

Description of Additional Supplementary Files

File Name: Supplementary Movie 1

Description: Minor shrinkage upon hypertonic deflation ($t = 0$ s) of giant unilamellar vesicles (labeled with DOPEAtto655, red) pre-incubated with the non-membrane-binding origami structure Q0 (labeled with Atto488, green). Scale bar: $10\mu\text{m}$.

File Name: Supplementary Movie 2

Description: Outward tubule formation upon hyperosmotic stress ($t = 0$ s) of giant unilamellar vesicles (labeled with DOPE-Atto655, red) pre-incubated with membrane-bound concave origami Q3 (labeled with Atto488, green). Scale bar: $10\mu\text{m}$.

File Name: Supplementary Movie 3

Description: Minor shrinkage upon hypertonic deflation ($t = 0$ s) of giant unilamellar vesicles (labeled with DOPEAtto655, red) pre-incubated with Atto488-labeled (green) origami structure QR3 (membrane binding side with zero curvature) Scale bar: $10\mu\text{m}$.

File Name: Supplementary Movie 4

Description: Membrane deformations upon hyperosmotic stress ($t = 0$ s) of giant unilamellar vesicles (labeled with DOPE-Atto655, red) pre-incubated with membrane-bound convex origami QI3 (labeled with Atto488, green). Scale bar: $10\mu\text{m}$