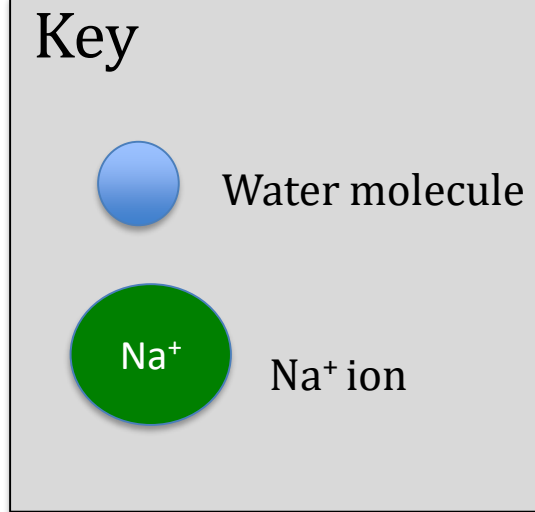
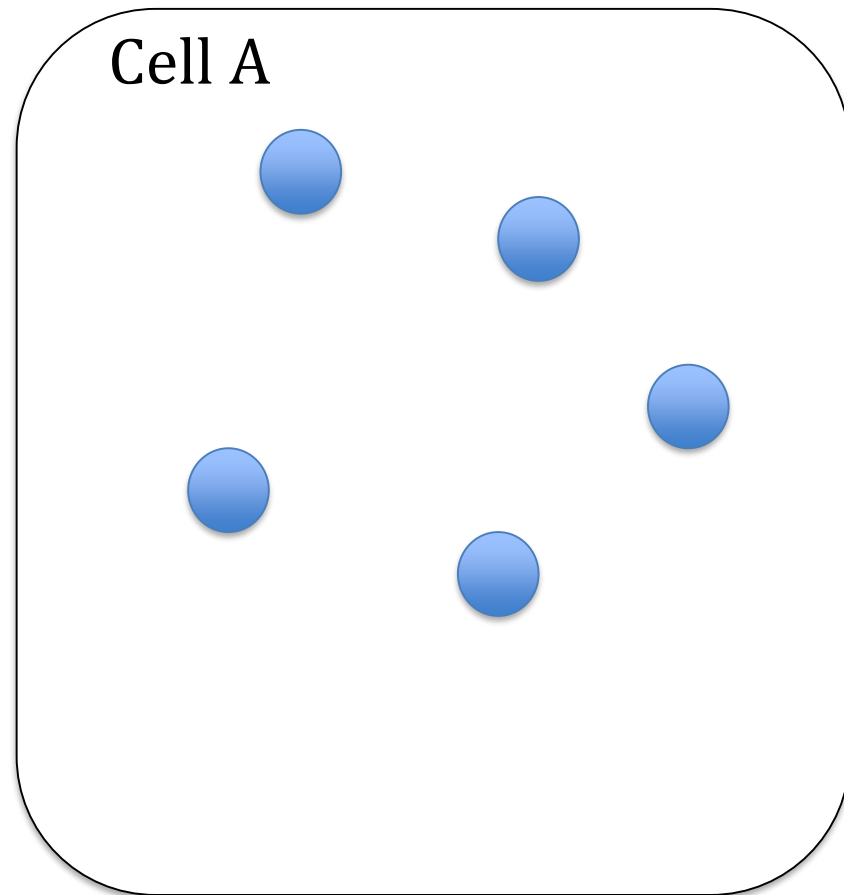


<b>Topic</b>	Osmosis	<b>Level</b>	GCSE (or any course for students aged 11-16)
<b>Outcomes</b>	<ul style="list-style-type: none"> <li>• Be able to explain the process of osmosis as involving the spontaneous net movement of water molecules from an area of higher water concentration to an area of lower water concentration, through a partially permeable membrane</li> <li>• Understand the terms net movement and passive transport</li> <li>• Understand why osmosis requires a membrane</li> </ul>		
<b>Information for teachers</b>	<ul style="list-style-type: none"> <li>• Read the progression model on slide 2 to make sure all concepts have been taught. Then get students to work individually on each multiple choice question and then discuss answers in pairs. Or, use each slide within your existing lessons to <u>check for understanding</u>. Answers are in the notes section of the PPT file.</li> </ul>		

## Progression of ideas needed to understand osmosis

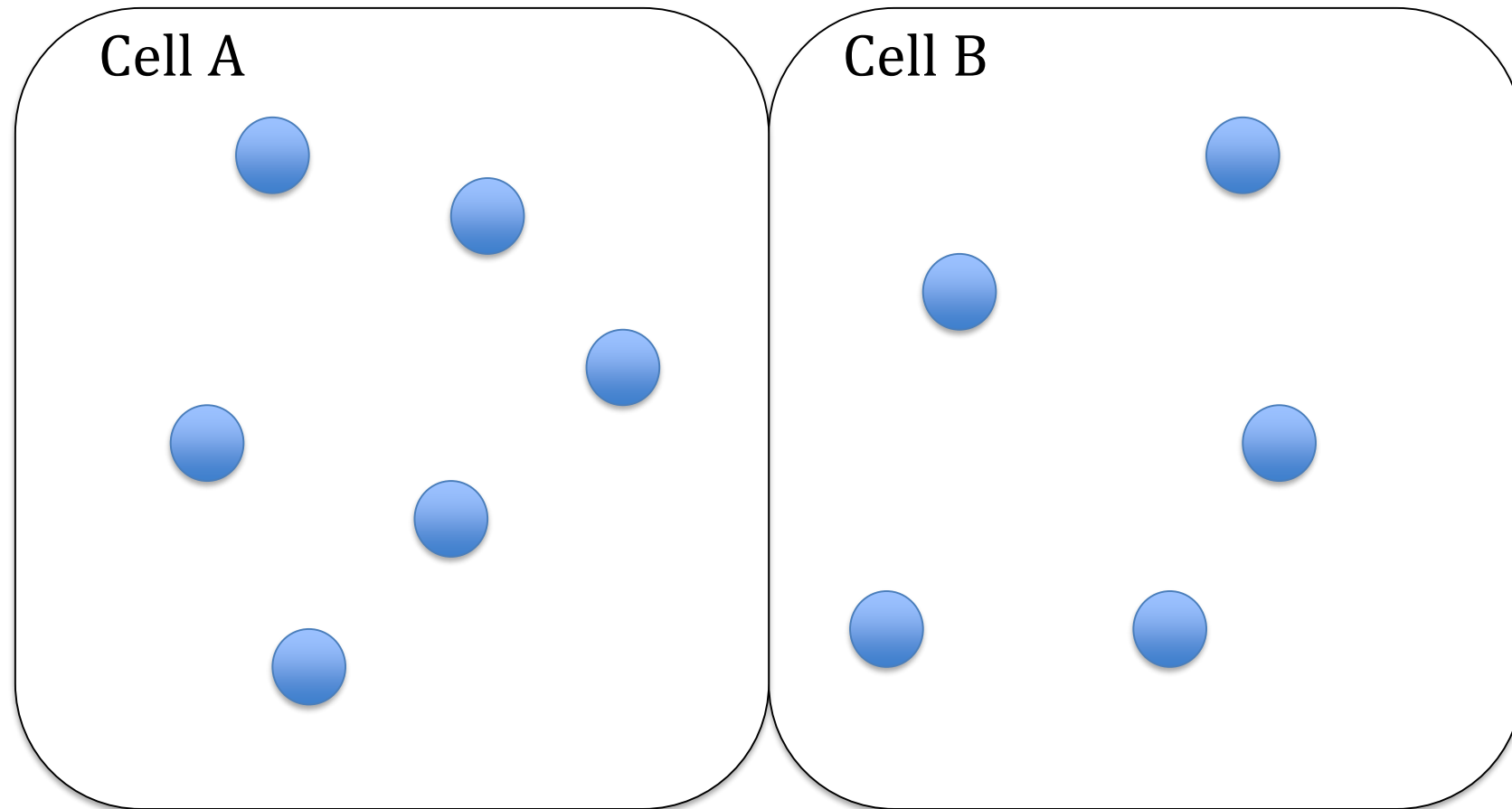
1. Diffusion is the net movement of particles from an area of higher concentration to an area of lower concentration.
2. Diffusion does not require the addition of energy. It is a passive process.
3. A solute dissolves in a solvent to form a solution.
4. A concentrated salt solution contains a relatively low concentration of water and a high concentration of salt.
5. Water molecules can pass freely through cell membranes but large or charged solute particles can't e.g.  $\text{Na}^+$  ions.
6. When a solute dissolves in water the concentration of water molecules decreases.
7. Water will move from an area of higher water concentration to an area of lower water concentration.
8. The net movement of water is the overall direction in which water will move.
9. When this takes place through a membrane we call this osmosis.



