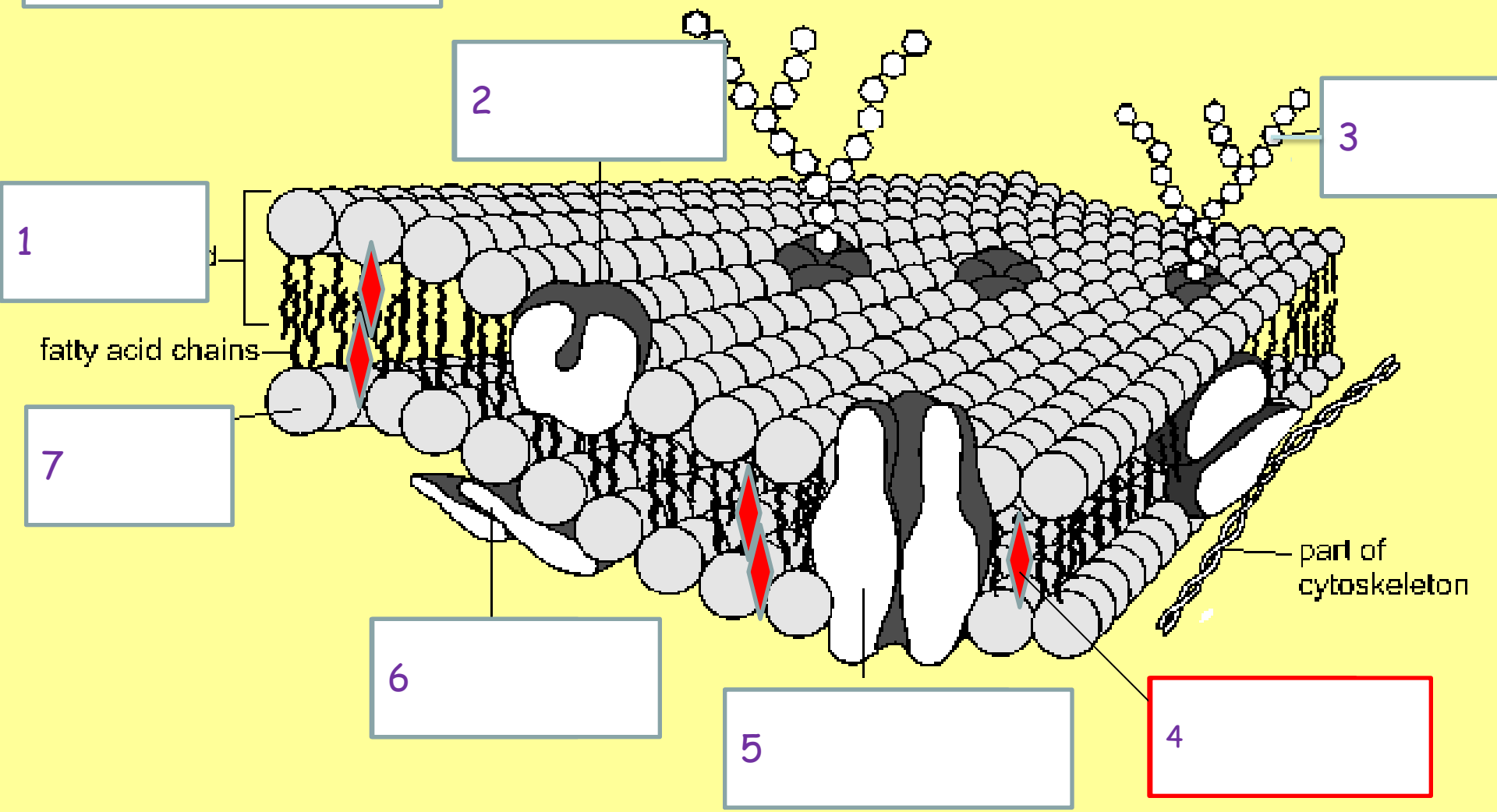
