Myxobacteria Fruiting Body Formation

YI JIANG, Los Alamos National Laboratory

Myxobacteria are social bacteria that swarm and glide on surfaces, and feed cooperatively. When starved, tens of thousands of cells change their movement pattern from outward spreading to inward concentration; they form aggregates that become fruiting bodies, inside which cells differentiate into nonmotile, environmentally resistant spores. Traditionally, cell aggregation has been considered to imply chemotaxis, a long-range cell interaction mediated by diffusing chemicals. However, myxobacteria aggregation is the consequence of direct cell-contact interactions. I will review our recent efforts in modeling the fruiting body formation of Myxobacteria, using lattice gas cellular automata models that are based on local cell-cell contact signaling. These models have reproduced the individual phases in Myxobacteria development such as the rippling, streaming, early aggregation and the final sporulation; the models can be unified to simulate the whole developmental process of Myxobacteria.

1Collaboration with M. Alber, D. Kaiser, O. Sozinova, and M. Kiskowski