This is a model diagram of a cell containing water molecules.

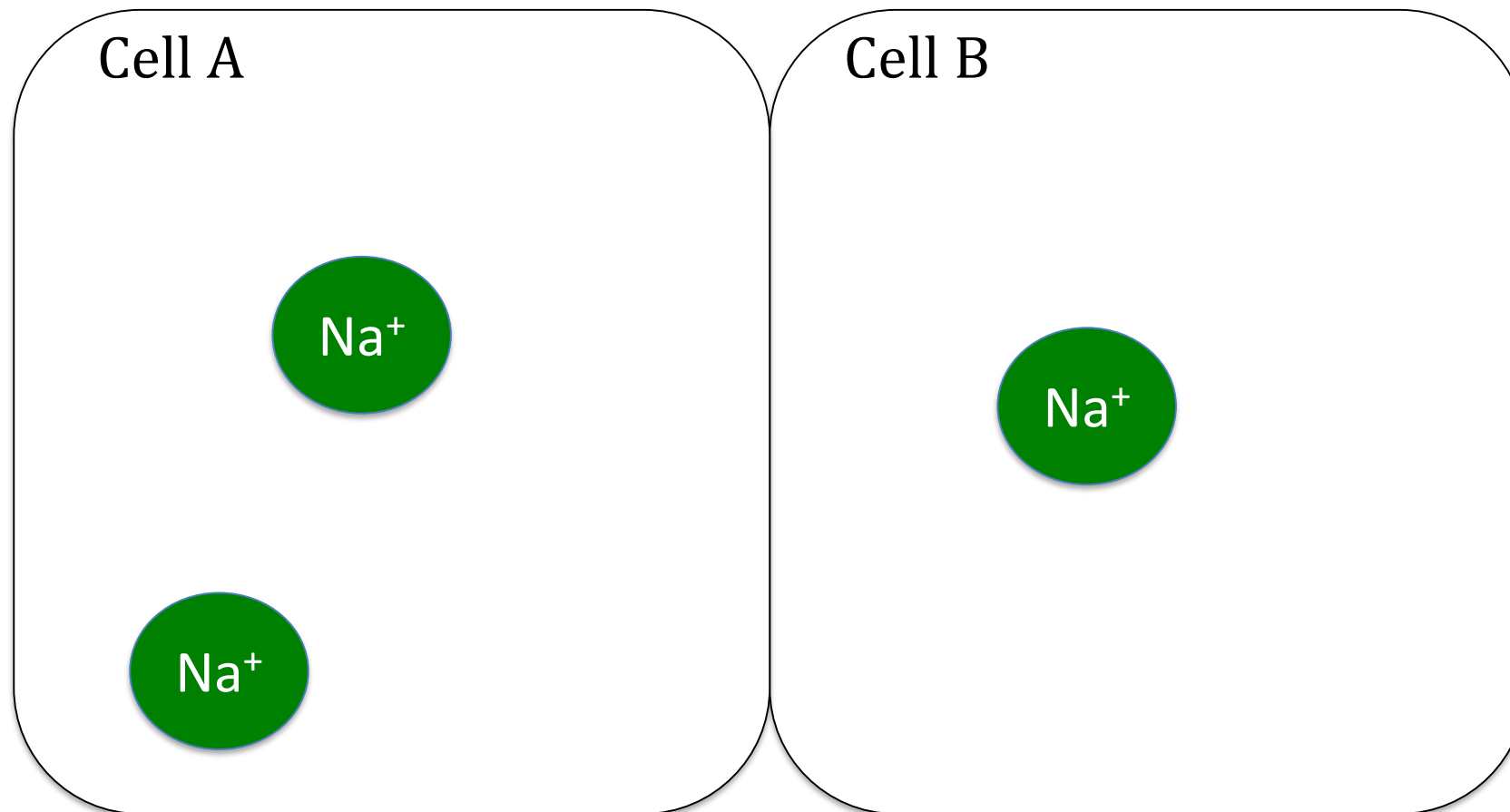
Which features does this model show? Circle the correct answer(s)

- a) some water molecules
- b) all water molecules
- c) the cell membrane
- d) the nucleus



