D1.2 Protein synthesis

What the Cell · DP Biology · worksheet · SL statements D1.2.1–11

Name _____ **Date** _____ **Total** _____ / 45

About 45 minutes, or one section at a time. You will need a table of mRNA codons. The number of marks shows how many separate points to make.

Section A: Recall

9 marks

1 **State** the name of the enzyme that carries out transcription. D1.2.1 **[1]**

2 A DNA template strand reads C A T G G A. **Write** the mRNA. D1.2.2 **[1]**

3 **Distinguish** between a codon and an anticodon. D1.2.7 **[2]**

4 **Define** gene expression. D1.2.4 **[1]**

5 **State** the type of bond that joins amino acids in a polypeptide. D1.2.10 **[1]**

6 **State** the number of different codons, and the number of amino acids they code for. D1.2.8 **[2]**

7 **State** the part of a ribosome to which mRNA binds. D1.2.6 **[1]**

Section B: Understanding

16 marks

8 **Describe** the process of transcription. D1.2.1, D1.2.2 **[4]**

9 **Explain** why a triplet code is needed, and not a code of two bases. D1.2.8 **[2]**

10 **Explain** what the universality of the genetic code suggests about living organisms. D1.2.8 **[2]**

11 **Explain** why stability of DNA is important in cells that do not divide. D1.2.3 **[2]**

12 Liver cells and neurons in one person contain the same genes. **Explain** why they make different proteins. D1.2.4 **[2]**

13 **Describe** one cycle of elongation in translation. D1.2.10 **[4]**

Section C: Working with sequences

12 marks

14 D1.2.9

A section of mRNA reads: A U G U U U C G U G G A U A A

a **Deduce** the amino acid sequence. **[2]**

b **Deduce** the DNA template strand for the first three codons. **[1]**

c **State** the anticodon for the second codon. **[1]**

d The third codon changes from C G U to C G C. **Deduce** the effect on the polypeptide, giving a reason. **[2]**

15 D1.2.11

Part of the non-template strand of a normal gene for beta-globin reads C C T G A G G A G. In the sickle cell allele, it reads C C T G T G G A G.

a **Deduce** the mRNA for each allele. **[2]**

b **Deduce** how the amino acid sequence differs. **[2]**

c **Outline** how this changes red blood cells at low oxygen. **[2]**

Section D: Longer answer

8 marks

16 **Explain** how the information in a gene is used to make a polypeptide. D1.2.1–10 **[8]**