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Salmonella typhi Vi-polysaccharide particulate vaccine: Class switching and memory antibody response

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Introduction: *Salmonella typhi* Vi-capsular polysaccharide antigen (T cell independent antigen) is poorly immunogenic and anti-phagocytic nature of Vi-polysaccharide further limits its use as subunit vaccine. Like other non zwitterionic polysaccharides antigens Vi polysaccharide fails to generate antibody class switching, memory antibody responses and protection in children below 5 years of age. Non zwitterionic polysaccharide antigens required conjugation with a carrier protein (T cell dependent antigen) for T cell presentation through MHC II pathway. Conjugation of polysaccharide antigen with T cell dependent antigen results in antibody class switching and memory antibody responses.

Methods: Biodegradable polymer particles (PLA and PLGA) were extensively studied for drug delivery. In last decade polymer particulate vaccines gained tremendous attention due to its depot effect and adjuvant activities. It has been reported that polymer particle entrapped antigens shows higher processing and presentation through MHC pathway as compare to the soluble antigens. In the current study immunogenicity of PLA polymer particle (nano and micro) entrapped *Salmonella typhi* Vi-polysaccharide antigen was evaluated. Further flagellin (a TLR 5 agonist) is used as an adjuvant and ligand for targeted delivery ofparticles to the antigen presenting cells (APCs).

Results: Entrapment of *Salmonella typhi* Vi-capsular polysaccharide antigen in to PLA polymer (45 KDa) particles (nano and micro-particles) results in to higher antibody titer, antibody class switching and memory antibody response like glyco-conjugate vaccines. *Salmonella typhi* Vi-polysaccharide antigen is well known for its anti-phagocytes activity which limits antigen uptake into antigen presenting cell.Vi entrapped PLA polymer particles were flagellin (a TLR 5 agonist) tailored which enhanced the polymer particle uptake in antigen presenting cells and subsequently enhance the antigen payload in antigen presenting cells. Flagellin tailored PLA polymer particles significantly enhance the anti Vi-IgM and IgG antibody responses. Furthermore polymer particle entrapped Vi-antigen shows IgM to IgG antibody class switching and enhances the IgG2a, IgG2b, IgG3 subtypes as compared to the soluble Vi polysaccharide antigen.

Conclusions: Flagellin (a TLR 5 agonist) coating enhances the polymer particle uptake in antigen presenting cells. PLA polymer particle (nano and micro-particle) entrapped Vi- polysaccharide antigen results in higher anti Vi-IgM and IgG antibody titer, antibody class switching and memory antibody response. PLA polymer particle entrapped Vi-antigen results in higher IgG2a, IgG2b and IgG3 antibody subtypes.

Biography

Robin Kumar is a PhD student in National Institute of Immunology New Delhi. He has been working as a researcher since 2013. He is working on the novel strategy for immunogenicity of subunit antigens of human infectious agent. He has expertise in making nano-particle and micro-particle formulation for delivering weak immunogens. He has done MSc in Biotechnology from Indian Institute of Technology Bombay, Mumbai. He was awarded DBT sponsored fellowship during his MSc. He secured 11th rank in highly competitive CSIR JUNIOR RESEARCH FELLOWSHIP (JRF) exam and was awarded fellowship for his PhD tenure. He is highly motivated and enthusiastic to understand science for better world.

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