OMICS Group Conferences
Accelerating Scientific Discovery

International Conference & Exhibition on
Vaccines & Vaccination

22-24 Nov 2011 Philadelphia Airport Marriott, USA

Application of electrochemically deposited gold nano-aggregates based DNA biosensor for early detection of typhoid

Anu Singh[1,2], Yuvraj Joshi[1], Manoj Pratap Singh[1], Varsha Sharma[3], H. N. Verma[2] and Kavita Arora[1]

[1]Advanced Instrumentation Research Facility, Jawaharlal Nehru University, India
[2]Department of Biotechnology, School of Life Sciences, Jaipur National University, Jaipur, Rajasthan
[3]School of Life Sciences, Jawaharlal Nehru University, India

Nanostructured gold has improved prospects for interfacing biological recognition events with electronic signal transduction to design a new generation of bio-molecular electronic devices. This work shows a recent and promising utilization of gold nano particles for biological applications like deoxyribonucleic acid (DNA) biosensor for Typhoid detection. Bio-molecular electronics based DNA biosensors due to their inherent physicochemical stability and suitability to discriminate different organism strains appear to be promising tool for early detection of typhoid as *S. typhi* can be isolated from blood at early stages of infection. A novel approach of electrochemical deposition of gold nano particles in form of aggregates (GNA) onto planar gold (Au) surface has been employed for fabrication of DNA biosensor. Fabricated nano pyramids electrode has been characterized using Scanning Electron Microscopy (SEM), UV-VIS spectroscopy, Atomic Force Microscopy (AFM), X-Ray diffraction (XRD) and electrochemical methods. It has been found that upon deposition of nano pyramids the performance was improved in terms of surface area and roughness (AFM studies), electron transport (cyclic Voltammetry), and surface stability (XRD studies). This nano pyramid based Au electrode was then used for fabrication of DNA biosensor by immobilizing specific single stranded DNA probe sequences identified from conserved region of Vi capsular antigen gene, part of *S. enteric* serovars *typhi* through self assembled monolayer of 11-Mercaptoundecanoic acid (MUA). Prepared DNA electrode was efficiently able to distinguish one base mismatch and non-complementary target and shows limit of detection for complementary targets upto 150 ottomol by monitoring guanine oxidation and upto 4 ottomol using Methylene blue as hybridization indicator using differential pulse Voltammetry (DPV) at 25°C in phosphate buffer with in 60 s hybridization time. This DNA electrode has implications towards detection of other pathogens like *M. tuberculosis, Campylobacter, H. Pylori, E. coli* etc for clinical diagnostics, food quality control and environmental monitoring.