Abstract Submitted
for the MAR08 Meeting of
The American Physical Society

Correlated Phenotypic Transitions to Competence in Bacterial Colonies INBAL HECHT, Center for Theoretical Biological Physics, University of California, San Diego, ESHEL BEN-JACOB, School of Physics and Astronomy, Tel Aviv University, Israel, HERBERT LEVINE, Center for Theoretical Biological Physics, University of California, San Diego — Genetic competence is a phenotypic state of a bacterial cell in which it is capable of importing DNA, presumably to hasten its exploration of alternate genes in its quest for survival under stress. Recently, it was proposed that this transition is uncorrelated among different cells in the colony. Motivated by several discovered signaling mechanisms which create colony- level responses, we present a model for the influence of quorum- sensing signals on a colony of *B. Subtilis* cells during the transition to genetic competence. Coupling to the external signal creates an effective inhibitory mechanism, which results in anti-correlation between the cycles of adjacent cells. We show that this scenario is consistent with the specific experimental measurement, which fails to detect some underlying collective signaling mechanisms. Rather, we suggest other parameters that should be used to verify the role of a quorum-sensing signal. We also study the conditions under which phenotypic spatial patterns may emerge.

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Date submitted: 19 Nov 2007 Electronic form version 1.4