B2.1 Membranes and membrane transport (HL)

What the Cell · DP Biology · worksheet · HL statements B2.1.11–17

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 **State** the effect of cholesterol on membrane fluidity at low temperature. B2.1.12 **[1]**

2 **Distinguish** between phagocytosis and pinocytosis. B2.1.13 **[2]**

3 **State** the number of sodium ions and potassium ions moved in one cycle of the sodium-potassium pump, and the direction of each. B2.1.15 **[2]**

4 **Name** the group of cell-adhesion molecules that usually join cells to the extracellular matrix. B2.1.17 **[1]**

5 **Outline** the role of tight junctions between intestinal epithelium cells. B2.1.17 **[2]**

6 **Name** the neurotransmitter that opens the channel of the nicotinic receptor. B2.1.14 **[1]**

Section B: Understanding

15 marks

7 **Explain** how the fatty acid composition of phospholipids affects membrane fluidity. B2.1.11 **[3]**

8 **Explain** how the structure of cholesterol determines its position in the bilayer. B2.1.12 **[2]**

9 **Explain** why exocytosis depends on the fluidity of membranes. B2.1.13 [2]

10 **Outline** how the sodium-potassium pump uses ATP to move ions. B2.1.15 [3]

11 **Explain** why glucose uptake by sodium-dependent cotransporters is called indirect active transport. B2.1.16 [2]

12 **Compare** voltage-gated and neurotransmitter-gated ion channels. B2.1.14 [3]

Section C: Working with evidence

10 marks

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

13 B2.1.11, B2.1.12

Groups of carp were kept at 5, 15 or 25 °C for four weeks. The phospholipids in their liver cell membranes were then analysed.

Water temperature / °C	Unsaturated fatty acids / % of total	Cholesterol / % of membrane lipid
5	68	17
15	59	20
25	49	24

a **Describe** the relationship between water temperature and the percentage of unsaturated fatty acids. **[1]**

b **Calculate** the percentage increase in unsaturated fatty acids from 25 °C to 5 °C. **[2]**

c **Explain** the advantage to the carp of the change in fatty acids at 5 °C. **[2]**

d **Suggest** why the cholesterol content is higher at 25 °C. **[2]**

e Membranes from the 5 °C and 25 °C groups were both tested at 15 °C. **Predict** which would be more fluid. **[1]**

f **Suggest** why the change in membrane composition takes days, not minutes. **[2]**

Section D: Longer answer

6 marks

14 **Explain** how cells lining the small intestine absorb glucose against its concentration gradient. B2.1.15, B2.1.16 **[6]**