



Helping you achieve
your wellness goal is our *business*.

Why Proteins

Are important?

Proteins make up body structures like organs and tissue, as well as control chemical reactions and carry signals between cells. If a cell's DNA is mutated, an abnormal protein may be produced, which can disrupt the body's usual processes and lead to a disease, such as cancer.

With its three-letter language, DNA contains the information needed to build the entire human body. A gene traditionally refers to the unit of DNA that carries the instructions for making a specific protein or set of proteins. Each of the estimated 20,000 to 25,000 genes in the human genome codes for an average of three proteins.

Located on 23 pairs of chromosomes packed into the nucleus of a human cell, genes direct the production of proteins with the assistance of enzymes and messenger molecules. Specifically, an enzyme copies the information in a gene's DNA into a molecule called messenger ribonucleic acid RNA (mRNA). The mRNA travels out of the nucleus and into the cell's cytoplasm, where the mRNA is read by a tiny molecular machine called a ribosome.

An organism's complete set of DNA is called its genome. Virtually every single cell in the body contains a complete copy of the approximately 3 billion DNA base pairs, or letters, that make up the human genome.

Virtually every human ailment, except perhaps trauma, has some basis in our genes. Until recently, doctors were able to take the study of genes, or genetics, into consideration only in cases of birth defects and a limited set of other diseases. These were conditions, such as sickle cell anemia, which have very simple, predictable inheritance patterns because each is caused by a change in a single gene.

Genome-based research is already enabling medical researchers to develop more effective diagnostic tools, to better understand the health needs of people based on their individual genetic make-ups, and to design new treatments for disease. Thus, the role of genetics in health care is starting to change profoundly and the first examples of the era of personalized medicine are on the horizon.

focus

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DNA (Deoxyribonucleic acid) is the chemical compound that contains the instructions needed to develop and direct the activities of nearly all living organisms. DNA molecules are made of two twisting, paired strands, often referred to as a double helix.

Each DNA strand is made of four chemical units, called nucleotide bases, which comprise the genetic "alphabet." The bases are adenine (A), thymine (T), guanine (G), and cytosine (C). Bases on opposite strands pair specifically: an A always pairs with a T; a C always pairs with a G. The order of the As, Ts, Cs, and Gs determines the meaning of the information encoded in that part of the DNA molecule just as the order of letters determines the meaning of a word.

Researchers can use DNA sequencing to search for genetic variations and/or mutations that may play a role in the development or progression of a disease. The disease-causing change may be as small as the substitution, deletion, or addition of a single base pair or as large as a deletion of thousands of bases.

