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Shape transformations of human red blood cells under osmotic deflation-inflation GERALD LIM, Center for Cell Analysis and Modeling, University of Connecticut Health Center, Farmington, USA, MICHAEL WORTIS, Department of Physics, Simon Fraser University, Burnaby, Canada — We systematically study the mechanics of osmotically driven shape transformations of human red blood cells, based on a computational model we developed earlier that successfully describes the stomatocyte-discocyte-echinocyte shape transformations, which are driven by the bilayer couple mechanism. We obtain a surprisingly complex energy landscape, the prominent feature of which is a tricritical point that gives rise to self-intersection of the main minimum-energy surface in a line and shape transformations exhibiting hysteresis, metastability, and re-entry. These occur in physically accessible regions of parameter space and, thus, can be tested experimentally.

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