

Body fluids :

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Learning objectives:

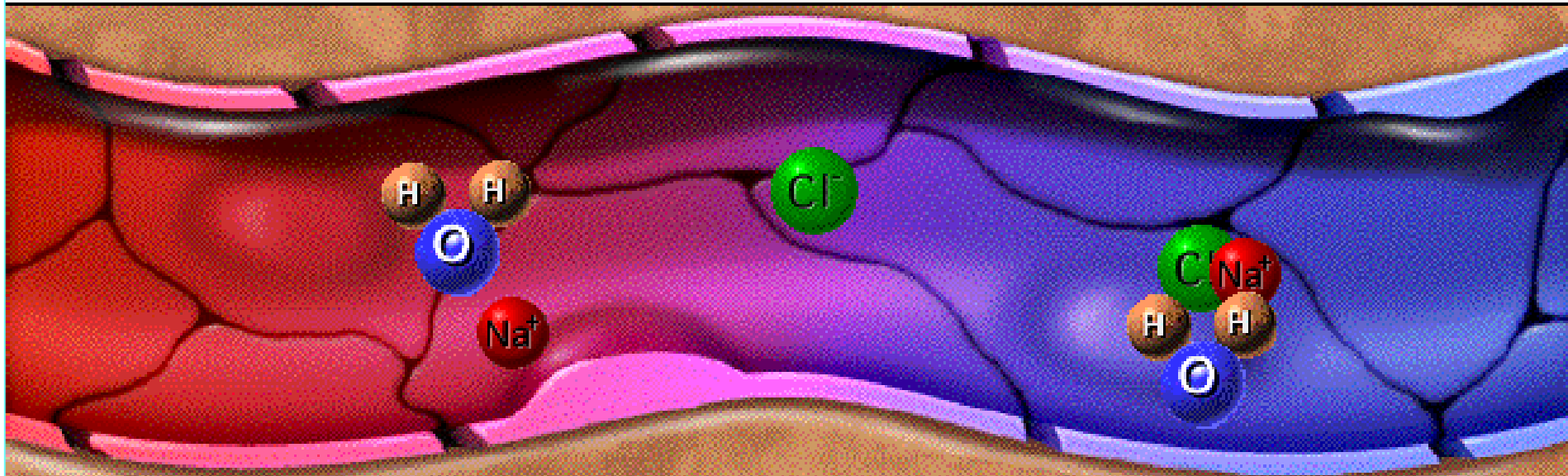
- Understand the Importance of Body Fluids
- Identify the Different Compartments of Body Fluids
- Describe the Composition of Body Fluids
- Explain Fluid and Electrolyte Balance Mechanisms
- Examine the Movement of Fluids Between Compartments

Overview:

- Body fluids are essential for maintaining homeostasis.
- They make up about 60% of total body weight in adults.
- Body fluids are categorized into two main compartments: intracellular and extracellular.

Roles of Water

- Temperature regulation
- Protective cushion
- Lubricant
- Reactant
- Solvent
- Transport



