427o Engineering of the Luxi-Luxr Quorum Sensing System for Increased Functionality

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Quorum sensing, which allows for cells to coordinate their behavior in a population density dependent manner, is an important physiological factor in many Gram-negative bacteria. Additionally, quorum sensing has been used for the construction of synthetic gene circuits that have potential applications in biotechnology and biomedical engineering. In order to expand the applicability of quorum sensing systems in these roles, we have applied directed evolution to alter the responses of these systems to occur at an increased range of cell concentrations. We introduce mutations via random mutagenesis into the system components, and then use a fluorescence screen to determine mutants which demonstrate modified properties. Currently, we are using this method to isolate mutants of the LuxR transcriptional factor from the LuxI-LuxR quorum sensing system of *V. fischeri*, and have identified mutants that show increased and decreased responses to the cognate signal molecule. This presentation will focus on describing the method and presenting the results to date, as well as discussing the application of these systems to metabolic engineering.