

DNA – THE CODE OF LIFE

05 FEBRUARY 2014



Lesson Description

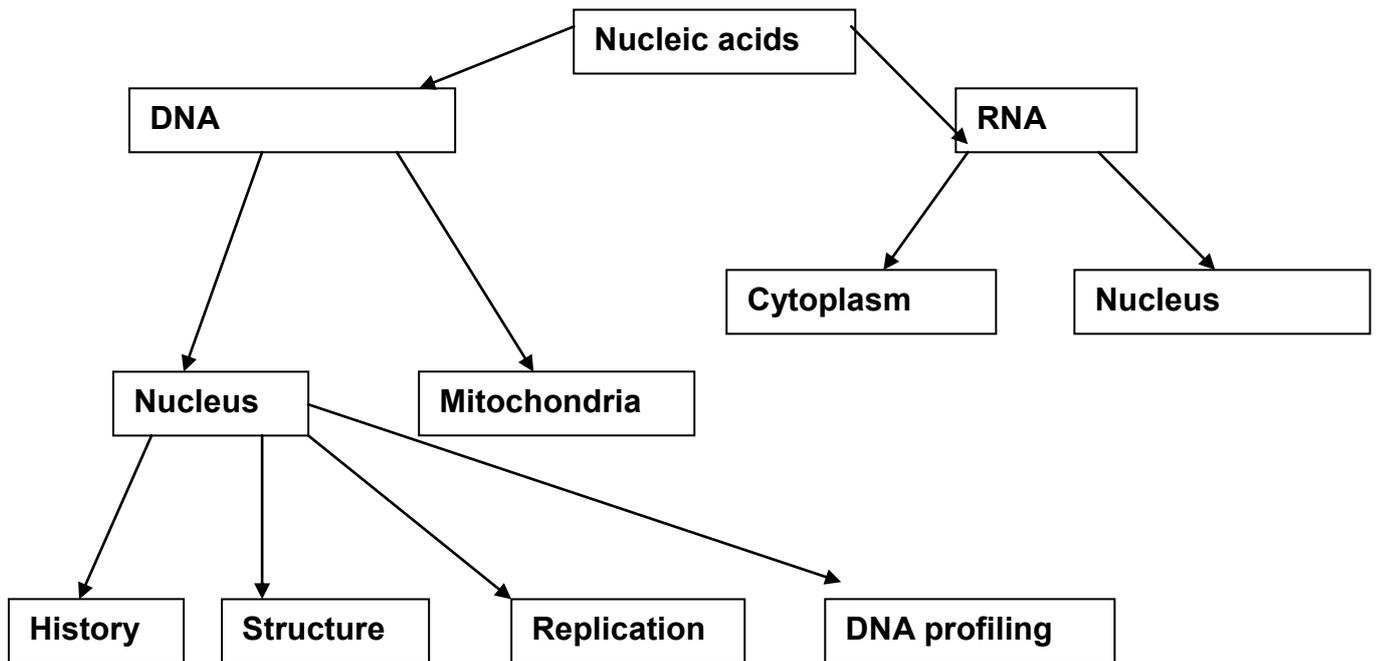
In this lesson we:

- Revise the structure of the cell with an emphasis on the ribosome, cytoplasm and parts of the nucleus
- Name the two types of nucleic acids
- State where DNA is located
- Describe the history of the discovery of the DNA molecule (Watson, Crick & Franklin story)
- Describe the structure and name the three components of a DNA nucleotide as follows:
- State the functions of DNA
- Describe DNA replication



Summary

DNA





Test Yourself

Select the most correct answer from the options given. Write down only the correct letter.

Question 1

Our current knowledge of the structure of DNA comes from

- A James Watson only
- B Francis Crick only
- C Watson and Crick
- D Mendel and Darwin

Question 2

The scientists who also worked on researching the structure at King's College London were

- A Wallace and Lamarck
- B Darwin and Mendel
- C Watson and Crick
- D Franklin and Wilkins

Question 3

The first person who realised that DNA was some sort of double helix from X-ray diffraction pictures was....

- A Rosalind Franklin
- B Maurice Wilkins
- C Francis Crick
- D James Watson

Question 4

The person who "leaked" information of the photo was

- A Rosalind Franklin
- B Maurice Wilkins
- C Francis Crick
- D James Watson

Question 5

Which of the following statements about nucleic acids and nucleotides is correct?

- A nucleic acids are monomers of nucleotides
- B nucleic acids are acids and nucleotides are bases
- C nucleotides are monomers of nucleic acids
- D nucleotides are large and nucleic acids are small

Question 6

After DNA replication, chromosomes appear

- A as a chromatid
- B double stranded
- C single stranded
- D as single stranded daughter chromosomes

Question 7

Which feature of the DNA molecule listed below is NOT always the same?

