# Quorum Sensing Experiment

GT iGEM Workshop
September 19, 2012

**Background:**
Many species bacteria can communicate using chemical signaling molecules called autoinducers (AI). These AI signals are used to determine the number of bacteria in the surrounding population. This phenomenon is called quorum sensing. This allows bacteria to coordinate their gene expression to perform behaviors that are beneficial when in large populations. *Vibrio harveyi* is a bacterial species that uses quorum sensing to produce bioluminescence when their population reaches a certain threshold.

**Problem:**
In order to demonstrate quorum sensing in *V. harveyi*, we will use one wild type and two mutant strains of bacteria. The wild type strain has the ability to make the signal and receive the signal. One mutant strain will not be able to make the autoinducer, but it will be able to receive the signal. We will call this strain the **Receiver**. The other mutant strain will not be able to receive the autoinducer, but will be able to make it. We will call this strain the **Sender**. We will plate these strains side by side in different combinations to see if they luminesce (make light).

**Hypotheses:**
What will happen when each of these strains is grown on plates side by side? Will there be fluorescence? On which side?

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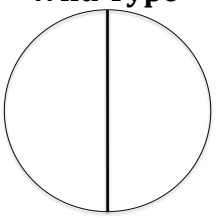
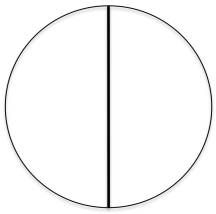
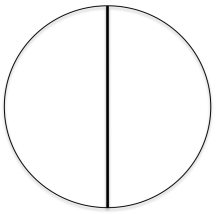
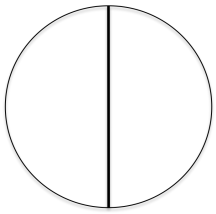
|---|---|
| Control 1:<br>**Wild Type**<br>  | Control 2:<br>**Sender + Sender**<br>  |
| Control 3:<br>**Receiver + Receiver**<br>  | Experimental 1:<br>**Sender + Receiver**<br>  |

**Materials:**
1 LM agar plate
2 sterile cotton-tipped applicators
1 marking pen
1 vial of Sender
1 vial of Receiver

**Procedure:**

1. Place your agar plate upside down on the lab bench, so that the bottom is facing upwards.
2. Draw a line on the bottom of the plate the separate the plate into two sections. Label one side **Sender** and the other side **Receiver.** Label your plate anywhere with your initials.
3. Open your cotton-tipped applicator, making sure the tip does not touch ***anything.*** Dip into the vial of **Sender,** soaking the entire tip.
4. Making sure not to touch anything with the tip, pick up the agar plate with your other hand. The lid should remain on the table when you pick it up.
5. Adjust the plate in your hand so that you can swab the agar comfortably. Paint the tip on the applicator on the **Sender** side of the plate, making sure the edge closest to the center line is straight and parallel. Paint the entire half circle. *Leave about one centimeter between the two strains along the center line where they do not touch*
6. Repeat steps 3-5 with the **Receiver** strain, painting the **Receiver** side of the plate.
7. Dispose of the used cotton-tipped applicators in the designated container.
8. Incubate at 30° C (if possible).
9. You will see results in a little over 24 hours!