Introduction

Our team’s main objective is to create a bi-directional logical construct using quorum sensing E. coli in a microfluidic chip. By patterning two types of cells near one another in a microfluidic channel, we should be able to have molecules secreted by one type of bacteria influence the other. Directionality of communication can also be modulated by changing the direction of flow in the channel. This system is a bacterial analog of a Zener diode, which allows electrical current to only flow in one direction above a voltage threshold and only in the opposite direction below a different voltage threshold. This type of a device can potentially serve as an advanced communications tool, biosensor, and for detection of diseases.

Project Design

When solvent flow is initiated from left to right, the quorum sensing molecule AHL secreted from the upstream luxI will travel to the right and trigger the downstream luxR+GFP to fluoresce green.

When solvent flows from right to left, luciferin secreted from luxCDE will travel to the left and trigger the downstream luxAB, which produces luciferase, to luminesce yellow.

Methods & Results

Conclusions & Future Work

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For a complete description of our project go to: [TinyURL](http://tinyurl.com/igembard) or scan the following QR code.