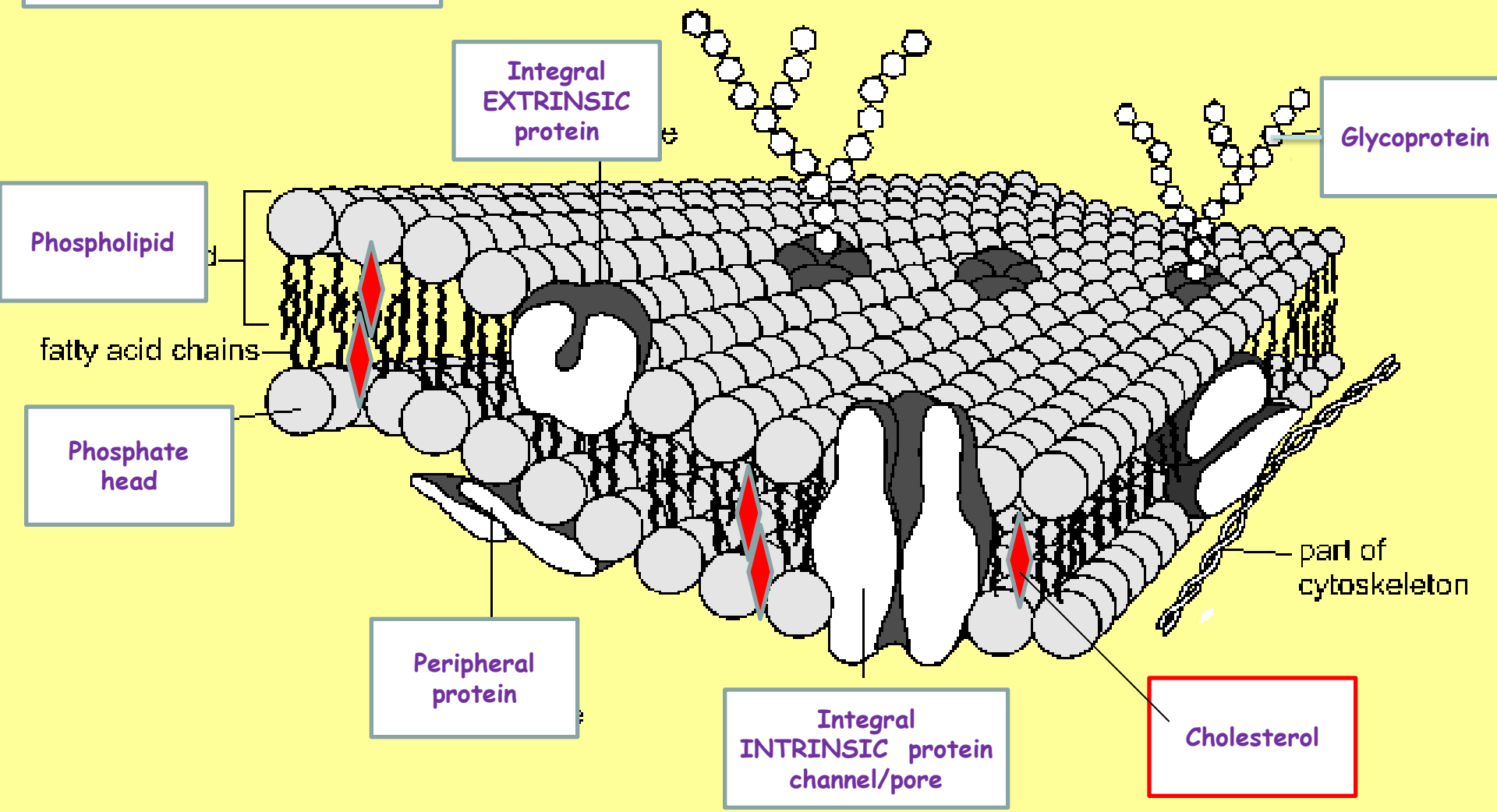
8. Something missing:

