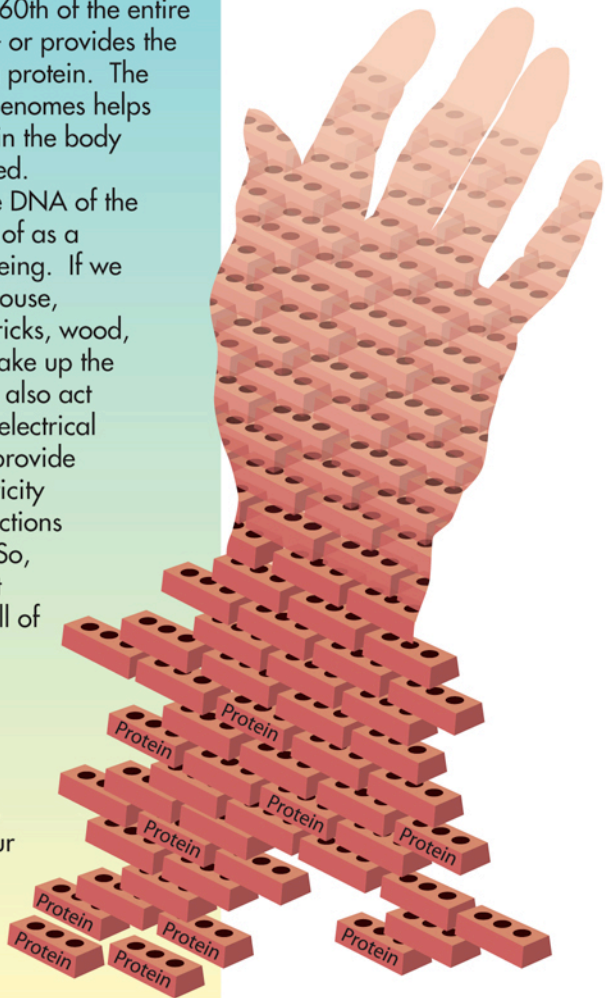
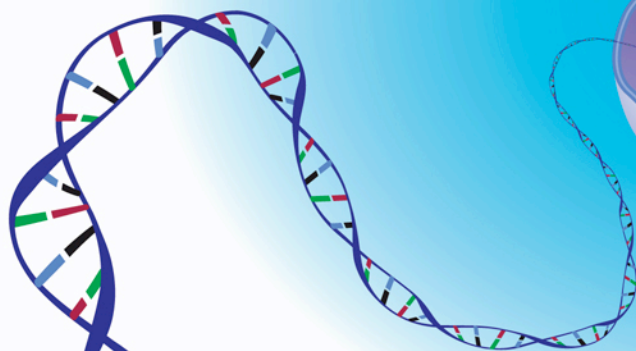


How does DNA work as the instructions for human traits? The cells of our bodies are made of different kinds of molecules, such as water, minerals, proteins, sugars, fats and DNA. Of those, proteins are particularly important because they are the fundamental components of the body that determine how all of the molecules are organized and how they act. Thus, proteins play a key role in the way we look and in the way we grow. DNA acts as a molecular code for making these proteins. The DNA in each gene provides the instructions for making one protein, or sometimes, a few related proteins.

However, only about 1/60th of the entire genome directly codes – or provides the instructions - for making protein. The rest of the DNA in our genomes helps direct when and where in the body each gene should be used.

Taken together, all of the DNA of the genome can be thought of as a blueprint for a human being. If we think of our body as a house, proteins would be the bricks, wood, cement and nails that make up the basic building. Proteins also act as the lights, plumbing, electrical wiring, vents, etc., that provide the running water, electricity and other necessary functions for living in the house. So, just as a house blueprint shows us the layout of all of the parts (the boards, bricks, wires, etc.), the genome is a set of instructions from which we can determine the layout of all the proteins used to build and run our body.





DNA is composed of an ordered series of four chemical structures called nucleotide "bases": adenine, thymine, cytosine and guanine, which are abbreviated A, T, C and G. These bases are lined up one after another along the length of a DNA strand. The sequence of these bases acts as a code that can be deciphered to reveal our genetic instructions. A gene is made up of a specific stretch of DNA, typically several thousand bases long. [For more information on "The Genetic Code," see Figure A.]

How does our body read the genetic instructions and use it to make a protein? DNA can't be converted into protein directly, but instead, sends a message describing the gene's instruction, to a protein-making machine. Each particular gene can be "transcribed," or copied, into a related molecule called mRNA (messenger ribonucleic acid) and is then transported to a molecular, protein-making machine called a ribosome. The job of the ribosome is to read the mRNA copy of the gene and assemble the appropriate protein. [For more information on "Making a Protein," see Figure B].

