Swarmming assay

Introduction

Swarming motility is a specialized form of bacterial surface translocation characterized by the coordinated, multicellular social migration of bacteria across semisolid surfaces. This protocol is a standardized, qualitative, and semi-quantitative method used to study collective bacterial migration, quorum-sensing integrity, and surfactant production

Reference:
1. Wu, K., Mo, Y., Duan, M., Zheng, Y., Chang, Y., Ding, M., ... & Duan, N. (2025). A structure-guided bifunctional aptamer mitigates Pseudomonas aeruginosa virulence and biofilms by disrupting las and rhl quorum sensing systems. *Analytical Chemistry*, *97*(37), 20291-20302.
2. Ha, D. G., Kuchma, S. L., & O'Toole, G. A. (2014). Plate-based assay for swarming motility in Pseudomonas aeruginosa. In *Pseudomonas methods and protocols* (pp. 67-72). New York, NY: Springer New York.

Materials

- swarmming plate
- 90mm petri dish
- Aptamer 2uM
- Bacterial strain
  - *Pseudomonas aeruginosa* PAO1

Procedure

Plate preperation

1. Mix DW (RO) 200ml, Tryptone peptone, NaCl, and bacterial agar in 500ml bottle.
2. Autoclave 500ml bottle
3. Pour plates (20mL/plate) and let plates solidify at room temperature for a few hours.

Inoculation

4. Adjust the overnight bacterial culture to an OD_{600}=0.1
5. Pipette a small volume (50 µL) of the overnight bacterial culture into a 1.5 mL microcentrifuge tube.
6. Add 2ul of aptamer into the bacterial suspension prepared in step 5

7. Inoculate the center of the plate(s) using the mixture in step 6, 2 µL per inoculum. The pipette tip should be close to the agar surface during inoculation

8. Incubate plate(s) upside down at 37 °C for 16–24 hr and observe the phenotype.

9. Analyze the radial growth of the swarmming phenotype.