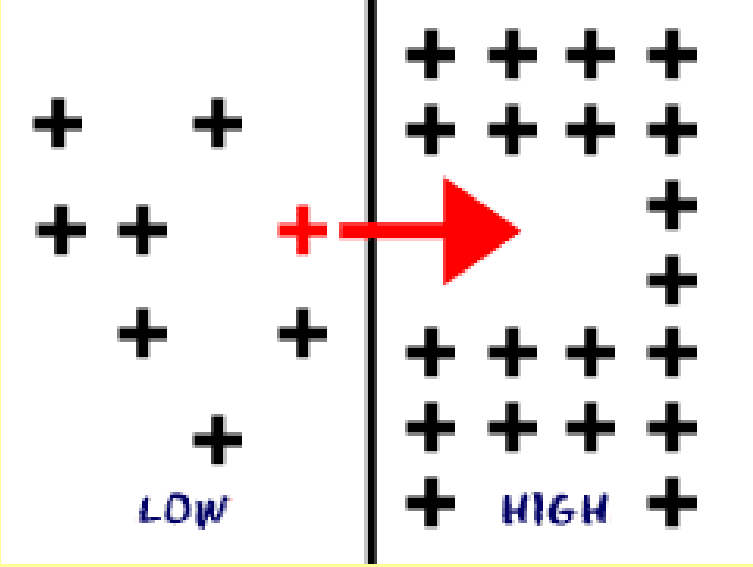


Label the diagram

8. Something missing:

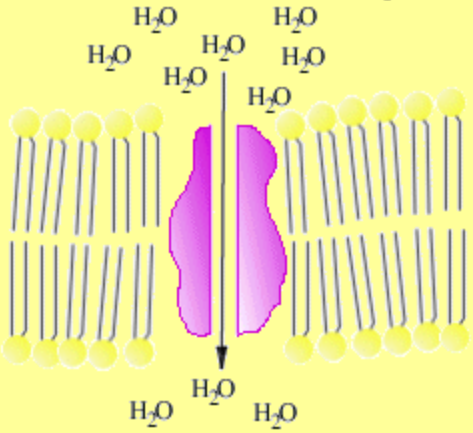


Label the diagram



Active Transport Mechanisms

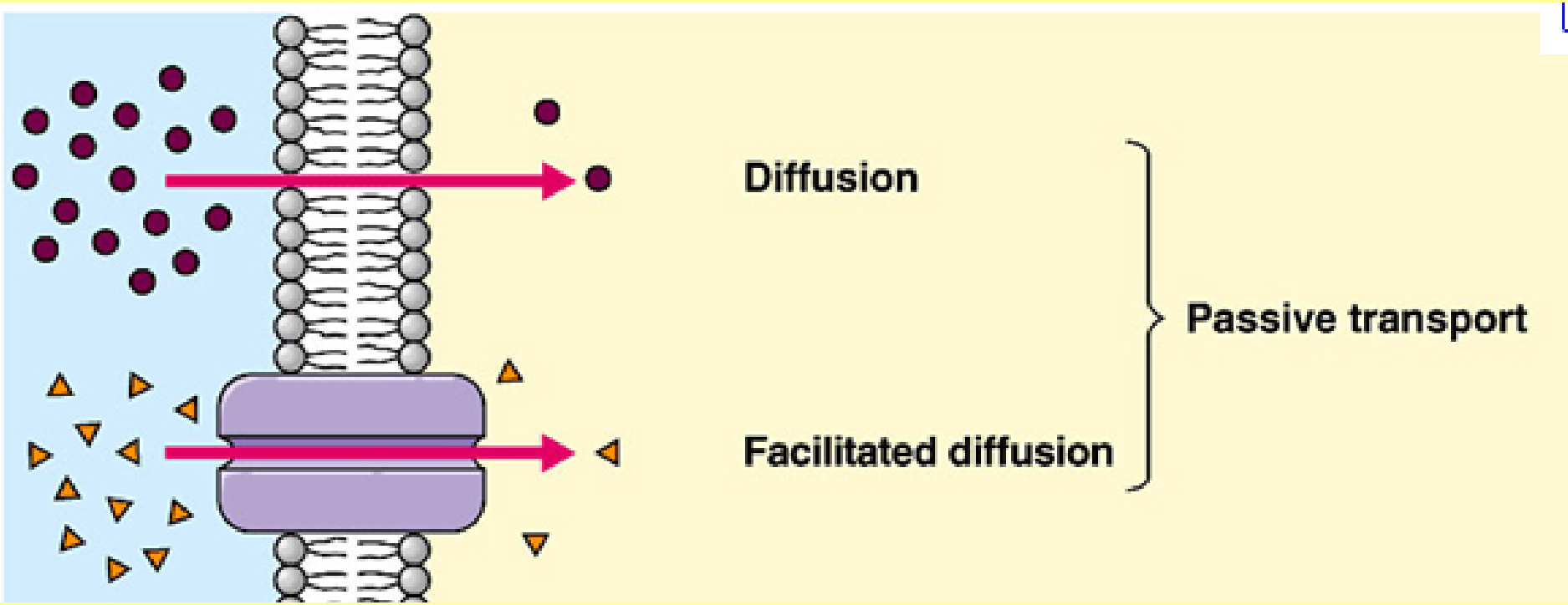
Aim: To understand how substances are moved from low to high concentration



