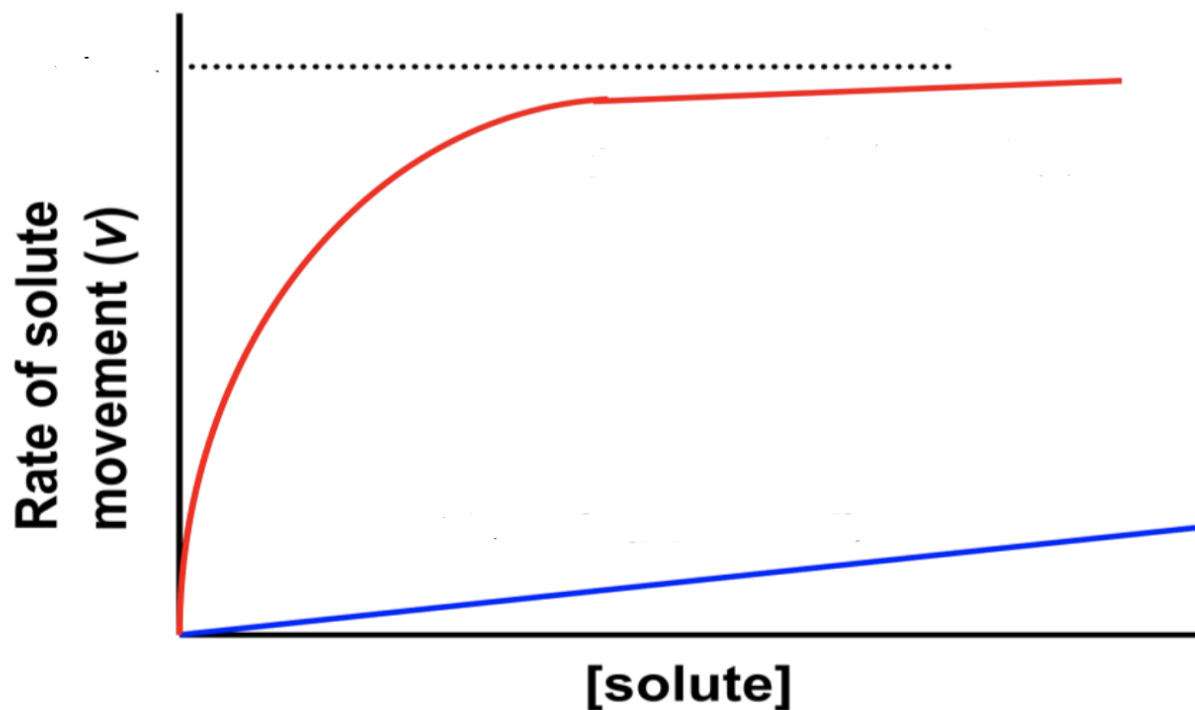
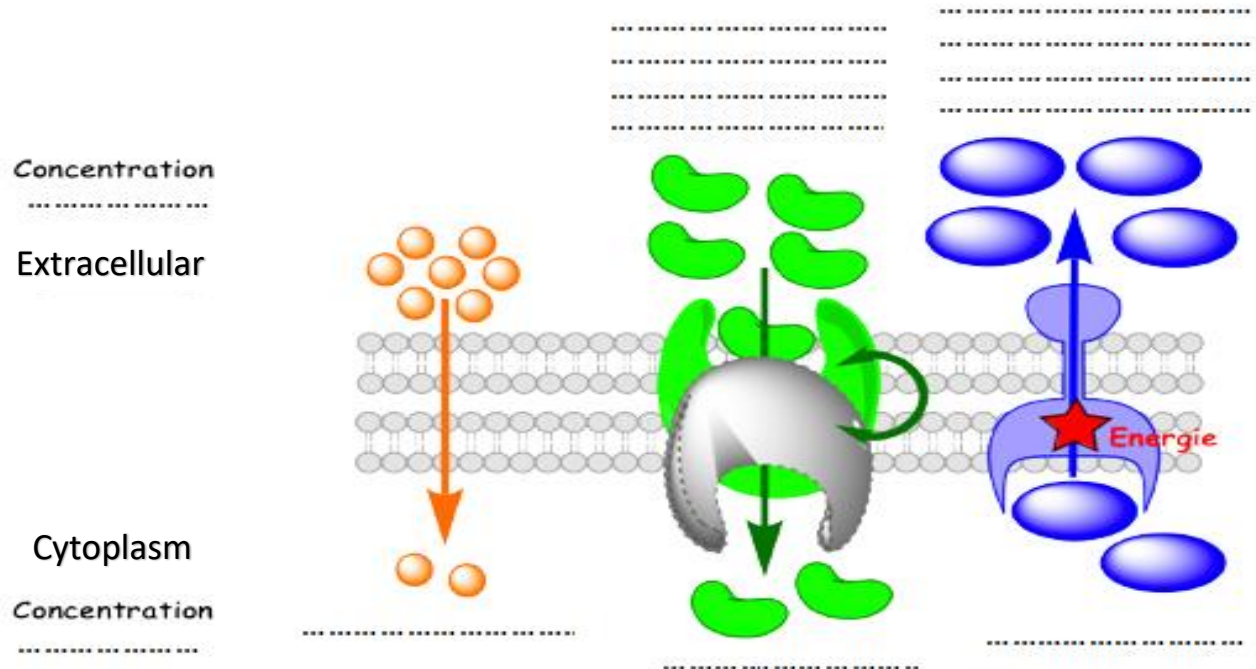
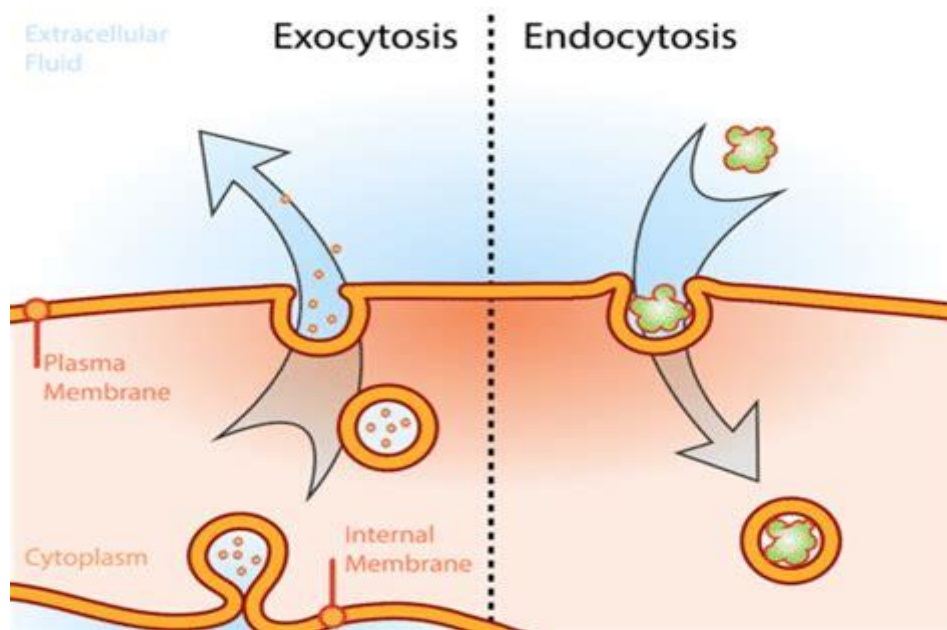


