

# Inspired by Nature: Synthetic Mimics of Antimicrobial Peptides (SMAMPs)

For non-medical or medical use - In solutions or linked to surfaces -  
Combining antimicrobial with anti-biofouling activities

## Technology

SMAMPs are fast acting, bactericidal polymers that, comparable to defensins, can kill all kinds of bacteria with a high safety window towards human cells. By inserting into bacterial membranes upon contact, they are able to repeatedly kill bacteria by a bio-physical mechanism (unlike bacteriostatic antibiotics, also important for any approval procedure). They can be chemically linked to virtually any surface but also work in solution. Similar to defensins, a SMAMP resistance is very unlikely. Hence, they are a clear alternative to Silver and Nickel treatments, which continuously create a growing number of resistant germs. Due to their size (typically >100 kDa) and associated positive charge, no penetration of human cells in is observed. Lead bactericidal SMAMP molecules have been identified, which in hemolysis test systems leave cells of the host organism undamaged even at a 50-100 times greater polymer concentration. Consistent further development lead to 3D-structured, multi-layer SMAMP products that combine antimicrobial with even anti-biofouling activities (preventing biofilm formation, i.e. founding and colonization of bacteria), enabling more potent applications for surface protection (e.g. catheters, implants, etc.) and thereby addressing yet unmet needs in medicine and medical engineering.

## Main Applications

- Non-medical technical applications: Coating of water system gaskets, surface coatings (ICU), etc.
- Consumer Products: Tooth brush filament coatings or extrusions, surface coatings for bacterial protection (band aids) or use in mouth washes, etc.
- Preservatives: Creams and lotions, instead of harmful reagents (Parabenes, silver, toxic nano-products)
- Medical devices classes 1-3: Coating of intrauterine device (IUD, catheters, syringes, medical instruments; endoscopes, coating of implants and stents, etc.)
- Drugs: disinfectant solutions for eye & ear care, treatment of vaginal and bladder infection; as active ingredient in topical creams for acne, and oral applications for treatment of GI disorders

## Developmental Status

- In depth analysis data for lead SMAMP prototypes
- Tech-transfer to GMP compliant production plant for prototype SMAMPs successfully completed
- Ongoing next generation development, particularly combining antimicrobial with anti-biofouling activities
- Spin-off with strategical partner in progress

## Publications

- Zou et al., J. Mater. Chem. B, 2015, 3, 6224-6238
- Al-Ahmad et al., PLoS One, 2014 Oct 31, 9(10)
- Al-Ahmad et al., PLoS One, 2013 Sep 9, 8(9)

## Responsible Scientist

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## Branch

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## Patent Status

Several patent families in pipeline, granted patents and pending applications

Priority Dates form Dec 2010 until Nov 2015

## Reference Nos.:

ZEE20160817, ZEE20151109,  
ZEE20120218, ZEE20101028 and  
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