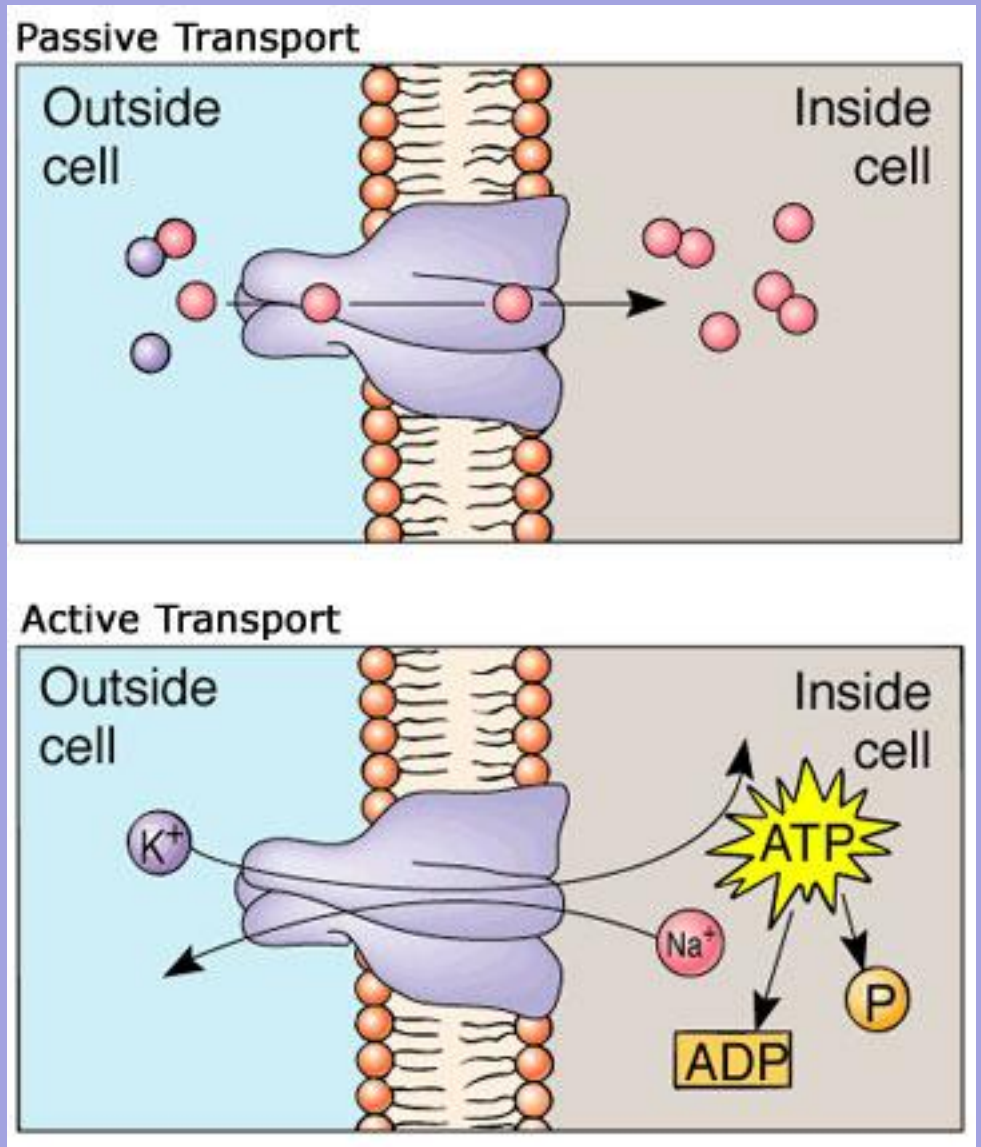
Diffusion through a protein channel

Passive Transport – Summary

- Substances that travel **with** the concentration gradient (diffusion, facilitated diffusion and osmosis) all travel without the need for energy – this is ***passive transport***.



