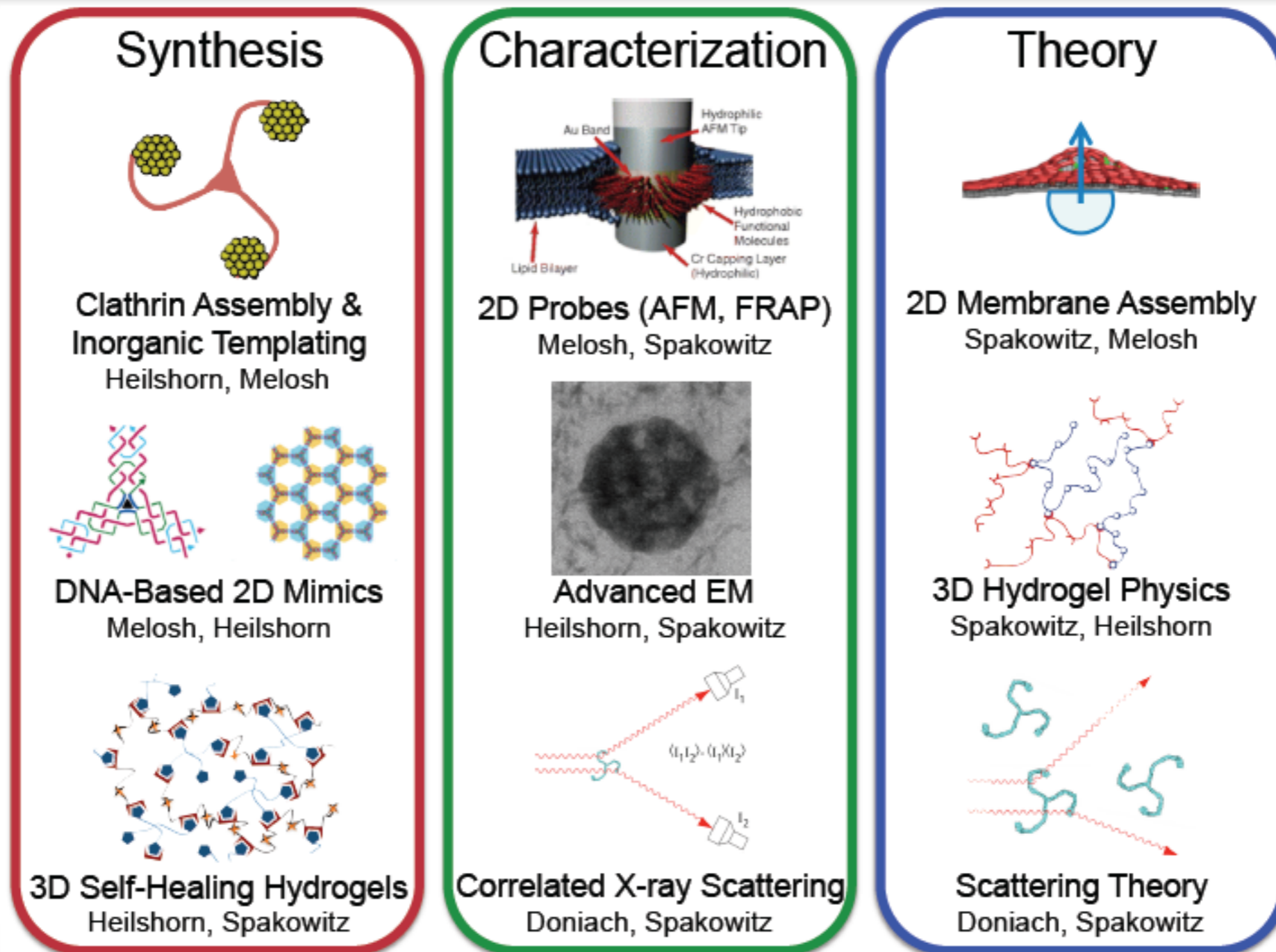
