

Type 1 diabetes oral vaccine based on SPI2-T3SS of live attenuated *Salmonella*

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Type 1 diabetes (T1D) is a metabolic disease that is initiated by the autoimmune destruction of pancreatic insulin-producing beta cells that is accompanied by the development of antigen-specific antibodies and cytotoxic T lymphocytes (CTLs). It has been proposed that induction of tolerance to these diabetogenic autoantigens would prevent and possibly ameliorate the disease, and in fact clinical trials based on this idea have been conducted but with only partial success. Several studies have shown that vaccination with diabetic autoantigens provides some protection against this process. In this report we describe a new oral vaccine that utilizes attenuated *Salmonella* for delivery of autoantigens as well as immunomodulatory cytokine genes to immune cells in the gut mucosa. This novel strategy was tested by fusion of preproinsulin with SseF effector protein of *Salmonella* pathogenicity island-2 (SPI2) for translocation into the host cell cytosol and co-delivery of *Salmonella* carrying the gene for transforming factor beta (TGF β) as DNA-based vaccine for host cell expression. In this report, co-vaccination of non-obese diabetic (NOD) mice significantly reduced the development of diabetes and improved the response to glucose challenge. The combination therapy of autoantigen and TGF β also resulted in increased circulating levels of tolerance-associated cytokines such as IL10, IL2, IFN γ , and IL4, but without significant effect on proinflammatory cytokines IL6 and IL12, indicating a shift toward a tolerogenic response. In conclusion, SPI2-T3SS *Salmonella*-based oral vaccines expressing autoantigens combined with tolerogenic cytokines appears to be a promising therapy for prevention of T1D.

Biography

Mohamed I Husseiny Elsayed has completed his PhD at the age of 35 years from Friedrich-Alexander University, Germany and Postdoctoral studies from LA Biomed at Harbor-UCLA Medical Center, School of Medicine, California, and Childrens Hospital Los Angeles at USC California. Currently, he is a Research Scientist at Beckman Research institute of City of Hope, California, USA. He is Associate Professor for Microbiology and Immunology, Faculty of Pharmacy, Zagazig University, Egypt. He is working with this vaccination strategy for over 14 years and published this methodology in reputed journals and serving as an editorial board member of reputed.

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