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GUEST COLUMN

A Simple Approach Towards The Development Of A *Shigella* Vaccine

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Shigellosis continues to be a major public health concern particularly in the developing countries. About 163 million cases occur annually, predominantly in children under 5 years of age, leading to possibly one million deaths per year worldwide [1]. Although antibiotic treatments are efficient in the control of shigellosis, in the recent years it has been observed that shigellae have acquired resistance to multiple antibiotics, even to the newest one. Consequently high priority has been given by the World Health Organization for the development of a safe and effective vaccine to help in the control of shigellosis in the developing regions of the world. Many approaches to develop vaccines targeting *Shigella* have been explored. However, a practical and inexpensive vaccine is still not available. Owing to the presence of different *Shigella* serotypes, an ideal *Shigella* vaccine would stimulate broad protective immunity against all species of *Shigella* (*S. fexneri*, *S. sonnei*, *S. dysenteriae*, and *S. boydii*) and this can be achieved either by using a cocktail vaccine or a subunit vaccine. Towards the development of a very simple and inexpensive vaccine, an approach has been made to evaluate the protective efficacy of orally administered heat-killed virulent *S. flexneri* 2a in the rabbit model of shigellosis against challenge with the same virulent *S. flexneri* 2a [2]. It showed 100% protection against homologous challenge along with the dose dependent increase in the production of serum IgG and IgA. Moreover, an outer membrane protein with a molecular mass of 34 kDa has been identified as the major protective antigen [3]. It has been found that the protein is crossreactive and antigenically conserved among *Shigella* spp. and the epitope is surface exposed on the intact bacterium, which are the criteria of an optimal vaccine antigen [4]. Furthermore, the protein induces the release of IL-12, IL-1β, TNF-α, G-CSF, NO and IL-6 by murine peritoneal macrophages, indicating that the protein has the ability to initiate protective immune response against invading bacterial pathogens. It has also been shown that the protein enhances the expression of type-1 chemokines (MIP-1α, MIP-1β and RANTES) as well as other molecules (MHC II, CD40 and CD80) known to modulate the adaptive response towards Th1 type [5]. These observations reveal that the 34 kDa outer membrane protein can be an important target for the development of subunit vaccine against shigellosis in the near future.

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