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Rapid detection of *Escherichia coli* based on 16S rDNA nanogap network electrochemical biosensor

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Abstract

Simple, fast and effective detection methods of *Escherichia coli* (*E. coli*) are essential for human life and health. This article proposes a sensitive and rapid detection method of *E. coli* based on electrochemical biosensor using 16S rDNA as target biomarker, and using oligonucleotide probes and nanogap network electrodes as transducer elements. The nanogap network electrodes are prepared by interconnecting of gold nanoparticles through thiolated peptide nucleic acid (PNA) probes on the substrate of Au interdigital electrode. In the presence of specific 16S rDNA fragments, PNA capture probe hybridized to 5' terminal of the fragments, and detection probe modified with horseradish peroxidase (HRP) hybridized to its 3' terminal. HRP attached to the hybridized detection probe catalyzed the polymerization of aniline along target chain. Conductive connection was caused by polyaniline deposition between the interrupted gold nanoparticles and offered a conductimetric response of constructed sensor. Thus,

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