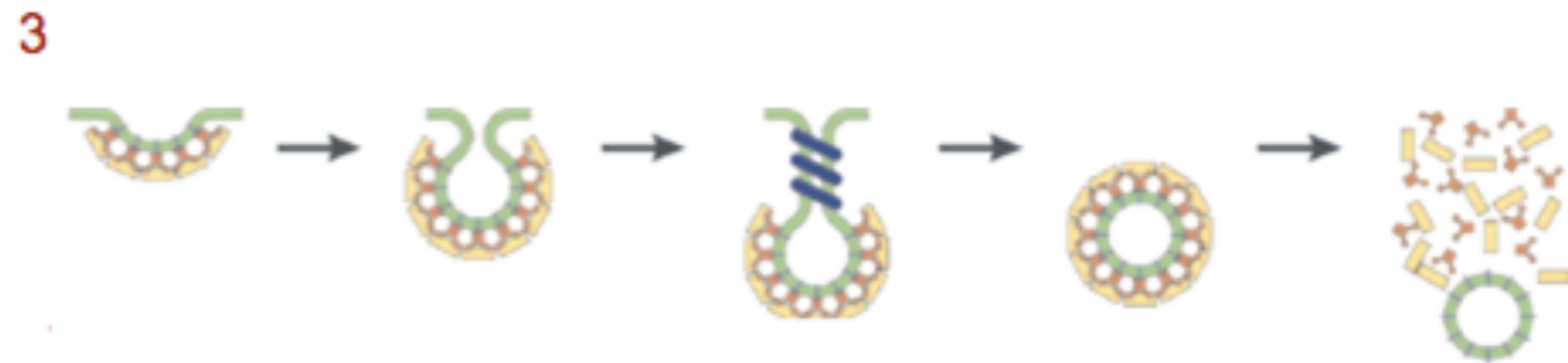
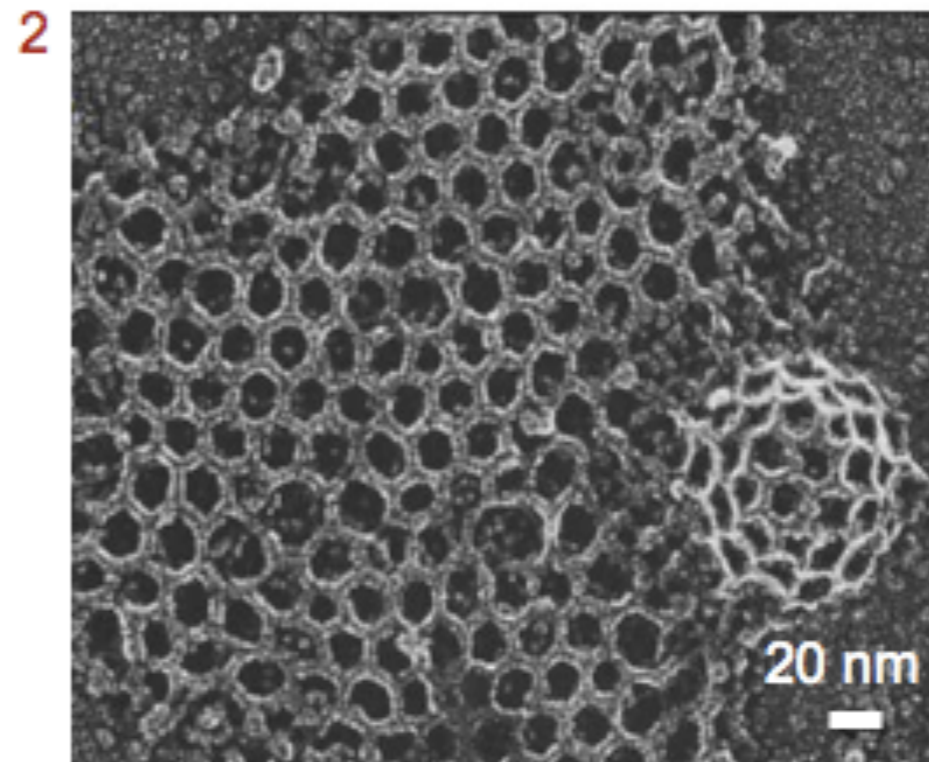
