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Scaling of Traction Stresses with Size of Cohesive Cell Colonies[1] AARON F. MERTZ, Yale University, SHILADITYA BANERJEE, Syracuse University, YONGLU CHE, Yale University, M. CHRISTINA MARCHETTI, Syracuse University, VALERIE HORSLEY, ERIC R. DUFRESNE, Yale University — We explore the mechanical properties of colonies of cohesive cells adherent on soft substrates. Specifically, we image the spatial distribution of traction stresses exerted by colonies of primary mouse keratinocytes on fibronectin-coated silicone gels. These cells have strong cell-cell adhesions mediated by E-cadherin. We observe that the work performed by a colony on its substrate is concentrated at the colony's periphery. The total work is strongly correlated to the geometrical size of the colony but not to number of cells. In other words, the mechanical output of a large single cell mimics that of a cohesive colony with the same overall size. We compare our findings to a recent theoretical model that treats the cohesive colony as an active gel.

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