C2.1 Chemical signalling (HL)

What the Cell · DP Biology · worksheet · HL statements C2.1.1–14

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

9 marks

1 **Define** ligand. C2.1.1 **[1]**

2 **State** one example each of a steroid hormone, a protein hormone and an amine hormone. C2.1.4 **[3]**

3 **Name** the second messenger in the action of adrenaline. C2.1.10 **[1]**

4 **State** the target cells of progesterone named in the course. C2.1.13 **[1]**

5 **Name** the amino acid phosphorylated by the insulin receptor. C2.1.11 **[1]**

6 **Distinguish** between hormones and neurotransmitters in the distance they travel. C2.1.5 **[2]**

Section B: Understanding

15 marks

7 **Explain** why steroid hormones have intracellular receptors but insulin has a transmembrane receptor. C2.1.6 **[3]**

8 **Explain** how binding of acetylcholine to its receptor changes the membrane potential. C2.1.8 **[3]**

9 **Outline** how a G protein-coupled receptor passes a signal into a cell. C2.1.9 [3]

10 **Explain** how insulin increases glucose uptake by a muscle cell. C2.1.11 [3]

11 **Distinguish** between positive and negative feedback, with an example of each. C2.1.14 [3]

Section C: Working with evidence

10 marks

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

12 C2.1.2, C2.1.14

Vibrio fischeri was grown in flasks. Cell density and light output per cell were measured every two hours. A second culture was given extra autoinducer from the start.

Time / h	0	2	4	6	8	10
Cell density / 10^8 cells cm^{-3}	0.1	0.3	1.0	3.0	8.0	10.0
Light per cell, normal culture / arbitrary units	1	1	2	40	95	100
Light per cell, extra autoinducer added	60	85	95	98	100	100

a **Describe** the change in light per cell in the normal culture. **[2]**

b **Estimate** the cell density at which light production switches on. **[1]**

c **Explain** the results of the culture given extra autoinducer. **[2]**

d **Explain** why light production rises so steeply once it begins. **[2]**

e **Suggest** why it is an advantage to the bacteria to make light only at high density. **[2]**

f **State** one variable that should be kept the same in both cultures. **[1]**

Section D: Longer answer

6 marks

13 **Compare** how adrenaline and oestradiol affect their target cells. C2.1.10, C2.1.12 **[6]**