Surface Plasmon Resonance Spectroscopy as a Key to the Development of Sensitive Biosensors

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An immunosensor is a type of biosensor that is designed to monitor the interaction between an antibody or antigen and an analyte. The formation of immune complex on the surface of transducer generates a measurable signal in response to a change in analyte concentration [1]. The immunosensors can be used to detect various biomarkers whose concentration in body fluids is usually quite low. Therefore, it is important to apply sensitive method of detection. One of the most sensitive methods is surface plasmon resonance (SPR) spectroscopy [2].

The main advantage of SPR technique is the real-time monitoring of analyte without any labels. Moreover, the binding kinetics of molecules can be investigated while measuring a low concentration of the analyte from relatively small volume [3]. Detection is possible under complex matrix conditions in the presence of high level of foreign substances, which eliminates the complex and time-consuming procedure of sample preparation and concentration. SPR biosensing is suitable for multiple use in automatic mode and can be applied for rapid quantifying of multiplex analytes. Moreover, examples of wearable SPR sensors can be found in the literature [4].

According to sensing principle, the detection of low molecular weight biomarkers is complicated using SPR spectroscopy. The application of sandwich immunoassay format could be a solution to this issue. Moreover, the detection of small biomarkers at low concentration could be reached using various nanostructures [3, 5].

Acknowledgments

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