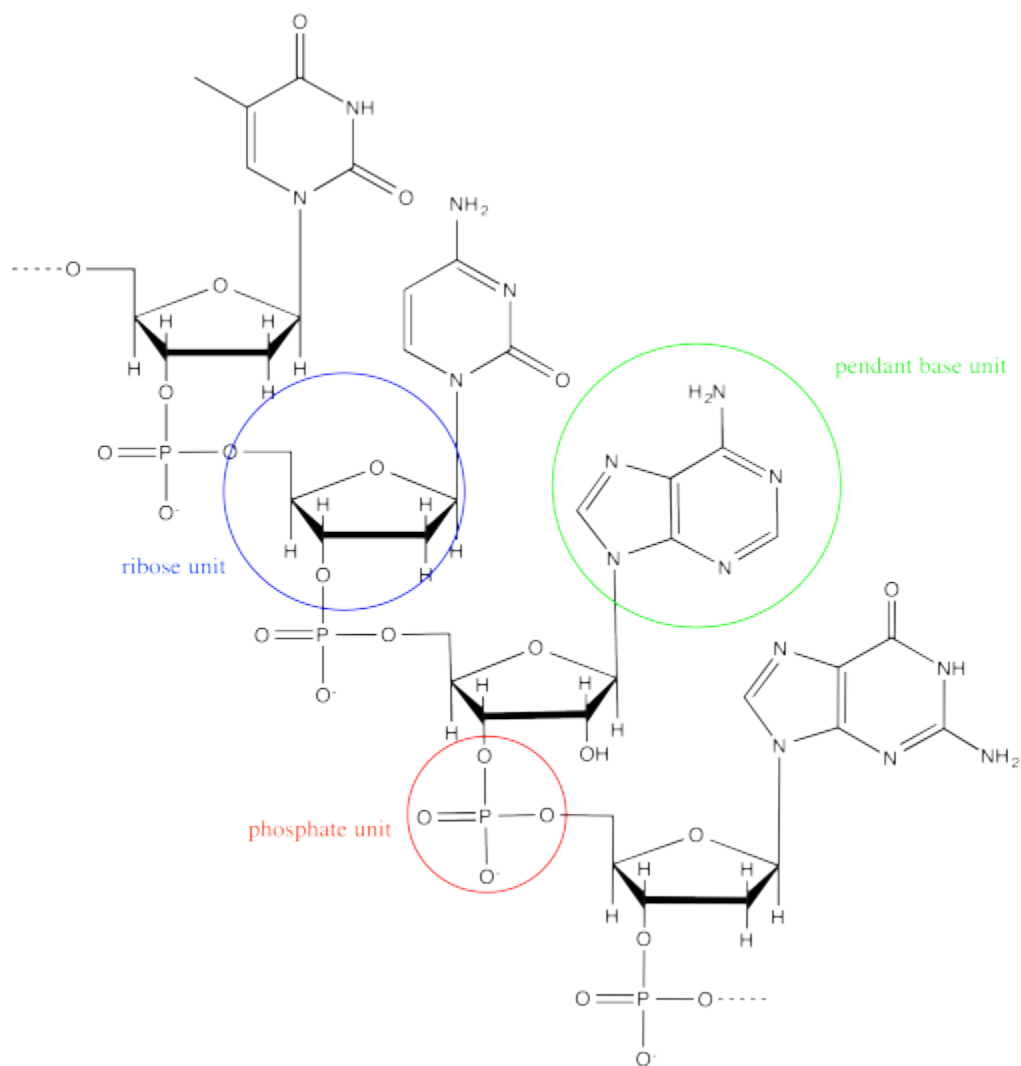


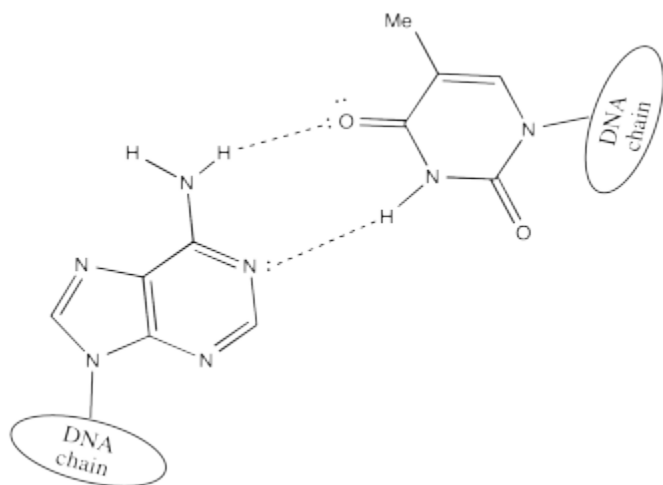
SUPRAMOLECULAR ASSEMBLIES

Supramolecular assemblies are a different type of large structure, related to macromolecules. In a supermolecular assembly, parts of the structure are held together by very strong interactions, but not necessarily by covalent bonds. For example, a polymer in which chains are held together by physical crosslinks such as hydrogen bonds may be considered to form a supermolecular assembly.

