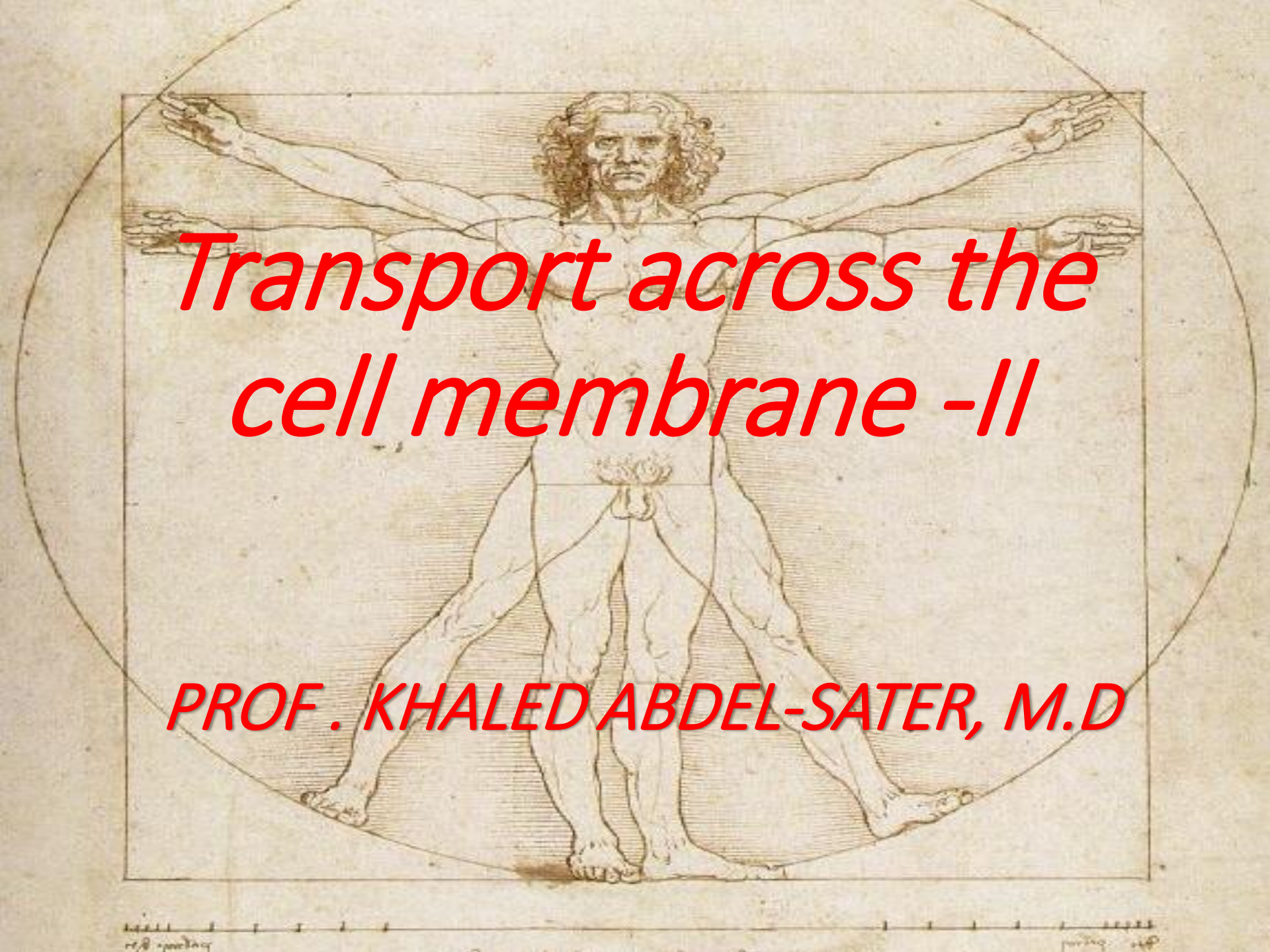


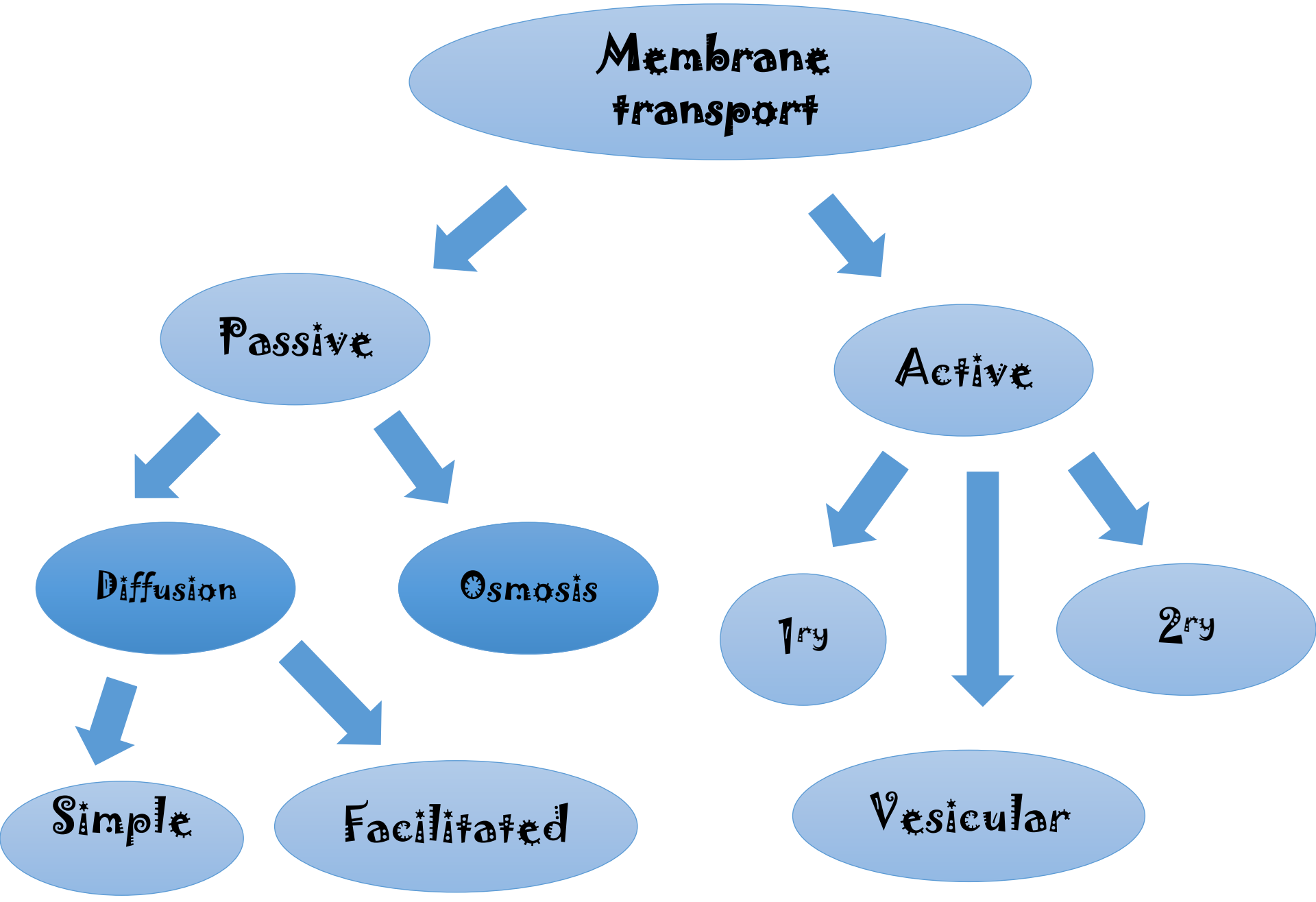
Transport across the cell membrane -II

PROF . KHALED ABDEL-SATER, M.D

STUDY OBJECTIVES

By the end of the lecture the student will able

- To enumerate the types of active transport
- To explain the difference between 1^{ry} and 2nd active transport.
- To compare between pinocytosis and phagocytosis
- To enumerate the types of body fluid and its factor affection.

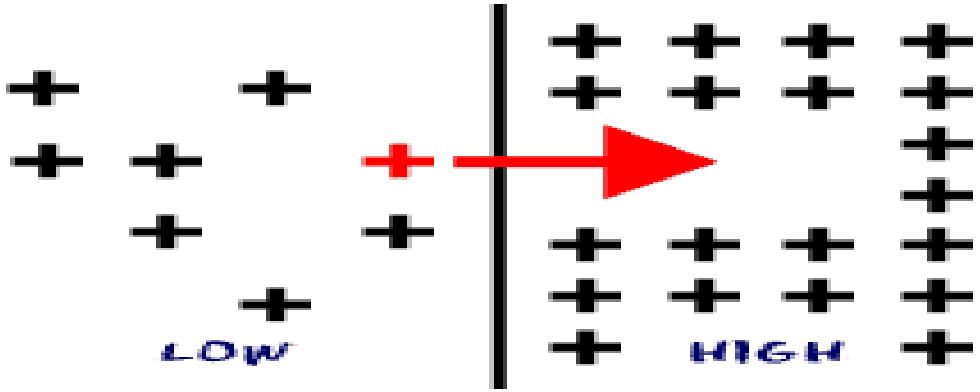

Membrane transport
Passive
Active
Diffusion
Osmosis
1ry
2ry
Simple
Facilitated
Vesicular

Active transport

