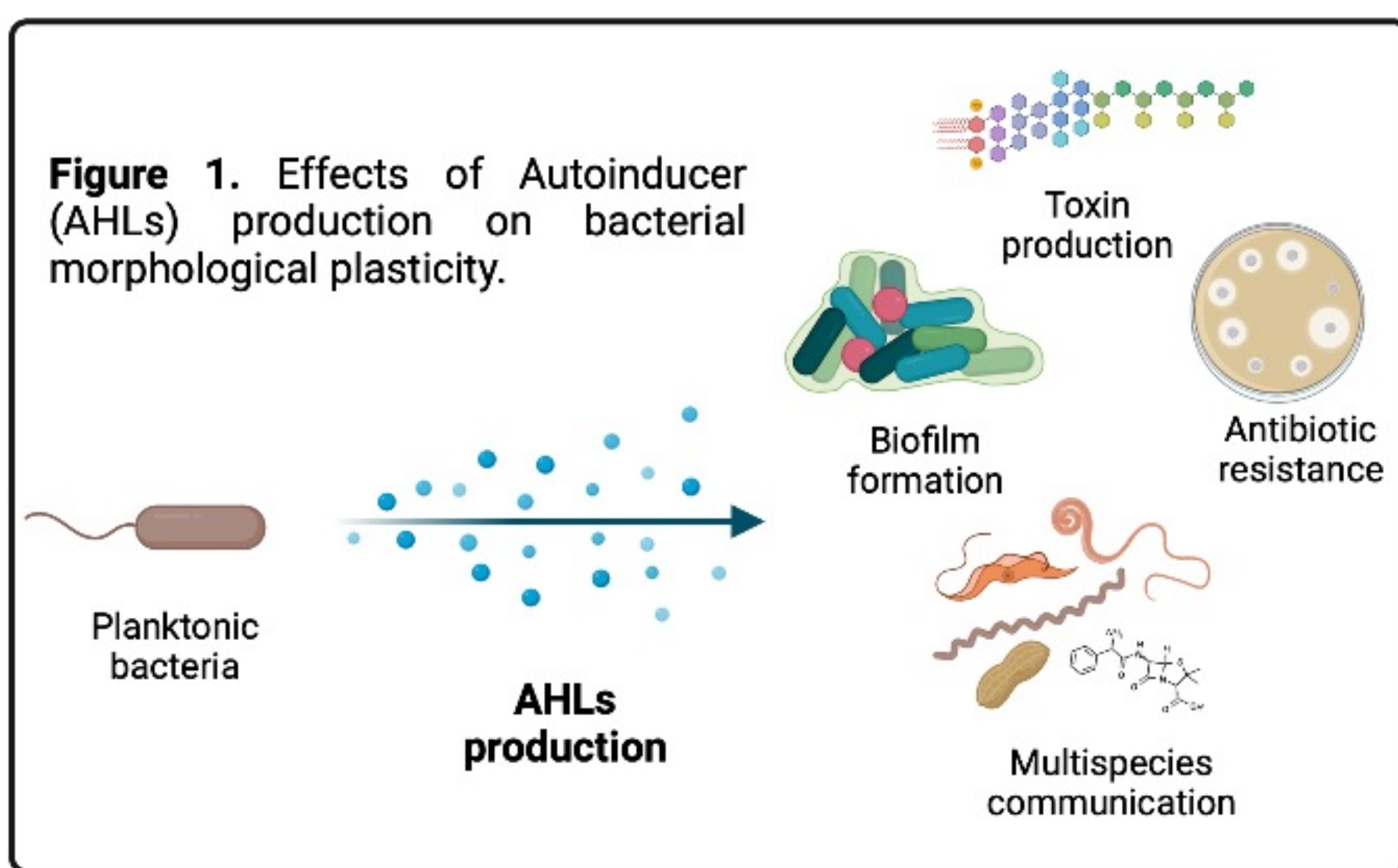
