The Mechanics of Vesicle Blebbing

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A broad range of *in silico* models (e.g. liquid or viscoelastic drop models) has been introduced to reproduce the complex mechanical properties of various cell types [1]. These models are used to understand and quantify experimental measurements. In this work, we employ a coarse-grained cell model which incorporates the membrane properties similar to the RBC-model [2] and an elastic inner mesh to include the cytoskeletal properties. The model is formulated in the framework of the dissipative particle dynamics simulation method. We investigate cell-blebbing in synthetic vesicles that are observed experimentally [3]. Cell-blebbing describes the dissociation of the membrane from the inner network, in this case as result of inner stress. The dissociated membrane will form a bubble within no actin network exists. We analyze different properties of the system *in silico* and link them to biological factors as concentrations of binding proteins and physical properties like the applied stress.

[1] M. Rodriguez et al., Applied Mechanics Review (2013)
[2] H. Turlier et al., Nature Physics in press (2015)
[3] E. Loiseau et al., Science Advances (2016)