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Traction cytometry applied to chemotacting *Dictyostelium discoideum* ALBERTO ALISEDA, now at University of Washington, BALDOMERO ALONSO-LATORRE, JUAN CARLOS DEL ALAMO, JAVIER RODRIGUEZ-RODRIGUEZ, now at Universidad Carlos III, RUDOLPH MEILI, RICHARD FIRTEL, JUAN C. LASHERAS, University of California, San Diego — The motion of *Dictyostelium discoideum* cells moving on a elastic substrate has been studied. Joint analysis of time-lapse DIC movies of the cells and UV fluorescence from the beads embedded in the substrate, allows for identification of characteristic time scales of the motion and the quantitative description of the crawling cycle. From the measured displacements of the beads, forces can be computed by analytically solving the elasto-static equation in a finite thickness slab. We found that the finite thickness of the substrate and the distance of the beads to its surface have a substantial effect and that the previous traction cytometry techniques based on the Boussinesq solution effectively low-pass-filtered the force field, reducing the spatial resolution and damping the range of the measured forces by as much as 50%. The improved spatial resolution of this method enables us to determine the spatial extent of the regions where the cells apply force on the substrate and, consequently, the magnitude of the elastic energy spent in its deformation. The measured forces, as well as the elastic energy communicated by the cell to the substrate, will be correlated to the different stages of the crawling cycle for various cell strains.

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