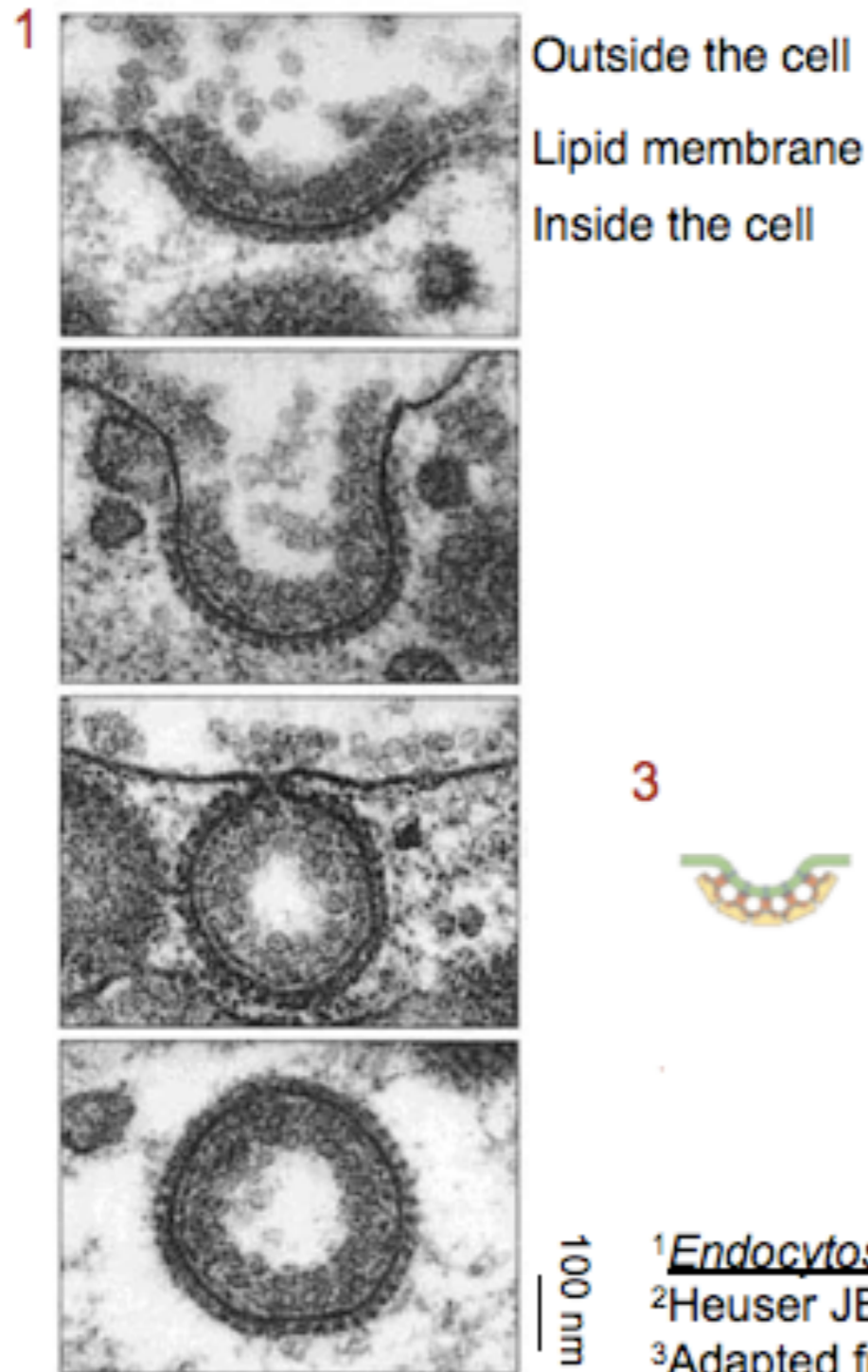


