Analysis of polyamine levels in blood serum of patients with breast cancer using optical SPR-based immune biosensor

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Background. Oncological diseases are very common throughout the population of many countries of the world, especially among middle-aged and elder people. The main threat of cancer diseases underlies in the difficulty of diagnosing them in the early stages. That is why it is extremely important to search, create and work out the latest diagnostic methods for oncological diseases that would allow to determine them more precisely and in shorter terms

Aim. The aim of the study was to develop a method for qualitative and quantitative analysis of polyamines as potential tumour markers in blood serum of patients diseased with breast cancer with use of newly created immune biosensor based on effect of surface plasmon resonance.

Methods. In the process of the study there were used basics of immune analysis, methods of biosensor analysis with preliminary modification of analytical surface of biosensor with certain reagents such as protein A and BSA for better orientation of sensitive layer made from antibodies. Also there were use methods of statistical analysis for comparison of results obtained from study of blood samples obtained from patient with different age, tumour size, and other parameters.

Results. During the study there were analysed 30 samples of blood serum, 20 of which were samples obtained from patients diseased with breast cancer and 10 samples were normal, taken from healthy people and used as controls. Analysis of blood serum samples were made, using previously created calibration curve, made on basis of polyamine solution in concentration from 10 ng/ml to 1.5 μg/ml. This allowed to determine as the presence of polyamines in blood samples and approximate concentration of polyamines comparing resonant angle shifts in calibration curve and blood samples. According to the results obtained there were studied that concentration of polyamines exceeds physiological levels of polyamines and were in range from 20 to 100 ng/ml. Elevation of levels of polyamines correlated with enlargement of tumour size of the patients and slightly with the age of the patients.

Conclusion. Proposed approach allows to determine presence and approximate concentrations of polyamines in range from 10ng/ml to 1.5μg/ml in samples of blood serum of patients with breast cancer which correlates with tumour size and age of the patients.