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Biotech In focus

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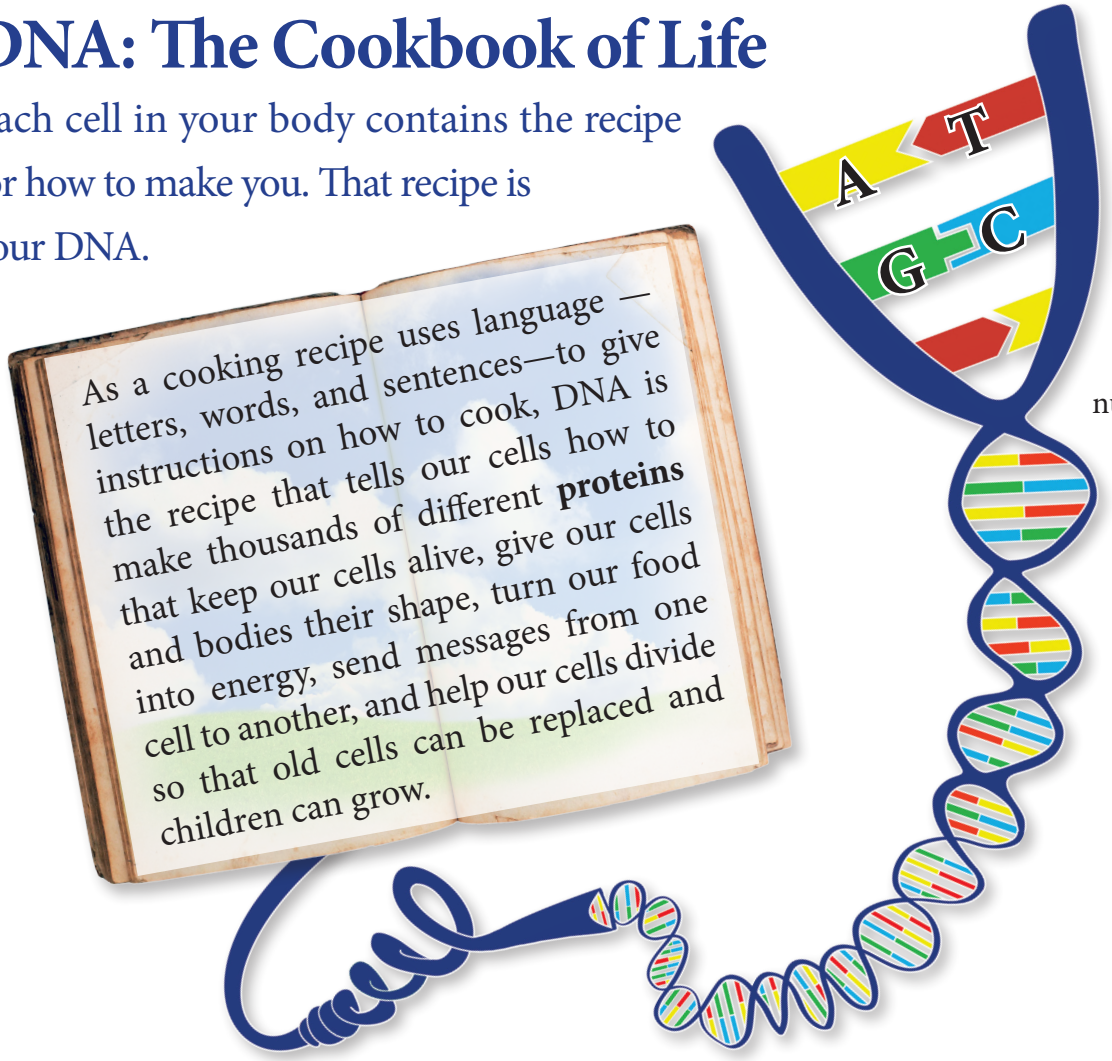
DNA: The Cookbook of Life

Each cell in your body contains the recipe for how to make you. That recipe is your DNA.



DNA

(deoxyribonucleic acid) resembles a twisted ladder, or double helix, made of two chains of molecules called nucleotides. When the two chains of DNA make a ladder, four different varieties, of nucleotides A, T, G, and C come together. G fits with C and A fits with T to form the rungs. This structure protects the DNA molecule and makes it very stable, so that the recipe for life is very reliable.

