

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Perturbing Streaming in *Dictyostelium discoidium* Aggregation

ERIN RERICHA, University of Maryland, College Park, GENE GARCIA, CAROLE PARENT, National Institutes of Health, WOLFGANG LOSERT, University of Maryland, College Park — The ability of cells to move towards environmental cues is a critical process allowing the destruction of intruders by the immune system, the formation of the vascular system and the whole scale remodeling of tissues during embryo development. We examine the initial transition from single cell to group migration in the social amoeba *Dictyostelium discoidium*. Upon starvation, *D. discoidium* cells enter into a developmental program that triggers solitary cells to aggregate into a multicellular structure. The aggregation is mediated by the small molecule, cyclic-AMP, that cells sense, synthesize, secrete and migrate towards often in a head-to-tail fashion called a stream. Using experiment and numerical simulation, we study the sensitivity of streams to perturbations in the cyclic-AMP concentration field. We find the stability of the streams requires cells to shape the cyclic-AMP field through localized secretion and degradation. In addition, we find the streaming phenotype is sensitive to changes in the substrate properties, with slicker surfaces leading to longer more branched streams that yield large initial aggregates.

Erin Rericha
University of Maryland, College Park

Date submitted: 21 Nov 2008

Electronic form version 1.4