# Self-Healing and Self-Regulation of Biomimetic Soft Materials



U.S. Department of Energy, Office of Basic Energy Sciences,  
Division of Materials Sciences and Engineering: Contract DE-AC02-76SF00515.

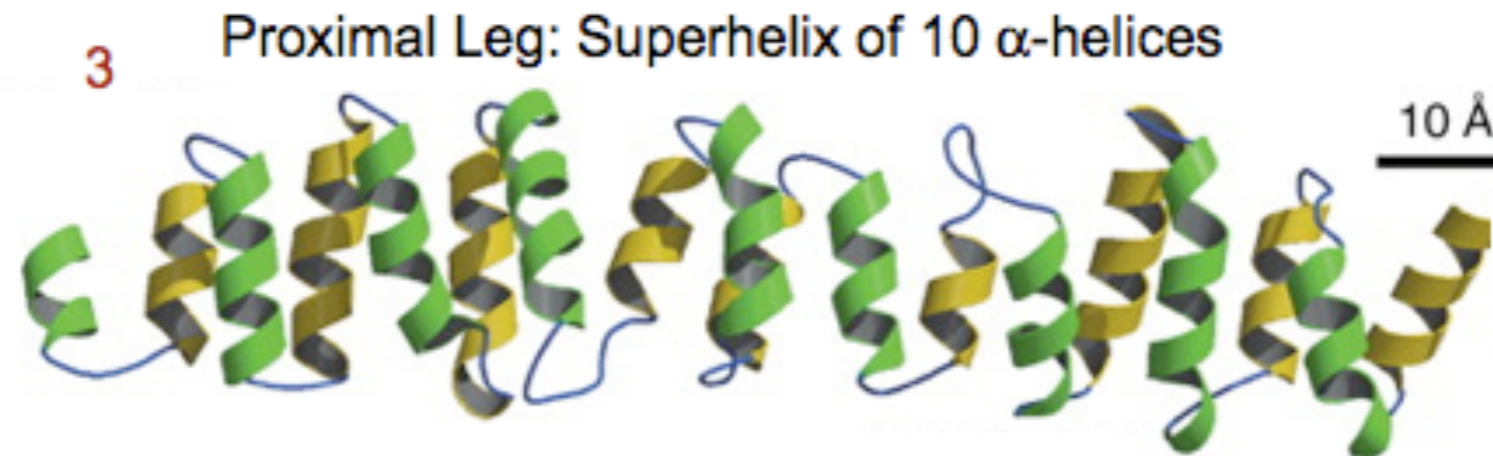
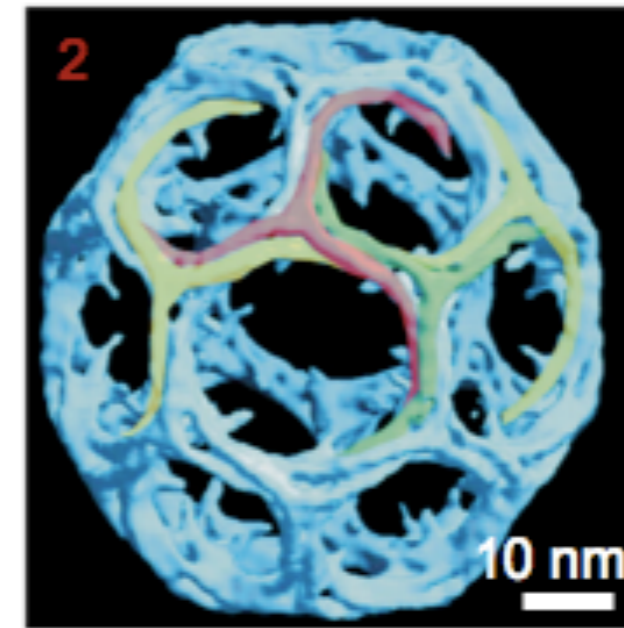
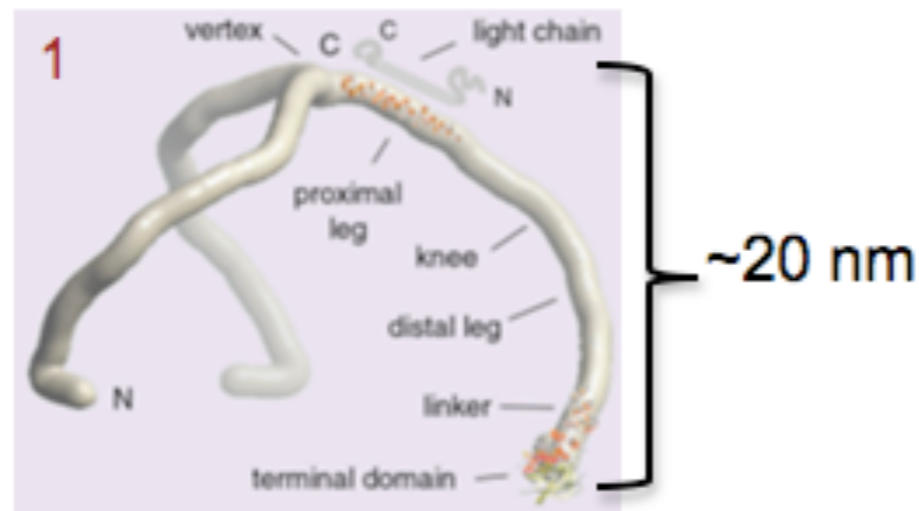
# Clathrin's Role in Endocytosis



