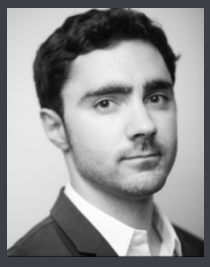
The University of Edinburgh - Friedrich Schiller University

Population Dynamics Virtual Seminar



Maxime Ardré
ESPCI Paris

17.10.22 - 2:30 pm BST - 3:30 pm CEST

A leader cell triggers end of lag phase in populations of *Pseudomonas fluorescens*

The relationship between the number of cells colonizing a new environment and time for resumption of growth is a subject of long-standing interest. In microbiology this is known as the "inoculum effect". Its mechanistic basis is unclear with possible explanations ranging from the independent actions of individual cells, to collective actions of populations of cells. Here we use a millifluidic droplet device in which the growth dynamics of hundreds of populations founded by controlled numbers of *Pseudomonas fluorescens* cells, ranging from a single cell, to one thousand cells, were followed in real time.

Our data show that lag phase decreases with inoculum size. The average decrease, variance across droplets, and distribution shapes, follow predictions of extreme value theory, where the inoculum lag time is determined by the minimum value sampled from the single-cell distribution. Our experimental results show that exit from lag phase depends on strong interactions among cells, consistent with a "leader cell" triggering end of lag phase for the entire population.

Suggested reading: *Interaction among bacterial cells triggers exit from lag phase* - Maxime Ardré, Guilhem Doulcier, Naama Brenner, Paul B. Rainey bioRxiv 2022.01.24.477561; doi: https://doi.org/10.1101/2022.01.24.477561

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