Broad-spectrum Antimicrobial Peptide for the Treatment of Acne and Skin Cancer

Tech ID: 20157 / UC Case 2005-351-0

BACKGROUND

Conventional antibiotics are often used in the treatment of skin infections and inflammation. Topical and oral antibiotics are common in the treatment of acne, which is aimed at killing the Propionibacterium acnes, the bacteria linked to the pathogenesis of acne vulgaris. Erythromycin and tetracycline are frequently prescribed for reducing P. acnes, though the efficacy of antibiotics has been declining as the prevalence of this microbe has become widespread. Excessive utilization of antibiotics due to improper use and inaccurate diagnosis is contributing to microbes gaining resistance to conventional therapeutics. Due to random genetic mutations that occur from natural selection and evolution, microbes develop resistance genes that make it impervious to antibiotics, exposing many current compounds to obsolescence. The new generation of antimicrobial compounds must therefore eradicate microbes independent of its survival machinery, such as cell wall or RNA synthesis. Novel strategies for killing pathogenic cells can also yield alternative uses for treating other skin diseases.

INNOVATION

Investigators at UCLA have modified the naturally occurring antimicrobial peptide, granulysin, which is known to possess antimicrobial activity against bacteria, parasites, and fungi. The length of the modified peptide has been shortened to 20 amino acids, yet it retains antimicrobial activity. A mutant of the peptide increases the in vitro cytotoxic activity to nearly 100x greater than wild-type granulysin. Crystal structure of the peptide suggests that it exerts its antimicrobial activity through a direct interaction with the microbial cell wall/membrane to increase permeability and induce lysis.

APPLICATIONS

▶ Possesses both anti-inflammatory and antimicrobial activity
▶ Directly microbicidal, and not dependent on interfering with the microbes survival machinery, such as binding sites or metabolic pathways
▶ Able to penetrate the lipid rich cutaneous environment

ADVANTAGES

▶ Improved therapeutic products that reduces the hyperproliferation of P. acnes
▶ Potential use for inflammatory and infectious skin conditions, such as psoriasis, wart, and skin cancers
▶ Exfoliating skincare products for reducing fine lines, wrinkles, and scarring

STATE OF DEVELOPMENT

In vitro studies have demonstrated that the modified peptide is effective in killing P. acnes. Various modifications have been tested to identify ones that produce the most cytolytic activity.

RELATED MATERIALS


PATENT STATUS

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RELATED CASES

2005-351-0

ADDITIONAL TECHNOLOGIES BY THESE INVENTORS

▶ Antimicrobial Peptide for the Treatment of Skin Diseases