## Nanochemistry and biotechnology

# Development of SPR immunosensor based on recombinant protein A for determination of IgG concentration in blood serum

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Immunodeficiency disorders, which involve various malfunction of the immune system, severely affect the quality of human life and shorten life span. The determination of immunoglobulin level is very important for the diagnosis of immunodeficiency and further treatment. As compared with existing analytical approaches, the biosensor methods of analysis have a number of advantages: they provide easy, fast, accurate, highly sensitive, specific, simple-to-operate, and cheap procedure without the need of large sample volumes or extensive sample pretreatment.

Surface plasmon resonance (SPR) biosensors have a great potential for the label-free, real-time and selective detection of various intermolecular interactions (antigen-antibody, receptor-ligand etc). SPR spectrometer registers the changes of the refractive index of a thin layer (~ 200 nm) of medium, adjacent to the sensor surface covered by gold nanofilm with thickness of 50 nm. Immobilization of biomacromolecules and their interactions with partner molecules alter the refractive index of the layer of medium and cause the SPR response.

Staphylococcal protein A is known to bind various classes of immunoglobulins of many organisms. In this work the bioselective element of biosensor was formed by immobilization of the recombinant Staphylococcal protein A with the introduced C-terminal cysteine residue (SPA-Cys) on the gold nanofilm surface followed by the surface passivation for reducing nonspecific sorption.

The interactions of immobilized SPA-Cys with human IgG from model solutions and samples of blood serum were investigated by using the flow measuring cell of the SPR spectrometer "Plasmon-9". The obtained results and some immunosensor characteristics (the storage stability, reproducibility, sensitivity) will be discussed.