Direct observations of transition dynamics from macro- to micro-phase separation in asymmetric lipid bilayers induced by externally added glycolipids

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We present the first direct observations of morphological transitions from macro- to micro-phase separation using micrometer-sized asymmetric lipid vesicles exposed to externally added glycolipids (GM1:monosialotetrahexosylganglioside). The transition occurs via an intermediate stripe morphology state. During the transition, monodisperse micro domains emerge through repeated scission events of the stripe domains. Moreover, we numerically confirmed such transitions using a time-dependent Ginzburg-Landau model, which describes both the intramembrane phase separation and the bending elastic membrane. Our findings could provide important mechanistic clues for understanding the dynamics of the heterogeneities exiting in cell membranes.

[1] S. F. Shimobayashi, M. Ichikawa, and T. Taniguchi, EPL **113**, 56005 (2016).