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Biosensor platforms with nanomaterials for diagnostics applications

Ibtisam E Tothill
Cranfield University, UK

Since the advent of the biosensor for glucose monitoring around the mid-eighties, there has been a phenomenal growth in the field of biosensor development with emerging applications in a wide range of disciplines, including medical, food and environmental diagnostics. This has been as a result of the increase in demand to develop rapid diagnostic for point- of- care testing and also to comply with legislations and food safety and quality standards.

With the emerging field of nanotechnology, new nanomaterials and micro/nano transducer devices have been introduced to the biosensor arena and applied to develop advanced and highly sensitive sensor devices. Their application in sensor development has been due to the excellent advantages offered by these materials in miniaturisation of the devices, signal enhancements and amplification of signal by the use for example nanoparticles as labels. The use of nanomaterials can increase sensitivity of the final devices and also allow the fabrication of multiplex sensor systems for several analytes analysis to be taken place at the same time. At Cranfield we are applying nanomaterials in the development of assays and sensors for a range of analytes detection. This is in order to achieve higher sensitivity when using electrochemical transducer and also optical (SPR) and quartz crystal microbalance sensors (QCM) sensor systems. This presentation will cover the recent developments and advances in biosensor fabrication and the emerging synthetic receptors and nanomaterials used for their developments giving examples of recent work conducted by the group.

Biography

Ibtisam E Tothill is a Reader in Analytical Biochemistry and leads the Analytical Biochemistry Research activity within Cranfield Health. She is also the Head of the Advanced Diagnostics and Sensors Group at Cranfield University, UK since 2004 and holds many Visiting Professor Positions in Europe and China. She has served as Programme Director, Deputy Education Director, Associate Dean for the Faculty of Medicine and Biosciences and a Director for the Sensors for Water Interest Group (SWIG).

Her research activity is focussed on the sensors and diagnostics arena covering the medical, foods and environmental sectors. Her current work covers analysis of microbial contaminants and pathogens and their toxins such as mycotoxins, cyanobacterial toxins and endotoxins, metals, and drugs in food, the environment and biological fluids and the detection of disease biomarkers for point-of-care testing with over 100 publications and book chapters covering this arena. She is also involved in several projects where micro/nanosensor arrays and nanomaterials are being developed for rapid analysis applications. Dr. Tothill sits on several Editorial Boards for international scientific journals and scientific committees.

i.tothill@cranfield.ac.uk