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Erratum

Mechanics of the human red blood cell deformed by optical tweezers [Journal of the Mechanics and Physics of Solids, 51 (2003) 2259-2280]

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Since the publication of the above paper, additional experiments involving optical tweezers deformation of human red blood cells have been conducted by the authors. This further work has also involved updated calibration methods and statistical analysis of data. The newer information has revealed stretching force values for the optical tweezers experiments that are smaller than those reported in the original paper. Full details of the revised deformation response can be found in recent publications by Lim et al. (2004) and Mills et al. (2004). While the approaches and broad trends reported in the above paper hold despite these revised values of stretching forces under optical tweezers, detailed parametric studies of the effects of various geometric and structural factors on large deformation can be performed using the updated information.

The computational results that match the recalibrated experimental data are summarized below. An updated version of Fig. 5 is provided in Fig. 7 of Mills et al.

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(2004), with $\mu_0 = 7.3\,\mu\text{N/m}$ and $\mu_l = 3.3\,\mu\text{N/m}$. In Fig. 6, computations using $\mu_0 = 7.3\,\mu\text{N/m}$ and $\mu_l = 3.3\,\mu\text{N/m}$ fit the recalibrated experimental data well, with or without the presence of cytosol. In Fig. 7, the modulus range of $\mu_0 = 5.3 - 11.3\,\mu\text{N/m}$ covers the scatter band of the recalibrated experimental results. These values of shear modulus are within the range of literature values based on micropipette aspiration experiments, which are discussed in the original paper. In Fig. 8, the three force levels should be changed to 35, 68 and 83 pN, respectively, the four μ_l values should be revised as 3.3, 2.7, 3.3 and 4.3 μN/m, respectively, and the four μ_0 values should be revised as 7.3, 6.1, 7.3 and 9.7 μN/m, respectively. In Figs. 9–12(a) and 14 the same trends and relative influences are found when the computational results are plotted against the recalibrated experimental results using $\mu_0 = 7.3\,\mu\text{N/m}$ and $\mu_l = 3.3\,\mu\text{N/m}$ while varying other parameters in each figure as they were done in the original paper. In Fig. 12(b), the parameter sets (1) $d_c = 2.0\,\mu\text{m}$, $\mu_0 = 7.3\,\mu\text{N/m}$, $\mu_l = 3.3\,\mu\text{N/m}$; (2) $d_c = 1.5\,\mu\text{m}$, $\mu_0 = 8.5\,\mu\text{N/m}$, $\mu_l = 3.8\,\mu\text{N/m}$; and (3) $d_c = 1.0\,\mu\text{m}$, $\mu_0 = 9.7\,\mu\text{N/m}$, $\mu_l = 4.4\,\mu\text{N/m}$ also provide predicted values comparable to the recalibrated experimental results.

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