

## CHAPTER OVERVIEW

### 19: Self-Assembly

Cooperative self-assembly refers to the the spontaneous formation of sophisticated structures from many molecular units. Generally, we think of this as involving many molecules (cooperative units), although single- and bi-molecular problems can be wrapped into this description, as in the helix–coil transition. Examples include:

- Peptides and proteins
  - Protein folding, binding, and association
  - Amyloid fibrilization
  - Assembly of multi-protein complexes
  - Viral capsid self-assembly
- Nucleic acids
  - DNA hybridization, DNA origami
  - Folding and association of RNA structures: pseudoknots, ribozym es
- Lipids
  - Bilayer structures
  - Micelle formation

Although molecular structures also assemble with the input of energy, the emphasis here in on spontaneous self-assembly in the absence of external input.

[19.1: Micelle Formation](#)

[19.2: Classical Nucleation Theory](#)

[19.3: Why Are Micelles Uniform in Size?](#)

[19.4: Shape of Self-Assembled Amphiphiles](#)

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