Amplified DNA-based Electrochemical Sensor for Pathogen Detection

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There have been many attempts to develop sensitive and accurate techniques for detection and diagnosis of pathogenic bacteria using nucleic acid-based technology. To achieve efficient simultaneous detection of seven selected pathogens, we introduced 16-pair electrode array containing two copies of 7 specific DNA probes as signal and two negative control as noise manufactured by GENEfluidics, Horse-radish peroxidase(HRP) and 3,3',5,5'-Tetramethylbenzidine (TMB) for pathogenic bacteria detection. The signals were obtained by amperometric voltammety and cyclic voltammetry. The signal-to-noise ratio was calculated as the signal with 16S rRNA divided by the noise without 16S rRNA. After condition optimization of mixed self-assembly monolayer (SAM), blocking, and washing, we investigated the limit of detection (LOD) and signal amplification by Gold-shell Magnetites. This platform might have possibility of fast, precise, quantitative, non-labeling, potable, and parallel detection system for pathogens.