TD n° 4**Exercise 1:** Fill in the blanks in the figures below.**Exercise 2 :** Explain the phenomena shown in the following figure.



Exercise 3 : Complete the following sentences.

- A- Specific proteins calledmust be present for cell membranes to be permeable to small polar molecules such as ions, carbohydrates, and amino acids.
- B- Two transport processes control the entry of solutes into transport cells..... does not require energy supplied by the cell, whereas transport pumps certain solutes across the membrane, against a concentration gradient.
- C- Sugars enter intestinal cells with Na^+ ions via
- D- The $\text{Na}^+ \text{K}^+$ pump ($\text{Na}^+ \text{K}^+$ ATPase) is inhibited by
- E-allows the absorption of microdroplets of fluid through small vesicles, whileallows the ingestion of larger particles.

Exercise 4 : The following two experiments are conducted with cells whose membranes are impermeable to glucose and fructose, but permeable to alanine and water.

First experiment: Fill a cell with an aqueous solution of $[\text{glucose}] = 2 \text{ mmol/l}$ and place it in one of the following environments:

Environment 1: $[\text{glucose}] = 2 \text{ mmol/l}$

Environment 2: $[\text{glucose}] = 0 \text{ mmol/l}$ (distilled water)

Environment 3: $[\text{glucose}] = 5 \text{ mmol/l}$

In each case (environments 1, 2, and 3):

- a) How would you describe the extracellular environment in relation to the intracellular environment (is it hypo-, iso-, or hypertonic)?
- b) What do you think will happen to the cell once it is in these media? Justify your answer.

Second experiment: fill a cell with an aqueous solution with the following characteristics:

$$[\text{glucose}] = 2 \text{ mmol/l} + [\text{fructose}] = 8 \text{ mmol/l} + [\text{alanine}] = 0 \text{ mmol/l}$$

What do you predict will happen when the cell is placed in the following environment? Will there be net diffusion of glucose across the membrane and, if so, in which direction? Also, ask the same questions for fructose, alanine, and H₂O.

- a) medium 1: $[\text{glucose}] = 8 \text{ mmol/l} + [\text{fructose}] = 2 \text{ mmol/l} + [\text{alanine}] = 0 \text{ mmol/l}$
- b) medium 2: $[\text{glucose}] = 5 \text{ mmol/l} + [\text{fructose}] = 5 \text{ mmol/l} + [\text{alanine}] = 0 \text{ mmol/l}$
- c) medium 3: $[\text{glucose}] = 8 \text{ mmol/l} + [\text{fructose}] = 2 \text{ mmol/l} + [\text{alanine}] = 6 \text{ mmol/l}$
- d) medium 4: $[\text{glucose}] = 0 \text{ mmol/l} + [\text{fructose}] = 4 \text{ mmol/l} + [\text{alanine}] = 6 \text{ mmol/l}$