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.
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
Biofilm formation of BP338 (wild-type *B. pertussis*) and BP347 (negative control, Bvg(-) *B. pertussis*) in the presence of increasing concentrations of recombinant purified ACT, as measured by a crystal violet assay at 96 hours.

ACT inhibited biofilm in a concentration-dependent manner.
ACT or the AC domain of ACT was added to bacterial cultures along with inhibitory antibodies (CaM and $\alpha$-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