

## Development of Lectin-Based Biosensor for Glycoprofiling of Clinical Samples: Focus on Prostate Cancer

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**Abstract :** Since aberrant glycosylation is frequently accompanied by both physiological and pathological processes in a human body (cancer, AIDS, inflammatory diseases, etc.), the analysis of tumor-associated glycan patterns have a great potential for the development of novel diagnostic approaches. Moreover, altered glycoforms may assist as a suitable tool for the specificity and sensitivity enhancement in early-stage prostate cancer diagnosis. In this paper we discuss the construction and optimization of ultrasensitive sandwich biosensor platform employing lectin as glycan-binding protein. We focus on the immunoassay development, reduction of non-specific interactions and final glycoprofiling of human serum samples including both prostate cancer (PCa) patients and healthy controls. The fabricated biosensor was measured by label-free electrochemical impedance spectroscopy (EIS) with further lectin microarray verification. Furthermore, we analyzed different biosensor interfaces with atomic force microscopy (AFM) in nanomechanical mapping mode showing a significant differences in the altitude. These preliminary results revealing an elevated content of  $\alpha$ -2,3 linked sialic acid in PCa patients comparing with healthy controls. All these experiments are important step towards development of point-of-care devices and discovery of novel glyco-biomarkers applicable in cancer diagnosis.

**Keywords :** biosensor, glycan, lectin, prostate cancer

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