

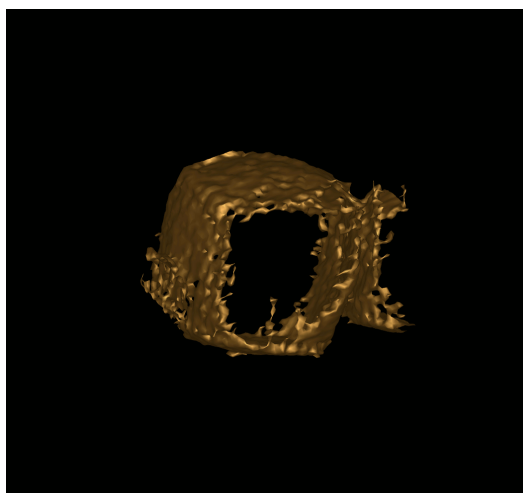
Vesicle Origami: Cuboid Phospholipid Vesicles Formed by Template-Free Self-Assembly^[1]

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Phospholipid vesicles are typical self-assembled structures. Typically these vesicles take spherical shape to minimize the energy. Deciphering the bilayer code, the basic physical interactions between phospholipids, would allow to utilize these molecules as building blocks for novel, non-spherical structures.

Here, we present a 1,2-diamidophospholipid that self-assembles into a cuboid vesicle structure in a template-free manner. Due to intermolecular hydrogen bonding, the bilayer membranes form an exceptionally tight subgel packing leading to a maximization of flat membrane shapes and a minimization of any edges. These conditions result in the geometrical structure of a cube. Surprisingly, the lateral surface pressure in the membrane is only one third of the value typically assumed for a bilayer membrane, questioning a long-standing rule of thumbs.



[1] Frederik Neuhaus, Dennis Mueller, Radu Tanasescu, Sandor Balog, Takashi Ishikawa, Gerald Brezesinski, Andreas Zumbuehl, *Angewandte Chemie*, **2017**, *in press*.