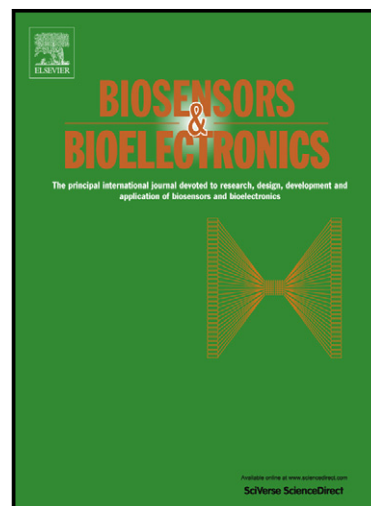


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Review

Synergizing Nucleic acid Aptamers with 1-dimensional Nanostructures as label-free Field-effect transistor biosensors

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Abstract

Since the introduction by Gold et al. in 1990, nucleic acid aptamers had evolved to become a true contender in biosensors for protein and cell detections. Aptamers are short strands of synthetically designed DNA or RNA oligonucleotides that can be self-assembled into unique 3-dimensional structures and can bind to different proteins, cells or even small molecules at a high level of specificity and affinity. In recent years, there had been many reports in literature in using aptamers in place of conventional antibodies as capture biomolecules on the surface. This is mainly due to the better thermal stability properties and ease in production. Consequently, also these characteristics allowed the aptamers to find use in field effect transistors (FETs) based upon 1D nanostructured (1D-NS) as label-free biosensing. In terms of designing label-free platforms for biosensors applications, 1D-NS FET had been an attractive option due to reported high sensitivities toward protein targets arising from the large surface area for detection as well as to their label-free nature. Since the first aptamer-based 1D-NS FET biosensor had surfaced in 2005, there had been many more improvements in the overall

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