MAR13-2012-020235

Abstract for an Invited Paper
for the MAR13 Meeting of
the American Physical Society

Cells as Drops and Drops as Cells

ERIC R. DUFRESNE, Yale University

How do the mechanical properties of tissues emerge from the interactions of individual cells? To shed some light on this fundamental biological question, we consider a model system of clusters of cohesive cells adherent to soft substrates. We quantify traction forces over a wide range of cluster sizes. The scaling of traction stresses with cluster size suggests the emergence of an apparent surface tension for large colonies. To explore the possible impact of cellular surface tension on physiology, we consider the behavior of liquid droplets on soft substrates. In this case, we find that the competition of surface tension and substrate elasticity can lead to rich phenomenology, mimicking certain aspects of the physiology of cells and tissues.