

Basic Biology of Genetics

Deoxyribonucleic acid (DNA) is the basic unit in which our bodies store inherited or genetic information. Each DNA molecule is a long chain of molecules called nucleotides, and each nucleotide contains one of four possible bases (adenine, guanine, cytosine, or thymine: AGCT). Individual nucleotides attach to one another to form the long spiraled chains that make up chromosomes. Each cell in each individual person has 46 chromosomes, two sets of 23 (one set from each parent), that contain all of the genetic information needed for the development and function of that person. The genetic information is contained in the order of the four bases, which acts like a four letter code, directing the cell not only how to make proteins, but also when, where, and how much of them to make. A section of this long chain of nucleotides that codes for a particular protein or gives a particular instruction to the cell is what we call a "gene."

A gene is a sequence of DNA at a specific location on a chromosome that codes for a particular protein and determines a particular characteristic in an organism.

Proteins control the critical functions of every organ system in the human body. Beyond building muscle and shiny hair, proteins actually control the beating of our hearts, the conversion of food to energy, even brain function. Proteins are comprised of long chains of twenty different amino acids. The order of nucleotides in the gene coding for that protein determines the order of amino acids in the protein. And the order of amino acids in the protein determines the shape and structure of the protein. The shape of a particular protein is what allows it to function in the precise manner that it does.

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