Needs carrier.

Needs energy.

Occurs against CONCENTRATION gradient.



Active transport

Both *facilitated diffusion and facilitated diffusion are* ***carrier mediated transport*** *.*

BUT

-ACTIVE transport requires energy and occurs against concentration and electrical gradients.

-**Facilitated diffusion** does not require energy and occurs only with concentration and electrical gradients.

Types of active transport

Primary active:

Direct release of energy (The carrier has an ATPase activity).

Examples:

1- Na+-K+ pump.

2- Calcium pump.

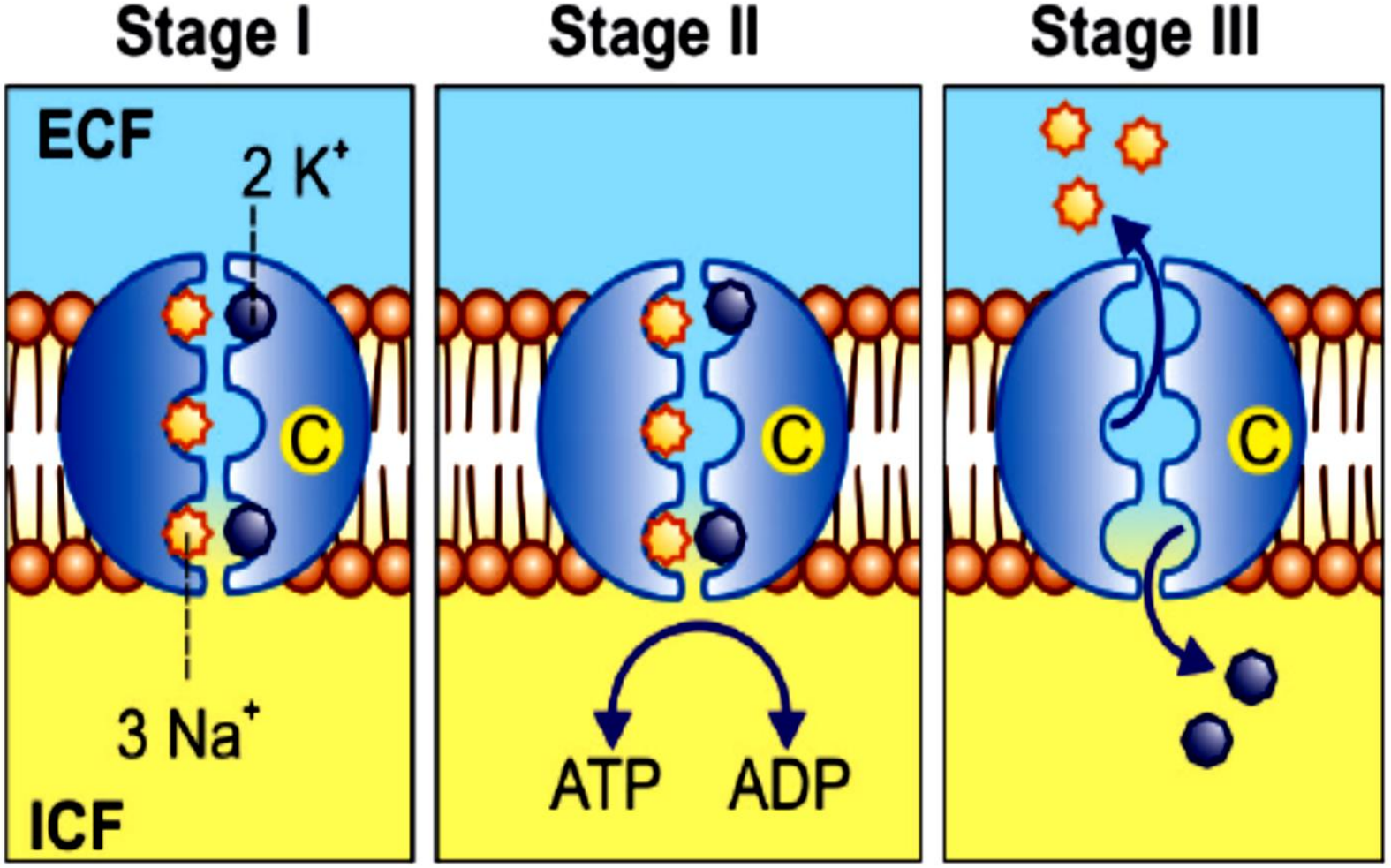
2- H+ pump.

