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On the oscillating motion of a red blood cell in bounded Poiseuille flows[1] YAO YU, LINGLING SHI, ROLAND GLOWINSKI, TSORNG-WHAY PAN, Department of Mathematics, University of Houston, Houston TX 77204, USA — Two motions of oscillation and vacillating breathing (swing) a RBC have been observed in bounded Poiseuille flows [Phys. Rev. E 85, 16307 (2012)]. To understand such motions, we have studied the motion of a neutrally buoyant rigid particle of the same shape in bounded Poiseuille flows and obtained that the equilibrium height of the mass center, the confined ratio of the long axis of the particle and the channel height, and the initial position of the particle are important factors for having such oscillating motion. But the crucial one is to have the particle interacting with Poiseuille flow with its mass center oscillating about the channel center. When the mass center is always away from the channel center, the particle just keep rotating. Since the mass center of the cell migrates to the channel center in bounded Poiseuille flow in the regime of low Reynolds number, the oscillating motion then is similar to the aforementioned motion as long as the cell keeps the shape of long body.

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