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Life Sciences

Title: ***Engineered Probiotic for Inhibition of Enteric Pathogens***

UMD18-01

Inventors: ***Vanni Bucci, Ph.D., et al.***

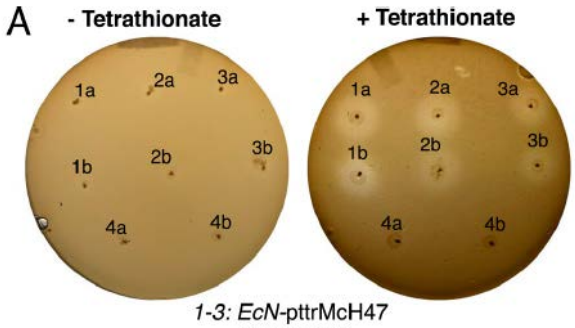
Applications: The invention provides a novel, potentially powerful method for treatment of antibiotic-resistant intestinal infections. The method involves the use of a microorganism that has been engineered to inducibly express the antimicrobial peptide microcin H47 only under conditions of intestinal inflammation. This modified microorganism can be used as a probiotic to treat intestinal infections by expressing this powerful antimicrobial peptide only when conditions of inflammation are present.

Benefits:

- Novel approach to treat antibiotic-resistant intestinal infections.
- Potentially applicable against many pathogenic microorganisms.
- Features use of a safe, nonpathogenic microbiome microorganism to combat infections.

Technology Description: Medical complications related to the emergence of antibiotic-resistant bacteria are a major issue in modern healthcare due to the resulting increase in morbidity, mortality, length of hospitalization and related healthcare costs. Opportunistic pathogens such as carbapenem-resistant *Klebsiella* species and fluoroquinolone-resistant *Salmonella* species are among the leading causes of morbidity and mortality worldwide, with drug-resistant *Salmonella* alone responsible for more than 100,000 infections in the US every year. The invention capitalizes on the ability of small antimicrobial peptides called microcins to inhibit certain pathogens. The invention features microorganisms engineered to detect and utilize tetrathionate, a known marker of intestinal inflammation, allowing the inducible expression and secretion of microcin H47 to inhibit the microorganism responsible for the inflammation.

Patent Status: UMass Dartmouth has filed a provisional patent application on this invention. The invention is based on research published in ACS Infectious Diseases in September 2017.



E. coli Nissle engineered to inducibly express microcin H47 (spots 1-3) can inhibit growth of *S. typhimurium* in the presence (right) of 1 mM potassium tetrathionate but not in its absence (left). Control wild type *E. coli* are in spots 4a and 4b.

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