



Synthetic Ligands Capable of Strongly Inhibiting or Inducing Quorum Sensing in Bacteria

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WARF: P07404US

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partners interested in developing a powerful new class of chemical probes that are capable of strongly inhibiting or inducing quorum sensing.

Overview

Quorum sensing is a process used by some bacteria to coordinate behavior based on local population density. To communicate, bacteria release signaling molecules, including low molecular weight ligands like acyl-homoserine lactones (AHL), into the environment. When a certain number of signaling molecules accumulates and the population reaches a sufficient density, the bacteria change their behavior to work together for a common goal. For example, they may adapt to the nutrients that are currently available, defend against other microorganisms or protect themselves from toxic compounds.

Agents that interfere with quorum sensing signals may reduce the virulence of certain types of pathogenic bacteria. When bacteria cannot work together to coordinate their attack, the likelihood of infection decreases. However, few synthetic modulators of quorum sensing are known.

The Invention

UW-Madison researchers have developed non-native ligands that can block or imitate quorum sensing signals. The ligands include *N*-phenylacetanoyl-L-homoserine lactones that are capable of inhibiting or strongly inducing quorum sensing in the bacterial symbiont *Vibrio fischeri*. The invention also includes methods of using the synthetic ligands to treat infections or modulate biofilm formation.

Applications

- Inhibiting quorum sensing bacteria to treat infections or reduce biofilm formation
- Promoting beneficial bacterial activity, such as the formation of biofilms for use in bioremediation
- Studying quorum sensing and its role in host-bacteria interactions

Key Benefits

- Provides a synthetic, super-agonist of quorum sensing
- Simple structural modifications can transform potent quorum sensing antagonists into quorum sensing agonists.
- Active *in vivo*
- Because quorum sensing inhibitors have virulence-attenuating but not cell-killing effects, they do not select for drug resistance in bacteria and are likely to remain effective for longer periods of time.

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For More Information About the Inventors

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Related Technologies

- [WARF reference number P05282US describes additional compounds that modulate quorum sensing.](#)

Related Intellectual Property

- [View Divisional Patent in PDF format.](#)
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Publications

- Geske G.D., O'Neill J.C. and Blackwell H.E. 2007. *N*-Phenylacetanoyl-L-Homoserine Lactones Can Strongly Antagonize or Super-Agonize Quorum Sensing in *Vibrio fischeri*. ACS Chem. Biol. 2, 315-320.

Tech Fields

- [Therapeutics & Vaccines : Anti-infectives \(antibacterials, antifungals, antivirals\)](#)

For current licensing status, please contact Rafael Diaz at rdiaz@warf.org or 608-960-9847

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