

8.2 Structure of DNA

KEY CONCEPT DNA structure is the code of all organisms.

DNA is composed of four types of nucleotides.

Since the 1920s scientists have known the chemical parts of the DNA molecule. DNA is a very long polymer, or chain of repeating units. The units, or monomers, that make up DNA are called **nucleotides** (NOC-lee-oh-ee-oh). Each nucleotide has three parts: a phosphate group, a base, and a sugar.

There are four different types of DNA nucleotides: cytosine (C), thymine (T), adenine (A), and guanine (G). All of the nucleotides contain a phosphate group and a deoxyribose sugar. They differ in their nitrogen-containing bases, as shown in the table below.

Notice that thymine (T) and cytosine (C) have nitrogen-containing bases with a single-ring structure. Adenine (A) and guanine (G) are bases with a double-ring structure. A single molecule of human DNA is made of billions of nucleotides.

NUCLEOTIDE

The small units, or monomers, that make up a strand of DNA are called nucleotides. Nucleotides have three parts.



- phosphate group: one phosphate with four oxygens
- deoxyribose: ring deoxyribose
- nitrogen-containing base: a single or double ring built around nitrogen atoms and carbon atoms

THE FOUR NITROGEN-CONTAINING BASES OF DNA

Pyrimidines – Single Ring

Name of Base	Structural Formula	Model
Thymine		
Cytosine		

Purines – Double Ring

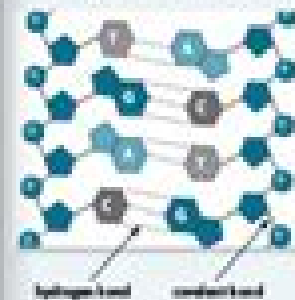
Name of Base	Structural Formula	Model
Adenine		
Guanine		



Circle the names of the four nucleotides shown in the table above.

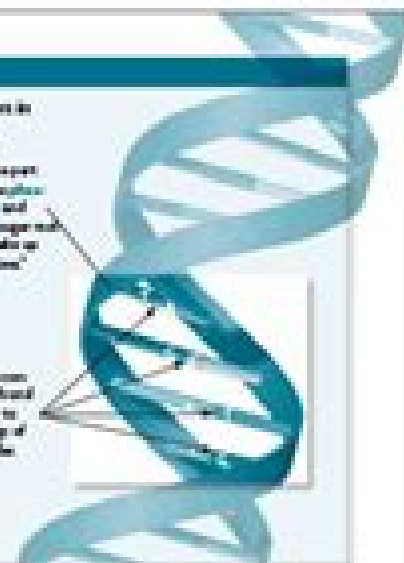
BASE PAIRING RULES

The base pairing rules describe how nucleotides form pairs in DNA. T always pairs with A, and C always pairs with G.



The phosphate group represents the phosphate group and deoxyribose sugar molecules that make up DNA's "backbone."

The nitrogen-containing bases bond in the middle to form the rungs of the DNA ladder.



What sequence of bases would pair with GTACGT?

8.2 Vocabulary Check

Mark It Up

nucleotide
base pairing rules

base pairing rules

Go back and highlight each sentence that has a vocabulary word in bold.



Label the drawing at the right with the terms nucleotide, base pairing rules, and double helix. Write each term and draw a line that connects the term to the appropriate part of the drawing.

8.2 The Big Picture

What are the three different parts of a nucleotide? _____

What are the names of the four nucleotides? _____

Use the base pairing rules to write the sequence that would pair with the following sequence: TCACGT. _____



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