



Contribution ID: 290

Type: **Poster (+) Presentation**

To biofilm or not to biofilm: Interplay between chemotactic dispersal and biofilm formation in bacterial communities

Monday, 31 May 2021 19:35 (1 hour)

Bacteria are ubiquitous in our daily life, frequently as surface-attached biofilm communities. In some cases, biofilms serve a positive purpose, such as improving health or remediating polluted water; in other cases, they negatively impact our lives, such as by causing infection or fouling equipment. For both positive and negative purposes, understanding the factors that regulate the onset of biofilm formation is crucial in determining how to control or treat them. However, how bacteria transition between the free-swimming planktonic state to the sedentary biofilm state in these heterogeneous environments is poorly understood. Here, we use computational modeling to investigate how biofilm formation depends on bacterial properties as well as the properties of their environment. Specifically, by analyzing the competition between chemotactic dispersal and quorum sensing, we establish universal rules predicting how the onset and extent of biofilm formation depend on cell concentration and motility, nutrient diffusion and consumption, chemotactic sensing, and autoinducer secretion. The findings from this study therefore yield quantitative principles to predict biofilm formation.

Time Block Preference

Time Block C (18:00-21:00 CET)

References

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Student Poster Award

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