- <sup>1</sup>*Endocytosis*, Eds. Pastan I & Willingham MC, Plenum Press, N.Y., 1985.  
<sup>2</sup>Heuser JE, et al. *JCB* 1987, 105:1999.  
<sup>3</sup>Adapted from Slepnev VI & De Camilli P, *Nat Rev Neurosci*, 2000, 1:161.

# Supramolecular Assembly

- Clathrin associates *in vitro* in the absence of lipids and adaptor proteins through tuning of pH and ionic strength



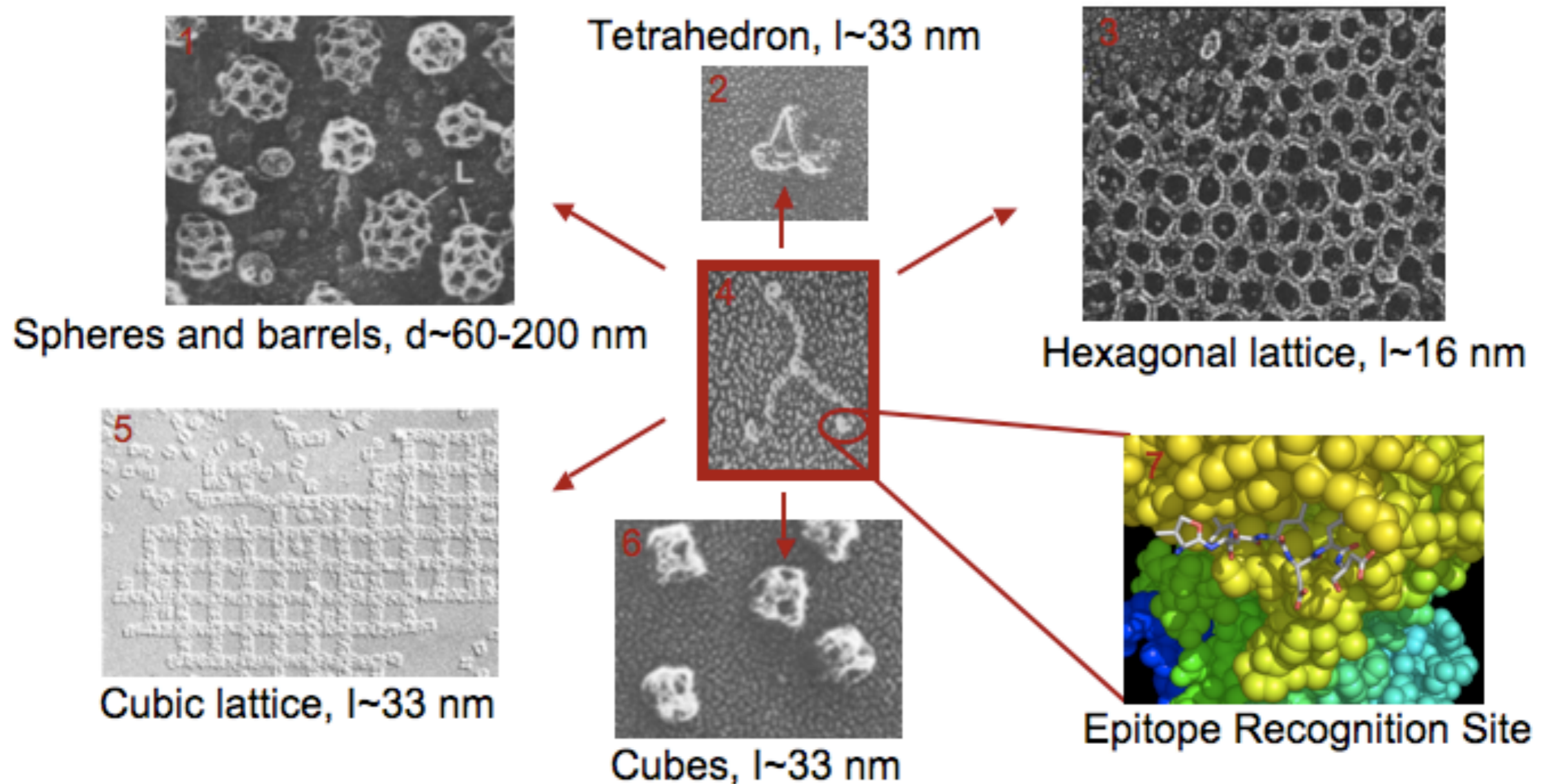
<sup>1</sup>Kirchhausen T. *Ann Rev Biochem* 2000, 69: 699.

