

Figure 2.1 The architecture of biological structures. A range of typical cellular structures, in addition to viruses. (a) Rodlike Maize mosaic viruses, (b) obtained using negative-staining followed by transmission electron microscopy, TEM (see Chapter 5); (c) mitochondria from guinea pig pancreas cells, (d) TEM of nucleus with endoplasmic reticulum (ER), (e) phase contrast image of a human cheek cell. (a: Adapted from Cell Image Library, University of California at San Diego, CIL:12417 c: Courtesy of G.E. Palade, CIL:37198; d: Courtesy of D. Fawcett, CIL:11045; e: Adapted from CIL:12594.)

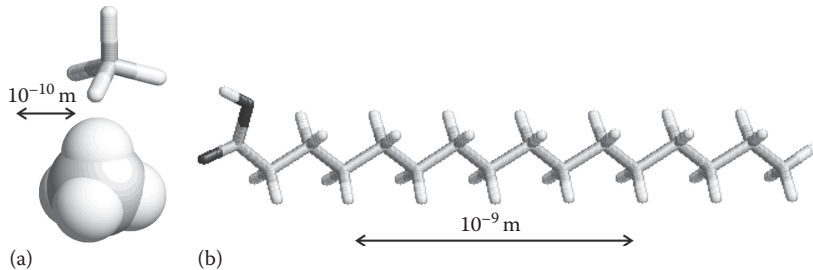


Figure 2.2 Carbon chemistry. (a) Rod and space-filling tetrahedral models for carbon atom bound to four hydrogen atoms in methane. (b) Chain of carbon atoms, here as palmitic acid, an essential fatty acid.

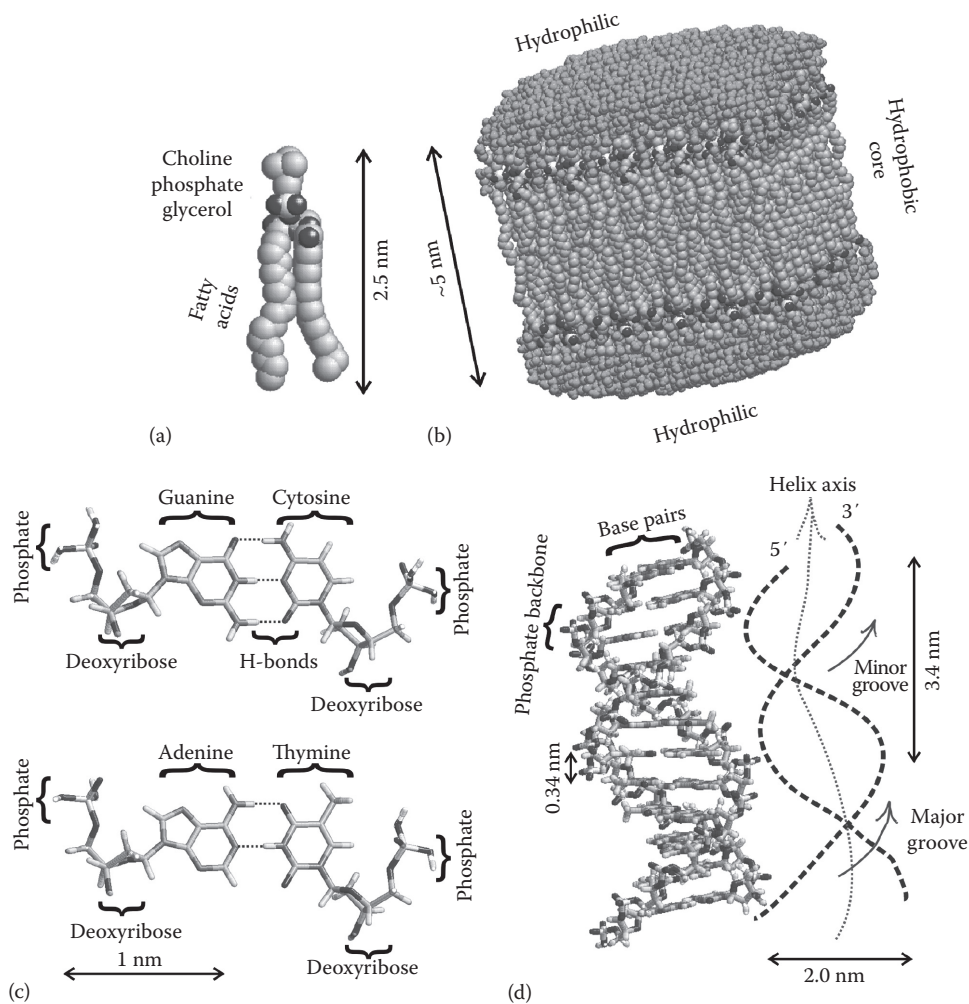


Figure 2.3 (See color insert.) Fats and nucleic acids. (a) Single phospholipid molecule. (b) Bilayer of phospholipids in water. (c) Hydrogen-bonded nucleotide base pairs. (d) B-DNA double-helical structure.