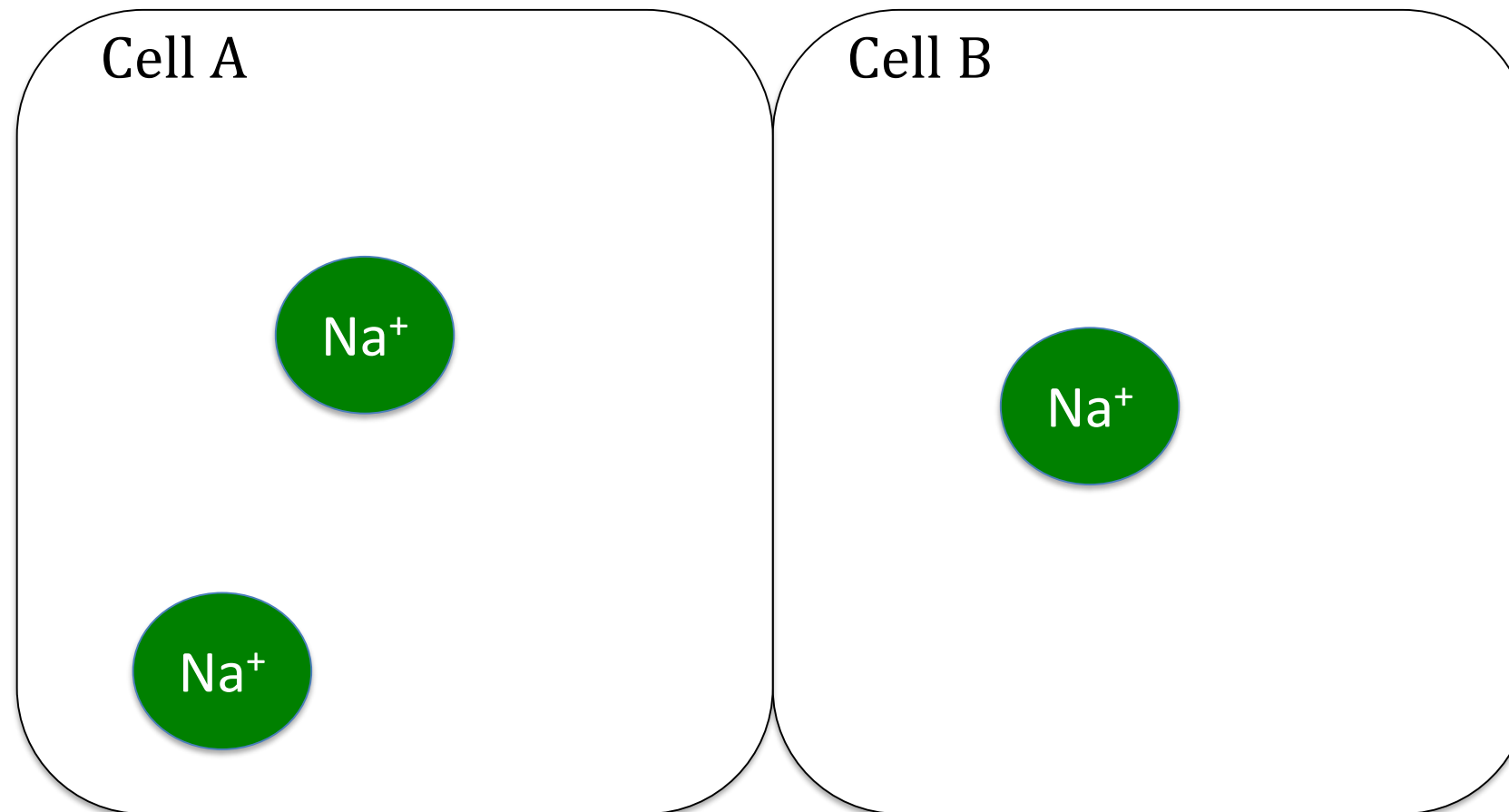
Water molecules will:

- a) move from cell A to cell B
- b) move from cell B to cell A
- c) move spontaneously back and forth between cell A and cell B
- d) not move



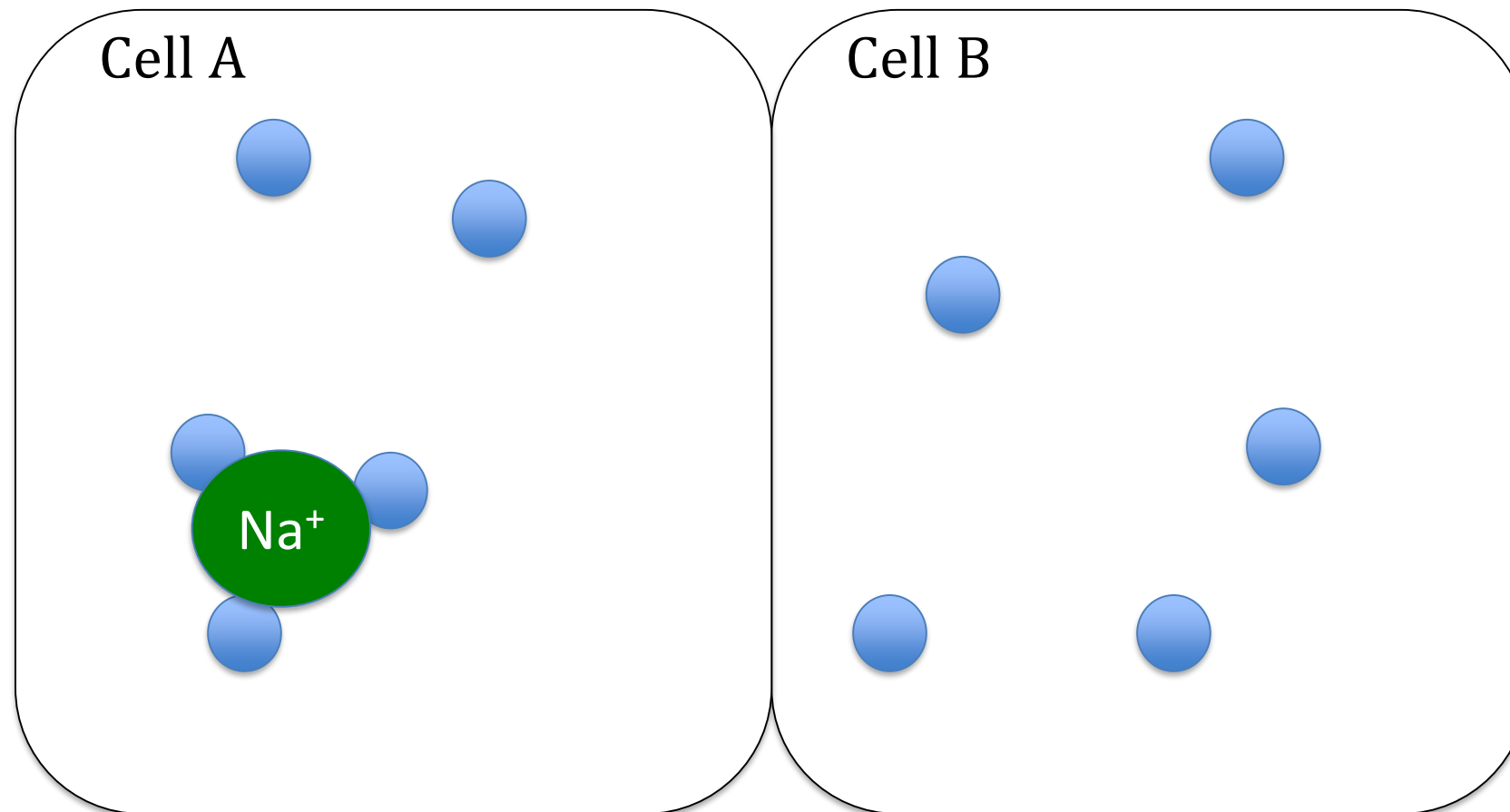
Na<sup>+</sup> ions will:

