FACULTY RESEARCH FUND

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Proposal Title: Development of a Novel Screening Procedure for the Detection of Anti-QS Activity

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Development of a Novel Screening Procedure
for the Detection of Anti-QS Activity

An important phenomenon in Microbiology is the ability of bacteria to communicate with each by the secretion of molecules. The concentration of these molecules reflects the concentration of that bacterial species, and the bacteria can sense and respond to this concentration. Pathogenic bacteria respond by turning on genes that increase their virulence, worsening the course of an infection. This phenomenon, known as quorum sensing (QS), is seen as a potential target for the development of new drugs in the fight against antibiotic resistance. These drugs would disrupt cell communication and decrease virulence rather than harm the bacterium directly. Although some QS inhibitory molecules have been discovered, development of drugs has been hampered by an inability to screen large numbers of candidate molecules against a panel of different pathogenic bacteria. Unrelated bacteria have different QS systems, using different signaling molecules, and expressing different proteins and behaviors. Therefore, there is no single measureable outcome to the activation of QS and no common protein or bacterial behavior to inhibit. Fortunately, many researchers, in studying their own pathogen of interest, have engineered the bacterium to express the Green Fluorescent Protein (GFP) when stimulated by QS signals specific to that bacterium. This general approach has been used for the study of a variety of medically important bacteria. Expression of the readily detectable GFP could provide a single outcome of QS activation for a variety of bacteria, and provide something measureable that could be inhibited by various molecules being tested. The goal of the research is to obtain these pre-existing bacterial strains and establish assay conditions by which potential OS-inhibiting could be tested against a panel of these different bacteria. In this way a wide variety of molecules could be screened to identify potential candidates for new drugs.