

Seminar

Social interactions during bacterial growth and survival

Samay Pande

ETH Zurich

Cooperation has played a grand role in the evolution of diversity and complexity of life on our planet. Some of the most spectacular and most visible examples of cooperation are reproductive cooperation among social insects such as honeybees, division of labor in the colony of leaf-cutting ants and among cells of multicellular organisms. In all of these examples individuals within a group are genetically highly related (e.g. cells within multicellular organisms are all genetically identical). Such high relatedness ensures that the benefits of cooperation are transferred to close relatives. However, interactions within and between social groups of organisms that have retained reproductive autonomy and exhibit within group variations remain difficult to explain.

Using natural isolates of *Myxococcus xanthus* I will demonstrate that diversity within natural populations of *M. xanthus* is predominantly synergistic during sporulation and spore germination processes. Moreover, I will also discuss how our results provide an intuitive ecological explanation for the ease with which possible shift in level of selection might occur in the populations that coexist together.

Bacteria use dormancy as a bet-hedging strategy to overcome unfavourable environmental conditions. The dormant individuals such as spores or persister-cells with low metabolic activity can determine community dynamics in future generations. Although importance of social interactions has been documented among actively growing microbes, role of social interactions between individuals in diverse communities during transition to, and away from dormancy, remained unclear. Our results demonstrate importance of synergistic interactions within natural social groups of *M. xanthus* during conversion of actively growing cells to dormant spores and also during resuscitation of spores to actively growing cells.

Finally, I will discuss importance of studying predator-prey interactions among microbes. Predation is one of the most pervasive and ancient forms of social interactions. However, role of predatory bacteria in the emergence and maintenance of diversity in microbial community remains unclear. I will highlight how I plan to use two parallel approaches of studying natural communities of microbes and experimental evolution to better understand the ecology and evolution of microbial predation.

Thursday, Sep 6th 2018

4:00 PM (Tea/Coffee at 3:30 PM)

Seminar Hall, TIFR-H