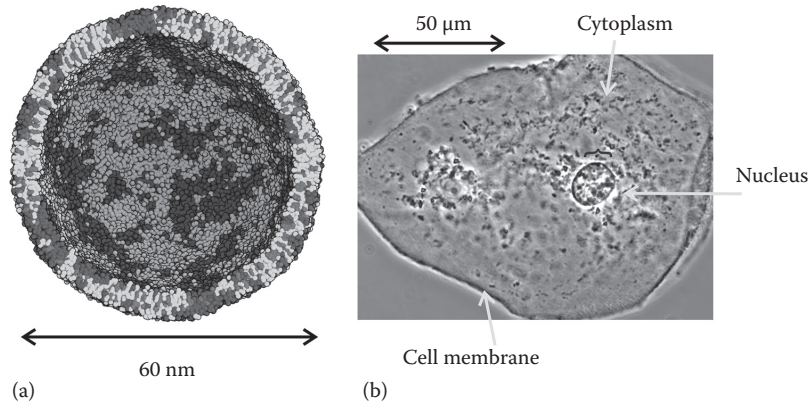


Figure 2.4 Structures formed from lipid bilayers. (a) Liposome, light and dark showing different phases of phospholipids from molecular dynamics simulation (see Chapter 8). (b) The cell membrane and nuclear membranes, from a human cheek cell taken using phase contrast microscopy (Chapter 3). (a: Courtesy of M. Sansom; b: Courtesy of G. Wright, CIL:12594.)

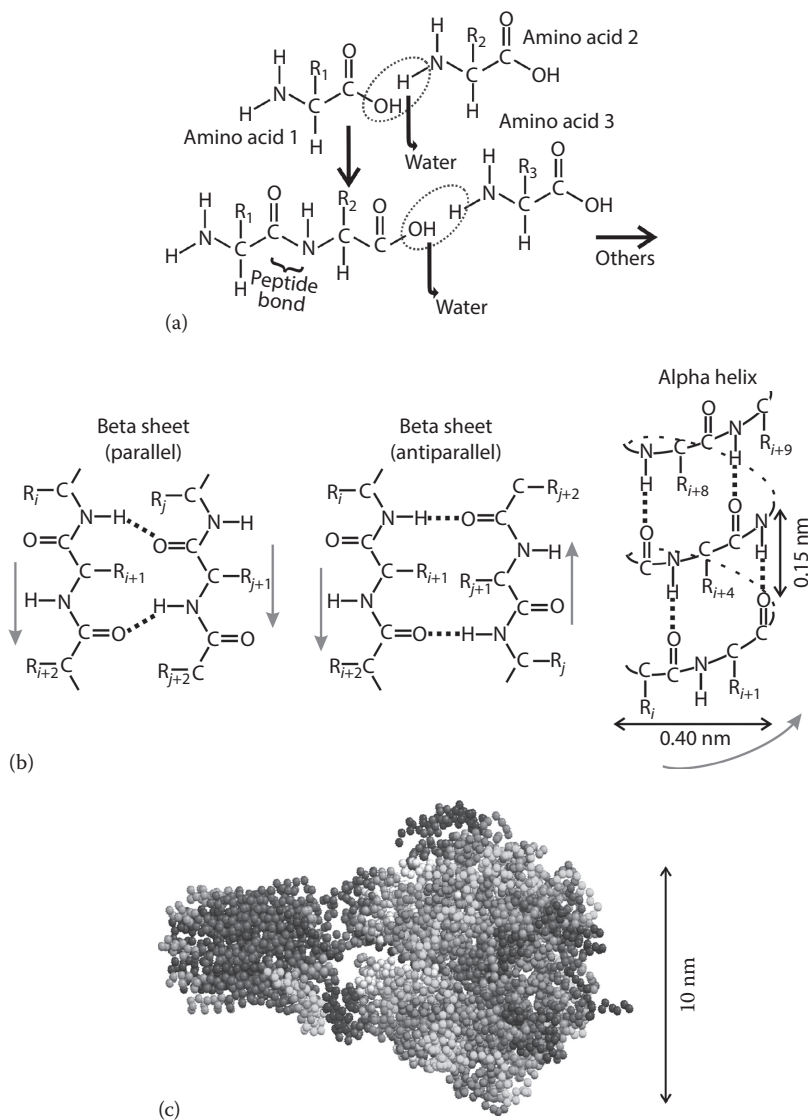


Figure 2.5 Peptide and proteins. (a) Formation of peptide bond between amino acids to form primary structure. (b) Secondary structure formation via hydrogen bonding to form beta sheets and alpha helices. (c) Example of a complex 3D tertiary structure, here of an enzyme that makes ATP.

