

Recombinant Invasive Plasmid as Platform for *Shigella* Vaccine Development

Optimization of *Shigella* Virulence Plasmid for Vaccine Development.

The Army seeks a partner interested in commercializing this technology.

Status

Title

Shigella-Based plasmid Recombinant Invasive *Shigella* Module (pRISM) and its Uses

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pRISM is a *Shigella*-based plasmid construct that can be readily introduced into any *Shigella* strain to convert it to a safe, immunogenic and efficacious vaccine candidate with a potential to express heterologous antigens (i.e. vaccine platform)

The Market Need

A need exists for improved and less expensive vaccine development approaches. *Shigella* species have been studied extensively and known to be a major cause of bacillary dysentery with an estimated 165 million infections world-wide. In healthy individuals. *Shigella* infection causes dysentery and diarrhea with symptoms such as abdominal pain, fever, dehydration, vomiting, and convulsions. According to the World Health Organization (WHO), *Shigella* is responsible for around 1 million deaths annually, and in particular, a high occurrence rate has been observed among children five years of age and younger. Due to wide-spread isolation of multidrug-resistant *Shigella*, other therapeutic options such as vaccines are needed. Presently, there are no licensed *Shigella* vaccines.

The Technology

Researchers at the Walter Reed Army Institute of Research (WRAIR) have developed a small, stable, and invasive *Shigella*-based plasmid (pRISM) that maximizes *Shigella* safety and immunogenicity by allowing invasion but eliminating intracellular spread and native enterotoxins. The pRISM construct is a unique tool that can be used for the rapid construction of any *Shigella* serotype-specific vaccine candidate by transforming it into the strain.



Source: CDC

Highlighted Benefits

- pRISM virulence plasmid can be used to rapidly develop vaccines against any *Shigella* serotype
- pRISM can function as a platform to express heterologous antigens of other enteric pathogens
- pRISM can be used as a basic invasion plasmid and other genes can be introduced into it to determine their function in pathogenesis
- pRISM is a smaller, more stable, and invasive virulence plasmid that lacks the ability to spread and release enterotoxins

Stage of Development

Shigella flexneri 2a strain transformed with two different pRISM constructs were significantly immunogenic in guinea pigs while causing no disease symptoms. Administration of additional doses of pRISM beyond the two vaccinations might boost immune responses and protection to an even greater extent.