



## TECHNOLOGY

# Phosphorylated and Branched DPD Analogs as Quorum Sensing Inhibitors in Bacteria

## OVERVIEW

### Background

Antibiotic resistance is a critical issue plaguing public health. The development of alternative antimicrobial therapies like Quorum Sensing inhibitors could be an effective solution. Quorum Sensing (QS) is a bacterial cell to cell communication system used by decentralized group of bacteria to coordinate behavior including motility, substrate attachment, biofilm formation and pathogenicity. This phenomenon allows broad spectrum bacterial species to interact in a communal fashion discouraging antibiotic efficacy. Disruption of this process could potentially lead to the inhibition of microbial growth.

### Innovative Technology

Inventors at the University of Maryland, College Park have created unique QS inhibiting AI-2 (Autoinducer-2) based analogs that disrupt QS and consequently bacterial pathogenicity and biofilm formation. Researchers have shown for the first time that phosphorylated branched DPD (dihydroxy-pentane-dione) analogs (or AI-2 analogs) are QS antagonists. Since AI-2 is considered a universal QS molecule, it is expected that inhibitors of AI-2 processes would have broader spectrum activities in contrast to the previously used AHL inhibitors that inhibit AI-1 (intraspecies QS molecule) and are usually species specific. The new AI-2 analogs are capable of inhibiting and modulating QS among multiple pathogenic species simultaneously. These quorum quenching analogs could potentially have extensive applications in both medical and non-medical fields.

### Advantages

Broad species or species-specific QS inhibition.

Based on the C1-alkyl chain length in the AI-2 analogs, this system could potentially modulate QS en mass or selectively.

The ability to selectively target pathogenic bacteria from the non-pathogenic ones has important clinical implications. The innocuous AI-2 analogs pose less evolutionary pressure on bacteria than other current bacteriostatic or bacteriocidal anti-microbials responsible for drug resistant strains.

### Applications

New generation antimicrobial therapy drug that prevents virulence in diverse pathogenic bacteria such as *Vibrio cholerae*, *Salmonella typhimurium* and *Pseudomonas aeruginosa*.

Easy to use tool-kit with specific analogs ideal for commercialization.

Ideal for treating gut infections where analogs could differentiate between the pathogens from mutualistic organisms using differentially constructed AI-2 analogs.

Utility in Surgical implants and catheters prone to biofilm induced infections.

Potential assistance in Bio-fermentation.

Use in common household products that require disinfection

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## **Additional Information**

### **INSTITUTION**

University of Maryland, College Park

### **PATENT STATUS**

Patent(s) pending

### **LICENSE STATUS**

Available for exclusive or non-exclusive license

### **CATEGORIES**

- Small molecules

### **EXTERNAL RESOURCES**

- [US Patent 8,952,192](#)

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