

Design, Characterization and Functionalization of Oligonucleotide Probes for Portable Diagnostic Assays Targeting *Salmonella Enterica Typhi*

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ABSTRACT

Approximately, nine million cases of typhoid fever occur per year with about 110,000 deaths globally, highlighting the importance of rapid and reliable diagnostic tools for *Salmonella enterica typhi*. Suitable pathogen surveillance assays must be rapid, portable, sensitive, specific and easy to use in the field. As such, oligonucleotide probes are attracting attention for application in portable assays because they have a higher target specificity, better stability, and better discrimination of highly similar targets. In this study, three probes of 40 base pairs were designed, and assessed for their specificity towards the STY0326 gene found only in *S. Typhi*. This gene codes for an 86 amino-acid deaminase domain containing protein. A reporter DNA probe (repDNA) and capture DNA (capDNA) probe that are complementary to the 5' and the 3' ends of the target gene respectively and a control DNA (contDNA) probe which serves to validate the test and is complementary to the reporter probe were synthesized. Following synthesis, the repDNA probe was conjugated to chemically synthesized gold nanoparticles (AuNPs) coated with dextrin, to develop a target-specific label for application in portable diagnostic assays for the surveillance of *S. Typhi*. The development of specific and portable diagnostic assays would serve as an attractive early warning system enabling quicker and more efficient response measures in the interest of public health.

Keywords: Typhoid fever, *Salmonella enterica typhi*, Oligonucleotide probes, Portable assays

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