SNS COLLEGE OF NURSING

Saravanampatti (po), Coimbatore.

DEPARTMENT OF NURSING

COURSE NAME : BSC (NURSING) II YEAR

SUBJECT : MEDICAL SURGICAL NURSING

UNIT: II: COMMON SIGN &SYMPTOMS , MANAGEMENT

TOPIC :FLUID AND ELECTROLYTE IMBALANCE

INTRODUCTION

Terminologies:

- Electrolyte: electro - electricity ; lyte - dissolve
- Intracellular: intra – within ; cellular - cell
- Extracellular: extra – outside ; cellular - cell
- Interstitial: inter – between; stitial – tissue (spaces between cells)

TERMINOLOGIES

- Intravascular: intra – within ;
  vascular – blood vessel

- Transcellular: trans – across ; cellular -cell

- Antidiuretic: anti –against ; diuretic - urination

Homeostasis

The ability or tendency of an organism or cell to maintain internal equilibrium by adjusting its physiological processes.

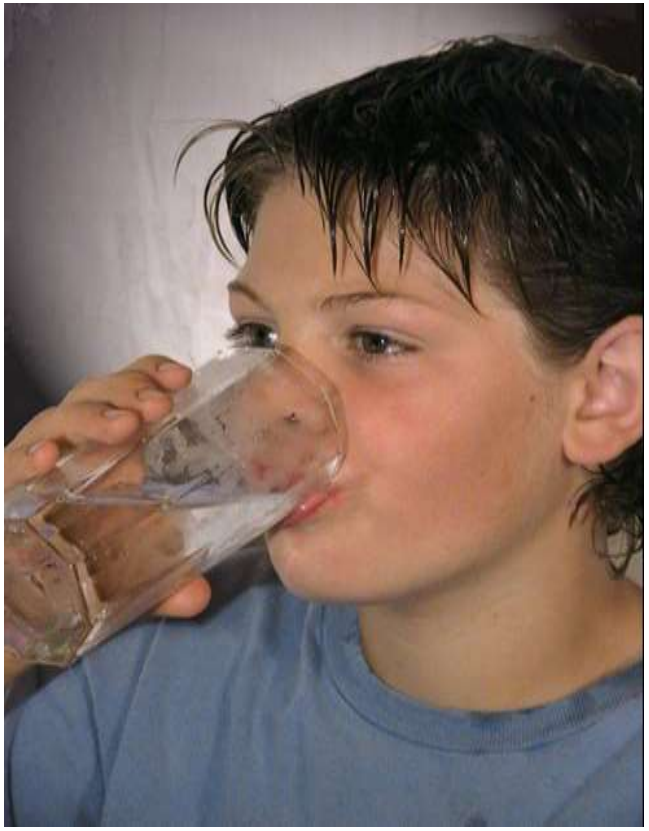
- Fluid balance:

  water gain = water loss

- Electrolytes balance:

  electrolyte gain = electrolyte loss

- Acid=base (neutral)

