

Review: Nano-Biosensors: The Future of Health Diagnostics

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ABSTRACT

Nanomaterial-based sensing approaches that incorporate different types of nanoparticles (NPs) and nanostructures in conjunction with natural or synthetic bio-receptors as molecular recognition elements provide opportunities for the design of sensitive and selective assays for rapid detection of rapid detection and identification of infectious pathogens, cancer biomarkers and viral infections. This talk will summarize recent advancements over the past years in the development of nanotechnology-enabled biosensors and systems for capture and detection. The most common types of nanostructures and NPs, their modification with bio-receptor molecules and integration to produce viable sensing systems with bio-recognition, amplification and signal readout will be discussed. Examples of all-in-one systems that combine multifunctional properties for capture, separation, inactivation and detection are also provided. Current trends in the development of low-cost instrumentation for rapid assessment of food contamination will be discussed as well as challenges for practical implementation and directions for future research.

Keywords: Multifunctional nanotechnology; portable biosensors; integrated sensing systems; biomarkers