

Unit 1 Cell Biology Revision Questions

Key Area 3 DNA and the production of proteins

1. Which of the following represents the sequence of events in the production of a protein from the genetic code?

- A DNA → amino acids → mRNA → protein
- B DNA → mRNA → amino acids → protein
- C mRNA → DNA → amino acids → protein
- D amino acids → DNA → mRNA → protein

2. Which of the following shows the correct DNA base pairing?

- | | | | |
|---|-------|---|-------|
| A | A – C | B | A – T |
| | C – G | | C – G |
| | G – C | | G – T |
| | T – A | | T – A |
| C | A – G | D | A – T |
| | C – G | | C – G |
| | G – A | | G – C |
| | T – A | | T – A |

3. The diagram represents part of a DNA molecule.

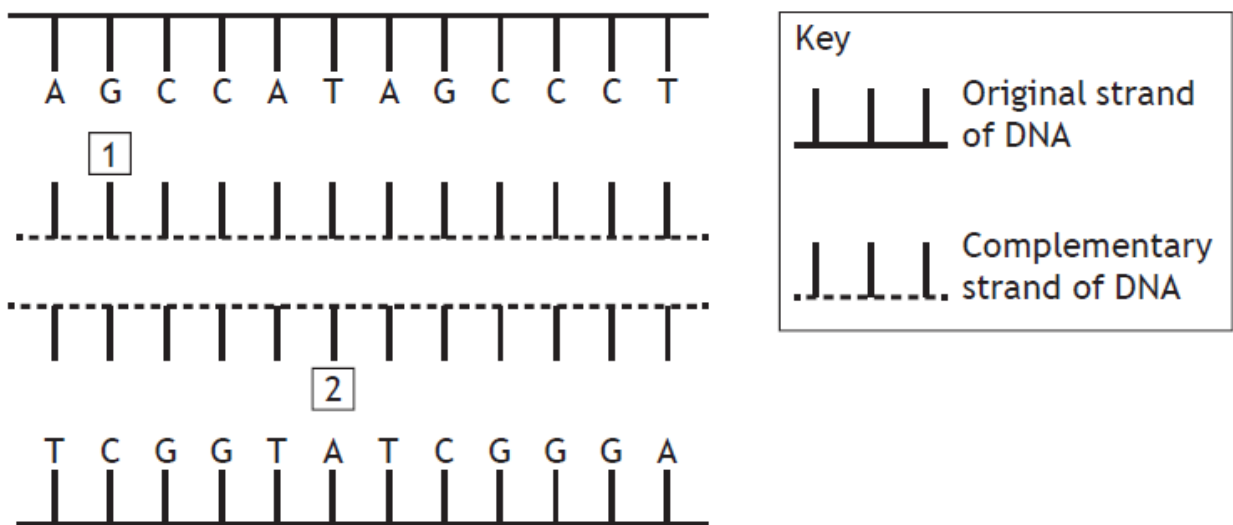


(a) (i) Give the term which describes the shape of a DNA molecule as shown in the diagram. 1

(ii) Describe the way in which the DNA strands are linked together. 1

(b) Name the organelle in animal cells which stores the DNA. 1

4. (a) Forensic scientists can take small quantities of DNA and use a process to make large quantities. Each DNA molecule is separated and used to make two complementary strands as shown below.



Give the full names of bases labelled 1 and 2 in the diagram above. 2

1 _____

2 _____

- (b) The bases in a strand of DNA make up the code for the production of proteins. The DNA for every individual person varies.

Describe the way in which this code differs from person to person.

1

- (c) Name the single stranded molecule which carries a complementary copy of the code from the DNA in the nucleus to the ribosome for protein synthesis.

1

5.

- (a) DNA is a double stranded molecule. The following diagram shows part of one strand. Complete the diagram to show the complementary strand.



