

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Group behavior in cell migration¹ WOLFGANG LOSERT, University of Maryland, CAROLE PARENT, National Cancer Institute, NIH, COLIN McCANN, University of Maryland and NCI — Cell migration up an external chemical gradient is a crucial element in many biological processes, such as embryogenesis and cancer metastasis. The aim of our study is to quantify chemotaxis of groups of cells. We find that at high cell densities (i.e. low cell-cell distances) cells migrate together in streams either spontaneously or in response to an externally applied chemical gradient. Analysis of cell tracks outside and within streams shows that cells do not speed up or slow down when moving as a group. In addition the persistence of motion appears unaffected by the formation of streams. At large cell-cell distances cells do not form streams in response to externally applied chemical gradients, and fewer cells move. At very low cell plating density cells are unable to respond to a chemical signal, even close to the signal source. We confirm that this lack of motion is not due to signal relay. Our results indicate that a quorum sensing mechanism exists which is closely coupled to chemotaxis.

¹Supported by NSF-PoLS and NCI Intramural Support

Wolfgang Losert
University of Maryland

Date submitted: 21 Nov 2008

Electronic form version 1.4