- a) move freely from cell A to cell B through the membrane
- b) move freely from cell B to cell A through the membrane
- c) move freely from cell A to cell B and cell B to cell A through the membrane
- d) not move freely through the membrane



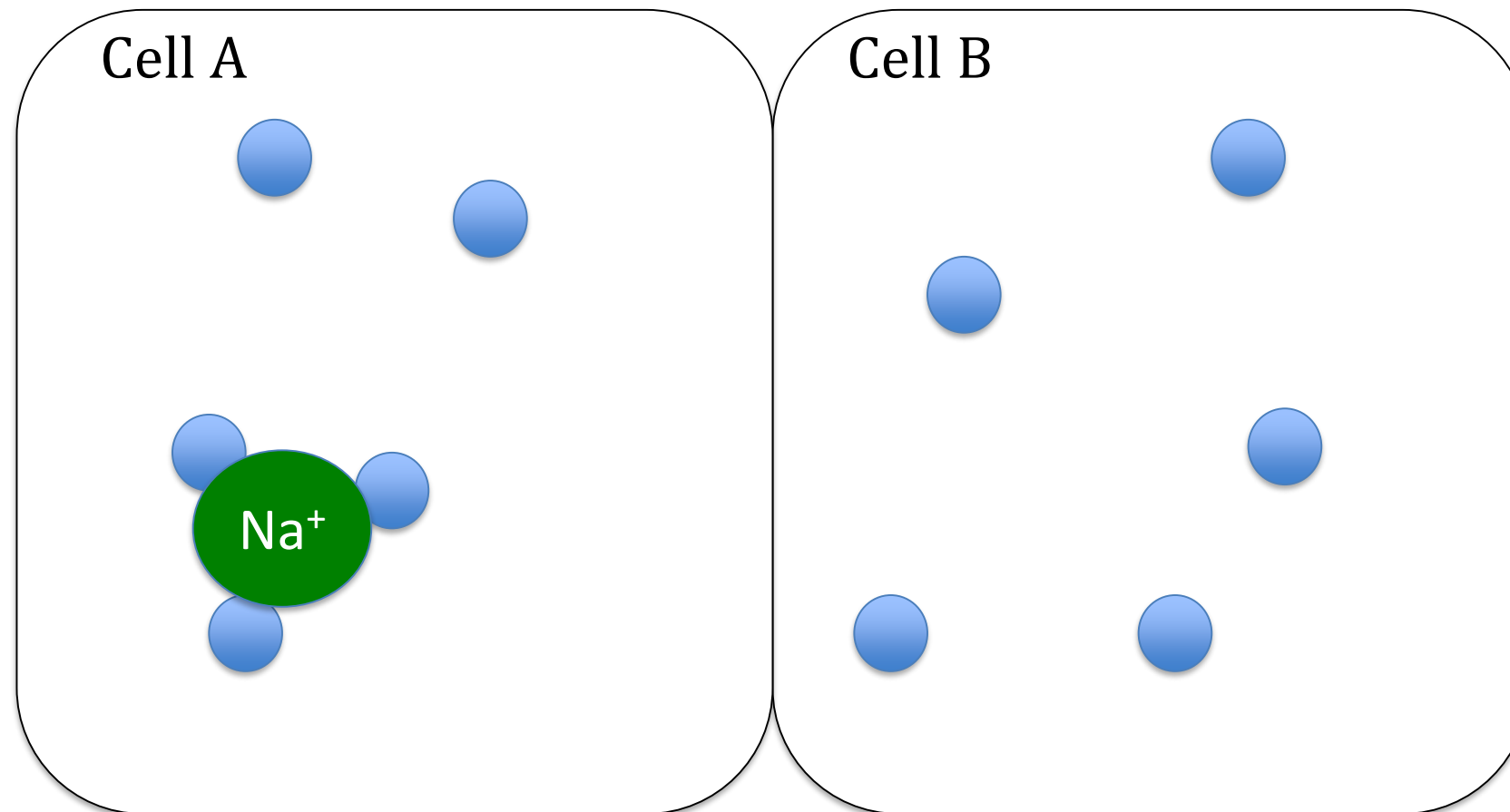
Na<sup>+</sup> ions will not move freely through the membrane because:

- a) Na<sup>+</sup> ions don't move
- b) Na<sup>+</sup> ions are too large
- c) Na<sup>+</sup> ions are charged



Which statement describes correctly what has happened in cell A?