Passive vs Active

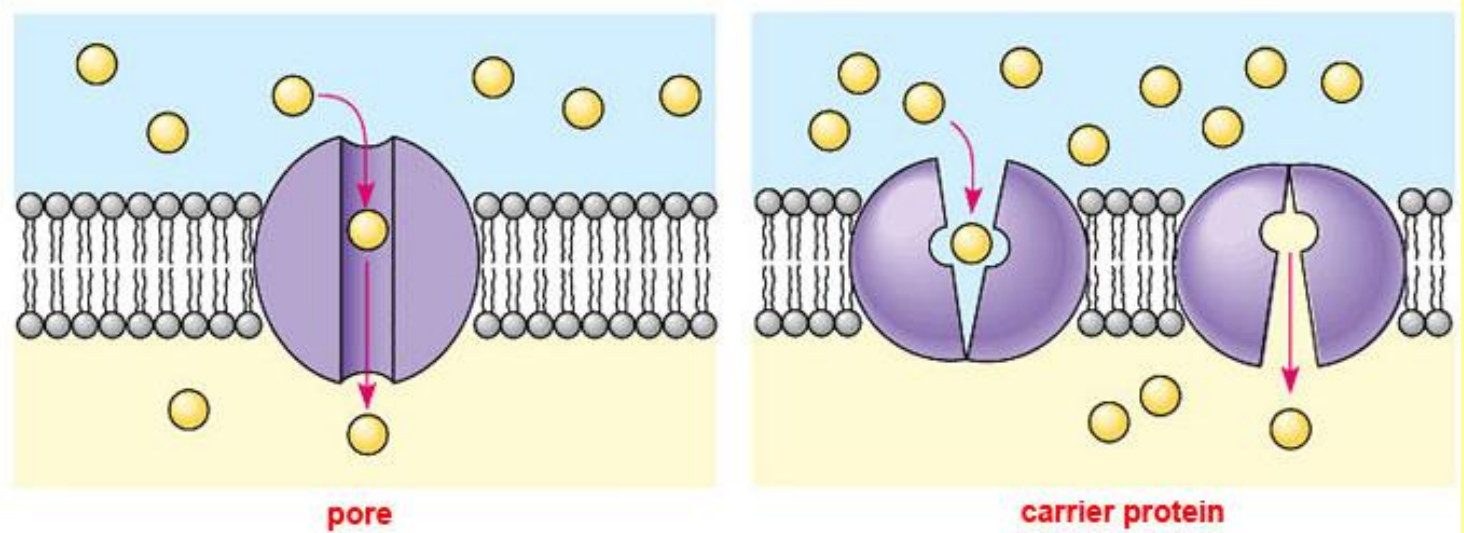


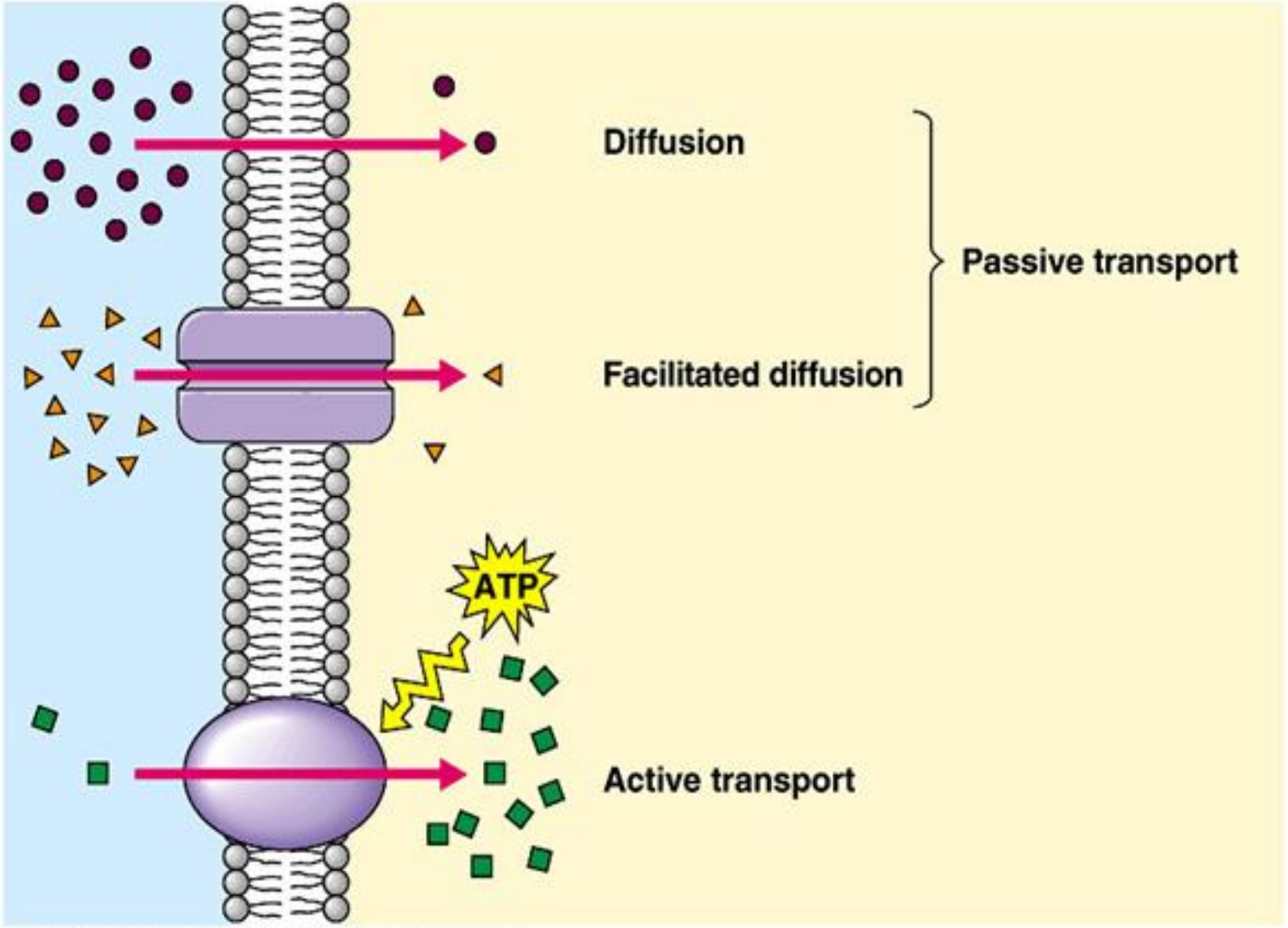
Active transport

http://www.bbc.co.uk/schools/gcsebitesize/science/add_ocr_pre_2011/homeostasis/importancerev6.shtml

Requires

- ***ATP*** - against the concentration gradient!
- ***Carrier proteins*** for the substances to move across membrane.
- Substance to be transported **binds** to a special (specific) **carrier protein**.
- Protein changes ***shape*** releasing the substance to be transported to the other side of the membrane.



