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Quartz crystal microbalance immunosensor for the detection of antibodies to double-stranded DNA

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Abstract

We report the development of a novel quartz crystal microbalance immunosensor with the simultaneous measurement of resonance frequency and motional resistance for the detection of antibodies to double-stranded DNA (dsDNA). The immobilization of poly(L-lysine) and subsequent complexation with DNA resulted in formation of a sensitive dsDNA-containing nanofilm on the surface of a gold electrode. Atomic force microscopy has been applied for the characterization of a poly(L-lysine)-DNA film. After the blocking with bovine serum albumin, the immunosensor in flow-injection mode was used to detect the antibodies to dsDNA in purified protein solutions of antibodies to dsDNA and to single-stranded DNA, monoclonal human immunoglobulin G, DNase I and in blood serum of patients with bronchial asthma and systemic lupus erythematosus. Experimental results indicate high sensitivity and selectivity of the immunosensor. [Figure not available: see fulltext.]. © Springer-Verlag 2007.

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Keywords

Antibodies to double-stranded DNA, Atomic force microscopy, Bronchial asthma, Immunosensor, Quartz crystal microbalance, Systemic lupus erythematosus