

Abstract Submitted  
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**Three-dimensional traction force distribution in migrating amoeboid cells** BEGONA ALVAREZ, JUAN C. DEL ALAMO, RUDOLF MEILI, BALDOMERO ALONSO-LATORRE, RICHARD A. FIRTEL, JUAN C. LASHERAS — We have studied the 3D traction forces exerted by migrating *Dictyostelium* cells moving over flat elastic substrates. For that purpose, we have developed a method to calculate both vertical and tangential cell traction forces from measurements of 3D substrate deformation, based on the solution of the elastostatic equation for a linearly elastic medium. 3D substrate deformation is measured by applying correlation techniques to a volume of substrate containing fluorescent markers. We have performed experiments for wild-type (WT) and mutant cell lines with crosslinking defects to study how cytoskeletal organization affects the overall distribution of traction forces. We find that cells push the substrate downwards near their center and pull upwards at their periphery with forces of comparable magnitude. Our initial findings show that the effect of the crosslinking mutations on the tangential forces do not necessarily predict the effect on the vertical forces. For instance, myosin II-null cells show a significant reduction of the front-back organization of the tangential traction forces, while the distribution of vertical forces basically remains unaffected.

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