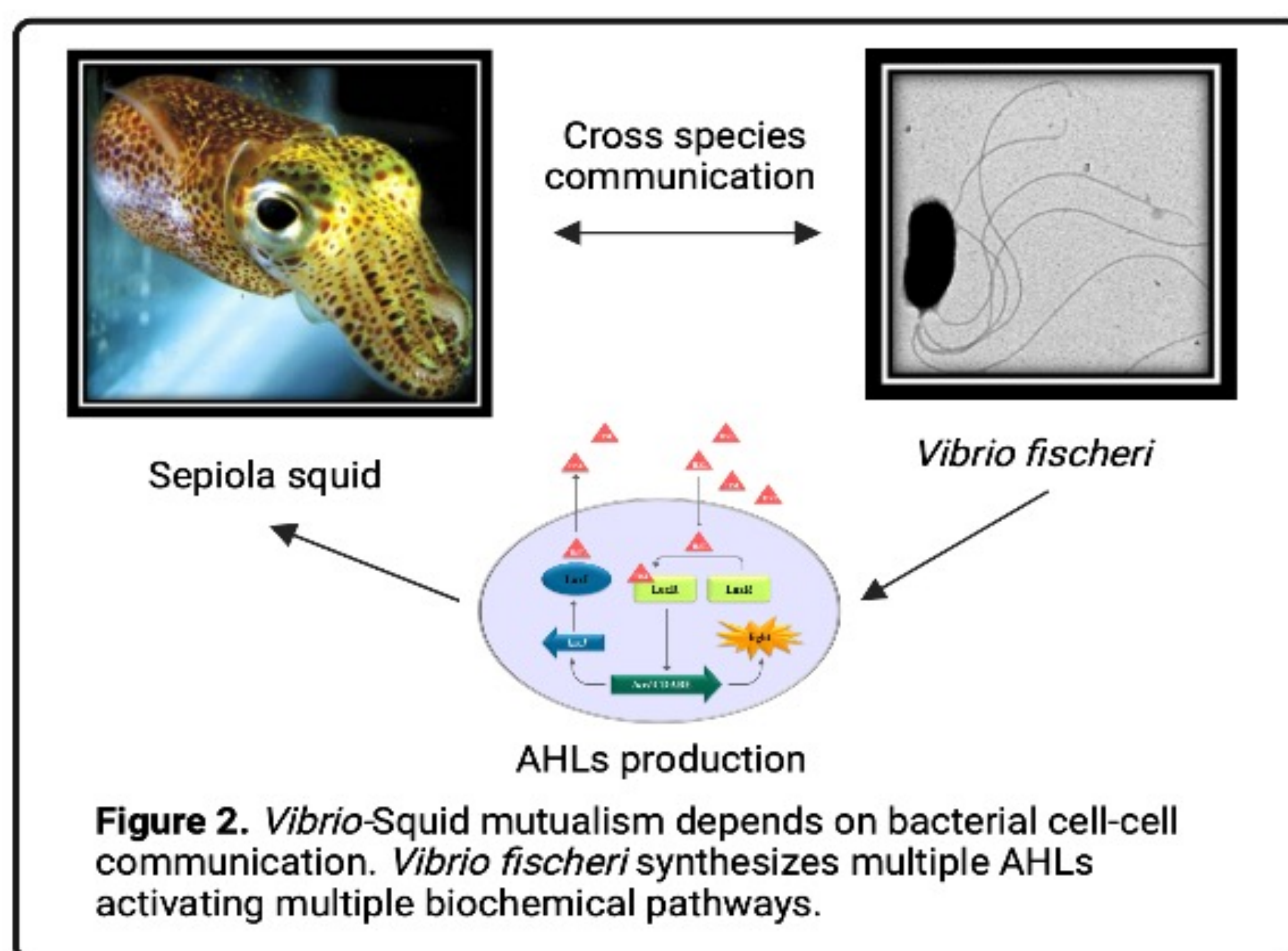