Barriers separate ICF, interstitial fluid and plasma

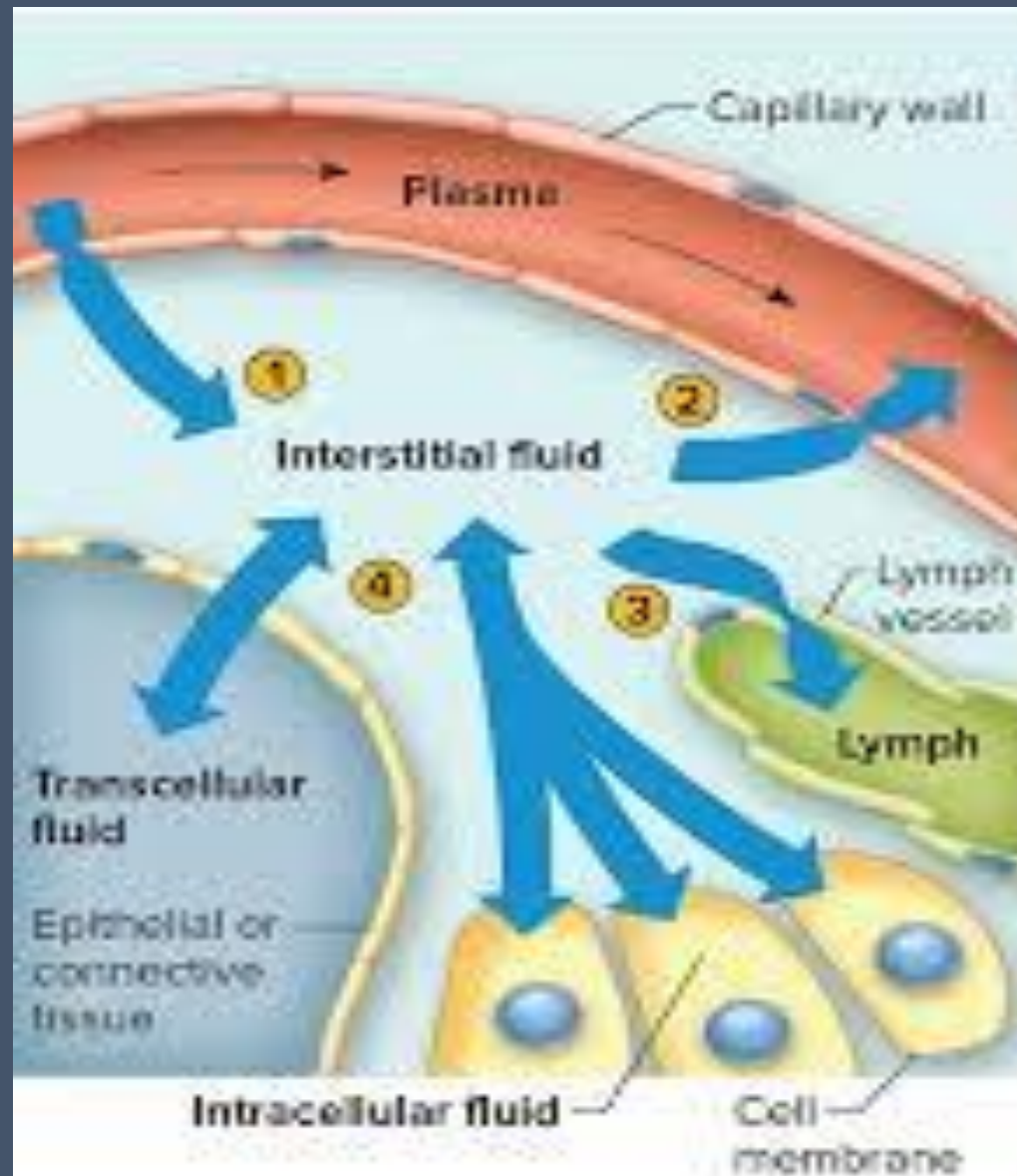
- Plasma membrane
 - Separates ICF from surrounding interstitial fluid
- Blood vessel wall
 - Separate interstitial fluid from plasma

Plasma

Description: The liquid component of blood.

Volume: Approximately 3 liters in a 70kg adult.

Function: Transport of nutrient



- 1 Fluid leaves plasma at arteriolar ends of capillaries because the outward force of hydrostatic pressure predominates.
- 2 Fluid returns to plasma at venular ends of the capillaries because the inward force of colloid osmotic pressure predominates.
- 3 Hydrostatic pressure within interstitial spaces forces fluid into lymph capillaries.
- 4 Interstitial fluid is in equilibrium with transcellular and intracellular fluids.

