

Confinement-induced compartmentalization of vesicles

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There are a few studies have focused on multi-lamellar vesicle shapes [1], because of the experimental difficulty of the preparation and treating. However most of actual cell organelles form multiple membranes. For example mitochondrion contains outer and inner bilayer membranes. The inner membrane has much larger surface area than outer one, and forms numerous invaginations called crista. Thus the confinement of outer membrane plays an important role to determine inner shapes.

In this study, we simulated the confined vesicles using a dynamically-triangulated surface model [2] and obtained several new vesicle morphologies. In particular, we found the confinement-induced compartmentalization of vesicles. Some of the vesicle shapes agree quite well with those of multilamellar liposomes observed in experiments.

[1] O. Kahraman, N. Stoop, M. M. Müller, *New J. Phys.* **14**, 095021 (2012).

[2] H. Noguchi, and G. Gompper, *Phys. Rev. E* **72**, 011901 (2005).