Secondary active:

Indirect release of energy (the carrier has no ATPase activity).

Primary Active Transport

Sodium-Potassium Pump



Secondary active transport

Co-transport (Symport):

The two substances move in the same direction.

Example:

Sodium-glucose & Sodium-amino acid transport.

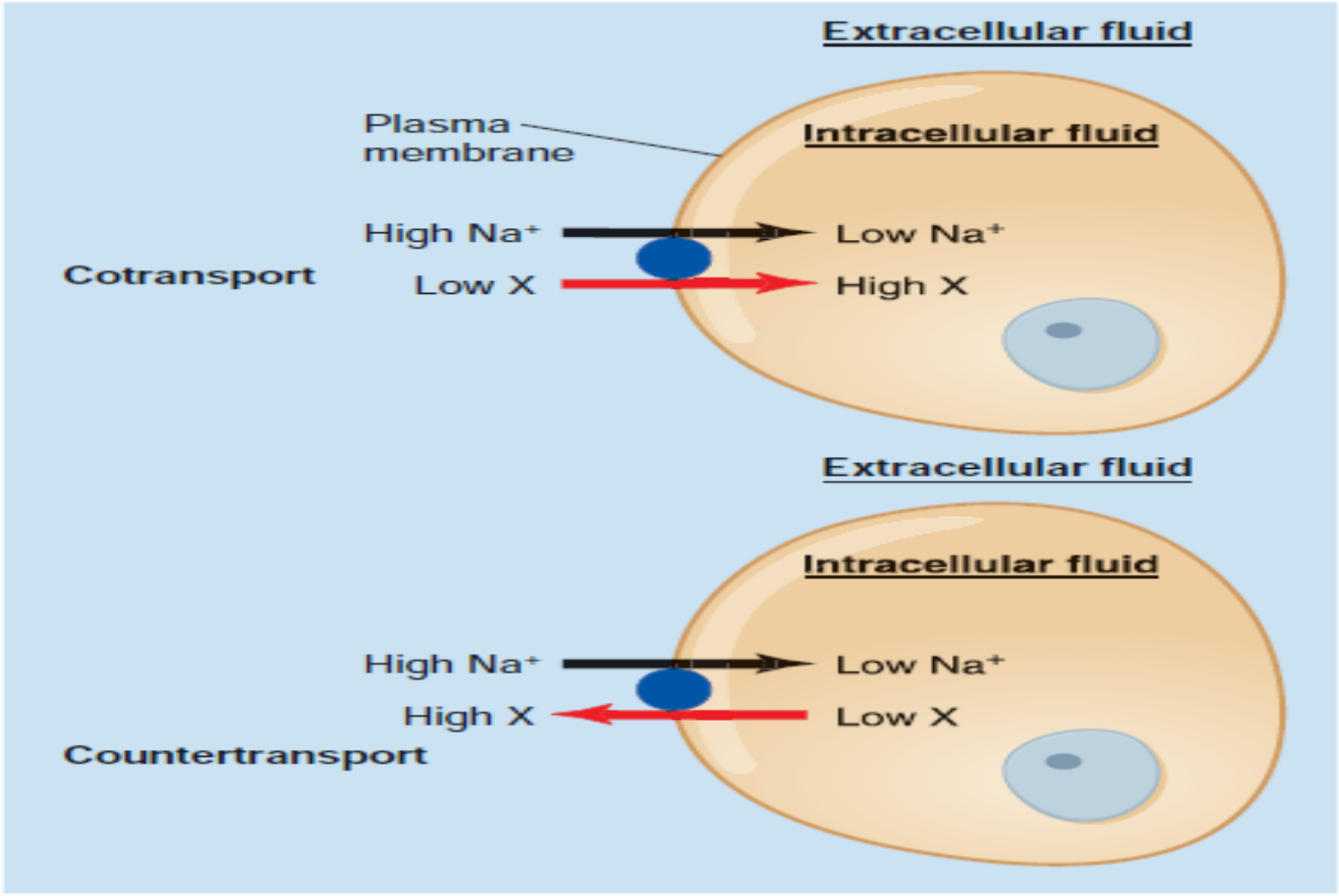
Counter-transport (Antiport):

The two substances move in opposite direction.

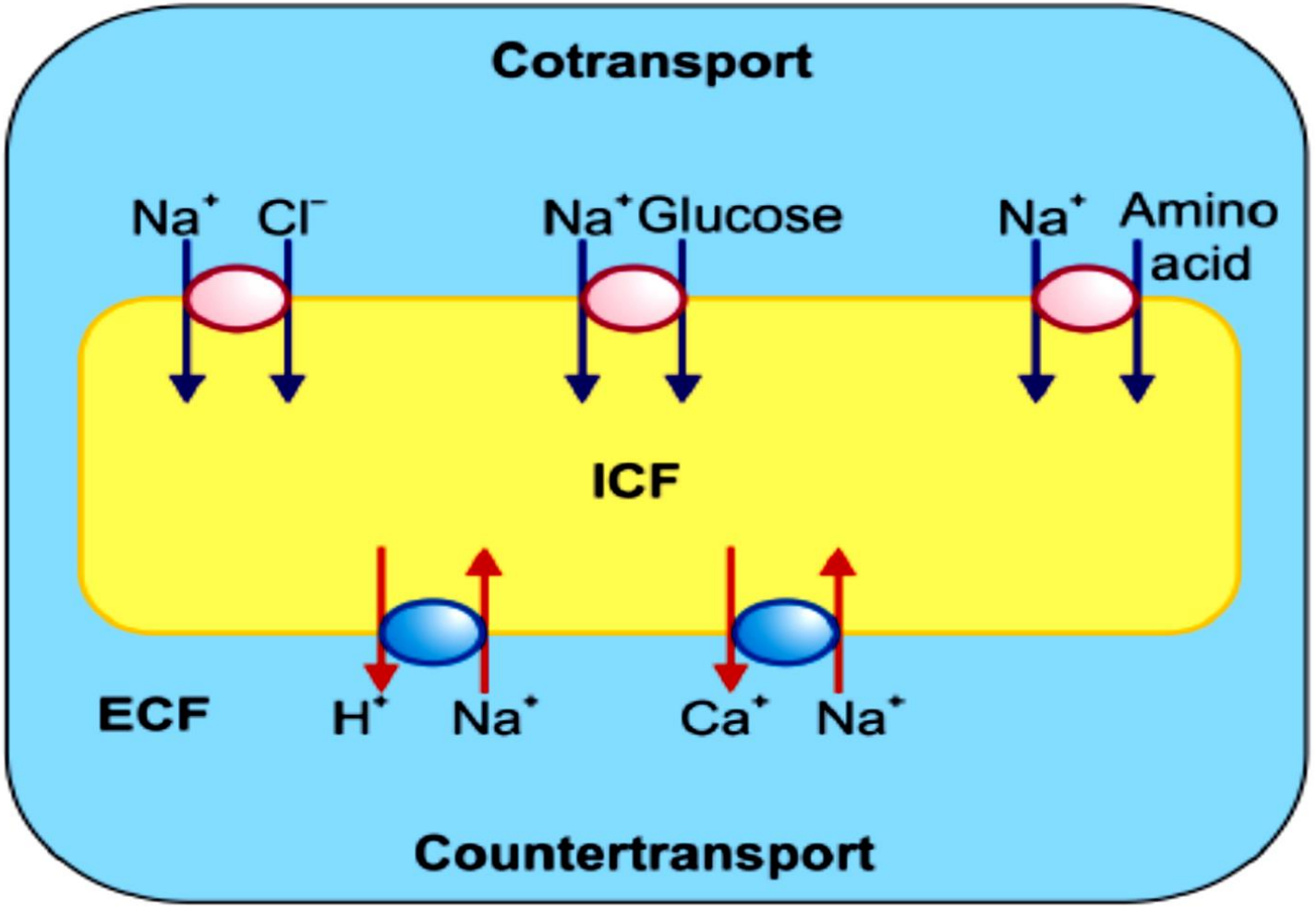
Example:

