

**DNA:** the double-helix-shaped molecule that holds an organism's genetic information. DNA is composed of sugars, phosphates, and four nucleotide bases: adenine, guanine, cytosine, and thymine (A, G, C, T).

**genetic markers:** random mutations in the DNA sequence that act as genetic milestones. Once a marker has been identified, it can be traced back in time to its origin—the most recent common ancestor of everyone who carries that marker.

**haplogroup:** branches on the human family tree. Haplogroups are defined by genetic mutations or markers found in Y chromosomes and mitochondrial DNA. These markers link the members of a haplogroup back to the marker's first appearance in the group's most recent common ancestor. Haplogroups often have a geographic relation.

**mitochondrial DNA:** genetic material found in the mitochondria. It is passed from females to their offspring without recombining and thus is an important tool for geneticists.

**X and Y chromosomes:** Chromosomes that determine sex. Females have two X chromosomes, and males have one X and one Y chromosome. When chromosomes pair, the mismatched Y determines male gender. Because of the mismatch, part of the Y chromosome does not recombine with the X during reproduction. The nonrecombining part of the Y chromosome contains a sequence of DNA passed intact from males to their sons through the generations, giving population geneticists a useful tool for studying human history.