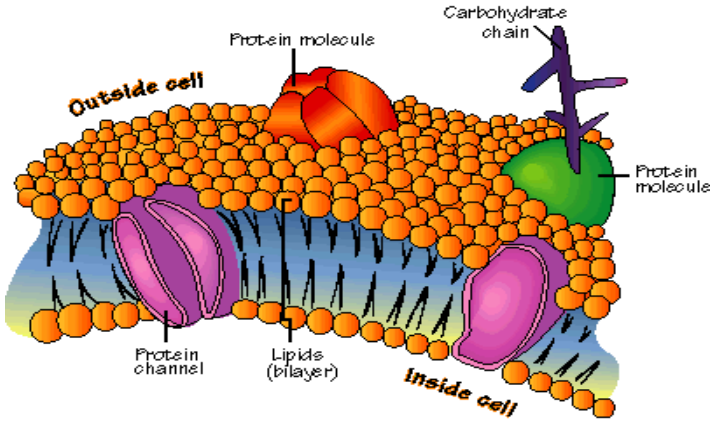


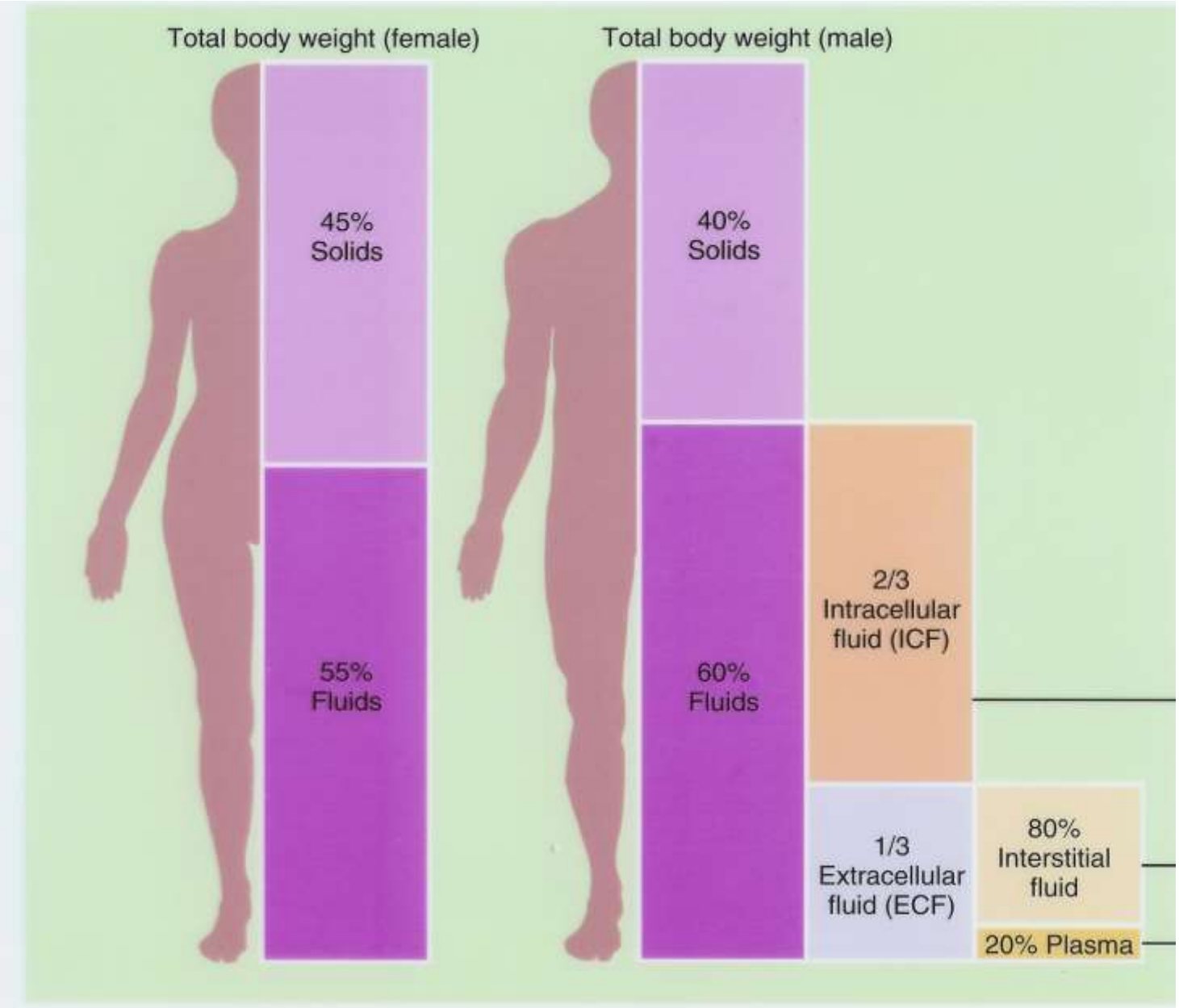
Body fluids

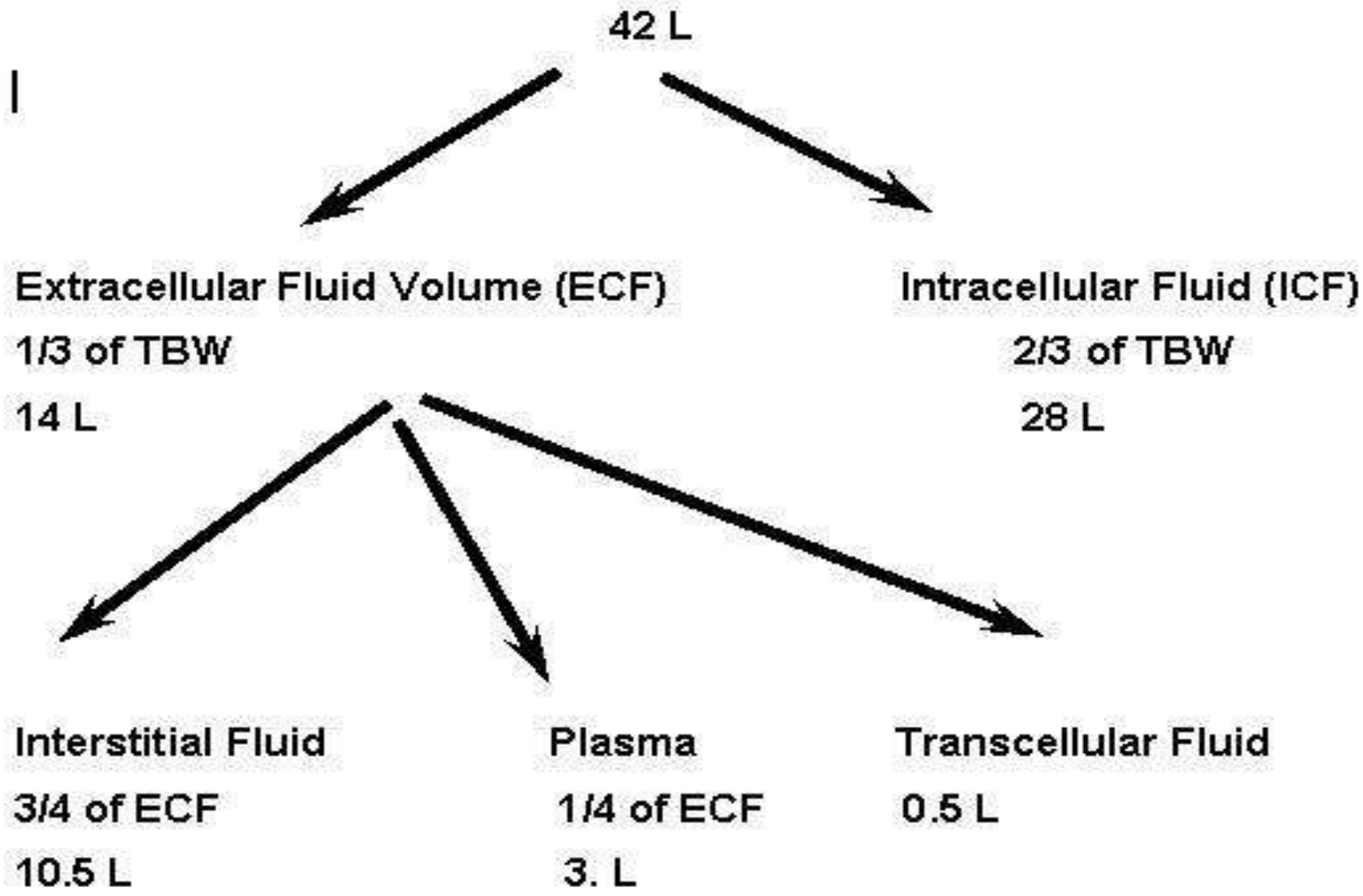
- The fluid compartments in healthy, normal men and women differ, because weight for the female body contains more fat.
- fluid compartments divided into two

