



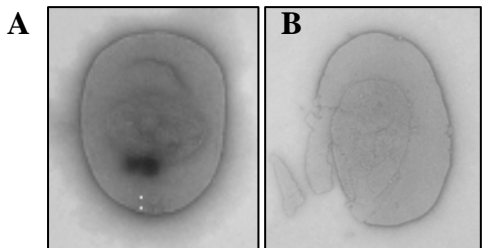
B-Defensins as Antimicrobial Agents for Food Preservation

The Technology

Food preservation is mainly accomplished through chemical treatment, either through the use of antibiotics, nitrates and other chemicals. It is widely suspected that the use of antibiotics in food is contributing to the rise of antibiotic-resistance in humans, so new alternatives must be found. Additionally, some of the chemicals are finding their way into the environment and upsetting the balance of nature's ecosystems.

β -defensins are cationic peptides that are an important component of the immune response in mammals. Defensins are a unique family of naturally occurring peptides that display both cytotoxic and antimicrobial properties. Their cytotoxic effect is nonspecific and the antimicrobial spectrum includes Gram-positive and Gram-negative bacteria, mycobacteria, fungi and some enveloped viruses. Their broad-range of antimicrobial activity has been proposed to contribute to host defenses by eliminating or preventing colonization of pathogenic organisms at a variety of anatomic sites.

Researchers at the University of Tennessee have identified and cloned two β -defensin sequences from bovine mammary epithelial cells and subsequently produced the bioactive peptides encoded by these genes. Bactericidal activity was demonstrated *in vitro* for several pathogenic bacteria at defensin concentrations as low as 20 μ g/ml and within 30 minutes. Further, the effects of the β -defensin, BTEA1, on the bacterial cell wall of a Group B *Streptococci* was visualized using TEM (Figure 1). This work demonstrated that the BTEA1 peptide was physically disrupting the bacterial cell wall, resulting in the bactericidal activity.



A. Untreated Cell
B. Cell after treatment with 15 μ g/ml of peptide

Related publications:

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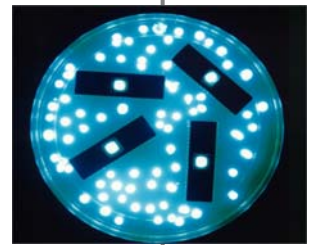
Benefits

Identifying, managing and licensing intellectual property from The University of Tennessee

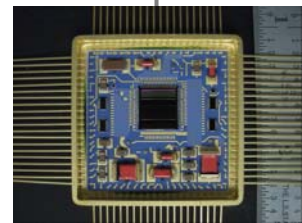
AGRICULTURE



BIOTECHNOLOGY



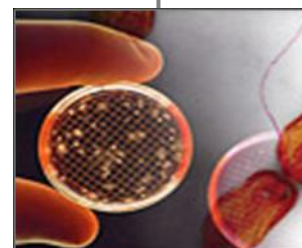
ENGINEERING



MATERIALS



MEDICINE





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- New alternative for preserving food using a naturally occurring peptide that produces strong antimicrobial activity
- Reduced probability of antimicrobial resistance
- Higher bacteria mortality as technique will destroy both active and dormant bacterial contaminants

The Inventor

Dr. Stephen Oliver is the Co-Director of the University of Tennessee Food Safety Center of Excellence and his focus areas are lactation physiology, mastitis and food safety. Dr. Oliver demonstrated that antibiotic infusion of heifer mammary glands a few weeks before calving is an effective procedure for eliminating many infections in heifers during late gestation and for reducing the prevalence of mastitis in heifers throughout lactation. Research conducted by Dr. Oliver has focused extensively on mastitis in dairy cows, particularly mastitis caused by environmental pathogens such as *Streptococcus uberis*. The primary goal of pre-harvest food safety research conducted by Dr. Oliver's laboratory is to provide comprehensive information on the occurrence of emerging pathogens on dairy farms under varying management conditions.

Contact

The University of Tennessee Research Foundation (UTRF) is a non-profit corporation responsible for commercializing University of Tennessee technologies and for supporting University research. UTRF is seeking parties interested in learning more about this technology and in exploring possible research and/or commercialization arrangements.

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