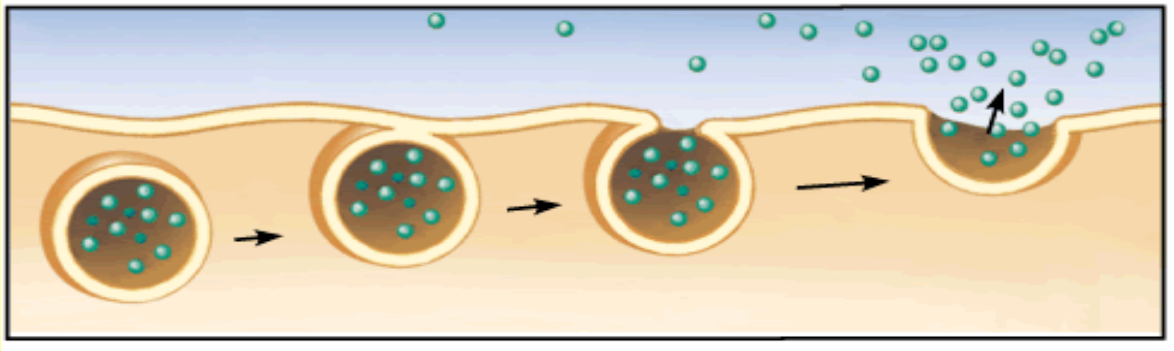


Poisons & Active Transport

- **Cyanide** inhibits respiration.
- Active transport requires energy from ATP made in respiration.
- Thus active transport stops.

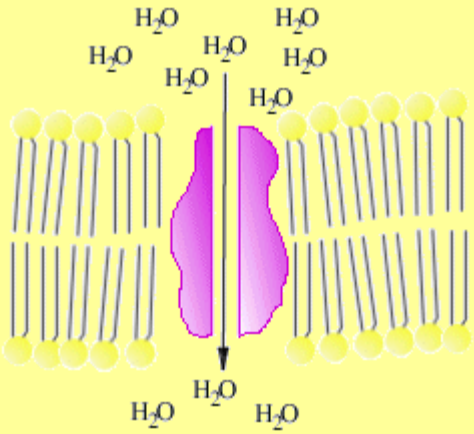
Eva Braun famously killed herself using cyanide

http://www.youtube.com/watch?v=kfy92hdaAH0

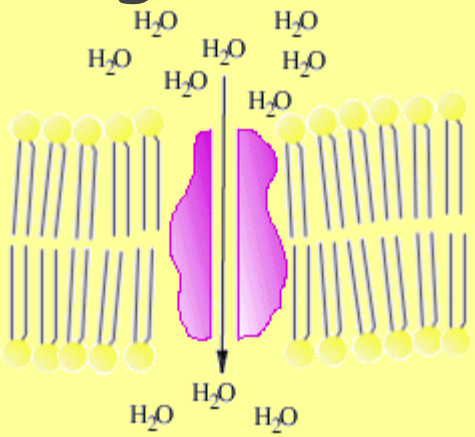


Bulk Transport

Aim: Outline how large quantities of substances are moved from high to low concentration



