

Real time label free detection of liver cancer using aptamer functionalized ZnO nanowire biosensor

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Nanoscale biosensors are emerging as one of the most impressive platforms for specific identification of biomolecules in the life sciences, with the nanotechnology revolution up to the scale that concert with the biological system. To date, there have been many reports for the nanoscale biosensors based on antigen-antibody interactions. In this work, we present that aptamer based nanowire biosensor is one of the promising platforms in biosensor applications for cancer diagnostics. It is expected that aptamer-antigen interactions can give us more effective options than antibody based biosensors due to their smaller size as compared to that of antibody generally. To evaluate and prove these effects in this work, aptamer functionalized ZnO nanowire devices were successfully demonstrated for the label free detection of Hepatocellular Carcinoma (HCC) markers. To verify our approaches, the immobilized surfaces of ZnO nanowires were investigated using fluorescence microscopy and field effect transistor (FET) with electrolyte gate configuration. Finally, our biosensor platform was shown to be capable of higher selective and sensitive detection of HCC markers as compared to antibody based biosensors.