**Cell Death as a Trigger for Morphogenesis of Bacterial Colonies**

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The complex organization of wrinkles observed in many biofilms plays a critical role in the survival of microbial communities. While the underlying genetic mechanisms of wrinkling are not well understood, recent discoveries have led to the counterintuitive idea that wrinkle formation is triggered by localized cell death. This work examines the hypothesis that the material properties of a biofilm both power and control wrinkle formation within biofilms in response to localized cell death. Using an agent-based model and a high-performance platform (*Biocellion*), we built a model that qualitatively reproduced wrinkle formation in biofilms due to cell death. Through the use of computational simulations, we determined important relationships between cellular level mechanical interactions and changes in colony morphology. These simulations were also used to identify significant cellular interactions that are required for wrinkle formation. These results are a first step towards more comprehensive multiscale models, which will include intracellular genetic mechanisms, to improve our understanding of the morphological development of bacterial colonies.