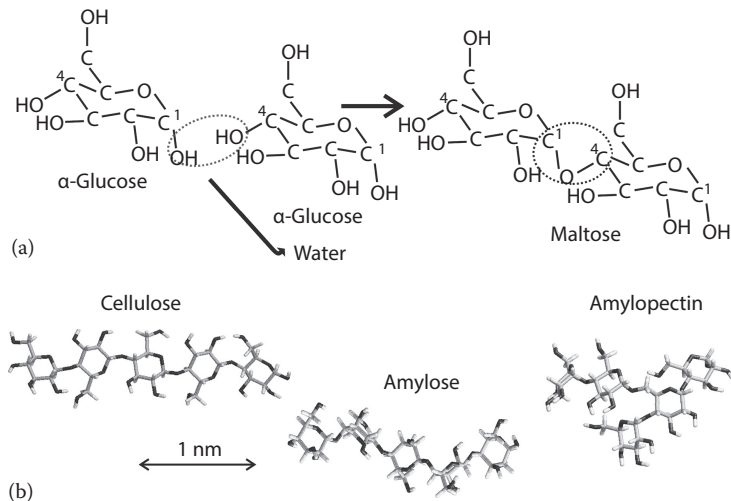


Figure 2.6 Sugars. (a) Formation of larger sugars from monomer units of monosaccharide molecules via loss of water molecule to form a disaccharide molecule. (b) Examples of polysaccharide molecules.

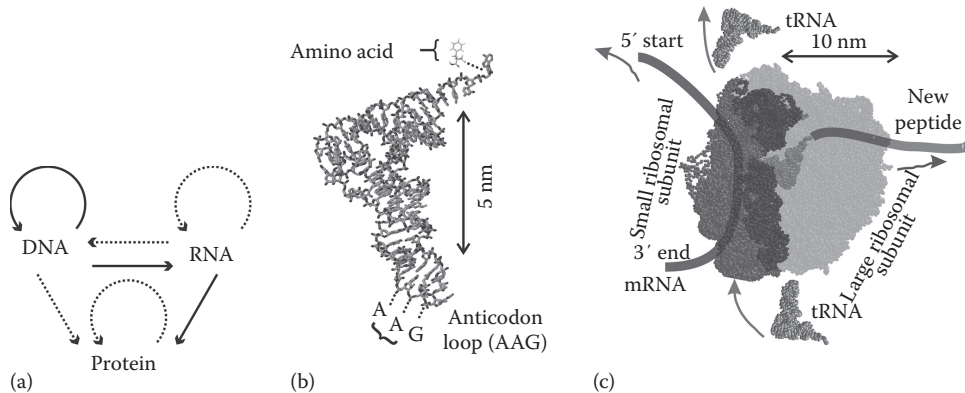


Figure 2.7 Central dogma of molecular biology. (a) Schematic of the flow of information between nucleic acids and proteins. (b) Structure of tRNA. (c) Interaction of tRNA with ribosome during peptide manufacture.

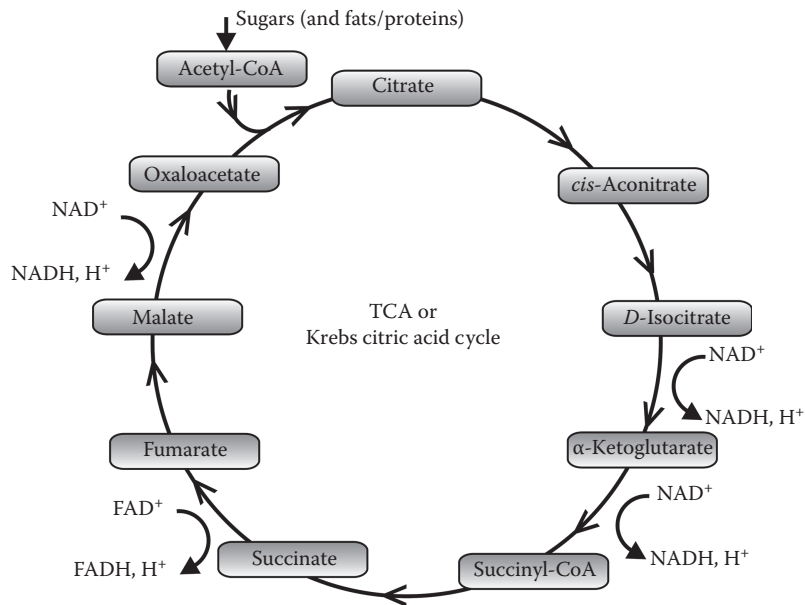


Figure 2.8 Schematic of the tricarboxylic acid or Krebs citric acid cycle.