D1.2 Protein synthesis (HL)

What the Cell · DP Biology · worksheet · HL statements D1.2.12–19

Name _____ **Date** _____ **Total** _____ / 40

About 40 minutes, or one section at a time. The number of marks shows how many separate points to make.

Section A: Recall

10 marks

1 **State** the direction in which RNA polymerase builds RNA. D1.2.12 **[1]**

2 **Name** the proteins that must bind the promoter before RNA polymerase can. D1.2.13 **[1]**

3 **State** two kinds of DNA sequence that do not code for polypeptides. D1.2.14 **[2]**

4 **State** two changes made to eukaryotic pre-mRNA before it leaves the nucleus. D1.2.15 **[2]**

5 **State** the anticodon of the initiator tRNA. D1.2.17 **[1]**

6 **Name** the small protein used to tag proteins for breakdown. D1.2.19 **[1]**

7 **Name** a heart muscle protein made in different forms by alternative splicing. D1.2.16 **[1]**

8 **Name** the part of proinsulin removed to make insulin. D1.2.18 **[1]**

Section B: Understanding

14 marks

9 **Explain** the roles of the A, P and E sites during elongation. D1.2.17 **[3]**

10 **Explain** how alternative splicing allows one gene to code for more than one protein. D1.2.16 **[3]**

11 **Outline** how translation is started. D1.2.17 [3]

12 **Explain** why cells need proteasomes. D1.2.19 [2]

13 **Explain** why a human gene put into bacteria must be a copy with no introns. D1.2.15 [3]

Section C: Working with evidence

10 marks

All data in this section are invented for practice. The patterns are realistic.

14 D1.2.18

Pancreatic beta cells were given radioactive amino acids for one minute, then non-radioactive ones. At intervals, the percentage of the radioactivity in each form of insulin was measured.

Time / min	1	5	20	60	120
Pre-proinsulin / %	60	10	1	0	0
Proinsulin / %	40	88	85	40	10
Insulin / %	0	2	14	60	90

a **Describe** the changes in proinsulin. [2]

b **Explain** why pre-proinsulin disappears so quickly. [2]

c **Deduce**, using the data, the order in which the three forms are made. [2]

d **Suggest** where in the cell proinsulin is converted to insulin, using the timing. [2]

e Doctors measure C-peptide in the blood to estimate how much insulin a person makes. **Explain** why this works. [2]

Section D: Longer answer

6 marks

15 **Explain** how a eukaryotic gene is transcribed and its transcript processed before translation. D1.2.13–15 **[6]**