Isolation of Protective Bacteriophage That Target Enteric Bacterial Pathogens

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Technology description

Introduction

Large-scale outbreaks of Shiga toxin—producing Escherichia coli (STEC) infection have revealed the great disease-causing potential of this organism, especially among children and elderly persons. Approximately 5%–10% of people with STEC infection will develop hemolytic-uremic syndrome (HUS), 10% of those who develop HUS will die or have permanent renal failure, and up to 50% of those who develop HUS will develop some degree of renal impairment. STEC E. coli O104:H4 has been responsible for a large number of outbreaks in the recent years. During the spring of 2011, a novel E. coli O104:H4 serotype infected about 4,000 individuals in Central Europe, mainly in Germany, provoking more than 900 cases of HUS. Important concepts in understanding the pathogenesis and prevention of STEC-associated HUS are emerging, although no specific therapy yet exists. Optimal management of STEC infection includes intravenous hydration, avoidance of antimotility agents and antimicrobials, and monitoring for sequelae. Antimicrobials may have a potentially harmful role, possibly by inducing intestinal production of Shiga toxin during the diarrheal phase of illness. Therefore, alternative treatments are needed. The potential use of bacteriophages as therapeutic agents was recognized from the 1900s.However, this therapeutic approach was eclipsed by the discovery and use of antibiotics. Nevertheless, phage therapy was used for the treatment of human bacterial infections, mainly in Eastern Europe. Currently the United States is more resistant to the idea of phage as a use in a treatment, but as a topical solution, there are commercially available phage treatments.

Description of Technology

This technology comprises a population of gut-derived phage population taken from individuals with and without diarrhea. These distinct phage populations have the ability to kill diarrheal pathogens and commensal E. coli. Shiga-toxin producing E. coli (STEC) O157. This kill rate was increased with co-treatment with mitomyocin C. Treatment of infection without production of toxin makes this invention advantageous over current therapies available for treatment because it does not induce Shiga toxin release. This technology could also be applied to animal treatments, or food safety spraying

Application area

Human and Cattle treatment

Food Spraying

Advantages

Better bacteria kill rate
No induction of Shiga Toxin release
Kills resistant bacteria
Cheap and fast production

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