

## ELASTICITY AND THE SHAPE OF GROWING PREVASCULAR TUMORS

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The mechanical environment influences normal and pathological cell functions, and may even influence many aspects of tumors growth. In an in vitro tumor model, which isolates mechanical interactions between tumor cells and a hydrogel, we find that tumors break symmetry and grow as ellipsoids, resembling in vivo tumors. Using the theory of elasticity and mechano-chemical models of tumor growth [1] we show how certain ellipsoidal shapes minimize the elastic free energy. This result may be highly significant for understanding the shape progression of early solid tumors in vivo and is an important step in understanding the processes underlying solid tumor growth.

### REFERENCES

- [1] S. Rudraraju, K. L. Mills, R. Kemkemer, and K. Garikipati. Multiphysics modeling of reactions, mass transport and mechanics of tumor growth in *Computer Models in Biomechanics*, Springer, Netherlands, Dordrecht, 293-303, 2013.