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An Experimental Study of a Giant Vesicle in a Simple Shear Flow RYUTA HATAKENAKA, TAKESHI YAMADA, SHU TAKAGI, YOICHIRO MATSUMOTO, Department of Mechanical Engineering, The University of Tokyo — Deformation and motion of lipid bilayer vesicles with the diameter of $10\text{-}50\mu\text{m}$ (giant vesicle, GV) in a simple-shear-flow have been observed using phase contrast microscopy. We developed a simple-shear-flow apparatus, which consists of two cylinders with the diameter of 50mm separated by a narrow gap of 0.5mm . A linear shear is created in the gap and GVs prepared by the gentle hydration method are transferred there. Their behaviors in the flow are observed with microscope from the direction of the axis of the cylinders. In our observation, GVs are deformed to steady ellipsoidal shapes and show constant orientations of θ , which is the angle between the major axis and the flow direction. It is also observed that θ becomes smaller with decrease of swelling ratio τ , which indicates the degree of deflation. Our experimental result shows good agreement with those of the previous theory [Keller and Skalak, *J. Fluid. Mech.* **120**, 27-47 (1982)] and numerical simulations.

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