Drug development for prevention and degradation of pathogen biofilms

Published date: Oct. 10, 2017

Technology description

PAGE TITLE
RelA Inhibitors for Degradation of Pathogenic Biofilms
PAGE SUMMARY
Pathogenic biofilms are multicellular bacterial organisms associated with over 80% of clinical infections and often emerge on medical implants. The ability of bacteria to grow in a biofilm allows for the coordinated communication among cells and the production of extracellular signaling molecules and toxins, quorum sensing, and metabolic switching. Biofilm bacteria are metabolically resistant to antibiotics, rendering them challenging to eliminate from the host and causing chronic infections. Furthermore, there are no effective medical treatments or pharmaceutical interventions for biofilm removal.
Researchers at Drexel University have developed small molecules that inhibit the RelA gene, which is highly conserved among bacteria. RelA is involved in the bacterial stringent response, where bacteria metabolically shift to persister cells, upregulating proteins that resist oxidative stress and imparting antibiotic resistance. Existing antibiotics kill bacteria by producing reactive oxygen species and increasing oxidative stress. The lead compounds under development at Drexel have been shown in vitro to reduce biofilm formation, and in vivo studies are underway.

Application area

Biofilm disruption
Repotentiation of antibiotics against biofilm bacteria
Therapeutic for bacterial biofilm diseases and persistent bacterial infections
Treatment of infections on medical implants

Advantages

Pharmaceutical approach for biofilm remediation
Broad-range treatment

Institution

Drexel University

Inventors

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