Short Communication

Heat Shock Protein 60 (HSP60) detection by QCM Biosensor and Antibody Covered Gold Nanoparticles

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Heat Shock Protein 60 (HSP60) is a 60 kDa weighting chaperonin that is an evolutionary conserved protein occurring in a wide number of organisms. It can serve as a plasma or blood serum biomarker of serious pathologies including cancer. In this work, quartz crystal microbalance (QCM) biosensor was constructed as a tool for a simple measurement of HSP 60 level. The QCMs were covered with an antibody specific to HSP60 and the antibody modified gold nanoparticles were also prepared. The assay was based of sandwich forming with captured HSP60, presence of HSP60 caused decrease of QCM oscillation frequency. The described assay exerted good sensitivity to HSP60, limit of detection for the assay was equal to 83 pg/ml for a sample with volume 5 μ l, one assay cycle was finished within 90 minutes. The assay well correlated to standard Enzyme-Linked ImmunoSorbent Assay (ELISA) with coefficient of determination 0.985 and was not sensitive to interference by selected proteins (HSP70, albumin, immunoglobulins). In a conclusion, the biosensor appears to be a reliable tool for the detection of HSP60, the achieved specifications make it promising for a routine application.

Keywords: bioassay; biomarker; biosensor; cancer; chaperonin; diagnosis; heat shock protein; immunoassay; sensor

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