Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Traction forces associated with shape changes in migrating amoeboid cells BALDOMERO ALONSO-LATORRE, JUAN C. DEL ALAMO, EFFIE BASTOUNIS, RUDOLPH MEILI, RICHARD FIRTEL, JUAN C. LASHERAS, University of California, San Diego — Amoeboid motility results from the repetition of a repertoire of shape changes (motility cycle). We studied the dominant changes and their relation to the activity and localization of cytoskeletal proteins by applying Principal Component Analysis (PCA) to measurements of cell shape, traction forces and F-actin concentration in migrating *Dictyostelium* cells. Using wild-type cells (*wt*) as reference, we investigated myosin II activity by studying myosin II-null (*mhc-*) and essential light chain-null cells (*mlc-*). Only three PCA modes are enough to represent 67% of the variance of cell area: dilation/elongation, a half-moon shape and a bulging of the front/back. These modes are similar for *wt, mlc-* and *mhc-* but they are implemented more slowly in *mhc-*. The second mode, which represents sideways protrusion/retraction and is associated to lateral asymmetry in the traction forces, is significantly less important in *mhc-*. These results suggest that migration speed decreases in the absence of myosin II due to a reduced control on the spatial organization of the cell stresses.

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Date submitted: 21 Nov 2008 Electronic form version 1.4