Diffusion through a protein channel



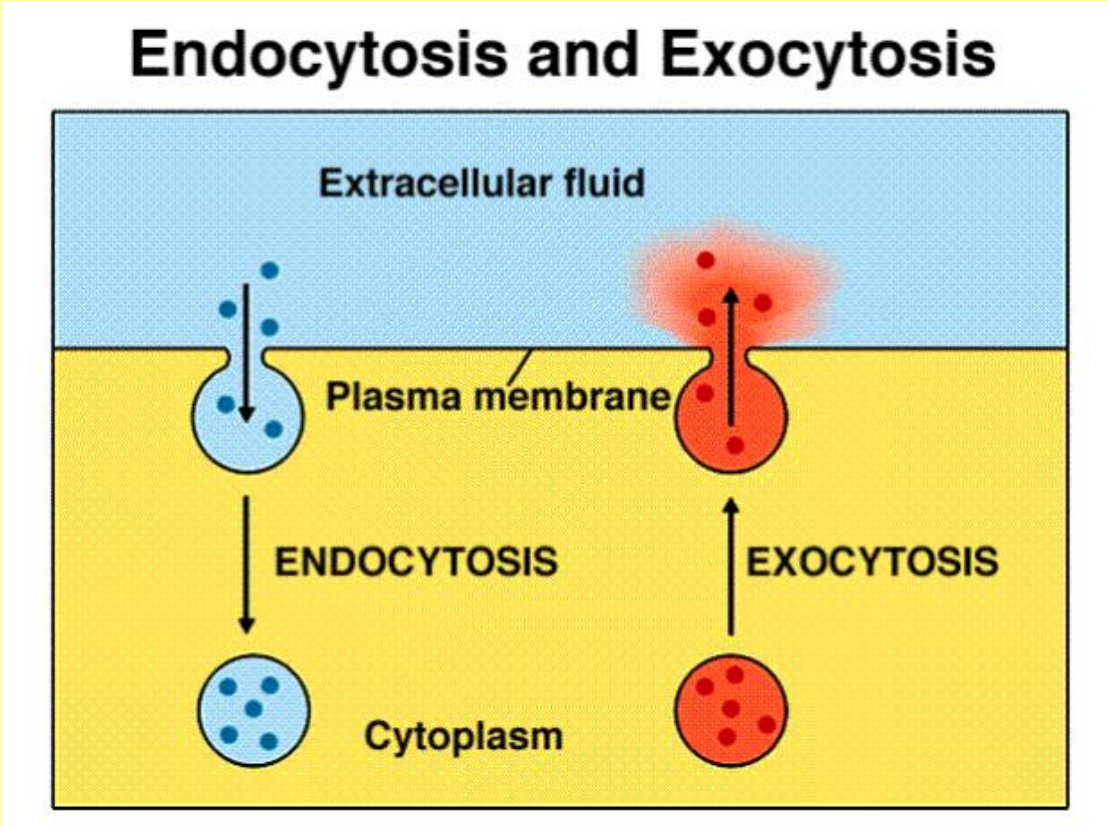
Diffusion through a protein channel

Bulk Transport

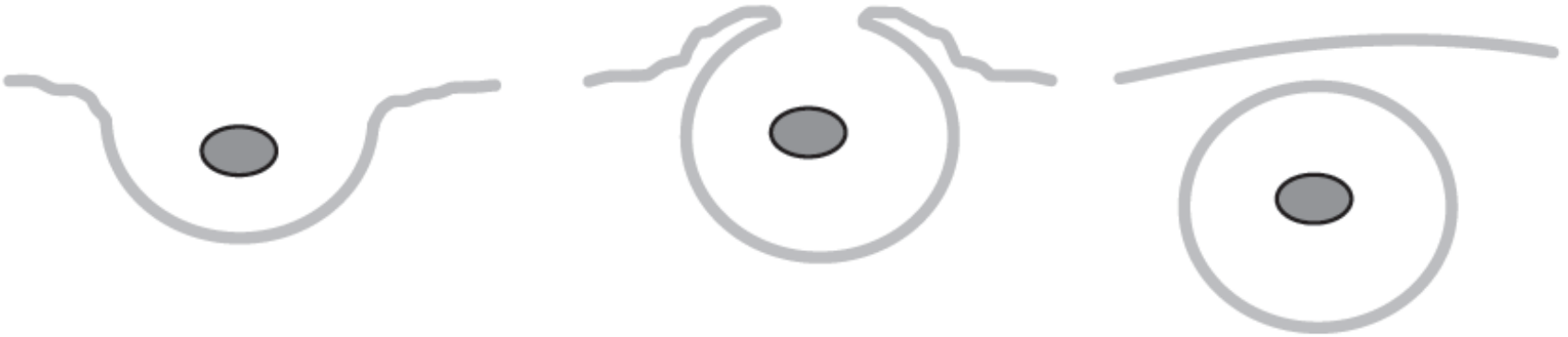
- Bulk import/export of substances
- Use membrane-bound sacs: vesicles
- Vesicles formed when they "bud off" from another membrane

The Two Types:

- Go ***down*** the [gradient]
- Don't require ***energy***
- Don't require ***proteins***



(d) The following diagram shows one way that prions may pass into cells.



1. Plasma membrane folds inwards.

2. Plasma membrane continues to fold engulfing the material.

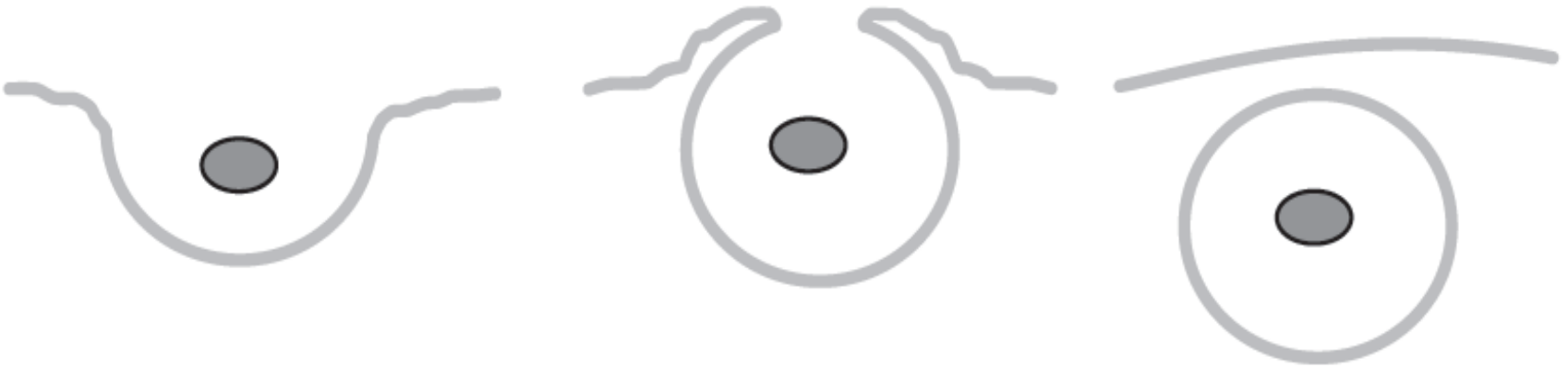
3. Plasma membrane fuses to enclose the material.

(i) Name the process shown in the diagram above. [1]

.....

(ii) Name **two** *other* ways in which substances might pass into the cell. [2]

(d) The following diagram shows one way that prions may pass into cells.