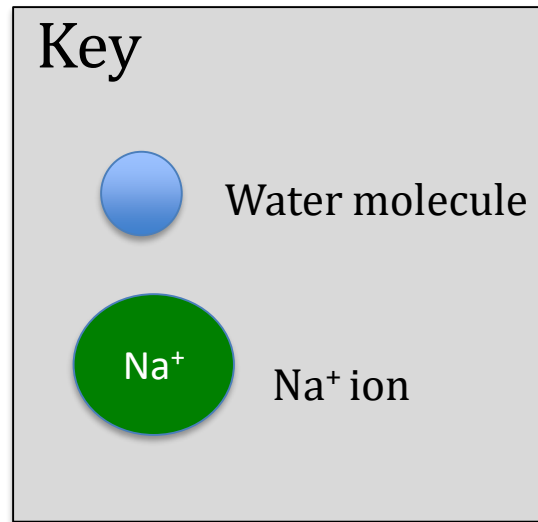
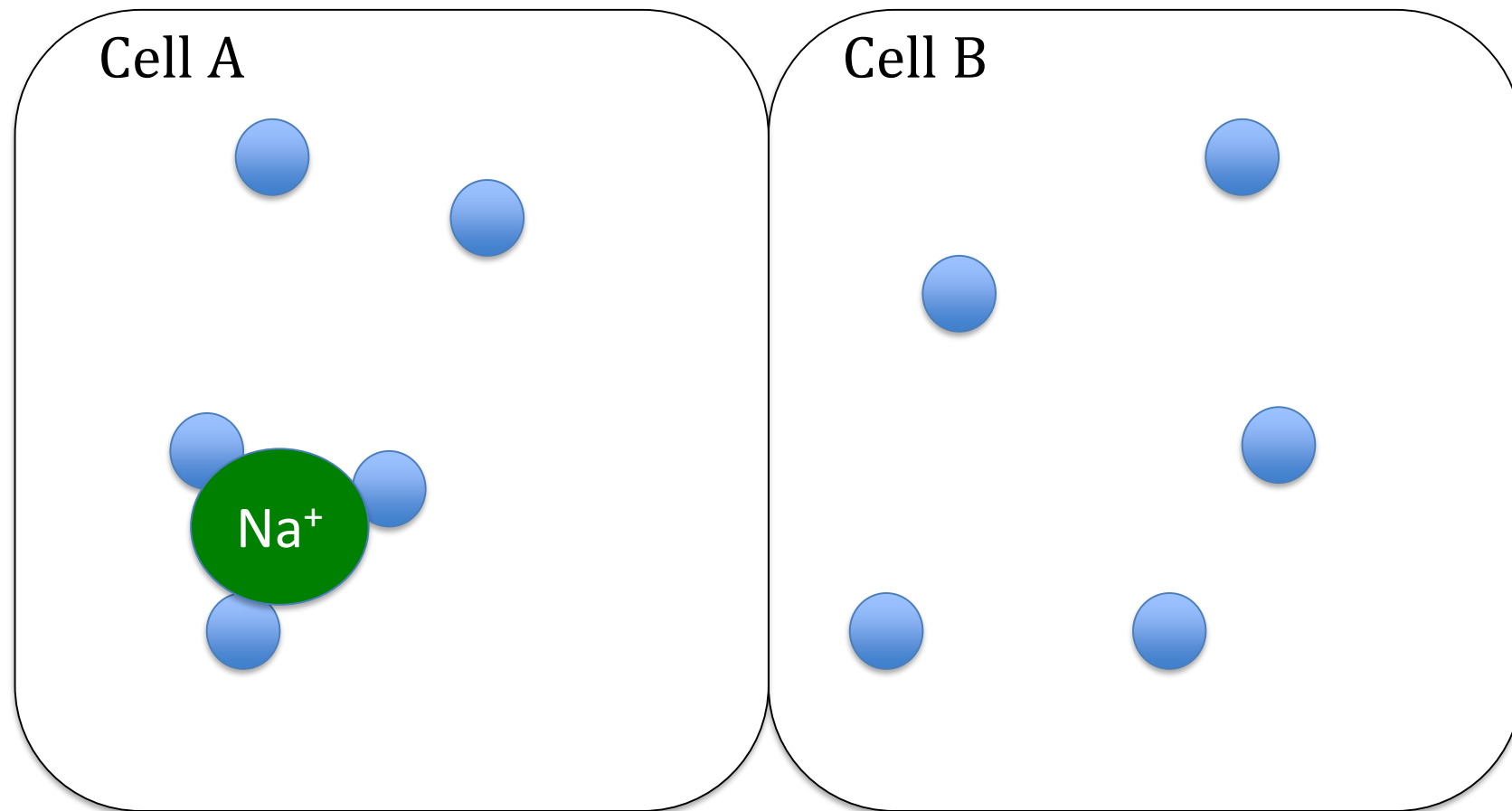
- a)  $\text{Na}^+$  ions have dissolved in water and increased the water concentration
- b)  $\text{Na}^+$  ions have dissolved in water and decreased the water concentration
- c)  $\text{Na}^+$  ions have reacted with the water molecules
- d) none of the above



Which statement is true about the concentration of water in cell A?

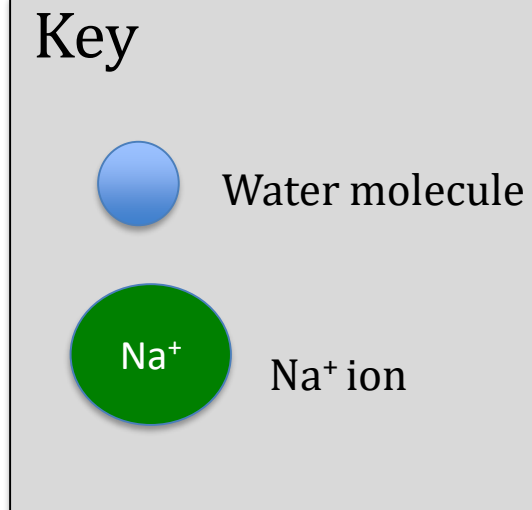
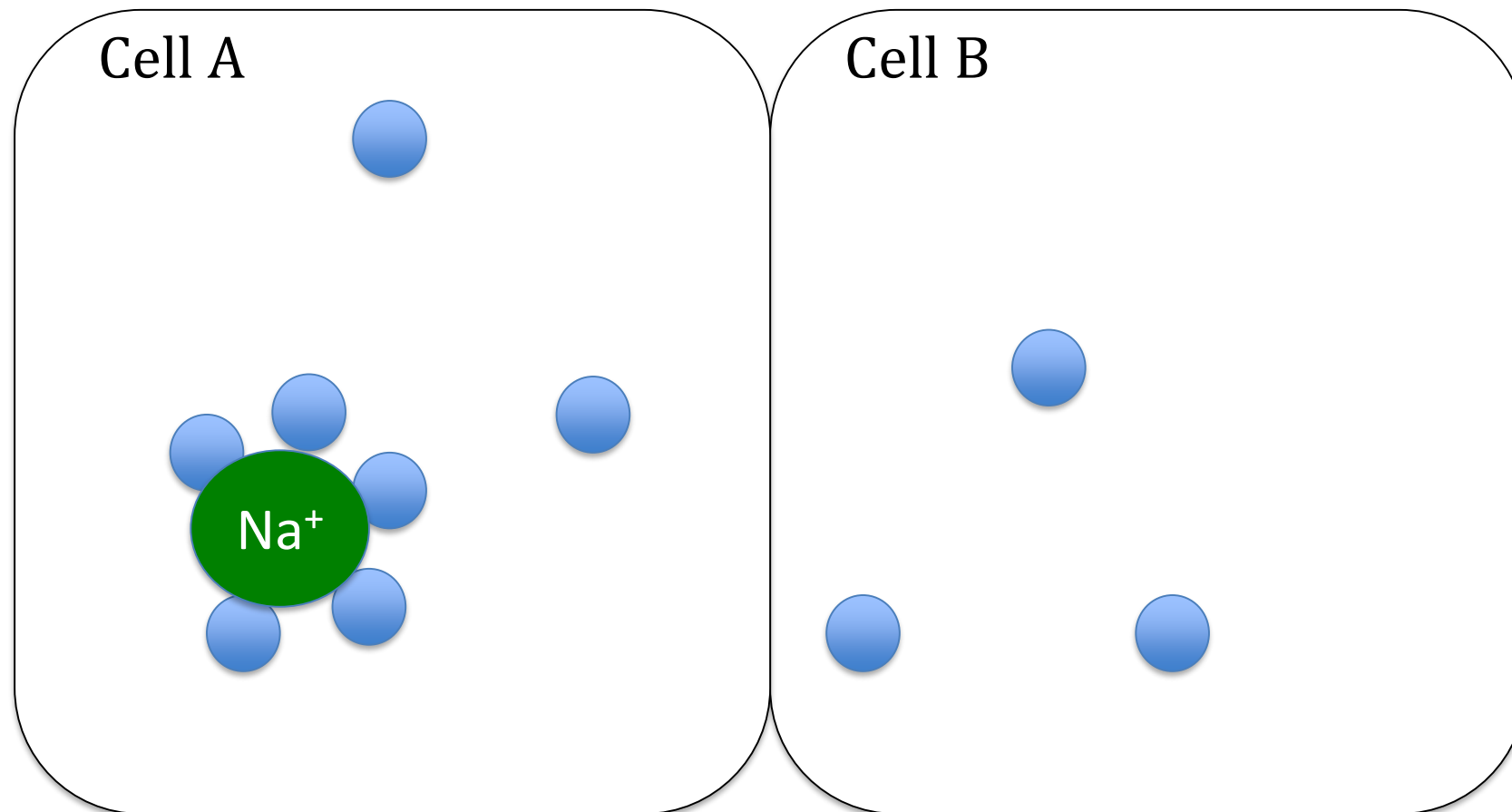
- a) cell A has a lower concentration of water molecules than cell B
- b) cell A and cell B have the same concentration of water molecules
- c) cell A has a higher concentration of water molecules than cell B
- d) cell A has fewer water molecules than cell B





