

Abstract Submitted
for the MAR09 Meeting of
The American Physical Society

Polymer Microlenses for Quantifying Cell Sheet Mechanics GUIL-
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interactions between individual cells and their substrate have been studied exten-
sively over the past decade; however, our understanding of how these interactions
change as cells interact with neighboring cells in the development of a cell sheet, or
early stage tissue, is less developed. We present a recently developed experimen-
tal technique for quantifying the mechanics of confluent cell sheets (Zimmerlin J.A.,
et al., *Cell Motility and the Cytoskeleton*, 65, 9, 762). Living cells are cultured
on a thin film of polystyrene [PS], which is attached to a patterned substrate of
crosslinked poly(dimethyl siloxane) microwells. As the cell sheet grows, cells apply
sufficient force to buckle the PS film over individual microwells to form a microlens
array. The curvature for each microlens is measured by confocal microscopy and
can be related to the strain and stress applied by the cell sheet. We demonstrate
that this technique can be used to decouple mechanical contributions of intercel-
lular junctions and focal adhesions while also providing insight into the important
materials properties and length scales that govern cell sheet responses.

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Date submitted: 20 Nov 2008

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