1. Plasma membrane folds inwards.

2. Plasma membrane continues to fold engulfing the material.

3. Plasma membrane fuses to enclose the material.

(i) Name the process shown in the diagram above. [1]

Endocytosis, phagocytosis

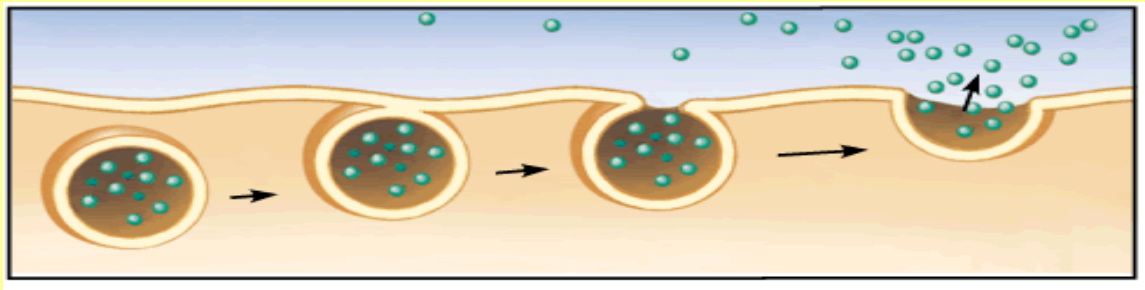
(ii) Name **two** *other* ways in which substances might pass into the cell. [2]

Via a carrier protein or by diffusion

http://www.youtube.com/watch?v=0w0PmVxDvXE&NR=1

Exocytosis

- Vesicle formed inside cell (often from Golgi A. or SER). This ***fuses*** with PM increasing surface area. Contents of the vesicle are released outside cell.

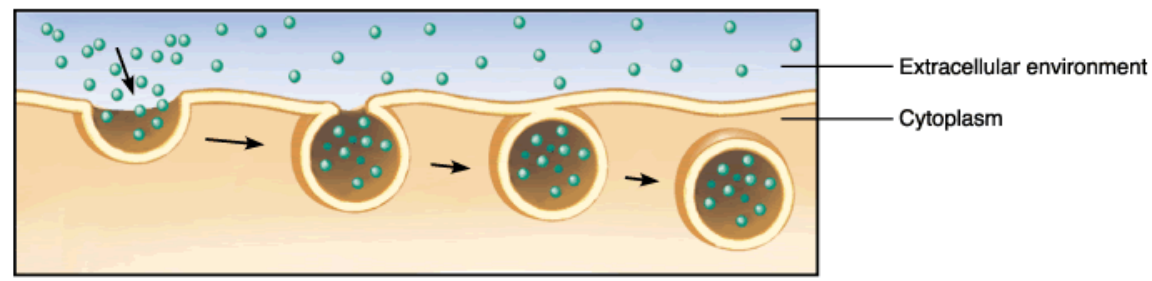


Endocytosis

• Part of membrane sinks into cell. "Buds off" and seals back onto itself (reducing SA) . Vesicle is produced containing substance from outside cell.

• Bringing solid material into the cell is: **Phagocytosis**

• Bringing liquid material inside a cell is: **Pinocytosis**



(b) An investigation was carried out on the uptake of potassium ions by root tissue.
The root was cut into four discs of uniform size and each disc was added to an equal volume of a solution containing a fixed potassium ion concentration.
The experiment was carried out in different oxygen concentrations and the results are shown in the table below.

Oxygen concentration / arbitrary units	0	4	11	20
Rate of potassium ion uptake / arbitrary units	7	27	92	100

(i) State, with a reason, **one** *other* variable that should be kept constant. [2]

.....

.....

(ii) Using the information in the table, state with an explanation, the **main** method by which potassium ions are taken into the root. [3]

.....

.....

.....

(c) State the rate of uptake you would expect if a drop of cyanide solution had been added to **each** of the four solutions.
Explain your answer. [3]

.....

.....

(b) An investigation was carried out on the uptake of potassium ions by root tissue.
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Oxygen concentration / arbitrary units	0	4	11	20
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(i) State, with a reason, **one** *other* variable that should be kept constant. [2]

Temperature, so that it does not effect rate of uptake of potassium ions due to **added kinetic** energy/i**ncreased membrane** permeability

(ii) Using the information in the table, state with an explanation, the **main** method by which potassium ions are taken into the root. [3]

K+ ions are mainly taken up by **active transport**. Little K+ uptake without oxygen and **much more when oxygen is present**. Oxygen is required to get **energy from ATP.** Small amount of K+ must be taken up by passive means

(c) State the rate of uptake you would expect if a drop of cyanide solution had been added to **each** of the four solutions.
Explain your answer. [3]

Cyanide is a **respiration inhibitor**. Active transport requires energy as so **won't continue** when cyanide is present. Each of the four solutions would have rate of uptake **of about 7** as this is taken up passively. NOT ZERO.