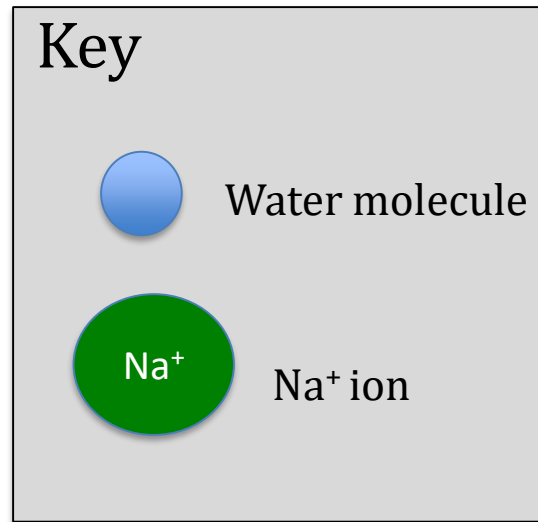
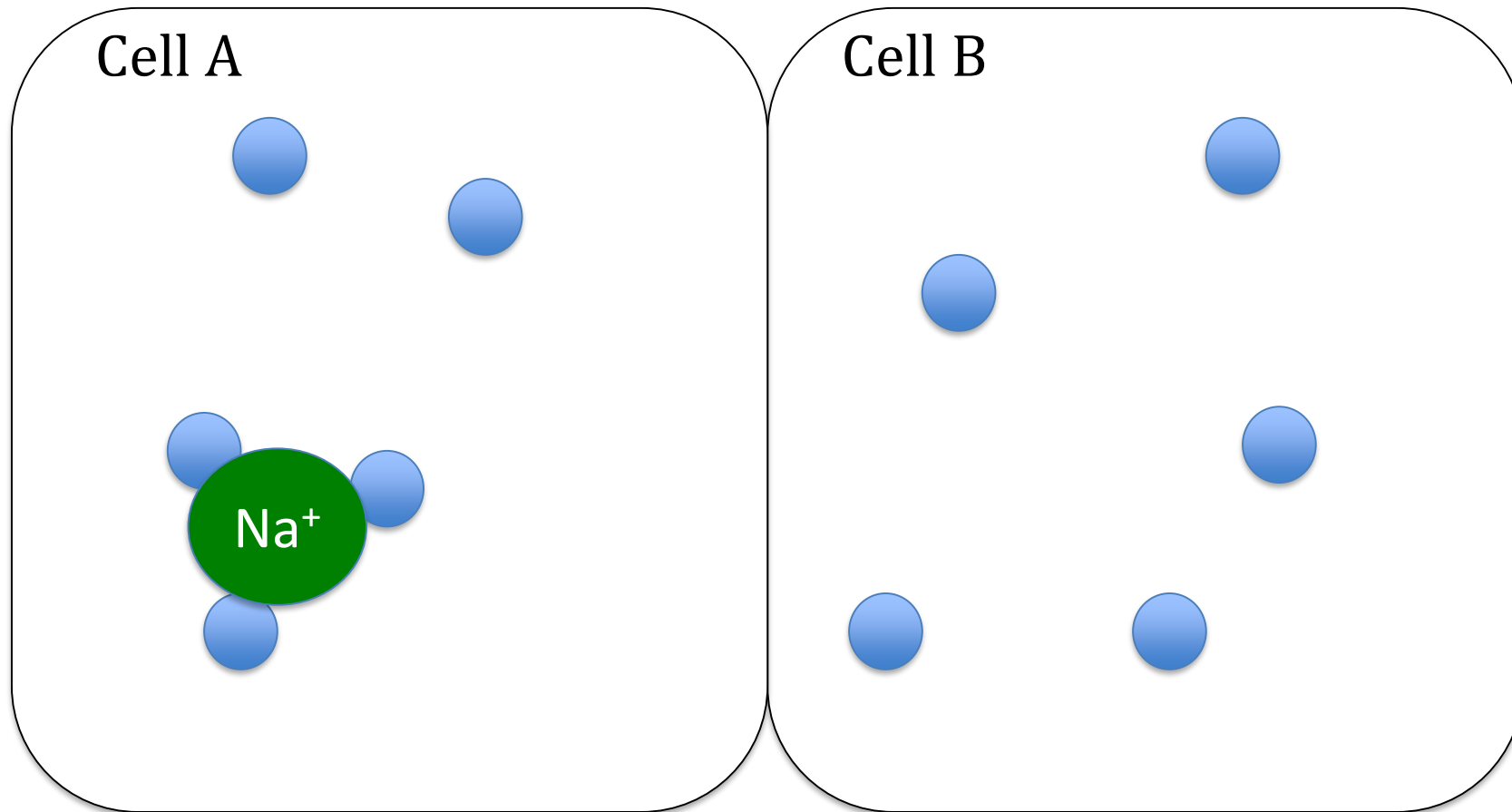
In which direction will the net movement of water molecules occur?