<sup>2</sup>Smith CJ, et al. *EMBO* 1998, 17:4943.

<sup>3</sup>Ybe JA et al. *Nature* 1999, 399:371.

# Flexible Protein Biotemplate

- Assembly of multiple nano-architectures from one building block
- Engineered peptide adaptor sequences to bind multiple inorganics



<sup>1,4</sup>Heuser J, et al. *J Ultrastruc Res* 1985, 92:1.

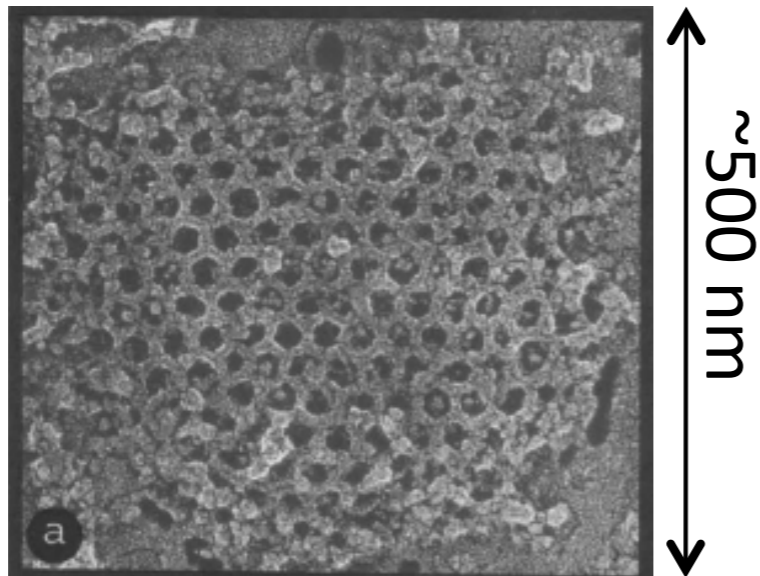
<sup>5</sup>Sorger PK, et al. *JCB* 1986, 103:1213.

<sup>2,3,6</sup>Heuser J, et al. *JCB* 1987, 105:1999.

