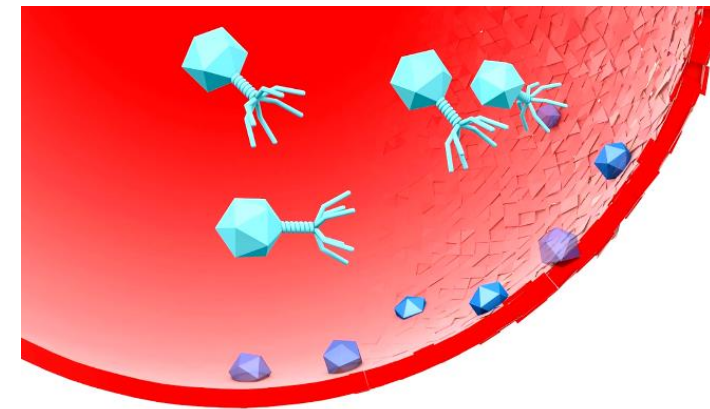


Staphefekt – intervening early in the Colonisation Infection Continuum with endolysins

Bjorn L. Herpers, MD, PhD | Regional Public Health Laboratory Kennemerland, The Netherlands | Chief Medical Advisor Microcos Human Health | b.herpers@streeklabhaarlem.nl

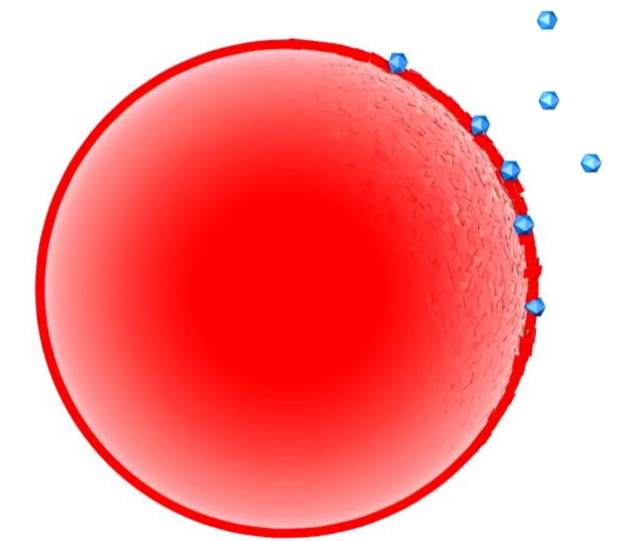
Background: *Staphylococcus aureus* is the most common cause of skin infections, both at home and in the hospital after surgery. The types of infection caused by *S. aureus* can be described across a spectrum of stages, the Colonisation Infection Continuum. Every infection with *S. aureus* is preceded by colonisation. By evading local barriers, progression to severe systemic infection eventually can occur. Over the years, *S. aureus* has developed increasing resistance to traditional antibiotics, evolving to the multi-drug resistant superbug MRSA, leading to difficult-to-treat infections and thousands of additional deaths every year. It is clear that new strategies are needed, as all traditional antibiotics eventually have led to resistance.



