- **Project Title:** Aptamers for Detection and Management of Bacterial Pathogens

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Project Summary:
Aptamers against 3O–C12–HSL or "Dec AHL" were synthesized by a process called "Systematic Evolution of Ligands by Exponential enrichment" or "SELEX" and their sequences determined. Their effect on modulation of Acyl homeserine lactones (AHL) activity was determined in model biosensor systems. AHL's from P. aeruginosa were purified and mixed with 3O–C12–HSL aptamers and incubated at room temperature. A. tumefaciens KYC55 biosensor was used to test the activity of the AHL's in the presence and absence of the aptamers in a top agar diffusion assay system developed in the laboratory and compared with controls. The control (only AHL) showed a number of blue colonies that indicated P. aeruginosa -galactosidase. BAHL mediated expression of lacZ gene and hydrolysis of X-gal by The treatment, which contained nuclease resistant (3O–C12–HSL) aptamers in addition to the AHL, had fewer number of blue colonies, suggesting a possible binding of the AHL's by the aptamers and resulting inhibition of the AHL mediated lacZ expression. These results, clearly indicate a strong effect of the aptamers synthesized in the laboratory on inhibiting AHL mediated gene expression. This could also suggest that, these 3O–C12–HSL-aptamers, and the aptamers specific to other QS molecules in P. aeruginosa can prove to be effective tools in inhibiting QS mediated virulence. The represents a novel approach to overcoming antibiotic resistance, biofilm formation and biofouling, not just for Pseudomonads but for many species of bacteria that exhibit quorum sensing for medical and food safety applications.
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