

## **Study of process of saccharides attachment to cell glucose receptors with consideration of mass transport phenomena.**

### **Description for the general public.**

Surface plasmon resonance (SPR) is an analytical technique that enables accurate research of many interactions of biological compounds such as proteins, DNA, or saccharides by using specially designed sensors covered with nanolayers of noble metals, most often gold. Thanks to this technique we can study affinity, which means a strength of will of binding between different biological particles. The aim of this project is to investigate affinity of different saccharides (sugars) to cell proteins which transport glucose. Such proteins are present in large amounts on the surface of cancer cells, because such cells need much more sugars than healthy cells - cancer grows and divides faster so it also has to "eat" more. Scientists think, that glucose transporters can move not only glucose but also more complicated sugar compounds, e.g. polysaccharide nanoparticles. Such nanoparticles could be used as a wrapper that will hold an anticancer drug which will kill the cancer cells from the inside. That would enable dosing of drugs only to cancer cells what would improve both efficiency of anticancer therapies and comfort of patients. Some results say, that cancer cells absorb nanoparticles but we do not know yet how does it happen. The will to explore this phenomenon is a motive to conduct research due to this project. The use of SPR technique should provide answers to the question whether glucose transporters react to nanoparticles as strongly as to glucose. In order to compare it more accurately, some physical parameters - mass transfer phenomena, that take place in measuring devices had to be considered. For that purpose computer modeling will be used, that will let us plan SPR experiments well. The use of modeling will also contribute to the development of modern analytical techniques what in the future will lead to construction of better miniature detecting devices.