DNA recipes vary from one individual to the next, and these variations result in differences that we can see, called **traits**. Brown eyes, blue eyes, straight hair, curly hair, and so on are all traits defined by our DNA.

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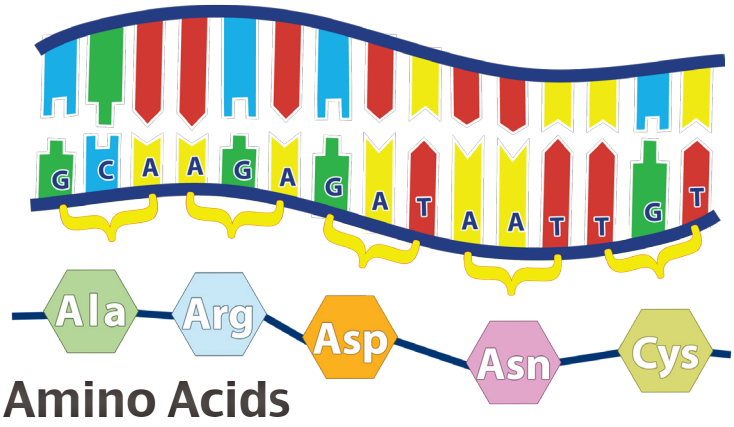
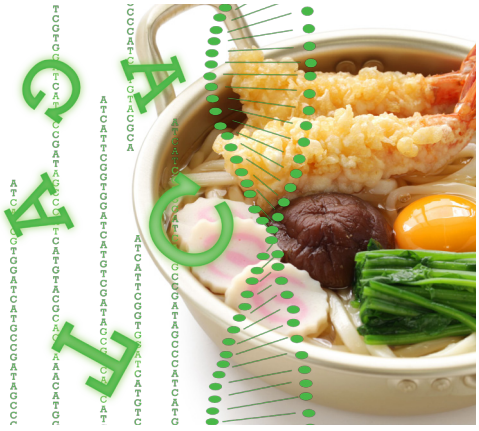
Codons

We can think of A, C, G, and T as the letters in the DNA alphabet. Our cells read these letters in groups of three, called codons. Each **codon** is like a three-letter word that represents an **amino acid**, one of the building blocks for making a protein.

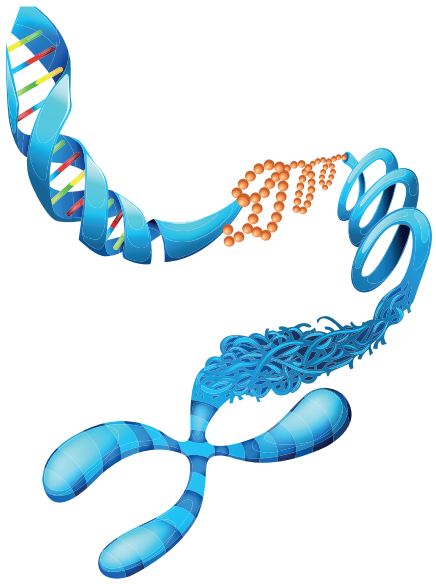


Genes

A string of DNA that contains the recipe for one protein is a called a **gene**. In the same way that a recipe tells the cook which ingredients to add, the order to add them in, and how to mix them together, a gene tells the cell which amino acids should be strung together in what order to make the protein. The gene can also include directions for when to make the protein and how much to make.



Chromosomes



The DNA inside a cell is packaged very tightly into **chromosomes**. Within a human cell, 23 pairs of chromosomes fit in a structure that is one-tenth the width of a human hair, but if you unwound the chromosomes, the DNA would be six feet long.

Genome

The entire cookbook, that is, the complete set of DNA in each cell, is called the **genome**. Each cell contains all of our recipes—our genes—but like a human cook, the cell makes only some of the books' recipes, and many of those are cooked only on special occasions. This lets each cell type do many different tasks while working together in larger groups of cells—tissues, organs, and organ systems—to perform all the functions we need to live.

All living things contain DNA recipes and use them to make proteins. This amazing commonality across all forms of life has made possible many practical uses of our DNA knowledge, some of which have been widely embraced, and some of which remain controversial. Our next issue of Biotech In Focus will address the DNA technologies we encounter in daily life.