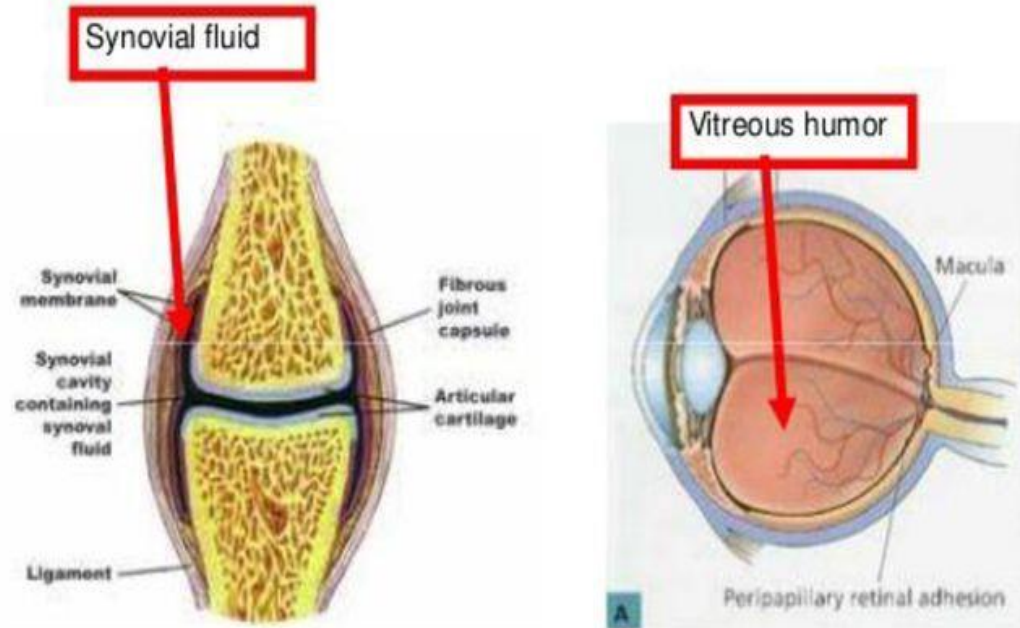
Transcellular Fluid

Description: Fluid in specific compartments like cerebrospinal fluid, synovial fluid, etc.

Examples: Cerebrospinal fluid, synovial fluid, aqueous humor.

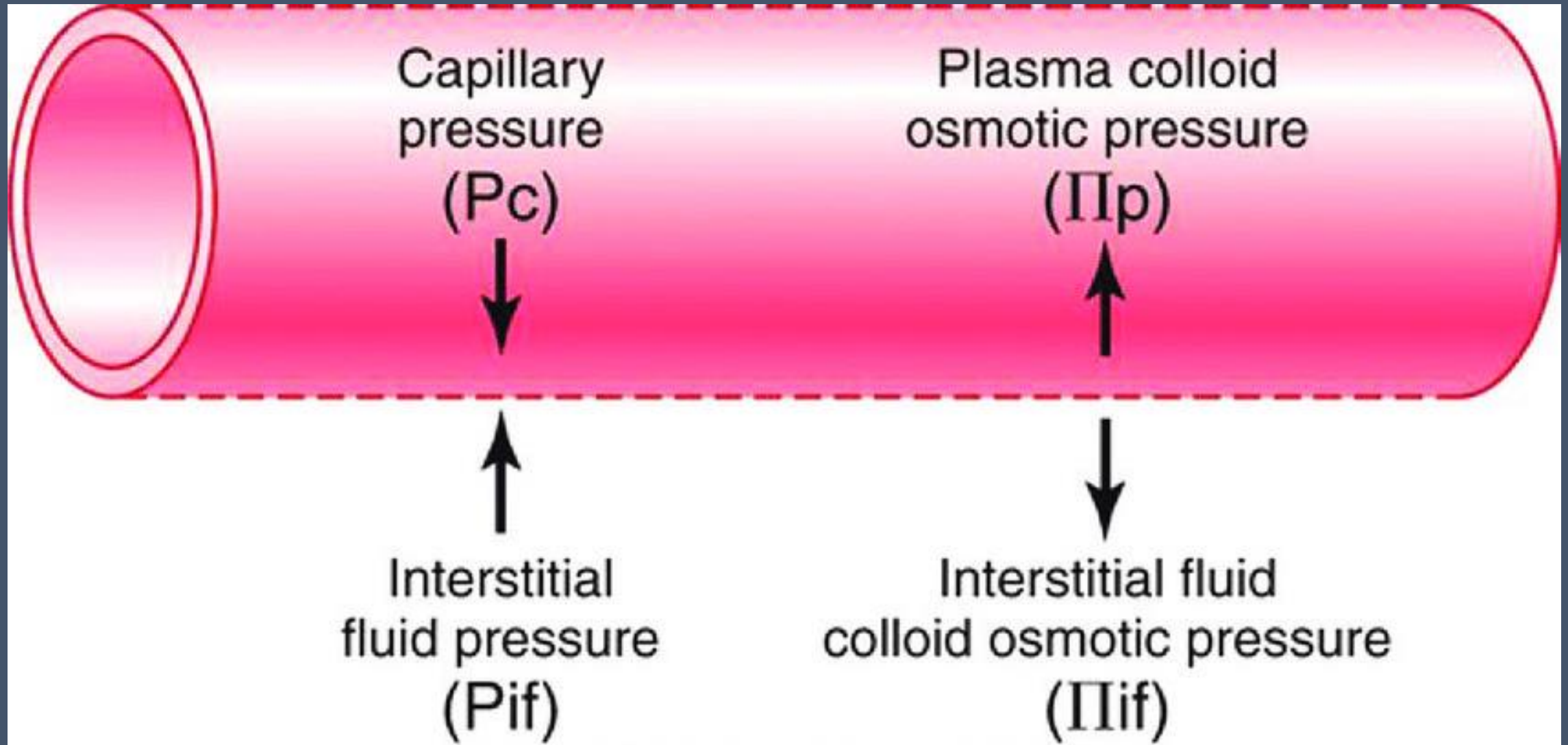
Function: lubricates the organ in which it is present.