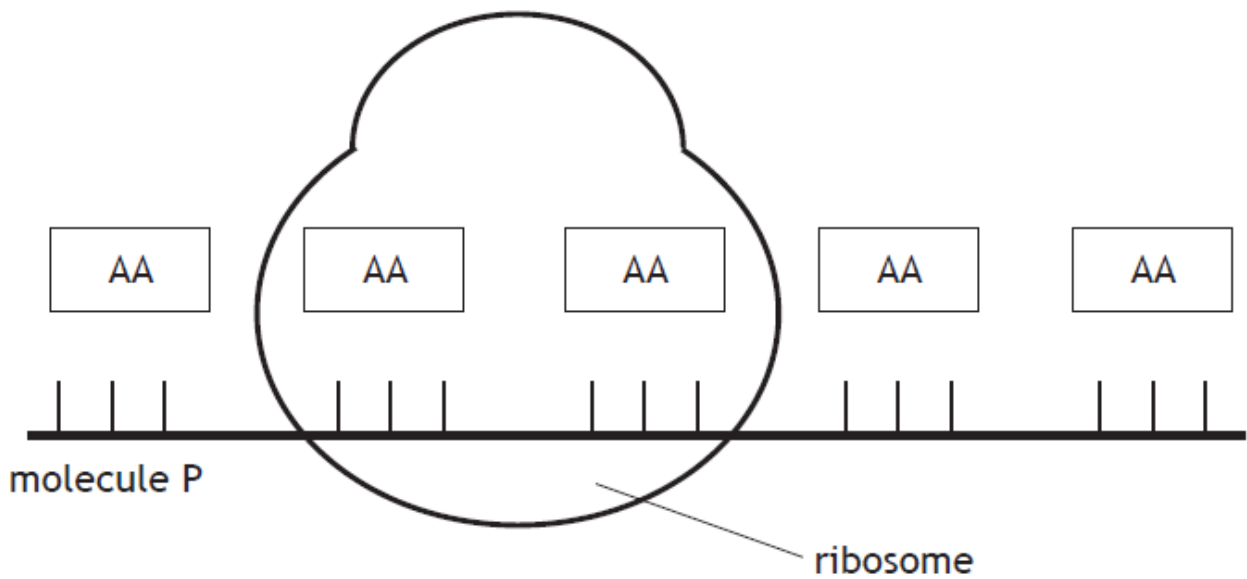
1

- (b) (i) DNA contains genetic material which controls the synthesis of chemicals made from amino acids.

Name the type of chemicals synthesised.

1

- (ii) The diagram below shows an example of one of these chemicals being synthesised.



Name molecule P and describe how it determines the sequence of amino acids, represented by , as shown in the diagram.

2

Molecule P _____

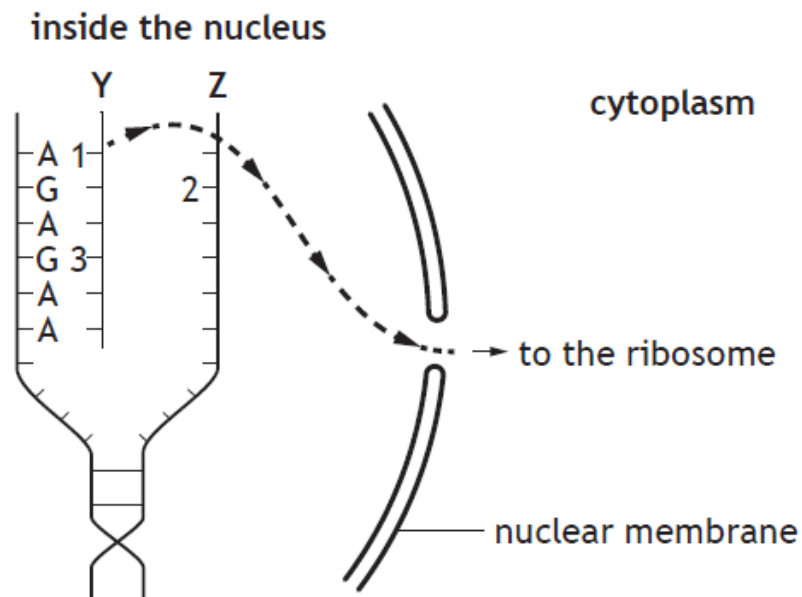
Description _____

- (iii) Name the part of the cell where molecule P was made.

1

6.

The diagram shows how genetic information in the nucleus is used in the first stage of making a protein.



(a) (i) Name molecule Y.

1

(ii) Underline one option in each bracket to complete the following sentences.

2

The molecules represented by the letter A are { bases
amino acids
proteins. }

The complementary strand Z would have the letter { A
C
G
T } at position 2 in the diagram.

(b) State the name given to a section of DNA which codes for a protein. 1

(c) The diagram above shows a section of the code to make a protein such as the enzyme amylase.

Describe how the code to make the protein insulin would differ from this. 1

7.

A study was carried out into the percentage of amino acids present in the blood of people with different diets.

One group tested were meat eaters and the other group were vegetarians.

In both groups, samples were analysed to show the percentage of amino acids in their food and in their blood after digesting the food.

The results are shown in the table.

<i>Amino acid</i>	<i>Amino acid present (%)</i>			
	<i>Meat eaters</i>		<i>Vegetarians</i>	
	<i>In food</i>	<i>In blood</i>	<i>In food</i>	<i>In blood</i>
Arginine	5.5	1.6	6.4	1.4
Leucine	8.0	5.4	7.0	5.0
Lysine	6.4	6.4	4.8	4.8
Serine	4.8	5.4	5.0	5.4
Threonine	4.0	3.8	3.8	3.8
Tyrosine	3.2	2.0	3.0	1.8

(a) Select the amino acid which

(i) is least well absorbed into the blood in both groups; 1

(ii) is completely absorbed from food into blood in both groups; 1

(iii) must be obtained from other sources as well as from food. 1

(b) Calculate the simple, whole number ratio for tyrosine to serine in the blood of vegetarians. 1

Space for calculation

_____ : _____
tyrosine serine

(c) On the grid below, add a scale and complete the remaining 5 bars to show the percentage of amino acids in the blood of both groups.

2

(An additional grid, if required, can be found on page 29)

