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Optical tweezer for probing erythrocyte membrane deformability

Manas Khan, Harsh Soni, A. K. Sood

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We report that the average rotation speed of optically trapped crenated erythrocytes is direct signature of their membrane deformability. When placed in hypertonic buffer, discocytic erythrocytes are subjected to crenation. The deformation of cells brings in chirality and asymmetry in shape that make them rotate under the scattering force of a linearly polarized optical trap. A change in the deformability of the erythrocytes, due to any internal or environmental factor, affects the rotation speed of the trapped crenated cells. Here we show how the increment in erythrocyte membrane rigidity with adsorption of Ca^{++} ions can be exhibited through this approach.

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