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Preparation and evaluation of immunogenic conjugates of *Salmonella enterica* serovars typhi and paratyphi O-specific polysaccharides with diphtheria toxoid

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Enteric fever caused by *Salmonella enterica* serovars typhi (*S. typhi*) and paratyphi (*S. paratyphi*) is a major health problem particularly in developing countries. The available vaccines are effective for a short time and do not induce an immune response in children below 2 years of age. Conjugate vaccines due to their protein component induce a T-cell dependent immune response characterized by enhanced immunogenicity in all ages. In this study, O-specific polysaccharides (OSP) of *S. typhi* and *S. paratyphi* were conjugated to diphtheria toxoid (DT) with and without adipic acid dihydrazide (ADH) as a linker. These conjugates (OSP-AH-DT) were then evaluated for their immunogenicity using mice as a model and showed significantly higher levels of IgG ELISA titers than lipopolysaccharides alone. Different immunization schedules were compared and it was found that schedule-B (three injections with 4-weeks interval) induced higher immune responses than schedule-A (three injections with 2-weeks interval). We showed that diphtheria toxoid can be successfully employed as a carrier protein for conjugation with OSPs of *S. typhi* and *S. paratyphi* and play an important role in facilitating adequate immune response.

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