Intracellular

Extracellular



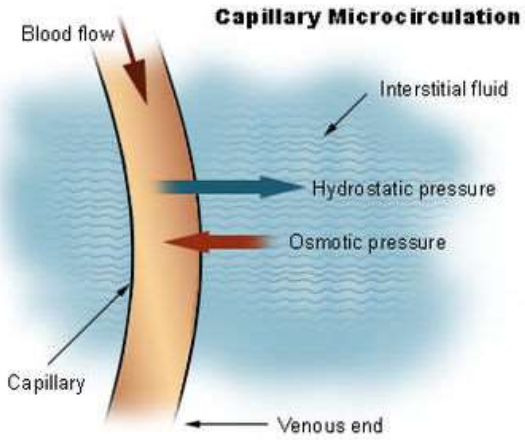

Total body weight (female)
Total body weight (male)
45%
Solids
55%
Fluids
40%
Solids
60%
Fluids
2/3
Intracellular
fluid (ICF)
1/3
Extracellular
fluid (ECF)
80%
Interstitial
fluid
20% Plasma


42 L
Extracellular Fluid Volume (ECF)
1/3 of TBW
14 L
Intracellular Fluid (ICF)
2/3 of TBW
28 L
Interstitial Fluid
3/4 of ECF
10.5 L
Plasma
1/4 of ECF
3. L
Transcellular Fluid
0.5 L

ECF

Divided into smaller compartments

<u>Interstitial fluid</u>
(between cells/surrounding the cells)



<u>Intravascular fluid</u>
(within arteries, veins and capillaries)
e.g. plasma of the blood and lymph

<u>Transcellular fluid</u>
Body secretions and excretions
e.g. GIT fluids, synovial fluid in joints, CSF (cerebrospinal fluid), peritoneal space, bile, intraocular, pleural, pericardial, urine

MOVEMENTS OF BODY FLUIDS AND ELECTROLYTES

- Fluid and electrolytes constantly moving between cells and extracellular compartments through the process of

  * osmosis
  * diffusion
  * filtration
  * active transport

MOVEMENTS OF BODY FLUIDS & ELECTROLYTES

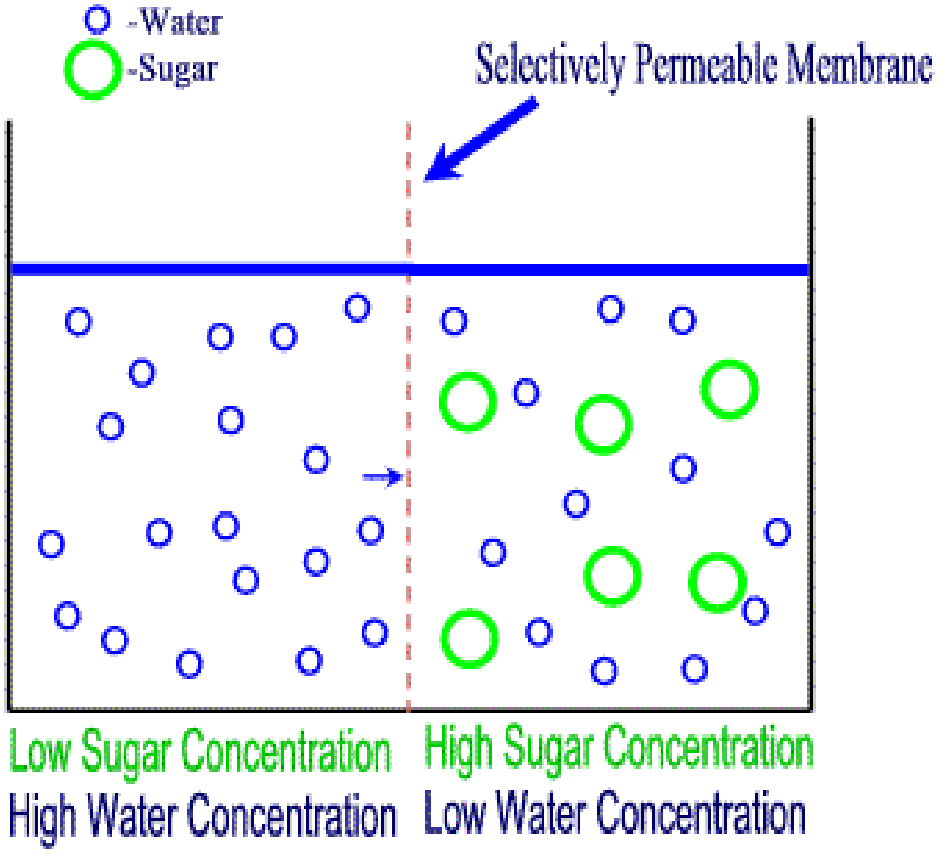
- * ***Osmosis***: ***water*** movement through a selectively permeable membrane from area of ↓ concentrated solution to area of ↑↑ concentrated solution.