Sodium hydrogen & sodium calcium counter transport.

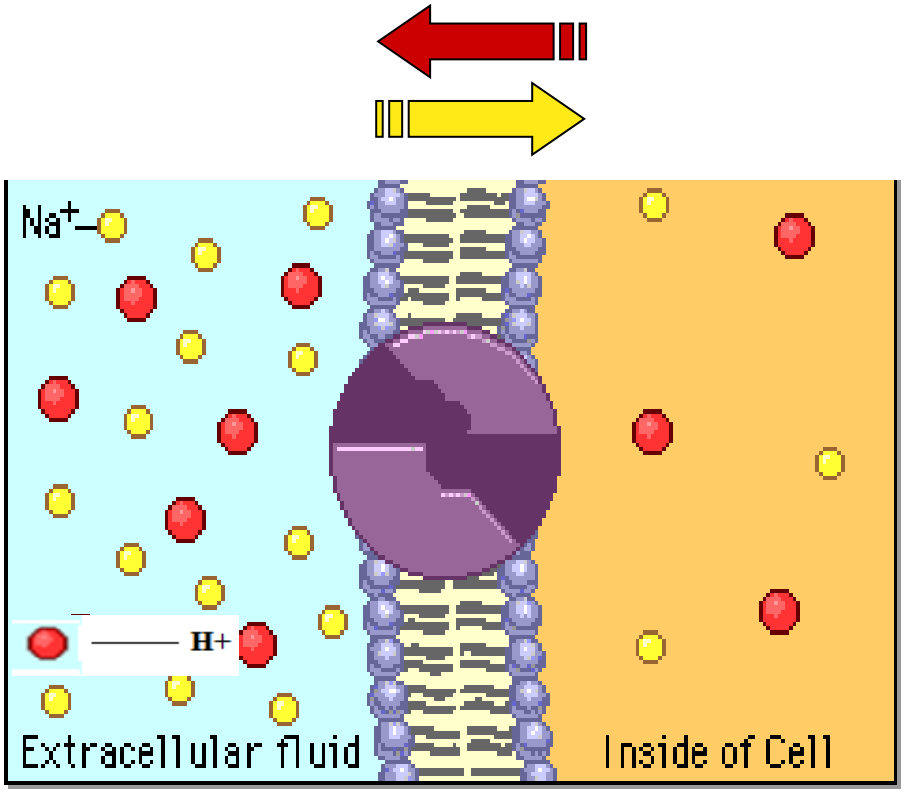
Secondary active transport



Secondary Active Transport

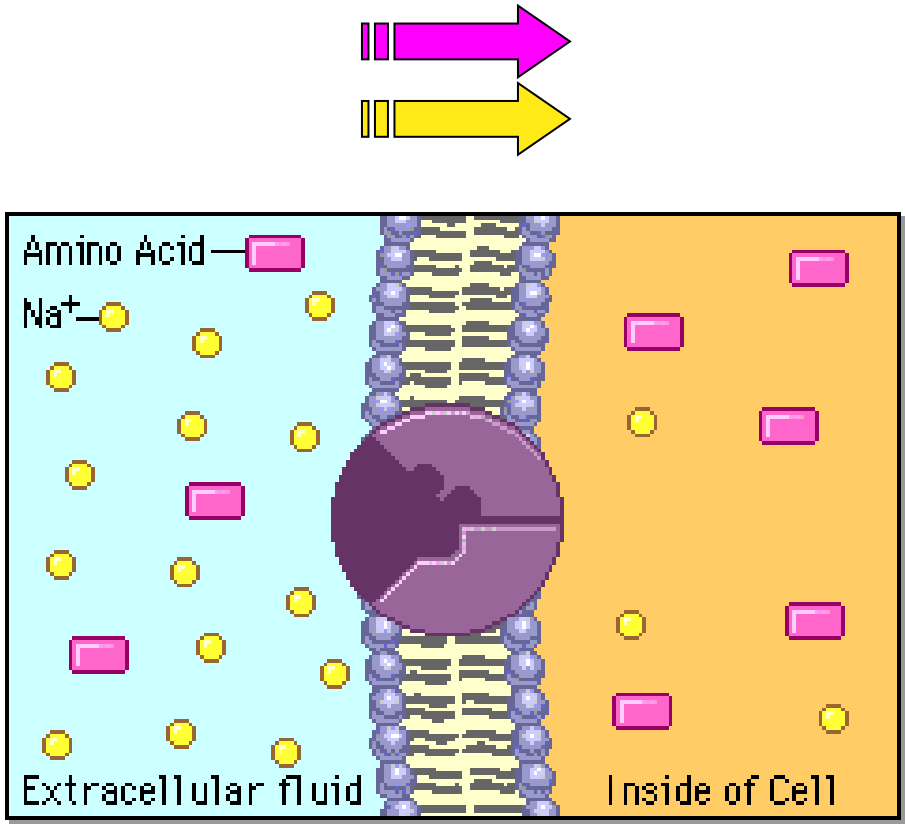


Counter-transport



antiport

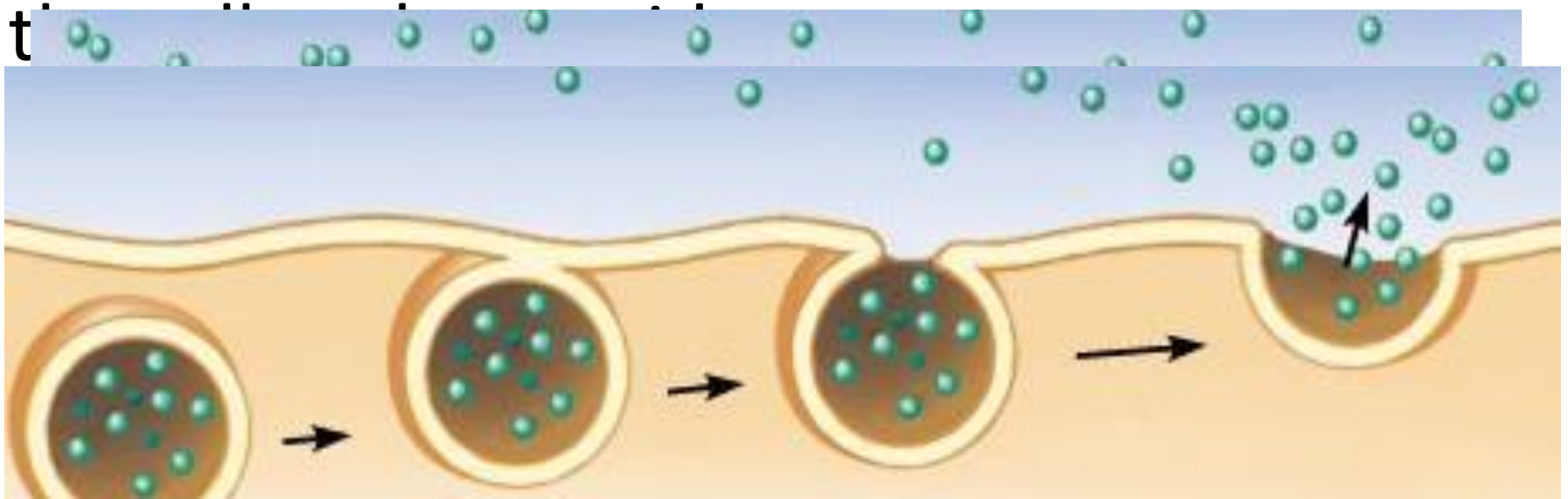
Co-transport



symport

Vesicular Transport

- It is the movement of large molecules.
- 2 types: Endocytosis and Exocytosis.
