Abstract Title: First characterization of immunogenic conjugates of Vi negative Salmonella Typhi O-specific polysaccharides with rEPA protein for vaccine development

M. Salman [a, b, d], F. St. Michael[a], A. Ali[b], A. Jabbar[e], C. Cairns[a], A.C. Hayes[a], M. Rahman[b], M. Iqbal[b], A. Haque[c], A.D. Cox[a]

a Vaccine Program, Human Health Therapeutics Portfolio, National Research Council, Ottawa, Canada
b Health Biotechnology Division, National Institute for Biotechnology, Faisalabad, Pakistan
c Faculty of Life Sciences, University of Faisalabad, Faisalabad, Pakistan
d Department of Microbiology and Biotechnology, Abasyn University, Peshawar, Pakistan
e Department of Biotechnology, Mirpur University of Science & Technology (MUST), Mirpur, AJK, Pakistan

Abstract

Efficacious typhoid vaccines for young children will significantly reduce the disease burden in developing world. The Vi polysaccharide based conjugate vaccines (Vi-rEPA) against *Salmonella* Typhi Vi positive strains has shown high efficacy but may be ineffective against Vi negative S. Typhi. In this study, for the first time, we report the synthesis and evaluation of polysaccharide-protein conjugates of Vi negative *S.* Typhi as potential vaccine candidates. Four different conjugates were synthesized using recombinant exoprotein A of *Pseudomonas aeruginosa* (rEPA) and human serum albumin (HSA) as the carrier proteins, using either direct reductive amination or an intermediate linker molecule, adipic acid dihydrazide (ADH). Upon injection into mice, a significantly higher antibody titer was observed in mice administrated with conjugate-1 (OSP-HSA) ($P = 0.0001$) and conjugate 2 (OSP-rEPA) ($P \leq 0.0001$) as compared to OSP alone. In contrast, the antibody titer elicited by conjugate 3 (OSPADH-HSA) and conjugate 4 (OSPADH-rEPA) were insignificant ($P = 0.1684$ and $P = 0.3794$, respectively). We conclude that reductive amination is the superior method to prepare the S. Typhi OSP glycoconjugate. Moreover, rEPA was a better carrier protein than HSA. Thus OSP-rEPA conjugate seems to be efficacious typhoid vaccines candidate, it may be evaluated further and recommended for the clinical trials.

Keywords—*Conjugate vaccines; Immunogenicity; rEPA; Salmonella Typhi Vi negative; Typhoid*

Professional Biography

Dr. Muhammad Salman is working as Assistant Professor in the Dept. of Microbiology and Biotechnology at Abasyn University Peshawar, Pakistan. He got his PhD degree in the field of Microbiology & Biotechnology from NIBGE, Pakistan. He worked on infectious disease, vaccine development and protein science. He got special training in vaccines at Human Therapeutic Portfolio, National Research Council (NRC), Canada, He accomplished 8 years of research experience in Microbiology and Biotechnology, Dr. Salman is teaching to undergrads and MPhil students for last 3.5 years. Currently he is supervising 10 MPhil student (working on TB, Diabetes, nanoparticles, Biofilm and medicinal plants). He is interested in International collaborations with scientists who want to work on infectious diseases in developing countries. He published various papers in prestigious journals and has been serving as reviewer and editorial board member of reputed journals. He was nominated for workshop by ICGEB, Italy from Pakistan.



Email Id: s.amazai@yahoo.com