- * ***Filtration***: **water and solute** e.g. nutrients, waste products (except larger ones) moves from high hydrostatic pressure area to low hydrostatic pressure area.

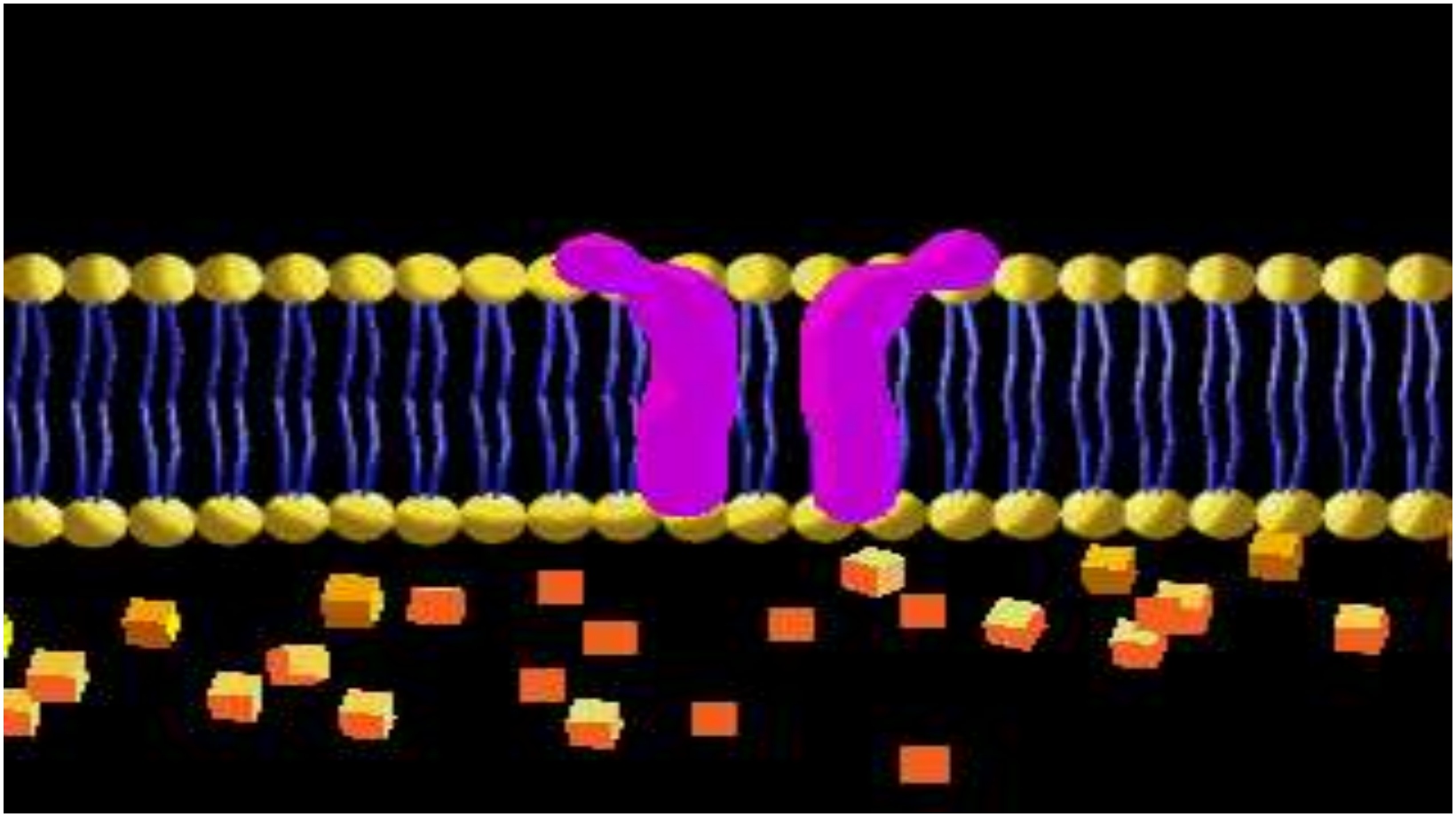
- * ***Diffusion*** - ***solutes*** moves from higher concentration to area of lower concentration via semi-permeable membrane