Lysis of bacterial cell by endolysins

Critical step in phage replication cycle

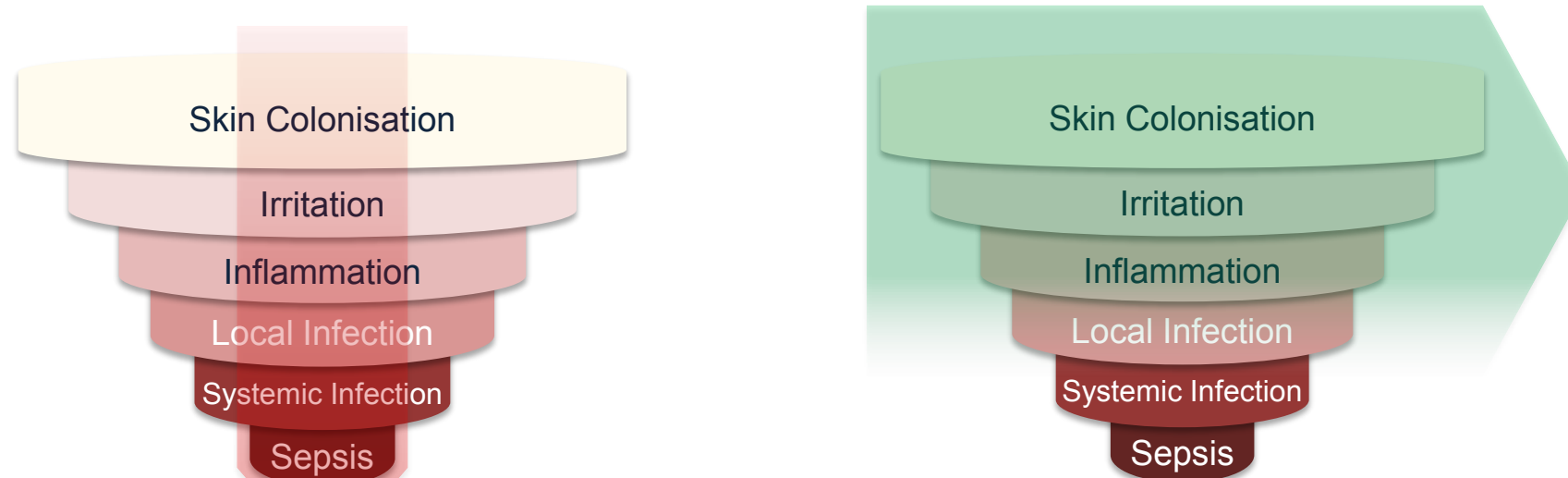
Resistance in this step unlikely & not observed



Endolysins (Staphefekt) lyse cell from outside

No phage needed, only protein

Colonisation Infection Continuum



Antibiotics

Side effects
Not selective
Resistance induction

Use is limited
in time & indication

Staphefekt / Endolysins

Selective
No resistance induction

Suitable for daily
suppression therapy
and prophylaxis

Conclusions: With Staphefekt, the first targeted therapy against *S. aureus* is available for long-term daily maintenance therapy, aimed at decreasing the burden of skin colonisation and preventing progression to inflammation and infection. This strategy has proven successful in the described exemplary cases of eczema and furunculosis. This illustrates how endolysins - unlike antibiotics - enable us to sustainably intervene at the early stages of the Continuum, before colonisation leads to infection.

Methods: The use of endolysins presents a new strategy. Endolysins are targeted antibacterial enzymes that are able to kill only a single unwanted bacterial species, leaving the beneficial ones unharmed. They target essential parts of the bacterial cell wall and therefore, resistance is neither observed nor expected. These two unique features distinguish endolysins from traditional antibiotics and make them suitable for long-term daily suppression therapy. Staphefekt SA.100 is an endolysin that kills only *S. aureus*, including MRSA, and is available in Europe for topical treatment. Two cases are described to illustrate how endolysins like Staphefekt unlock new antibacterial treatment modalities.

Before Staphefekt *After Staphefekt*

A 29-year old man suffered from recurrent atopic dermatitis triggered by glove use during work (left). Once to twice monthly, a short course of topical corticosteroids was applied. Before starting Staphefekt cream twice daily, the presence of *S. aureus* in the lesions was confirmed. After 3 days he reported less inflammatory symptoms of redness and itch (right). After 6 weeks, *S. aureus* was not found anymore, while other skin bacteria remained present. During 24 months of use, two flares were noted during non-compliance, and almost no corticosteroids were necessary anymore.

Before Staphefekt *After Staphefekt*

An 18-year old man with hyper-IgE syndrome, a severe immune deficiency, suffered from recurring severe boils caused by *S. aureus* for years (left). Frequently, this progressed to abscesses and severe cellulitis, for which antibiotics and hospitalisation were necessary. Staphefekt gel was used twice daily on skin and wounds. After 2 weeks, wounds from drained abscesses showed no more signs of infection, old lesions eventually healed (right) and no severe infections occurred during 12 months of follow up.