



DEFENSINS AND ANTIMICROBIAL PEPTIDES

The treatment of infectious diseases is one of the greatest challenges modern medicine is facing today. Microorganisms have developed numerous resistances as a result of inappropriate use of antibiotics. Therefore, many antibiotics can no longer be used. Fraunhofer IZI addresses this need by developing peptide-antibiotics.

Mutational variations of peptides are being developed on the basis of known sequence motifs and being tested on different human pathogenic germs. Antimicrobially active peptides are modified to affect only pathogenic bacteria. Furthermore, we offer to create antimicrobial peptide libraries for client-specific applications.

Fraunhofer Institute for Cell Therapy and Immunology IZI

Perlickstraße 1
04103 Leipzig
Germany

Contact

Dr. Andreas Schubert
Department of Immunology
Vascular Biology Unit
Phone +49 341 35536-5105
andreas.schubert@izi.fraunhofer.de

www.izi.fraunhofer.de

Peptide-antibiotics will play a leading role as an alternative treatment to the current antibiotics in the near future. These substances have the capacity to treat virtually every infectious disease effectively.

Client Advantage

A plasmid library which covers a range of several billion different antimicrobial peptides has been established at Fraunhofer IZI. This plasmid library can be used to test the effect of codified antimicrobial peptides in a co-culture against one or more human pathogenic bacteria. A great advantage of the predominantly small antimicrobial peptides lies in their marginal immunogenicity.



Methods

The cloning of known and modified sequence motifs in combination is carried out in specific expression-plasmids which can be cultivated in *E. coli*. Following this step, a co-culture system is created in which *E. coli* and another pathogenic bacterium under investigation are cultivated to a level that both germs can tolerate. Plasmids are isolated from the *E. coli* colonies, which are surrounded by growth-inhibiting aureoles and then sequenced. The stability and cytotoxicity of the peptides within the human gastrointestinal tract are subsequently tested in cell culture models.

Selected Applications

- development of therapies against antibiotic-resistant infectious diseases
- development of functional food additives

Reference Project

The antimicrobial effect of different peptides on the main (pathogenic) organism for the development of tooth decay, *Streptococcus mutans*, has been tested in a project at the Fraunhofer IZI. In the process, many antimicrobial peptides that stunt the growth and reproduction of *Streptococcus mutans* have been identified.