

What does “DNA” stand for?

Deoxyribonucleic acid

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Within which organelle is DNA found in eukaryotic cells?

- Nucleus
- Endoplasmic reticulum
- Ribosome
- Mitochondria
- Plasmid
- Golgi apparatus

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What long polymer molecules serve as the information storage device in a cell?

- Carbohydrates
- Acetylcholine
- Microvilli
- Nucleic acids
- Steroids
- Cyclic AMP

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True or False:
Nucleotides are composed of nucleic acids.

- True
- False – NUCLEIC ACIDS are made of NUCLEOTIDES.
- Nucleic acids are the large polymers that encode information
- Nucleotides are the sub-units of nucleic acids

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What is a nucleotide composed of?
(Select all that apply)

- 5-carbon sugar
- Phosphate group
- Cholesterol
- GABA
- Nitrogenous base
- ATP

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How many different kinds of nucleotides does DNA contain?

- DNA contains four (4) distinct kinds of nucleotides.
- They are:
 - Guanine
 - Cytosine
 - Thymine
 - Adenine

Which component of a nucleotide differs between types of nucleotide?

Nitrogenous base

Describe the different kinds of nucleotides found in DNA.

The four (4) kinds of nucleotide found in DNA vary by size and by the chemical make-up of their nitrogenous bases.

The two larger nucleotides are adenine and guanine. They are double-ringed structures called "purines".

The two smaller nucleotides are cytosine and thymine. They are smaller because they contain only single-ring structures and are called "pyrimidines".

How does a nucleic acid form?

Nucleic acids are long polymers (large molecules formed of long chains of similar molecules called subunits) of repeating subunits called nucleotides.

Nucleic acids are formed when the individual sugars link together in a long line by their phosphate group (the long line is called a polynucleotide chain).

How does the structure of a nucleic acid allow it to store information?

- Nucleic acids act like books.
- Individual nucleotides act as letters of the alphabet.
- The pattern and position of different nucleotides in each polynucleotide chain act as words and code for the creation of different proteins.
- Nucleic acids encode information by varying which nucleotide is positioned at each point in the polymer.
- Strung together, the pattern and order of the individual nucleotides can be "read" to provide a huge amount of information, just like a novel.

Which of the following best describes the structure of DNA

- 2 polynucleotide chains composed of mononucleotides covalently bonded between the sugar of one and the phosphate of another mononucleotides to form a sugar-phosphate backbone. Complementary nitrogenous bases attached to the sugar-phosphate backbone point inward toward each other and are linked by hydrogen bonds.
- 2 nucleotides bonded to the sugar molecule of a carbon isotope by covalent bonds. The isotopes form a sugar-carbon backbone. Complementary phosphoric bases attached to the sugar-carbon backbone point inward toward each other and are linked by covalent bonds.

Why are only two complementary base pairs possible in DNA?

- The four nucleotides are different sizes. Two are large and two are small. The distance between the sugar-phosphate strands which form the DNA double helix is consistent. Connecting the two large nucleotides would make them too bulky to fit. Connecting the two small nucleotides would pinch the strands together.
- Base pairs form by hydrogen bonding, which requires sharing of electrons. Base pairs A and C and G and T can't bond because their electron-sharing atoms are not aligned to each other.

Fill in the blank: Write the nucleotide that bonds to each of the listed nucleotides.

- Adenine (A): Thymine (T)
- Cytosine (C): Guanine (G)
- Guanine (G): Cytosine (C)
- Thymine (T): Adenine (A)

Why are hydrogen bonds so essential to the structure of DNA?

Hydrogen bonds form between the nucleotide pairs and hold the two sugar-phosphate strands of the double helix together.

The backbone of DNA consists of?

- Carbon-sulphur chains
- Sugar-phosphate chains
- Iron-carbon chains
- Lipid-sulphur chains

Describe Rosalind Franklin's contribution to the understanding of DNA structure.

Rosalind Franklin was a British chemist who carried out X-ray diffraction analysis of DNA.

She bombarded DNA molecules with a beam of X-rays.

The DNA molecules diffracted the X-rays and the pattern was captured on photographic film.

The diffraction pattern she obtained suggested that DNA molecule had a corkscrew shape.

Her contribution added to the knowledge about DNA and helped support later discoveries about DNA's structure.

Describe James Watson's and Francis Crick's contribution to the understanding of DNA structure?

James Watson and Francis Crick of Cambridge University worked out the structure of the DNA molecule.

They determined that:

- Each DNA molecule is made up of two chains of nucleotides
- The two chains are intertwined and form a double helix.
- Each DNA molecule is composed of two complementary polynucleotide strands whose nucleotides extend into the interior of the helix.
- The bases from opposite strands form hydrogen bonds with each other to join the two strands.

Label the main components of DNA.

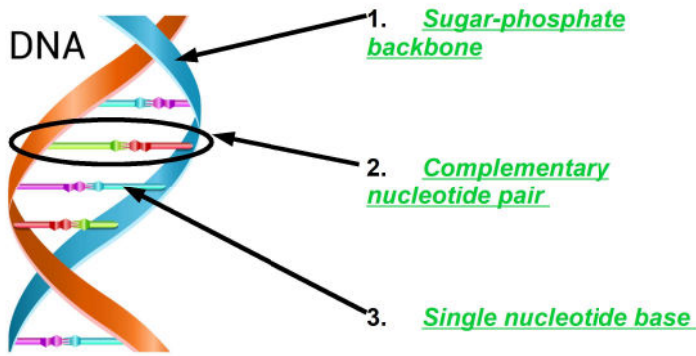


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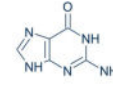
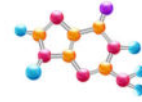
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Label these two DNA nucleotides.

NITROGENOUS BASES



1. Adenine



2. Guanine

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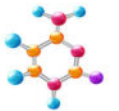
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Label these two DNA nucleotides.



1. Thymine



2. Cytosine

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Resources Consulted

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- Johnson, George B. 2012. *The Living World*. 7th ed. New York: The McGraw-Hill Companies, Inc.

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