- *****Active transport***: - movement of substances across cell membranes from lower concentration to high concentration with help of ***enzymes*** (**ATP)** that produces ***energy***.

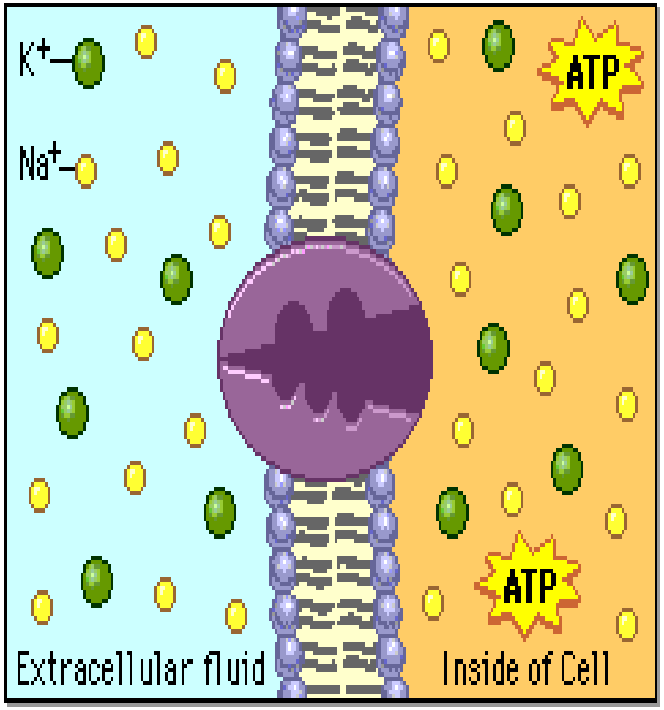
Osmosis

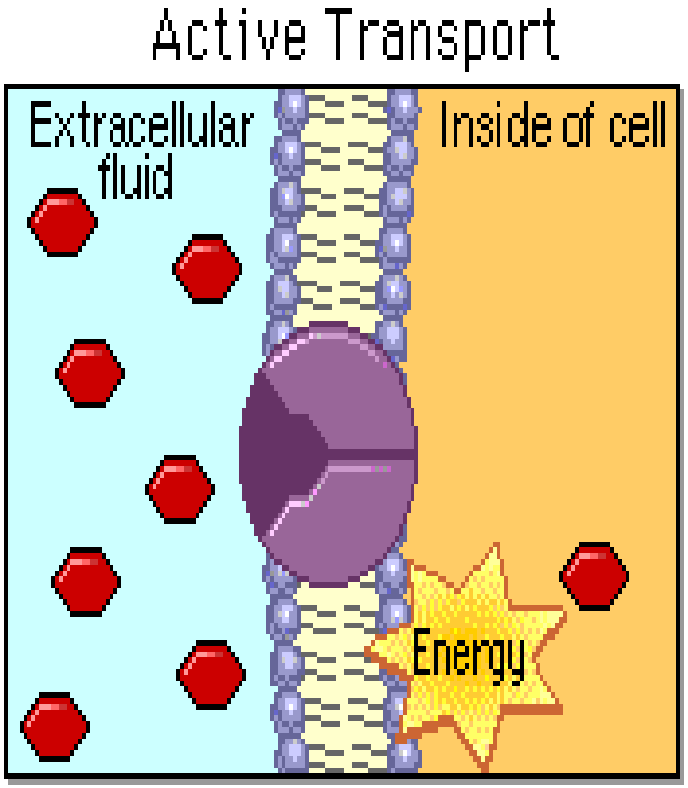

-Water
-Sugar
Selectively Permeable Membrane
Low Sugar Concentration
High Water Concentration
High Sugar Concentration
Low Water Concentration

DIFFUSION



SODIUM – POTASSIUM PUMP





ROUTES OF GAINS AND LOSSES

- Gains

Drinking

Eating

Sometimes

Parenteral route

Enteral feeding

- Losses

Kidney → urine

Skin → sweating

Lungs → perspiration

GI → stools

REGULATION BODY FLUIDS

- Body maintains fluid equilibrium by equalizing its input and output (homeostasis)

- **It can be regulated by**

1) the body's thirst mechanism

(hypothalamic thirst centre)

→Thirst results from decreased fluid intake, excessive fluid loss or excessive sodium input**.**

REGULATION BODY FLUIDS

2) **Renin-angiotensin-aldosterone system**

Increase B/P and fluid intake

3) Atrial natriuretic peptide (ANP)

Release from atrium of heart in response to increase B/P

4) Antidiuretic hormone

Regulate water excretion from kidneys

FLUID BALANCE

- The amount of water a patient requires each day depends on the patient's age and the nature of the patient's medical condition.
