Broad spectrum biofilm inhibition by a small bacterial peptide

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Biofilms

- Biofilm infections, such as pneumonia in cystic fibrosis patients, chronic wounds and implant- and catheter-associated infections, affect millions of people in the developed world each year and many deaths occur as a consequence.
- Estimated that most of the bacterial infections in humans are correlated with biofilm and about 50% of the hospital infections are biofilm derived.

Clinical Problem:
- Currently removal relies on abrasive mechanical disruption and harsh chemicals.
- A major goal of medical and industrial biofilm research is to prevent biofilm formation from occurring in the first place.

![Biofilm formation diagram](image-url)
Inhibition of biofilm formation

Solution: Researchers at the University of Virginia have identified a *Bordetella* adenylate cyclase toxin (ACT)-derived peptide that inhibits biofilm formation

- Broad spectrum inhibitor
- Small size of peptide makes it more soluble and deliverable
- Potential treatment option for antibiotic-resistant biofilms
- Represents a novel regulatory mechanism and has major clinical, environmental and industrial applications

Archives of Microbiology, 2016. Gupta et al.
ACT inhibited biofilm in a concentration-dependent manner

Biofilm formation of BP338 (wild-type \textit{B. pertussis}) and BP347 (negative control, Bvg(-) \textit{B. pertussis}) in the presence of increasing concentrations of recombinant purified ACT, as measured by a crystal violet assay at 96 hours.
ACT or the AC domain of ACT was added to bacterial cultures along with inhibitory antibodies (CaM and α-ACT) and negative control (Mouse IgG) and the biofilm formation was measured by a crystal violet assay at 96 hrs.
Relevant Publications

Intellectual Property

- UVA Tech ID: HEWLETT-BIP
  - Title: Compositions for inhibiting formation of and/or disrupting bacterial biofilms and methods of use therefor
  - PCT Application PCT/US2017/026012 filed Apr. 4, 2017