1038-76-214 **J. E. F. Green*** (egreen@mbi.ohio-state.edu), Mathematical Biosciences Institute, The Ohio State University, Columbus, OH 43210, and **A. Friedman**. *A simple model for the mechanical behaviour of thin layers of collagen gel.*

Mechanical interactions between cells and the materials in which they are seeded play an important role in determining the architecture of tissues grown in vitro. As an initial step towards modelling these processes, we consider the mechanical behaviour of cell-free biological gels (such as collagen gels) which have a fibrous microstructure, subjected to prescribed forces. We treat the gel as an incompressible, transversely isotropic viscous fluid, and for simplicity consider a thin two-dimensional geometry. Two regimes are investigated: extensional flow, and squeezing flow of the gel between two rigid plates. Neglecting inertia, gravity and surface tension, in each regime leading-order equations are derived from a perturbation expansion of the full flow problem in powers of the (small) inverse aspect ratio. Special cases in which the solution may be determined explicitly are considered and the results compared with observations of gels experiencing cell-induced forces. (Received February 10, 2008)