  - Water is 30ml/kg of body weight

- Intake of fluid from drinks and food

- Fluid loss
  - sensible loss (urine, vomit)

  - Insensible loss – evaporation from skin (sweat), feces (stool), breathing (lung)

FLUID BALANCE

• Water intake : fluids	• 1000 -1500mls
• Water : food	• 700mls
• Oxidation	• 300mls
Total	**2000mls-2500mls**
• Urine	• 1000 – 1500mls
• Skin	• 500mls
• Lungs	• 400mls
• Stools	• 100mls
Total	**2000-2500mls**

BALANCE

- Fluid and electrolyte homeostasis is maintained in the body
- Neutral balance: input = output
- Positive balance: input > output
- Negative balance: input < output

NURSES RESPONSIBILITY

- Check the vital signs
- Monitoring the weight
- Verifying the lab values
- Maintaining fluid balance chart
- Observing signs and symptoms of imbalances.

ASSESSMENT

- A state of balance in the body is known as _____
- The body's fluid is divided into 2 major compartments, that is the _____ and _____
- Intracellular fluid is found _____ the cells
- Extracellular fluid is found _____ the cells

ASSESSMENT

- Name a component found in the compartments below:

1. Intravascular fluid _____

2. Transcellular fluids _____, _____, _____

References

- BRUNNER & SUDDARTH, MEDICAL SURGICAL NURSING, 1ST EDITION
- LEWIS'S, MEDICAL SURGICAL NURSING, 9TH EDITION
- M.P SHARMA, MEDICAL SURGICAL NURSING,1ST EDITION, AITBS PUBLISHERS


THANK YOU