

Abstract Submitted
for the MAR16 Meeting of
The American Physical Society

Volume Changes During Active Shape Fluctuations in Cells

CATERINA A. M. LA PORTA, ALESSANDRO TALONI, University of Milan, ELENA KARDASH, University of Geneve, OGUZ UMUT SALMAN, CNRS, Paris, LEV TRUSKINOVSKY, CNRS, Ecole Polytechnique, Palaiseau, STEFANO ZAPPERI, University of Milan — Cells modify their volume in response to changes in osmotic pressure but it is usually assumed that other active shape variations do not involve significant volume fluctuations. Here we report experiments demonstrating that water transport in and out of the cell is needed for the formation of blebs, commonly observed protrusions in the plasma membrane driven by cortex contraction. We develop and simulate a model of fluid-mediated membrane-cortex deformations and show that a permeable membrane is necessary for bleb formation which is otherwise impaired. Taken together, our experimental and theoretical results emphasize the subtle balance between hydrodynamics and elasticity in actively driven cell morphological changes ¹.

¹A. Taloni et al. Phys. Rev. Lett. 114, 208101 (2015)

Caterina La Porta
Univ of Milan

Date submitted: 30 Oct 2015

Electronic form version 1.4