- a) from cell A to cell B
- b) from cell B to cell A
- c) water won't move



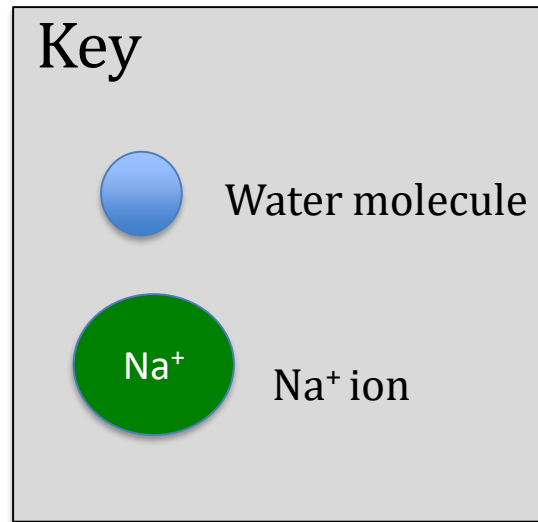
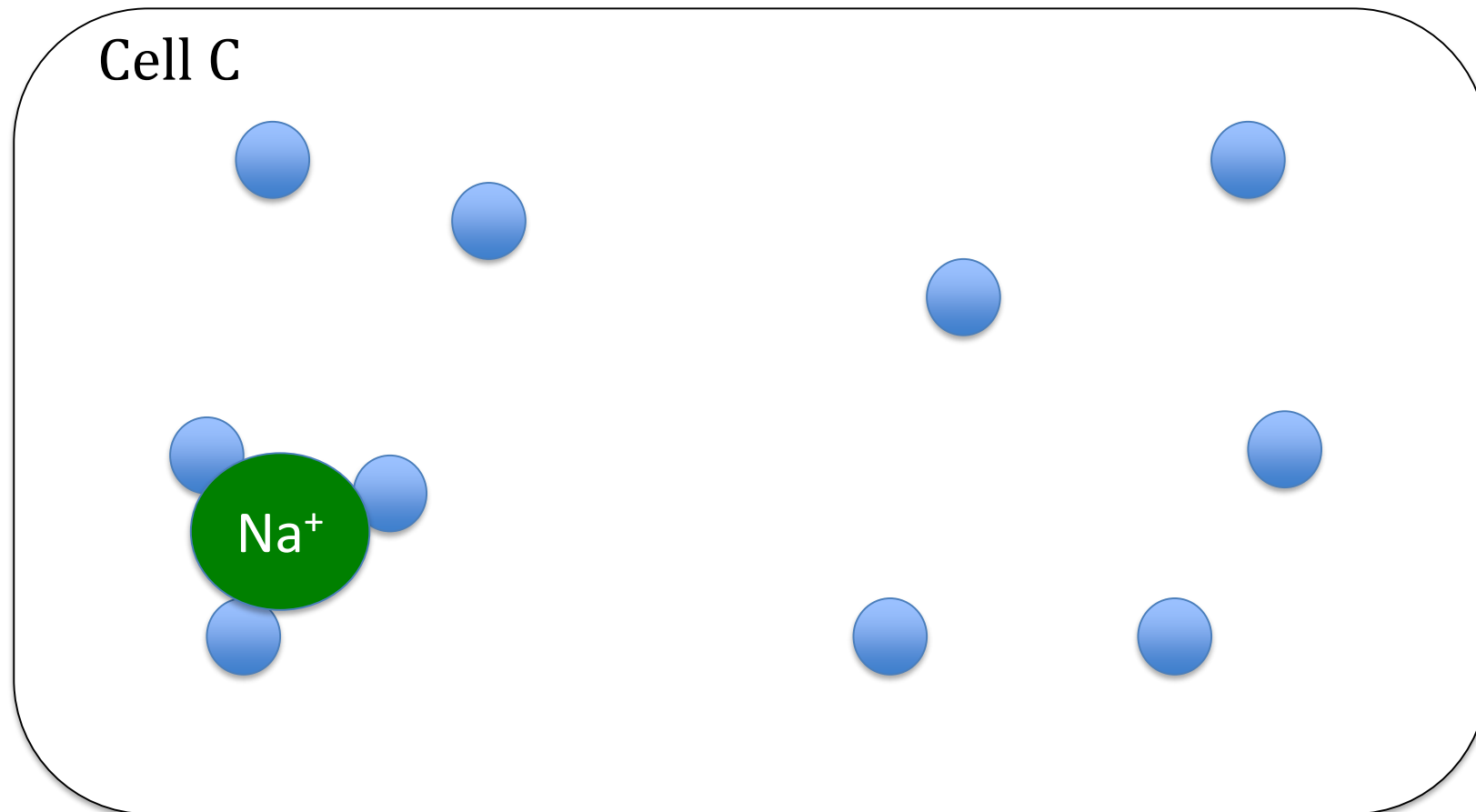
In which direction will the net movement of water molecules occur?

