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Collective Behavior of Amoebae in Thin Films ALBERT BAE, BRADLEY WEBSTER, DANICA WYATT, LOLING SONG, DAVID REYNOLDS, EBERHARD BODENSCHATZ, CARL FRANCK, Cornell University — We have discovered new aspects of social behavior in *Dictyostelium discoideum* by culturing high density colonies in liquid media depleted of nutrients in confined geometries by using three different preparations: I. thin (15-40 μ m thick) and II. ultrathin (<3 μ m) films of liquid media with a mineral oil overlayer, and III. microfluidic chambers fabricated in PDMS (\sim 7 μ m tall). We find greatly reduced, if not eliminated, cell on cell layering in the microfluidic system when compared to the wetting layer preparations. The ultrathin films reveal robust behavior of cells despite flattening that increased their areas by over an order of magnitude. We also observed that the earliest synchronized response of cells following the onset of starvation, a precursor to aggregation, was hastened by reducing the thickness of the aqueous culture layer. We were surprised to find that the threshold concentration for aggregation was raised by thin film confinement when compared to bulk behavior. Finally, both the ultra thin and microfluidic preparations reveal, with new clarity, vortex states of aggregation.

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