## Introduction



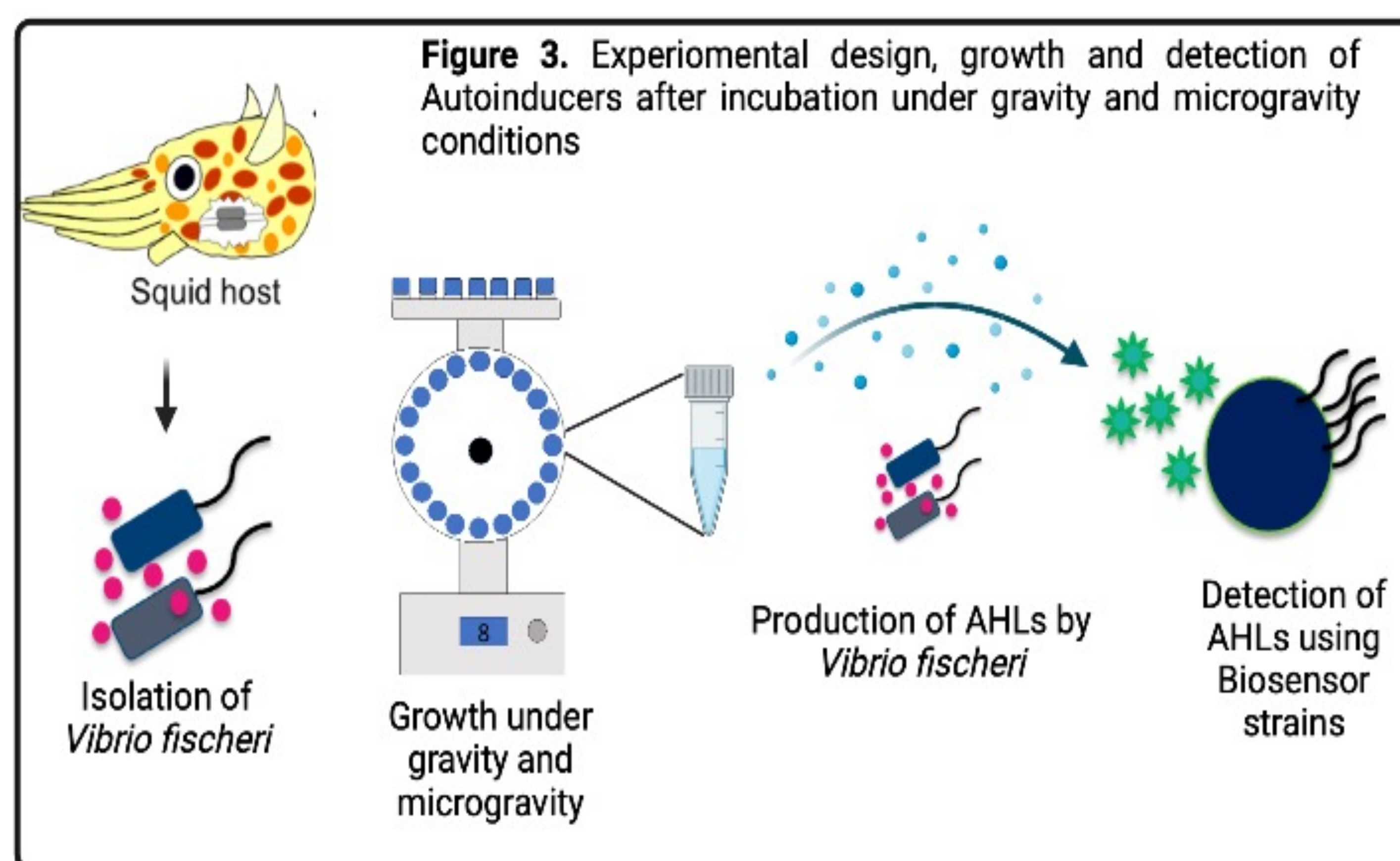
- Bacteria communicate with each other through a process called Quorum Sensing or cell-cell communication accomplished through the activation of small signaling molecules known as Autoinducers (acyl-homoserine lactones or AHLs).
- Quorum sensing controls every single aspect of bacteria, including antibiotic resistance, biofilm formation and toxin production (Figure 1)
- Stressors, such as microgravity conditions, have been proven to alter cell-cell communication.
- For the present study, we have used the model system *Vibrio fischeri*, a marine mutualistic bacterium that infects sepiloid squids and monocentrid fishes and has been studied for its capacity to synthesize long and short chain AHLs and alter bacterial behavior and host colonization (Figure 2).



## Hypothesis

- Simulated microgravity has proven to alter bacterial phenotypes, including an increase in biofilm production and antibiotic resistance.
- Hypothesis:** Simulated microgravity will increase AHLs production in *Vibrio fischeri* bacteria.