Transcellular fluid



Specialized Fluids of the Body

- Lymph
- Milk
- Cerebrospinal fluid
- Amniotic fluid
- Aqueous humor
- Sweat
- Tears



Hall: Guyton and Hall Textbook of Medical Physiology, 12th Edition
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Regulation of Body Fluids:

- *Kidneys and Fluid Balance:*

- Kidneys regulate the volume and composition of body fluids.
Renal function: Filtration, reabsorption, secretion.

• *Thirst Mechanism:*

- Controlled by hypothalamus in response to changes in plasma osmolarity or volume.

Fluid Imbalance Disorder

Dehydration:

- Occurs when body loses more water than it takes in.
- Can be caused by excessive sweating, diarrhea, or inadequate fluid intake.



Fluid Imbalance Disorders

Edema:

Excess fluid accumulation in the interstitial space.

Causes: heart failure, kidney disease, liver cirrhosis

Peripheral Edema

Common Symptoms



full hand and neck veins



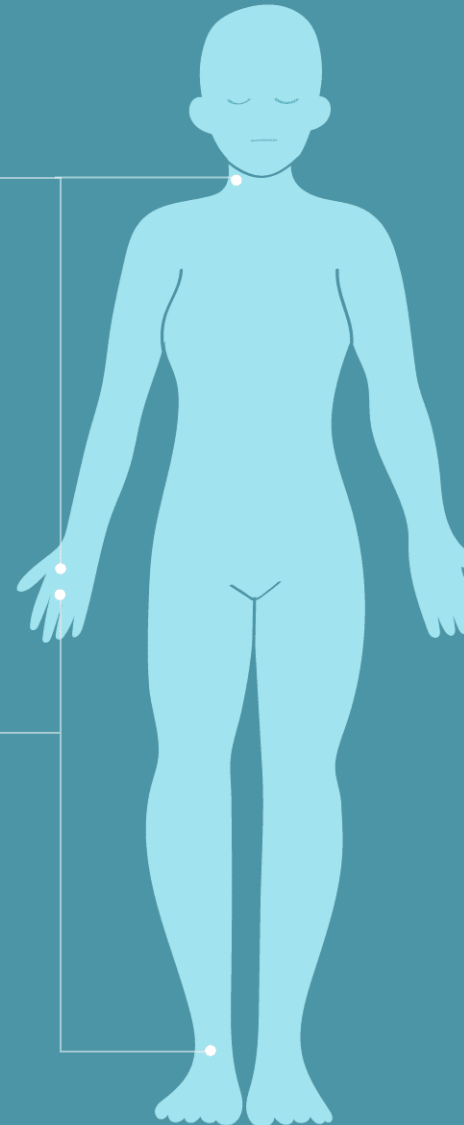
joint aches



pitting skin



puffiness in ankles, hands, or face



METHODS OF MEASUREMENTS

INDIRECT METHOD – INDICATOR (DYE) DILUTION

- YOU HAVE TO SELECT A SUITABLE DYE OR RADIO-ISOTOPE
- V = VOLUME OF FLUID
- A = TOTAL AMOUNT OF DYE USED
- E = AMOUNT OF DYE EXCRETED OR LOST .
- C = CONCENTRATION

FORMULA
$$V = A - E / C$$