- **Endocytosis:** It is the movement from outside the cell to the inside.
- **Exocytsis:** It is the movement from inside t



ENDOCYTOSIS :

It is the transport to inside the cell .

It is the reverse of exocytosis .

Exocytosis can be classified into two main types :

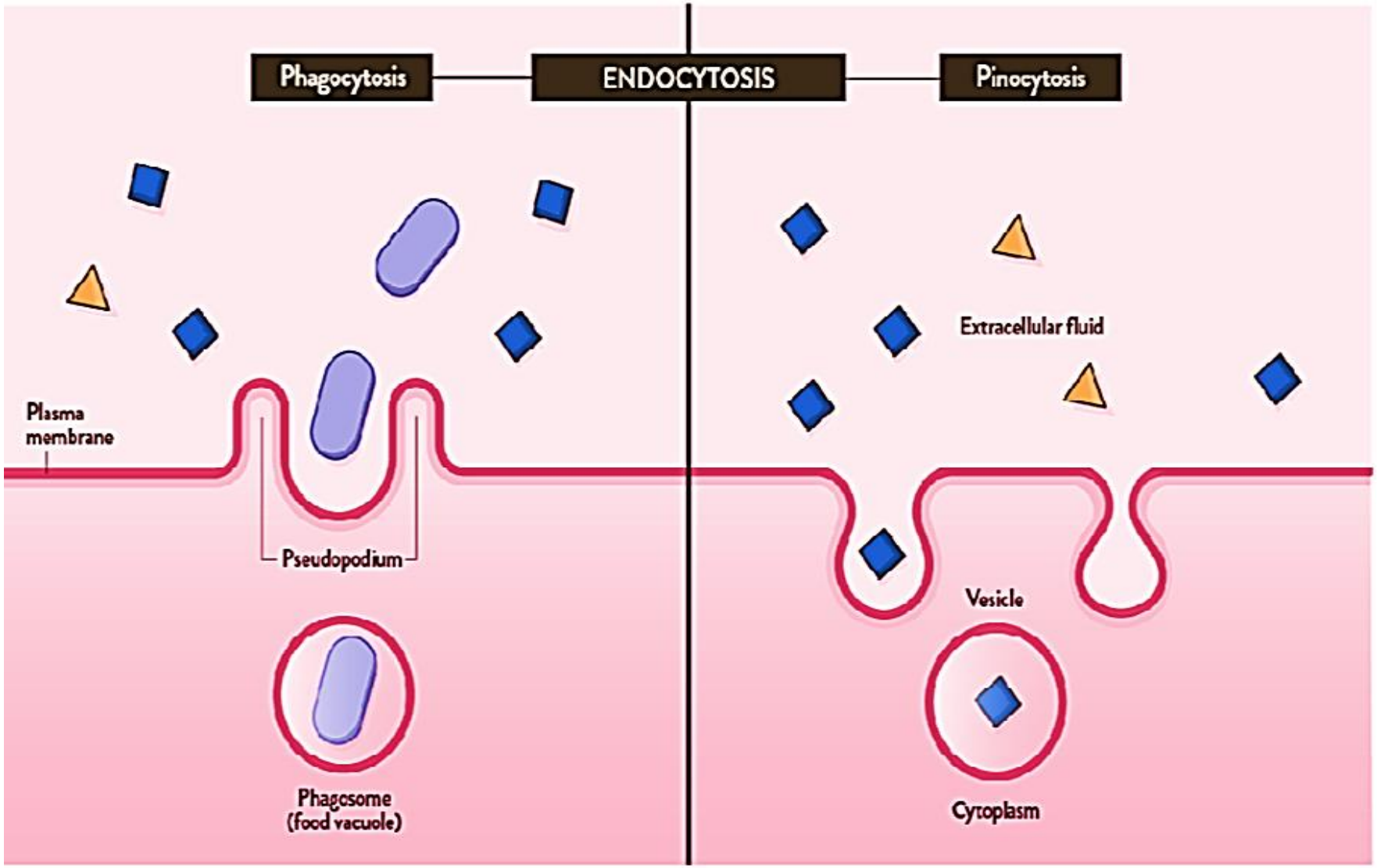
A- PHAGOCYTOSIS : (CELL EATING):

It is endocytosis of solid particles.