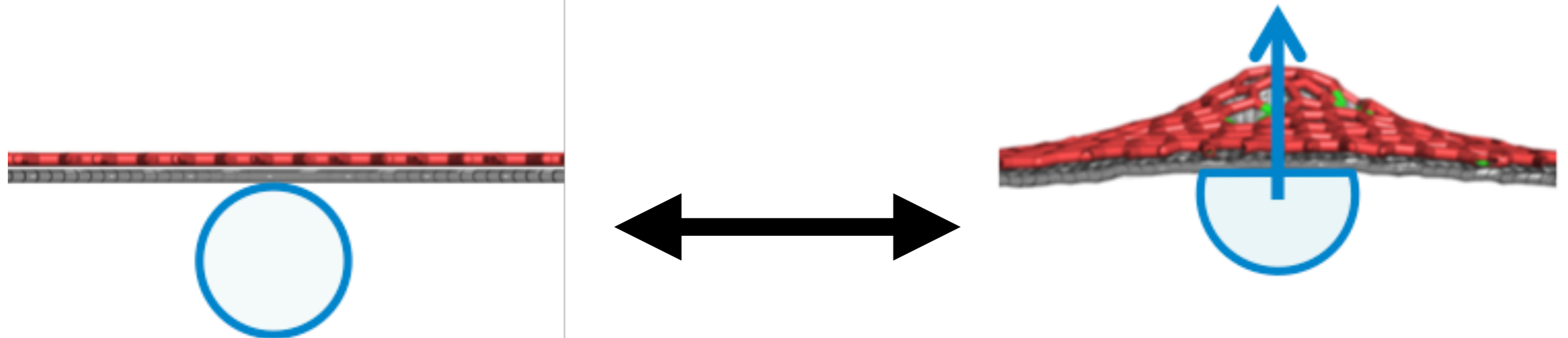
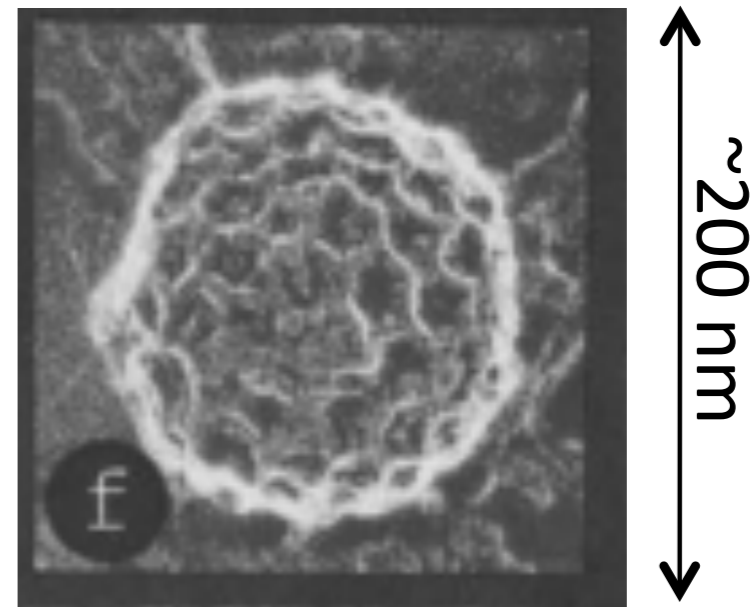
<sup>7</sup>ter Haar E, et al. *PNAS* 2000, 97:1096.

# Lattice Fluidity and Stabilization

Fluid-like ability to restructure lattice



(Heuser, *J Cell Bio*, 1980)



