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Bacterial biofilm: from social evolution of matrix sharing to phenotypic heterogeneity

Date: 2023/06/07 (Wed)
Venue: S4-208 (理論中心)
Time: 11:00-12:00

Abstract:
Biofilm formation is an important growth mode of bacteria. I will discuss two closely-related topics: 1. An outstanding question regarding fitness conferred by biofilm matrix is how diffusible matrix production can be stable over evolutionary timescales. Using *Vibrio cholerae* as a model, we show that shared diffusible biofilm matrix proteins are susceptible to cheater exploitation and that the evolutionary stability of producing these matrix components depends on biofilm spatial structure, intrinsic sharing mechanisms of these components, and flow conditions in the environment. We expect the mechanisms revealed and tools developed generally applicable to other systems [1]. 2. Phenotypic heterogeneity is ubiquitous in microbial systems. We show that in Vibrio cholerae biofilms, phenotypic heterogeneity leads to differential production of biofilm matrix components, which in turn leads to coupled cell state and community organization in a biofilm. This eventually impacts the development of a biofilm.

References:

[1] Social evolution of shared biofilm matrix components, Jung-Shen B. Tai, Saikat Mukherjee, Thomas Nero, Rich Olson, Jeffrey Tithof, Carey D. Nadell, Jing Yan, PNAS 119, e2123469119 (2022).