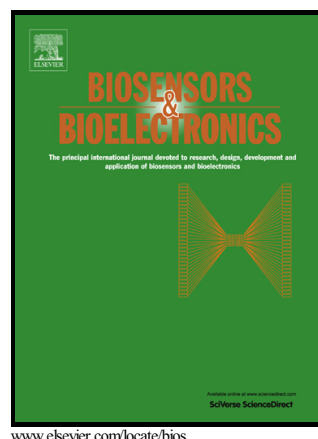


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Label-free Electrochemical Detection of Prostate-Specific Antigen based on Nucleic Acid Aptamer

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Abstract

We report a label-free aptasensor to make direct detection of prostate specific antigen (PSA, a biomarker of prostate cancer) using a quinone-containing conducting copolymer acting as redox transducer and grafting matrix for immobilization of the short aptamer strands. It is shown that capture of PSA generates a current decrease (*signal-off*) measured by Square Wave Voltammetry. This current decrease is specific for PSA above a limit of quantification in the ng mL⁻¹ range. The change in current is used to determine the PSA-aptamer dissociation constant K_D , of ca. 2.6 nM. To consolidate the proof of concept, a heterogeneous competitive exchange with a complementary DNA strand which breaks PSA-aptamer interactions is studied. This double-check followed by a current increase provides full assurance of a perfectly specific recognition.

Keywords: Electrochemical aptasensor; Label-free detection; Aptamer; Prostate-specific Antigen (PSA).

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