Integrating Nanotechnology with Cell Biology and Neuroscience

INCBN IGERT Seminar
(in conjunction with the Physics Colloquium Series)

Friday, 15 February 2013, 4pm

Speaker: Harry L. Swinney
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How Competing Bacterial Colonies Can Survive by Killing Siblings

We examine the growth of colonies of *Paenibacillus dendritiformis* bacteria, commonly found in soil. The bacteria within a growing colony are observed to exhibit collective motion (swarming) and large fluctuations in the number growing in a given area. When neighboring colonies of these bacteria grow and approach one another, the colonies mutually inhibit growth. Analysis of the gel between the competing colonies reveals the presence of a lethal protein secreted by the colonies. The immediate question is why doesn’t this toxin kill the bacteria secreting it? A mathematical model helps answer this question. Further, sub-lethal concentrations of the toxin are found to induce the rod-shaped bacteria to switch to a spherical shape that is resistant to the toxin and to other antibiotics. Thus the bacteria adapt to adverse environmental conditions by a change in form; this change is reversible if favorable conditions are encountered.