

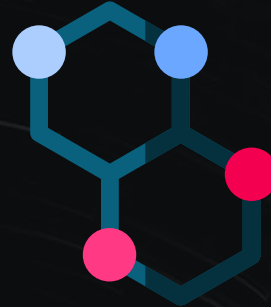
# DNA Structure and Function

DNA is the information molecule. It stores instructions for making other large molecules, called proteins.

These instructions are stored inside each of your cells, distributed among 46 long structures called chromosomes.

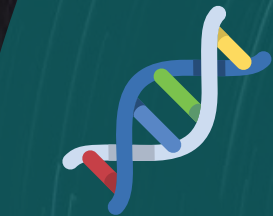
## 1. There are four nucleotide monomers

DNA "letters" have only four "letters", that is, four nucleotide monomers. They have short, easy-to-remember names: A, C, T, G. Each nucleotide monomer consists of three simple molecular parts: sugar, phosphate and nucleobases.



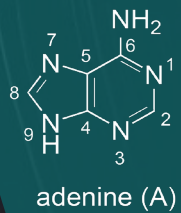
## 2. The molecular structure of DNA

In order to understand the biological function of DNA, you first need to understand its molecular structure. This requires learning vocabulary about the components of DNA and how to assemble these components to make DNA molecules.

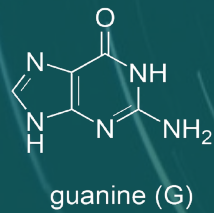


## 3. The sugar and acid in all four monomers are the same

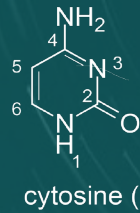
All four nucleotides (A, T, G and C) are made by sticking a phosphate group and a nucleobase to a sugar. The sugar in all four nucleotides is called deoxyribose.



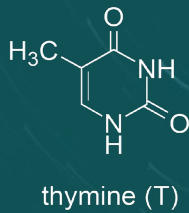
adenine (A)



guanine (G)



cytosine (C)



thymine (T)

## 5. DNA monomers are called nucleotides

DNA polymers are also composed of monomers called nucleotides. DNA molecules are piles of nucleotide monomers, one after another very long chain.



## 4. DNA molecules are Polymers

Polymers are large molecules that are formed by repeatedly connecting small molecules together. Consider how to construct a freight train by linking many individual boxcars together, or how to construct this sentence by pasting specific single letter sequences together.



## 6. Chromosomes are made of two DNA polymers that stick together via non-covalent hydrogen bonds

Chromosomal DNA consists of two DNA polymers that make up a 3-dimensional (3D) structure called a double helix.



**A.** The nucleotide monomers in a DNA polymer are connected by strong electromagnetic attractions called phosphodiester bonds.

**B.** The phosphodiester bonds that join one DNA nucleotide to another always link the 3' carbon of the first nucleotide to the 5' carbon of the second nucleotide.

**C.** In order to keep things organized, biochemists have developed a numbering system for talking about the molecular structure of nucleotides.