



Figure 2.14. Examples of important steroids. The basic numbering of the carbon atoms in these molecules is also shown.

Nucleotides are the building blocks of DNA and RNA and also serve as molecules to store energy and reducing power. The three major components in all nucleotides are phosphoric acid, pentose (ribose or deoxyribose), and a base (purine or pyrimidine). Figure 2.15 depicts the structure of nucleotides and purine-pyrimidine bases. Two major purines present in nucleotides are adenine (A) and guanine (G), and three major pyrimidines are thymine (T), cytosine (C), and uracil (U). Deoxyribonucleic acid (DNA) contains A, T, G, and C, and ribonucleic acid (RNA) contains A, U, G, and C as bases. It is the base sequence in DNA that carries genetic information for protein synthesis. In Chapters 4 and 8 we discuss how this information is expressed and passed on from one generation to another.

In Chapter 5 we will discuss further the role of nucleotides in cellular energetics. The triphosphates of adenosine and to a lesser extent guanosine are the primary energy currency of the cell. The phosphate bonds in *ATP* (*adenosine triphosphate*) and *GTP* (*guanosine triphosphate*) are high-energy bonds. The formation of these phosphate bonds or their hydrolysis is the primary means by which cellular energy is stored or used. For example, the synthesis of a compound that is thermodynamically unfavorable can be