- a) from cell A to cell B
- b) from cell B to cell A
- c) water won't move

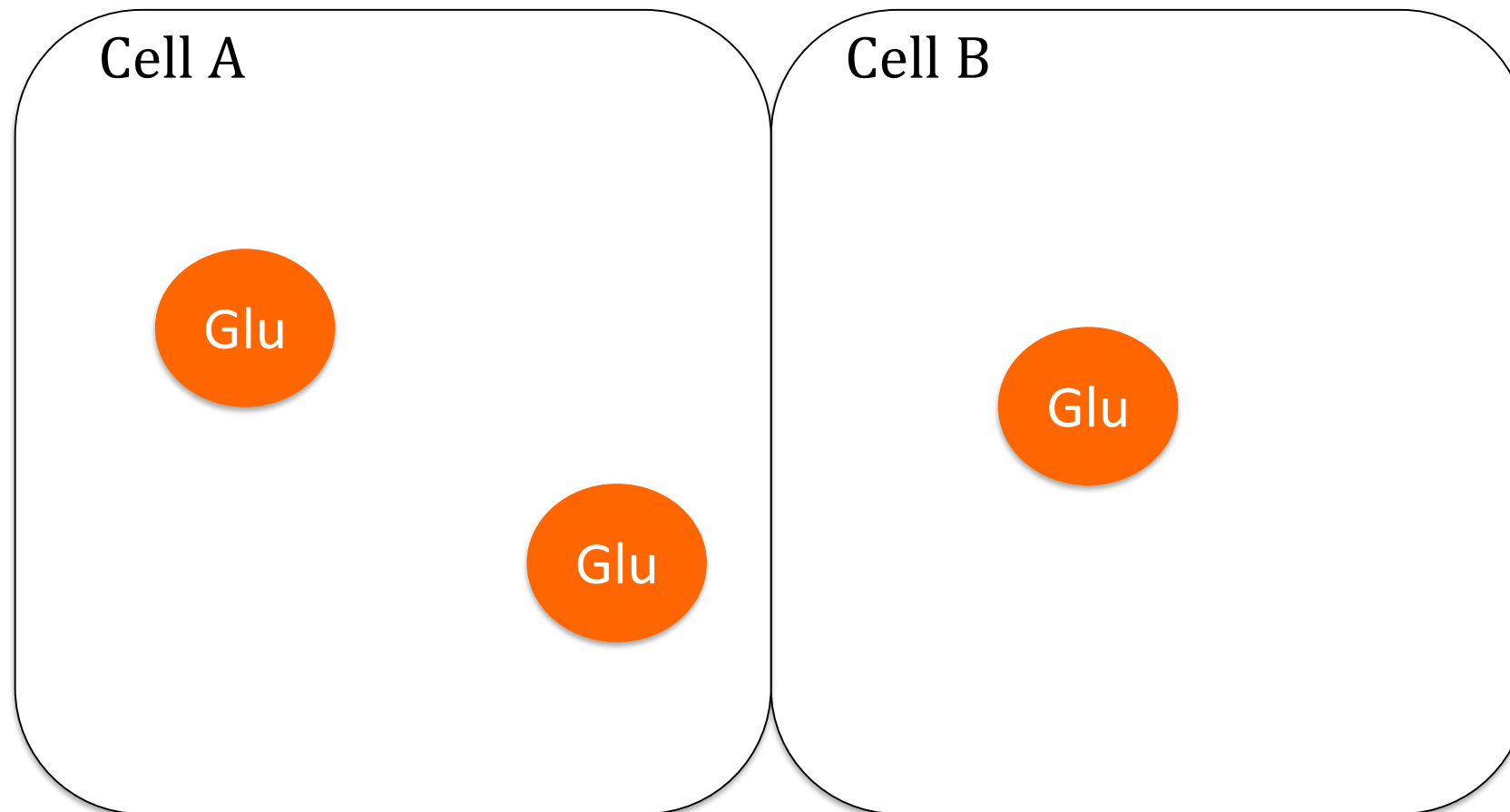


Which statements about osmosis are true?

- a) osmosis does not require energy
- b) osmosis does not require additional energy
- c) osmosis is an active process
- d) osmosis is a passive process
- e) osmosis requires a membrane



Would osmosis occur inside this cell? Justify your answer.

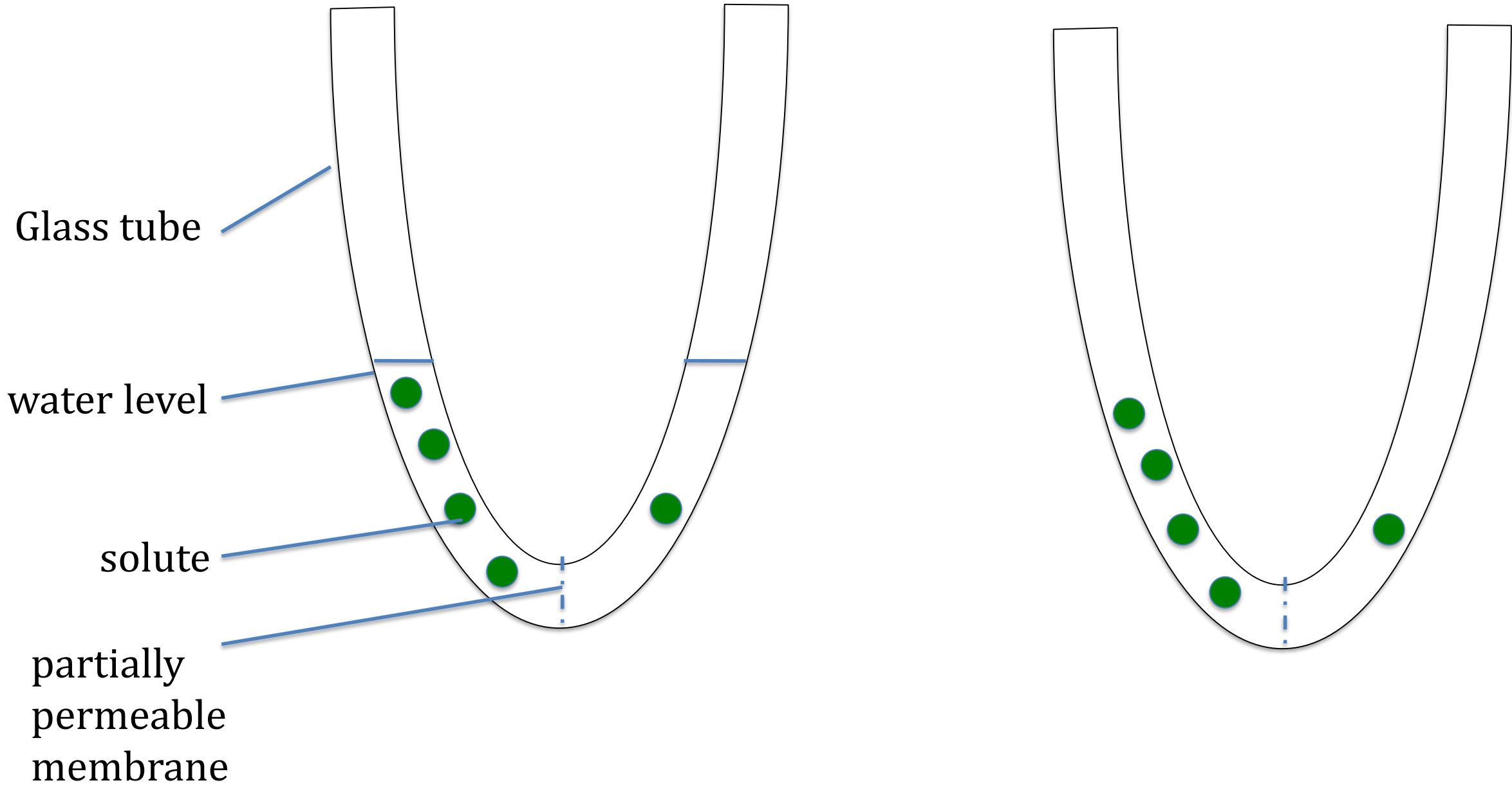


Glucose will not move freely through the membrane because:

- a) glucose molecules don't move
- b) glucose molecules are too large
- c) glucose molecules are charged

Start

End - 24 hours  
later



Mark on the right-hand diagram where you predict the water level will be after 24 hours