- A The order of the bases on a single chain of the molecule
- B The arrangement of the sugar-phosphate groups
- C The pairing of adenine with thymine and guanine with cytosine
- D The weak hydrogen bonds between the bases

Question 8

Provide the correct biological term for each of the following

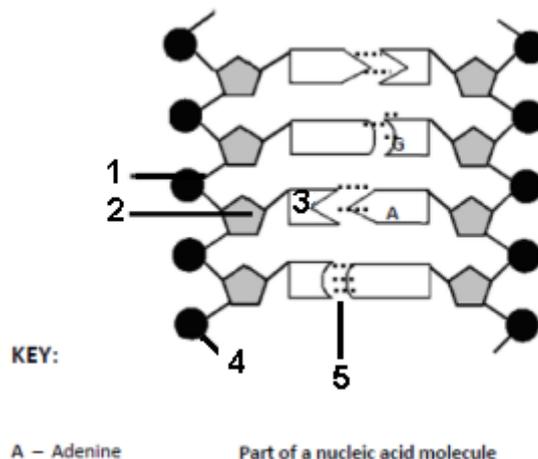
- a.) Bonds that holds nitrogenous bases together in DNA
- b.) The nitrogenous base that combines with Adenine in DNA
- c.) The type of sugar molecule in DNA
- d.) The phase during which DNA replicates prior to cell division
- e.) An arrangement of black bars representing DNA fragments, used to determine whether people are related



Improve your Skills

Question 1

Study the diagram below which represents a part of a nucleic acid molecule and answer the questions that follow.



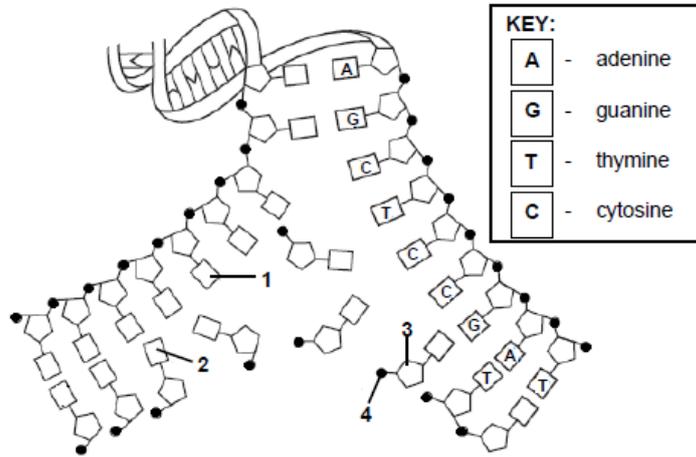
- a.) Identify the nucleic acid shown in the diagram above. (1)
- b.) Label the following:
 - Part 1
 - Part 2
 - The nitrogenous base 3 (3)

notes for...

- c.) What is the collective name for the parts numbered 1, 2 and 3? (1)
 d.) Comment on the significance of the nature of the bond labelled 4. (2)

Question 2

The diagram below shows part of a DNA molecule in a nucleus just before cell division.



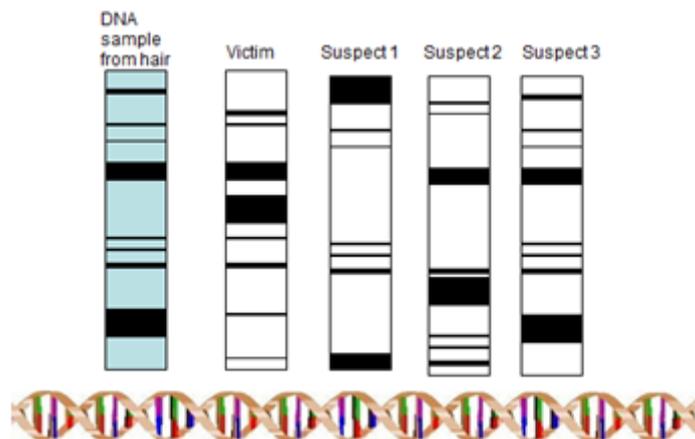
- 2.1. Identify the parts labelled:
 a.) 3
 b.) 4
- 2.2. Identify the nitrogenous bases labelled:
 a.) 1
 b.) 2
- 2.3 Explain why the diagram above represents replication and not transcription.

Question 3

Read the following case study and answer the questions that follow:

Inspector Ndlovu was investigating the scene of a violent crime. The victim was a 70 –year old woman. She was stabbed and left to die. They found a few pieces of hair in one of her hands. There was also skin under her nails.

They arrested three possible suspects. DNA samples were taken from all three and the victim. DNA fingerprint samples of the four samples were compared with the DNA fingerprints taken from the crime scene. The following diagram illustrates the DNA fingerprints.



notes for...

- a.) Identify the suspect responsible for the crime out of the above evidence.
- b.) Provide a reason for your answer above.
- c.) Suggest a reason for comparing the victim's DNA with the other samples.
- d.) Do you think that the DNA evidence on its own is enough to convict a suspect? Explain your answer.



Links

- Gr 12 Learn Xtra Lessons:
<http://www.youtube.com/watch?v=XocvZSQYMIk&list=PLOaNAktW5HLQOqIIPY7QGcEGHpCm9RgtY&index=1>
- DNA molecule: <http://www.dnaftb.org/19/animation.html>