OP3.3 - A NOVEL BACTERIOPHAGE RECEPTOR BINDING PROTEIN FOR IMPROVED *SALMONELLA* DETECTION

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ABSTRACT

Salmonella is one of the most important foodborne pathogenic bacteria which can cause serious public health problems. The substantial health and economic impact of *Salmonella* infections, coupled with its antibiotic resistance demands the fast and reliable identification of this pathogen. Conventional approaches are time-consuming, present high detection limits, low specificity, and inability to differentiate viable from non-viable cells. These facts call for urgent improved detection methods to prevent the introduction of Salmonella into the food-chain and to provide timely guidance for clinical treatment and avoid disease progression. Due to their high specificity and binding ability, bacteriophages and their proteins can circumvent these limitations and provide the foundations for the development of novel cost-effective and improved diagnosis.

In this study, we employed bioinformatic tools to identify potential receptor-binding proteins within the genome of a sequenced bacteriophage. Selected genes were cloned into *Escherichia coli*, fused with a green fluorescent protein (EGFP) and assessed for their ability to bind and decorate *Salmonella* cells.

Results showed that phage protein gp27 exhibits strong binding affinity for *Salmonella* cells, enabling their identification under a fluorescent microscope. This protein demonstrated high specificity by effectively binding to *Salmonella* and not to other related genera. Its exceptional specificity minimizes the occurrence of false-positive results. Notably, this protein binds to *Salmonella* cells within a rapid 15-minute timeframe.

Our research unveils a novel bacteriophage receptor-binding protein with remarkable specificity for *Salmonella*. This breakthrough paves the way for the development of novel advanced diagnostic tools, promising faster and more reliable *Salmonella* detection. These advancements will significantly enhance food safety measures and mitigate the impact of *Salmonella*-related infections on public health and the economy.

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