STa toxin and STa derivative used in toxoid development against enterotoxigenic Escherichia coli associated diarrhea

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Technology description

SDSU has developed an expressing system for STa toxin and STa toxoid expression. Twenty-eight STa mutants were constructed and screened for structural integrity, and function. The STa toxoid genes were cloned into the pUC19 high copy plasmid as HindIII-BamHI fragments. The expressed mutant STa toxoid proteins induced a strong immune response relative to the control sample.
Diarrhea continues to be one of the most important diseases worldwide. It causes up to two millions of deaths annually to children under the age of five, more than AIDS, malaria and measles combined. Enterotoxigenic Escherichia coli (ETEC) strains are the major cause to children's diarrhea, and also travelersΓÇÖ diarrhea. Currently there are no vaccines available to protect against ETEC diarrhea. Pathogenesis of ETEC diarrhea has been well studied. The virulence determinants are ETEC colonization factor antigen (CFA, and coli surface antigen - CS) adhesins and two enterotoxins (heat-labile toxin - LT, andheat-stable toxin - STa). CFA adhesins mediate bacteria attachment to host epithelial cells and facilitate bacteria colonization at host small intestines. Enterotoxins disrupt fluid homeostasis in host epithelial cells to cause fluid hyper-secretion that leads to diarrhea. The optimum prevention strategy against ETEC diarrhea is to block bacteria attachment to host cells and to eliminate toxic activity of enterotoxins. The most practical approach is to develop vaccines to induce both anti-adhesin immunity and antitoxin immunity in hosts to block bacterial adherence and to neutralize toxin enterotoxicity. Recent studies demonstrated that toxin antigens, especially toxoids and toxoid fusions induce protective antitoxin immunity against ETEC.

Advantages

We have cloned the correct STa toxin gene into a high expression vector for plasmid p8835 to express STa toxin or STa toxoids.

Institution

South Dakota State University

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com