

Abstract Submitted
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Why do red blood cells have asymmetric shapes even in a symmetric flow? BADR KAOUI, Technische Universiteit Eindhoven (Eindhoven, The Netherlands) and CNRS - Universite de Grenoble I (Grenoble, France), GEORGE BIROS, Georgia Institute of Technology (Atlanta, GA, USA), CHAOUQI MISBAH, CNRS - Universite de Grenoble I (Grenoble, France) — Understanding why red blood cells (RBCs) move with an asymmetric shape (slipper-like shape) in small blood vessels is a longstanding puzzle of the blood circulatory research. We discover, by considering a phospholipid bilayer model (a biomimetic system of RBCs), that slipper results from the loss of stability of the symmetric shape. It is shown that the birth of slipper results in a significant decline of velocity difference between the cell and the imposed flow, providing thus higher flow efficiency for RBCs. An increase of membrane rigidity is found to lead to a dramatic change of the slipper morphology, offering thus a potential diagnostic for cell pathologies.

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