B- PINOCYTOSIS : (CELL DRINKING):

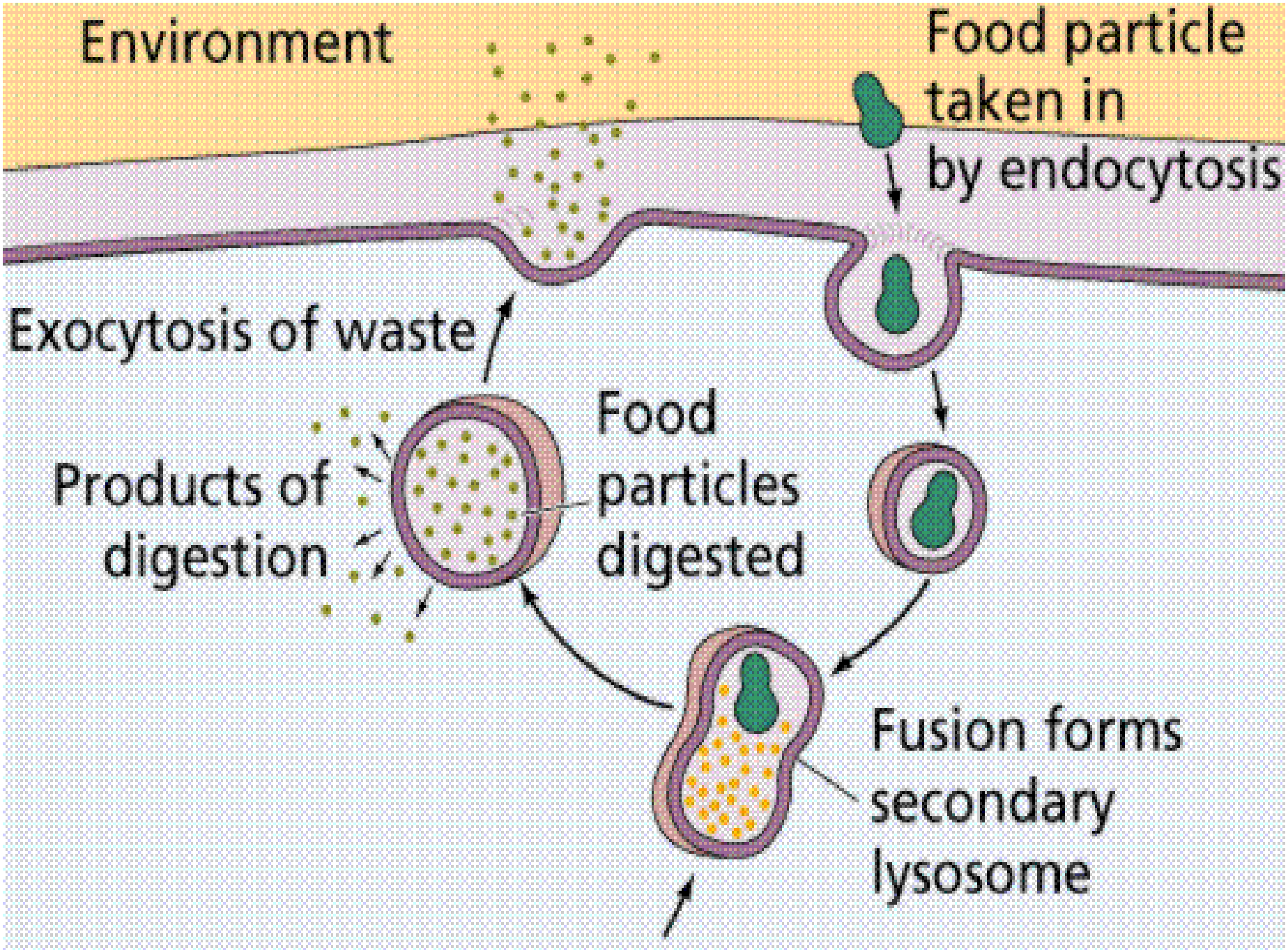
It is endocytosis of fluid particles.

ENDOCYTOSIS :

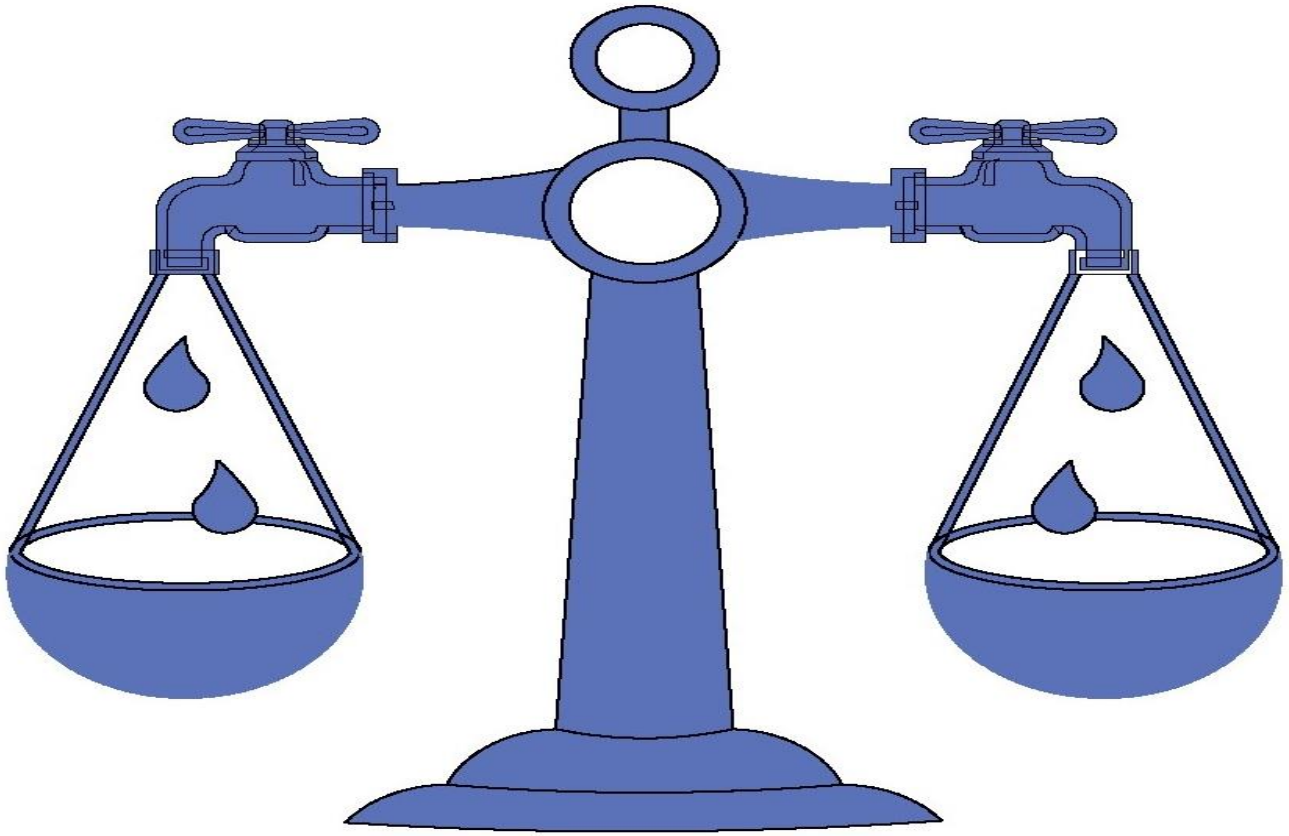


EXOCYTOSIS :