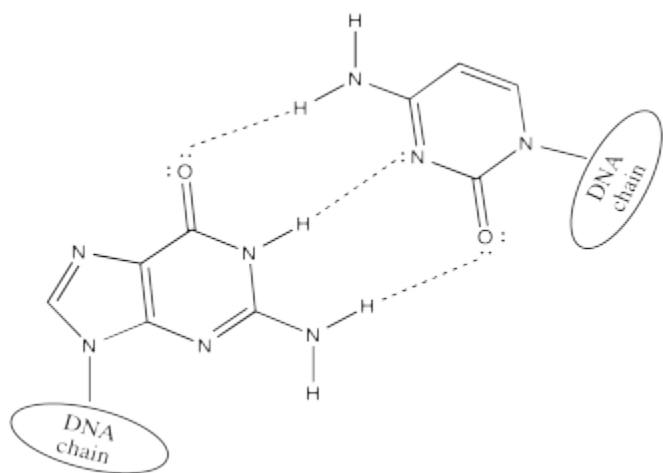
DNA is an example of a supramolecular assembly. Each strand of DNA is an alternating sugar-phosphate copolymer. Along this backbone, there are pendant "base" units, adenine, cytosine, guanine or thymine.



Two DNA strands form a helical supramolecular assembly through hydrogen bonding interactions that form between the bases. Thymine can hydrogen bond preferentially with adenine.



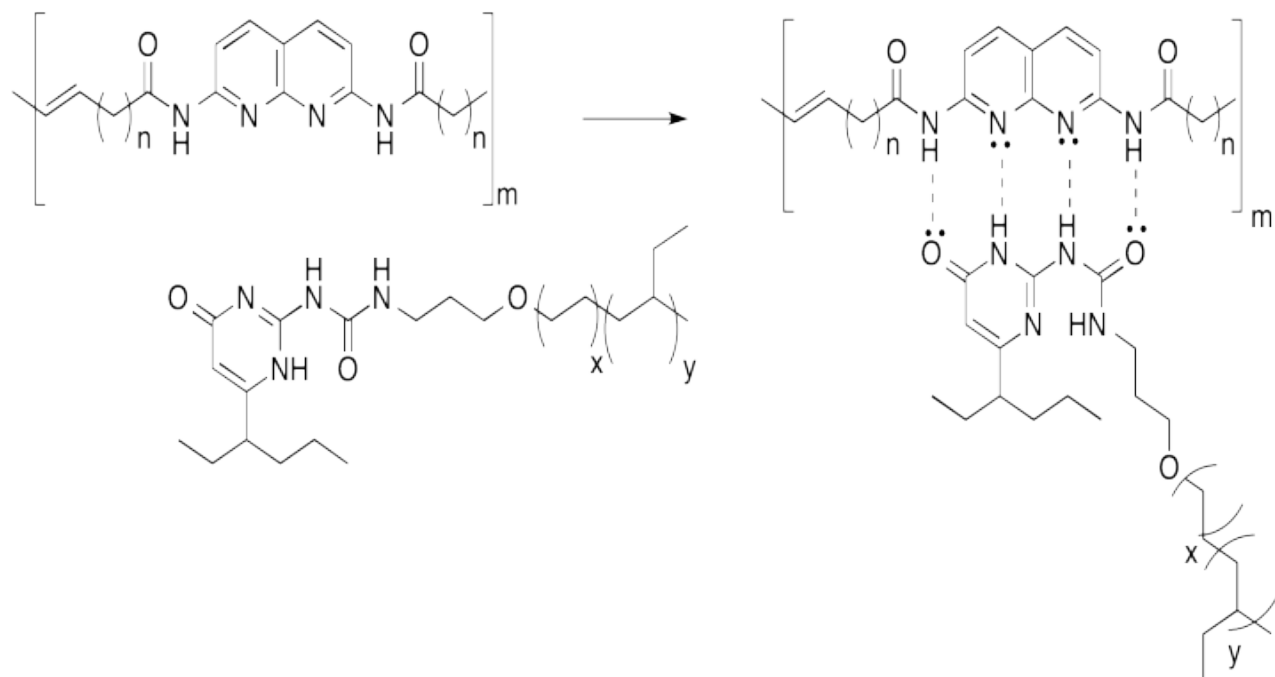
Cytosine hydrogen bonds preferentially with guanine.



There are a number of different ways in which synthetic supramolecular assemblies can be formed. These kinds of structures have been getting increased attention in recent years as researchers try to develop new materials with useful properties. There are a few common methods through which the assemblies are formed. We will look at hydrogen bonding, host-guest chemistry and coordination chemistry.

Hydrogen Bonding

Hydrogen bonding is a common way to build supramolecular assemblies. [Bert Meijer](#) at Eindhoven Technical University in the Netherlands has developed a number of systems that use this approach. For example, graft copolymers have been assembled in his lab by hanging pendant chains onto a polymer backbone via hydrogen bonds.



This approach can be pictured in cartoon, below, in which the hydrogen bonding elements are boxes and the lines are flexible chains or tails.