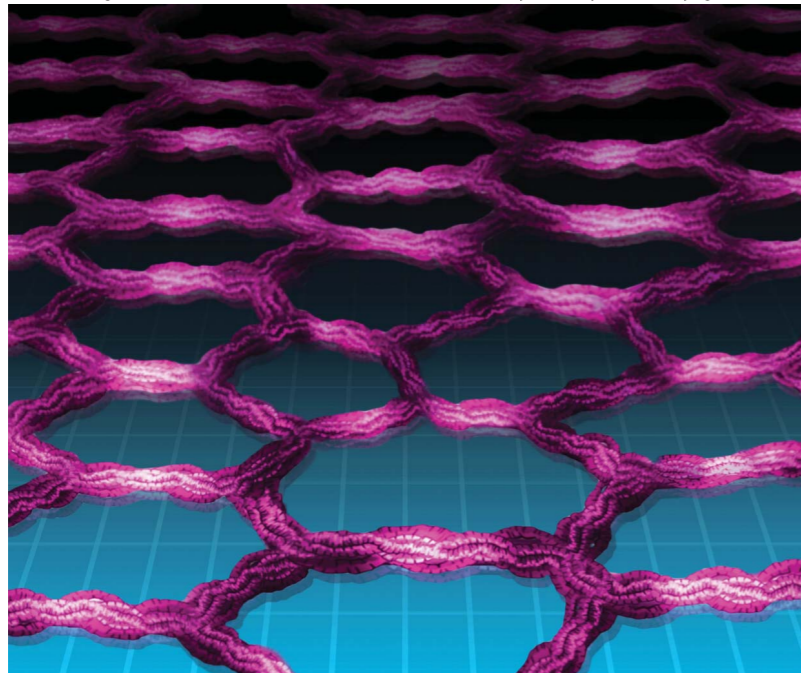
Solid-like stabilization of curvature

# Membrane Indentation Triggers Clathrin Lattice Reorganization and Fluidization

## Soft Matter

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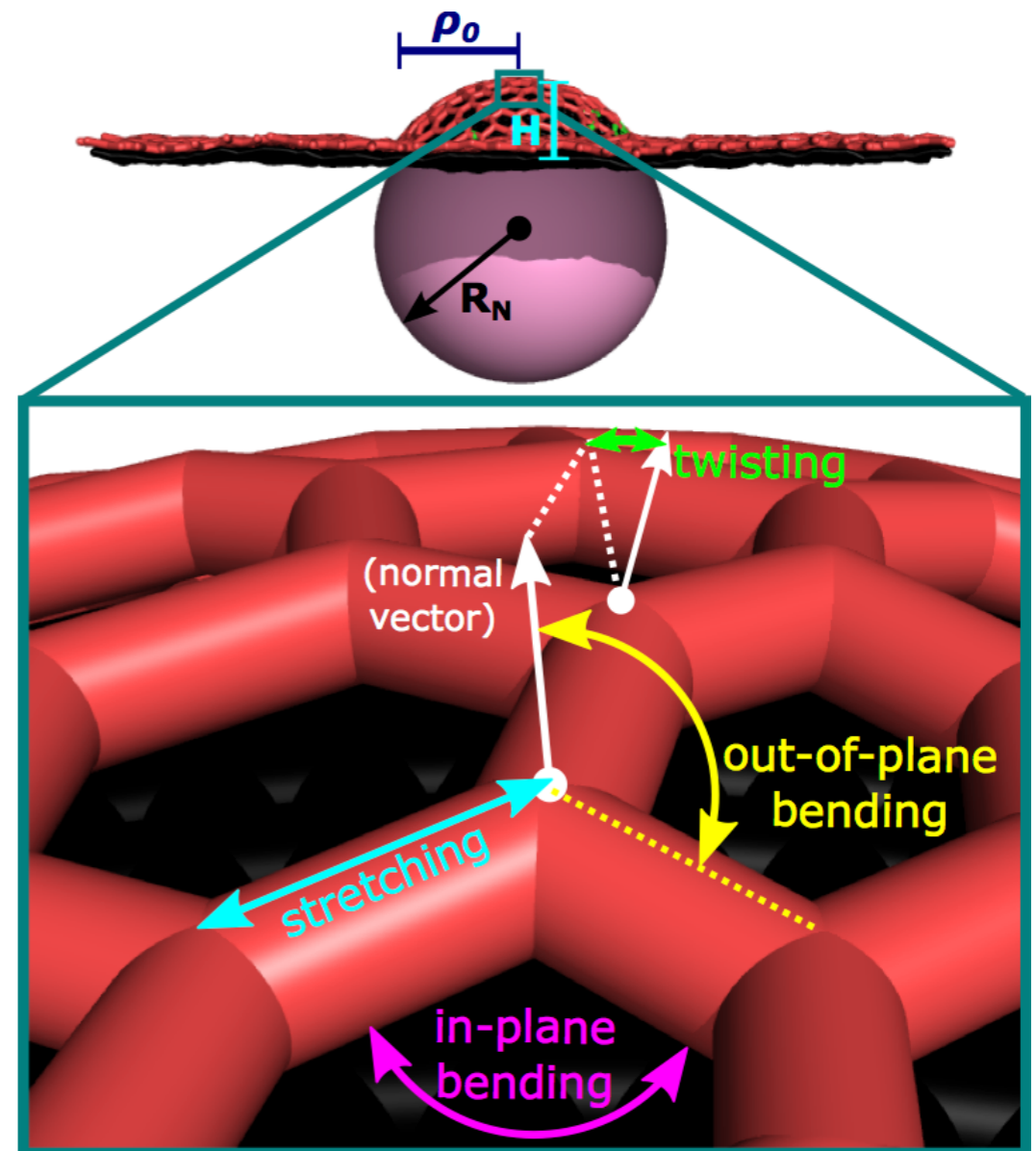
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*Soft Matter*, **7**, 8789 (2011).



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*Soft Matter*, accepted (2014).