Abstract Submitted
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The numerical study of the deformed behavior of vesicles in a shear flow.[1] XIAOBO GONG, The National Institute for Physical and Chemical Research (RIKEN), Japan, SHU TAKAGI[2], YOICHIRO MATSUMOTO, Dept. Mech. Eng., Univ. Tokyo — Two types of vesicles, the liposome and red blood cell are modeled with the immersed boundary method. The lipid bilayer membrane model is adopted for the liposome, in which the Helfrich's (1973) bending energy model and the surface tension with tolerable dilation of surface area are used; the hyper-elastic model is used for the red blood cell, in which Hookean model for bending stress and Skalak's (1973) model for hyper-elastic in plane stress are adopted. The numerical result suggests that, because the hyper-elastic membrane of a red blood cell is "stiffer" than the lipid bilayer membrane of a liposome, the viscosity ratio between inside and outside the vesicle that the tumbling motion is observed is smaller for a red blood cell than for a liposome. The interactions of multiple liposome and red blood cells in the rectangular channel flow are presented and discussed.

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