

Streszczenie rozprawy doktorskiej pt.: "Oznaczenie potencjalnie charakterystycznych białek prozapalnych i proangiogennych jako nowy obszar rozwoju matrycowych bioczuJNIKÓW SPRi"

Summary

The object of the doctoral dissertation is the construction of three new SPRi biosensors, sensitive to pro-angiogenic and pro-inflammatory factors, and the development of three analytical tests based on SPRi biosensors for the diagnosis of brain glioma.

For the newly developed methods using various metallic bases (gold or silver-gold) and various biorecognition elements (antibody or inhibitor), a validation and verification procedure was carried out, which led to the determination of analytical parameters and the conclusion that the new methods may be useful for diagnostic purposes. The data obtained as a result of validation reveal that the newly proposed assay methods slightly exceed the commercial method used, which was the ELISA test. The new methods are resistant to the influence of potential particles that can interfere with measurements and generate false positive or false negative results. They also do not require complicated sample preparation for analysis. It is enough to dilute the obtained biological material, if it is plasma or serum, with an appropriate buffer, selected in terms of pH value to the maximum activity of the enzyme, or optimal in terms of preserving all properties by the protein. In addition, the analysis is shorter than in the case of ELISA tests. It lasts about 40 minutes, where ELISA requires at least 1 hour for sample preparation. SPRi immuno-sensors are direct methods, they do not use any tracers. The volume of the sample for analysis is only 3 μ L, which is a huge attribute and distinguishes the constructed biosensors from other analytical methods. Verification of the data obtained using the constructed biosensors confirms their high convergence with the data obtained using the reference method.

The developed analytical tests for the diagnosis of brain glioma, due to the inability to distinguish the control group from mild degrees of the disease, enable the diagnosis of this disease in more advanced degrees of malignancy. Nevertheless, they are a valuable proposition of methods supporting the so far poor laboratory diagnosis of brain glioma, which is confirmed by the ROC analysis. Appropriate statistical analysis revealed a number of relationships between proteins and parameters available from the clinical description of the samples, such as: statuses of molecular markers, the presence of cancer in the family, comorbidities, the stage of the disease, the size of the cancerous tumor. The characteristic correlations between the determined biomolecules, recorded in the population of the tested samples, were also presented.

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Łukasz Ołdak