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Lateral migration of particles in a microchannel ALEXANDER LESHANSKY, Chemical Engineering, Technion -IIT, AVISHAY BRANSKY, NATANIEL KORIN, URI DINNAR, Biomedical Engineering, Technion-IIT — The use of microfabricated elements and microfluidics, offer a great promise in the field of clinical blood tests. An automated rheoscope has been developed, utilizing a microfabricated glass flow cell, high speed camera and advanced image-processing software. Red Blood Cells (RBCs) and rigid microspheres (1-8 μm) suspended in a high viscosity media were filmed flowing through a microchannel ($Re << 1$) and their spatial distributions and velocities were measured. Under these conditions, both the RBC and the microspheres showed an enhanced inward lateral migration. RBCs exhibit different orientations and deformations according to their location in the quadratic velocity profile. Therefore, the control over the spatial distribution of RBCs across the microchannel is a crucial issue. For RBCs, the inward lateral migration is usually attributed to their deformability. However, the symmetry of the Stokes equations rules out the possibility of lateral migration in a dilute suspension of rigid spheres. In the present work we demonstrate that *microelasticity* of the suspending fluid can be responsible for the particle lateral migration. Although, the suspending media was characterized as Newtonian, the small, but finite first normal stress difference can lead to the observed inward migration effect. The proposed theoretical model based on scaling arguments is in a very good agreement with the experimental results.

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