



SECTION
8.5

TRANSLATION
Reinforcement

KEY CONCEPT Translation converts an mRNA message into a polypeptide, or protein.

Translation is the process that converts an mRNA message into a polypeptide, or protein. An mRNA message is made up of combinations of four nucleotides, whereas proteins are made up of twenty types of amino acids. The mRNA message is read as a series of non-overlapping **codons**, a sequence of three nucleotides that code for an amino acid. Many amino acids are coded for by more than one codon. In general, codons that code for the same amino acid share the same first two nucleotides. Three codons, called **stop codons**, signal the end of the polypeptide. There is also a **start codon**, which both signals the start of translation and codes for the amino acid methionine. This genetic code is the same in almost all organisms, so it is sometimes called the universal genetic code.

Although tRNA and rRNA are not translated into proteins, they play key roles in helping cells translate mRNA into proteins. Each tRNA molecule folds up into a characteristic L shape. One end has three nucleotides called an **anticodon**, which recognize and bind to a codon on the mRNA strand. The other end of the tRNA molecule carries a specific amino acid. A combination of rRNA and proteins make up the ribosome. Ribosomes consist of a large and small subunit. The large subunit has binding sites for tRNA. The small subunit binds to the mRNA strand.

At the start of translation, a small subunit binds to an mRNA strand. Then the large subunit joins. A tRNA molecule binds to the start codon. Another tRNA molecule binds to the next codon. The ribosome forms a bond between the two amino acids carried by the tRNA molecules and pulls the mRNA strand by the length of one codon. This causes the first tRNA molecule to be released and opens up a new codon for binding. This process continues to be repeated until a stop codon is reached and the ribosome falls apart.

1. What is a codon?

2. What role does tRNA play in translation?

3. What forms the bond between neighboring amino acids?
