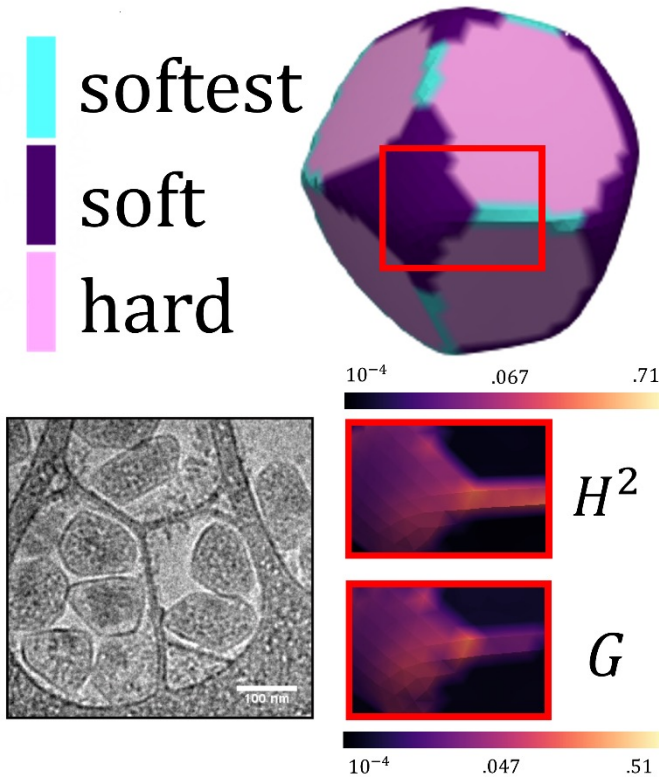


Microcompartment Patterning and Morphology



Elastic shell with three components (hard, soft, and softest). These components pattern the shell based on the mean curvature, H , and the Gaussian curvature, G .

Waltmann, C.; Shrestha, A.; Olvera de la Cruz, M.
arXiv:2307.12834

Scientific Achievement

We show that three components with different mechanical properties can explain observed microcompartment morphologies and highlight the role of Gaussian curvature.

Significance and Impact

This establishes design rules for controlling microcompartment morphology and patterning and thus function. This work can be combined with all-atom simulations to control morphologies via protein mutations.

Research Details

- A discretized model of continuum elasticity described a closed membrane with three components of differing rigidities
- We find the soft component prefers the vertices due to its lower gaussian rigidity, while the softest component prefers the edges due to its lower mean bending rigidity