The vesicles move near the cell membrane & become attached to it , the membrane rupture & contents of the vesicle are extruded outside the cell .


Environment
Food particle taken in by endocytosis
Exocytosis of waste
Products of digestion
Food particles digested
Fusion forms secondary lysosome

BODY FLUIDS



Total Body Water

- 60% of body weight of young adult males

-50% in young adult females

-45% in obese persons (fat contains no water).

Factors affecting Body Water Content

1-Age: (inverse relation with body fat)

Age	Male	Female
Newborn	80%	75%
1–5 years	65%	65%
10–16 years	60%	60%
17–39 years	60%	50%
40–59 years	55%	47%
60+	50%	45%

Factors affecting Body Water Content

2-Sex:

Water in healthy females is around 50%. This difference in females due to:

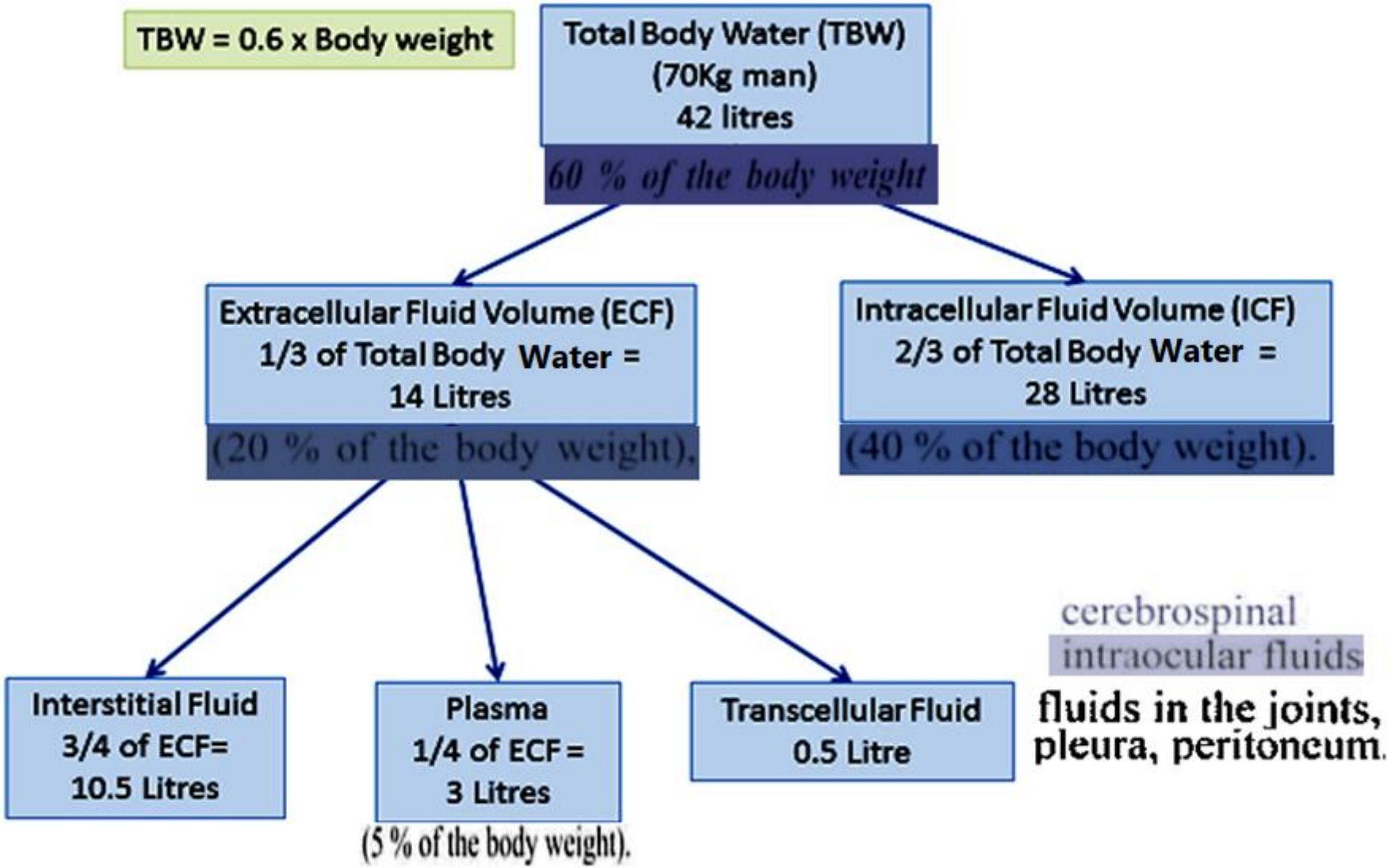
-Higher body fat.

-Smaller amount of skeletal muscle.

