



ANSWER BOOK

The fluid mosaic model: what a membrane is made of

Membranes and transport across cells · Unit B04

AQA 3.2.3 · OCR A 2.1.5 (a)–(c) · Edexcel A Topic 4.5 · CAIE 4.1

5 questions · 18 marks

NAVY EDITION

SECTION A · Short, 1 to 2 marks

- A1** **B1** glycoprotein: a membrane protein with a carbohydrate chain attached. **B1** glycolipid: a phospholipid with a carbohydrate chain attached. [2]
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SECTION B · Standard, 3 to 5 marks

- B1** **B1** a phospholipid is amphipathic: the phosphate head is hydrophilic and the two fatty acid tails are hydrophobic. **B1** the heads face the water on both surfaces while the tails are buried between them, facing each other. **B1** no bonds join one phospholipid to the next; this arrangement is simply the one of lowest energy, because it hides the greatest number of tails from water. **B1** an open edge would leave hydrophobic tails exposed to water, so a fragment closes on itself rather than remaining as a sheet. [4]
- B2** **B1** at high temperature cholesterol binds to the fatty acid tails around it and restricts their movement. **B1** so the membrane is less fluid than it would otherwise be and does not become leaky. **B1** at low temperature cholesterol sits between the tails and stops them packing closely together. **B1** so the membrane keeps some fluidity instead of setting solid and cracking, and stays intact. [4]
- B3** **B1** a channel protein is a pore lined with hydrophilic amino acids, whereas a carrier protein has a binding site shaped to fit one kind of molecule. **B1** a substance passes through the open channel, whereas a carrier protein changes shape to move the substance across. **B1** channels carry water-soluble ions such as sodium, potassium and chloride, whereas carriers take larger polar molecules such as glucose and amino acids. **B1** channels are used in facilitated diffusion only, whereas carrier proteins are used in both facilitated diffusion and active transport. [4]
- B4** **B1** cutting ruptures the cells at the cut surfaces, which releases pigment that has nothing to do with the temperature being tested. **B1** absorbance is therefore raised at every temperature, including those at which the membranes are undamaged. **B1** the readings at low temperature overstate the permeability, so the rise caused by temperature itself is masked. **B1** any one control variable named: size and number of discs, volume of distilled water, time in the water bath, time before the reading is taken, or the age and variety of the beetroot. [4]
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