

DESCRIPTION FOR THE GENERAL PUBLIC

Most cells that build the human body are adherent, that is why in the *in vitro* study they need to attach to the surface of the culture dishes to begin their physiological processes. A proper surface modification may cause changes in different biomechanical properties of cells. What is more, surface modification may also modify structures present directly in the cell membrane like glycoproteins and glycolipids (glycoconjugates), which are responsible for cell adhesion to the surface. Melanoma is one of the most aggressive tumors, which in advanced stages is resistant to standard methods of cancer treatment like radio- and chemotherapy. According to WHO, there are more and more new cases of melanoma diagnosed each year around the world, which is why research dedicated to this type of cancer is extremely important.

The project aims to investigate how melanoma cells adapt to modified surfaces, especially considering the biomechanical properties of cells (mainly elasticity and adhesion). Using a unique combination of complementary label-free methods (the atomic force microscopy AFM and the quartz microbalance with dissipation monitoring QCM-D), the effect of surface modification on the availability of cell glycoconjugates for lectins that bind sugars will be assessed (ligand - receptor interactions). Additionally, to modulate the interaction of lectins with glycoconjugates present on the melanoma cells, glycosylation inhibiting compounds will be applied. The research will be carried out on established melanoma cell lines with different metastatic potential cultured on chemically modified glass and gold surfaces. To confirm the obtained results fluorescence microscopy will be used.

This project may increase the current knowledge about the formation of melanoma metastasis and could lead to the launching of new diagnostic procedures and enable the modification of Lab-on-a-Chip devices to control the behavior of living cells. Particularly, increasing the adhesion of one type of cells and limiting the growth of other types of cells would be very helpful in case of selected cell type isolation from patients. The application of glycosylation inhibiting compounds may help in the elaboration of reliable prognostic models for melanoma, including the initiation of medicine that reduces its metastatic potential.