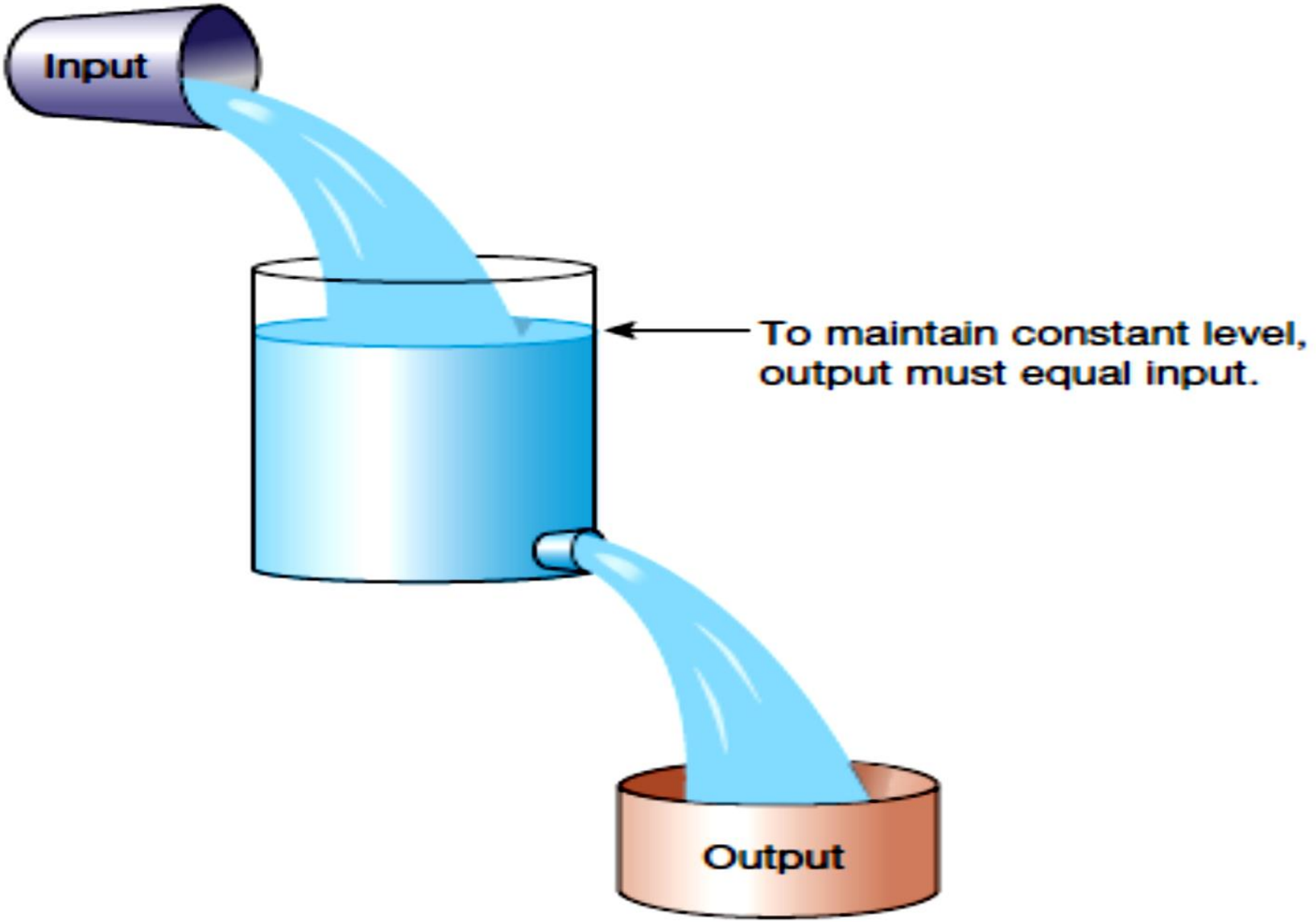
3- Percentage of body fat:

(fat contains no water).

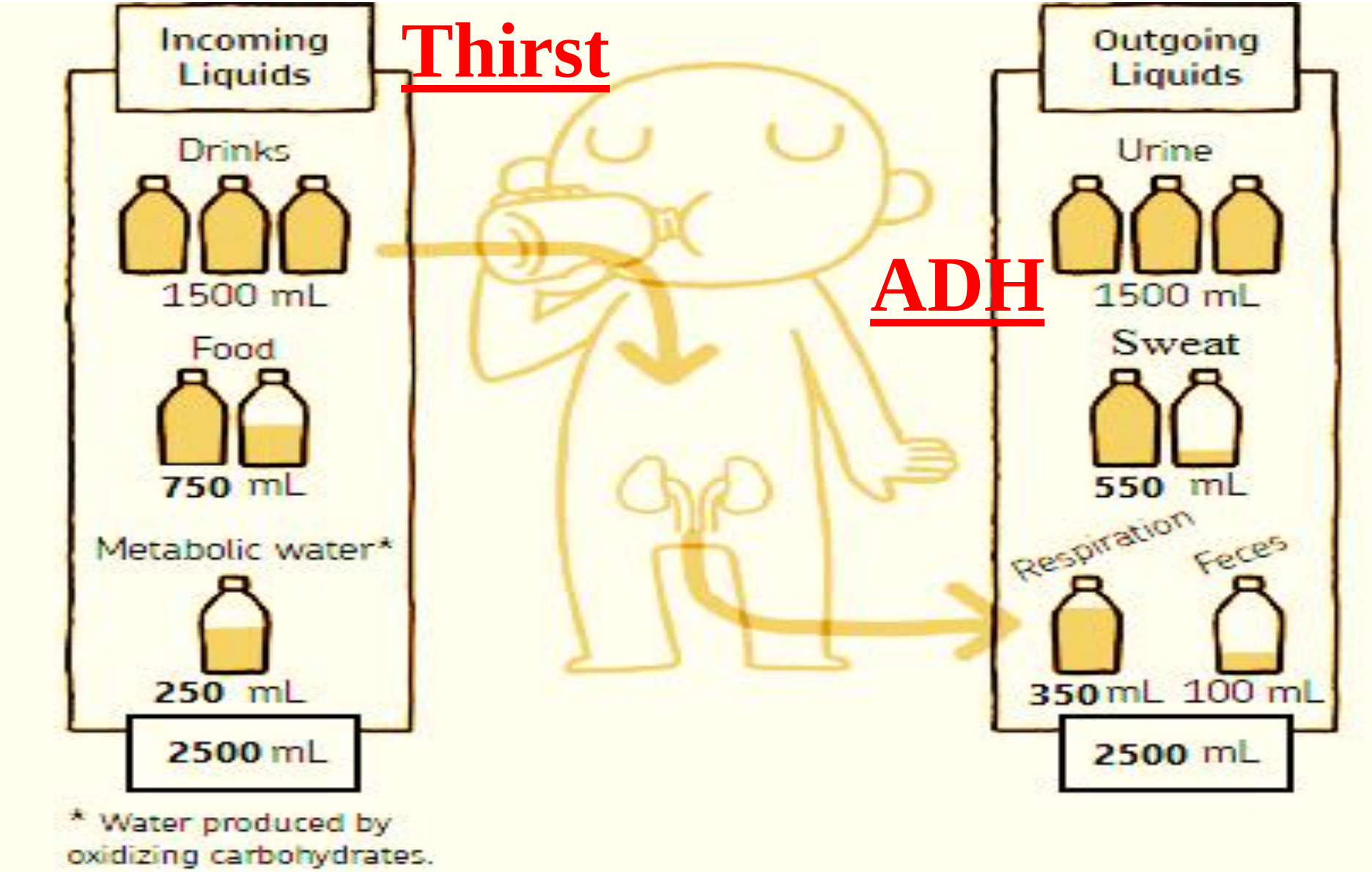
Fluid Compartments



Water Balance



Water Balance




Thank you