

## **Abstract**

# **BINDING KINETICS OF FREE- AND TOTAL- PROSTATE SPECIFIC ANTIGEN BY BIOSENSORS USING FRACTAL ANALYSIS**

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The detection of free- and total-prostate specific antigen (f-PSA, t-PSA) by biosensors is described using fractal analysis. Single- and dual-fractal models were employed to fit the binding data. Corel Quattro Pro 8.0 was used to determine the values of the binding rate coefficients and the fractal dimensions using regression analysis. The binding rate coefficients are very sensitive to the degree of heterogeneity on the biosensor surface. For example, the analysis indicates that in the binding of the total PSA (t-PSA) in solution to the anti-t-PSA immobilized on an immunostrip surface using lateral flow and a non-competitive sandwich assay, a decrease in the fractal dimension,  $D_f$  by a factor of 15.2 from 0.7252 to 0.0477, leads to a decrease in the binding rate coefficient,  $k$  by a factor of 1.857 from 0.07428 to 0.04. Note that the changes in the binding rate coefficient and in the degree of heterogeneity (fractal dimension) are in the same direction on the immunostrip surface. The analysis provides physical insights into the interactions occurring on the immunostrip surface.

