently linked to proteins called proteoglycans. DS chains are composed of alternating residues of N-acetylated galactosamine (GalNAc) and the glucuronate (GlcA) or iduronate (IdoA) residues. Most of the GalNAc residues as well as some of the IdoA and GlcA residues are sulfated. Hence, DS chains are characterized by high density of negative electric charge. This structural feature of DS chains and their high flexibility, associated with the presence of IdoA residues, make that these carbohydrates bind strongly to many different proteins, including growth factors and their receptors. As a consequence of these interactions, DS chains can regulate cell functions, although the nature of this impact is not fully understood. However, the ability of DS to bind different molecules and, hence to fulfill its biological functions, is subjected to changes in the course of various physiological and pathological processes due to structural remodeling of this carbohydrate and it is reflected in the variable number and location of sulfate groups and IdoA residues within DS chains. **It should be noted, that the relationship between the structure of the DS and its binding potential as well as biological functions is still poorly understood.**

The process of carcinogenesis is characterized by substantial disturbances in the metabolism of DS, that manifests in diminution of electric charge and flexibility of its chains, as well as in a progressive reduction of the carbohydrate content in the tumor microenvironment. This structural remodeling, possibly leading to impairment of the DS ability to interact with other molecules, as well as an elimination of this compound from the tumor environment suggest that the mentioned carbohydrate may have inhibitory effect on tumor growth. However, the detailed impact of the DS on the function of cancer cells is still poorly understood. **Therefore, the aim of the proposed project is extensive evaluation of in vitro activity of structurally different DS chains on breast cancer cell behavior, including the assessment of the viability and cell proliferation, induction of apoptosis and the course of cell cycle. In addition, this project also involves an indication of potential mechanism of DS action on tumor cells by assessing the impact of this carbohydrate on signal transduction and downstream signaling associated with receptors for growth factors.** The DS-dependent effects induced in cells grown on plastic surface will be compared with those evoked in cell cultured on Matrigel, which is an extract of tumor extracellular matrix. The usage of Matrigel as substrate will approximate the in vivo co-operation between the receptors for growth factors and integrins. **Therefore, implementation of this project will broaden the knowledge about the role of DS chains in tumor cell biology.**