Abstract Submitted
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Spatio-temporal Kinetics of Nontypeable *Haemophilus influenzae* (NTHi) Biofilms[1] ALEYA DHANJI, The Ohio State University, LUCIA ROSAS, WILLIAM RAY, The Research Institute at Nationwide Children's Hospital, CIRIYAM JAYAPRAKASH, The Ohio State University, LAUREN BAKALETZ, JAYAJIT DAS, The Research Institute at Nationwide Children's Hospital and The Ohio State University — Bacteria can form complex spatial structures known as biofilms. Biofilm formation is frequently associated with chronic infections due to the greatly enhanced antibiotic resistance of resident bacteria. However, our understanding of the role of basic processes, such as bacteria replication and resource consumption, in controlling the development and temporal change of the spatial structure remains rudimentary. Here, we examine the growth of cultured biofilms by the opportunistic pathogen NTHi. Through spatial information extracted from confocal microscopy images, we quantitatively characterize the biofilm structure as it evolves over time. We find that the equal-time height-height pair correlation function decreases with distance and scales with time for small length scales. Furthermore, both the surface roughness and the correlation length perpendicular to the surface growth direction increase with time initially and then decrease. We construct a spatially resolved agent based model beginning with the simplest possible case of a single bacteria species Fisher-Kolmogorov-Petrovsky-Piscounov equation. We show that it cannot describe the observed spatio-temporal behavior and suggest an improved two-species model that better captures the dynamics of the NTHi system.

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