## Experimental design

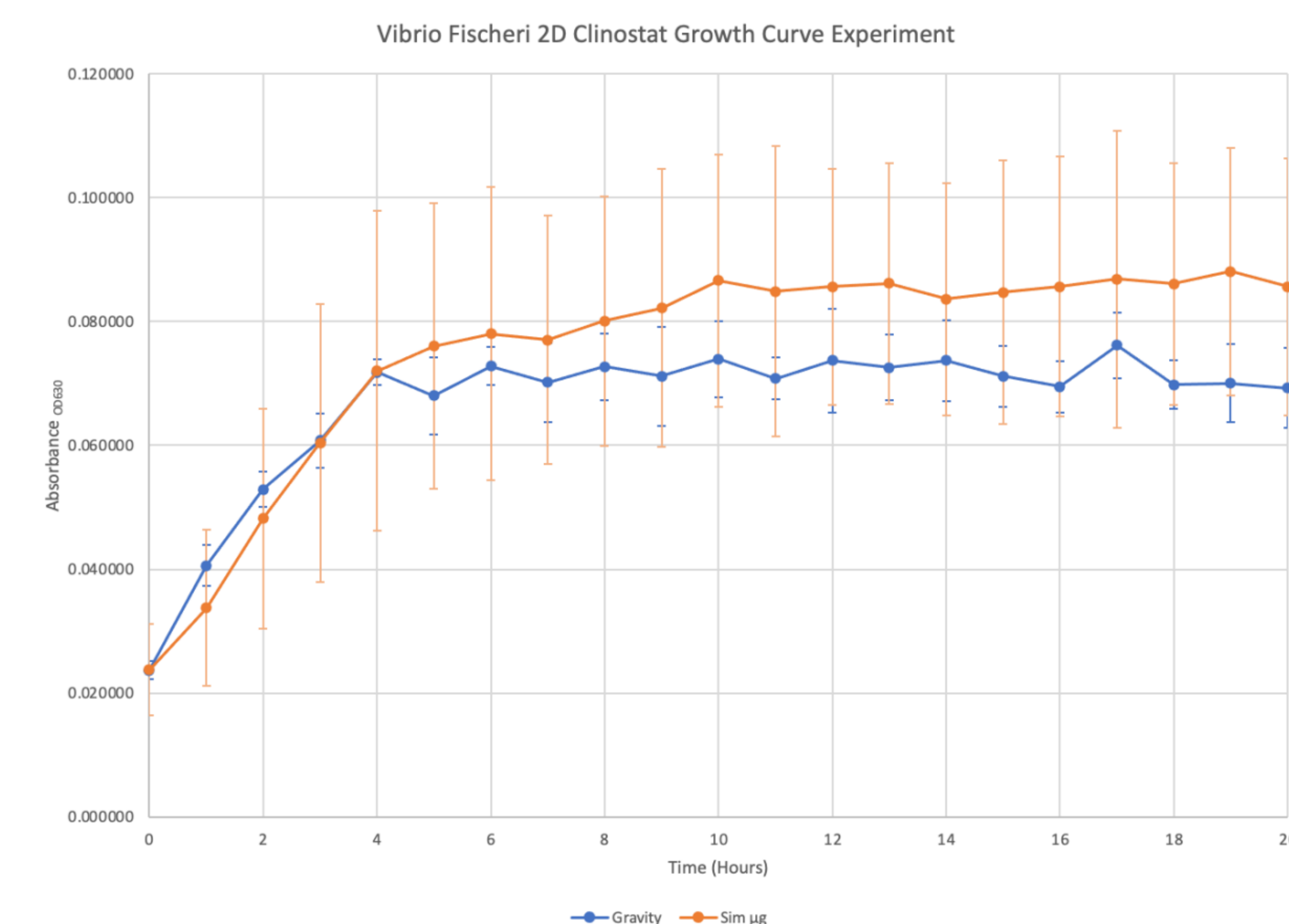


- V. fischeri* will be grown under simulated microgravity and gravity conditions using the 2D clinostat device, EagleStat. Cell growth will be measured (Figure 3).
- Biosensor strains (Table 1) will be used to detect AHLs production by activating a fluorescent reporter marker gene.

Biosensor Strains	AHL detected	Reporter
<i>Vibrio harveyi</i> -MM32	<chem>CCCCCCCCCCCCCCCCCC(=O)NCC1OC1</chem>	<i>luxCDABE</i>
<i>Escherichia coli</i> -MT102	<chem>CCCC(=O)NCC1OC1</chem>	GFP
<i>Pseudomonas putida</i> -FF17	<chem>CCCCCCCC(=O)NCC1OC1</chem>	GFP

**Table 1.** Biosensors used in this study

## Preliminary data



- 20-hour growth curve completed to demonstrate the ability for *V. fischeri* to properly grow on the EagleStat.
- Similar growth results between treatment and control indicates the Eaglestat is valid for future experiments with *V. fischeri*

## Future perspectives

- Detection of Autoinducer production after incubation under gravity and microgravity for 24, 48 and 72 hours.
- Host infection experiments.
- Chemical detection of Autoinducers using HPLC analysis

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