Advances in medical diagnostics are largely dependent on the availability of high reliability sensors. Development of the technology requires new solutions and adaptation of available methods to obtain the product that meets a number of strict criteria, like small size, easy operation, rapid results and reliability.

The primary goal of this project is to develop and test new procedures for production and calibration of new family of biosensors, characterized by two unique features - a dual analyte detection method and the innovative use of gold clusters.

Designed sensor will employ two methods of measurement simultaneously - surface plasmon resonance (SPR) and electrochemical techniques. The specificity of the measurement system includes the use of aptamers ("programmable" oligonucleotide compounds, with structure that can interact with the substance to be analyzed) immobilized on the gold substrate and modified with gold clusters of size below 2 nm. Such system with appropriate selection of the measuring equipment will allows to obtain analytical signal from two sources - change of mass of the layer will yield the SPR signal while change in the electrochemical characteristics of the layer will be measured with electrochemical techniques. It should be noted that the use of specifically designed gold clusters will ensure electrochemical response, and in the same time will provide SPR signal amplification, which in normal circumstances would be negligible. This innovative design provides high accuracy and reliability of the sensor, which in the later stage of the project will be used to determine the concentration of C-reactive protein, glycated hemoglobin, and other low molecular weight analytes like for instance poisons in real-life samples.

It is also worth noting that the chemical / biomedical sensors market value is constantly growing (in 2012 was worth globally $ 8.5 billion, and is estimated to reach $ 14.58 billion in 2018), and this trend is to be maintained in subsequent years .

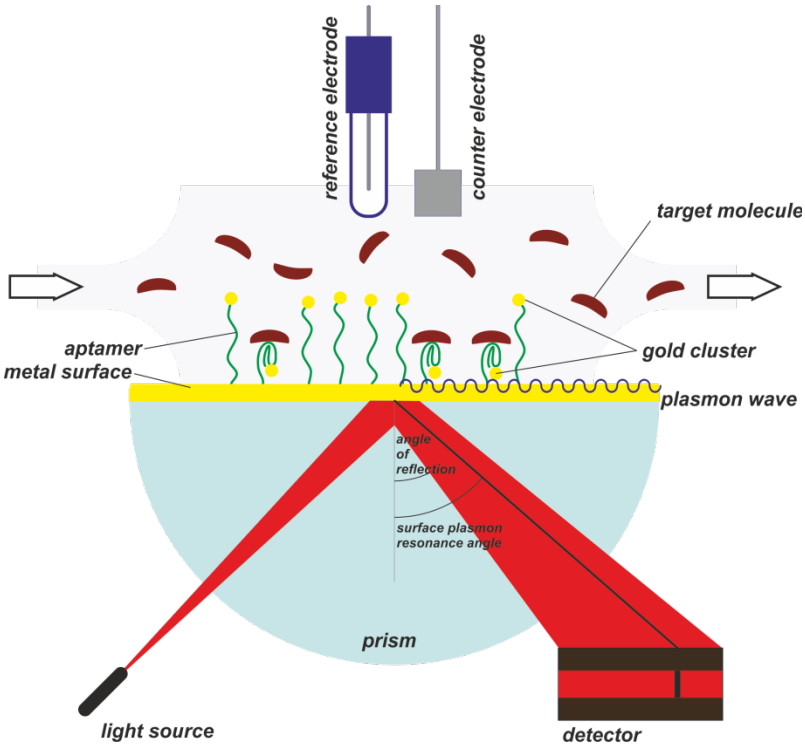

Figure 1. Scheme of the aptamer/gold clusters system.