Water And Electrolytes Balance

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Body Water

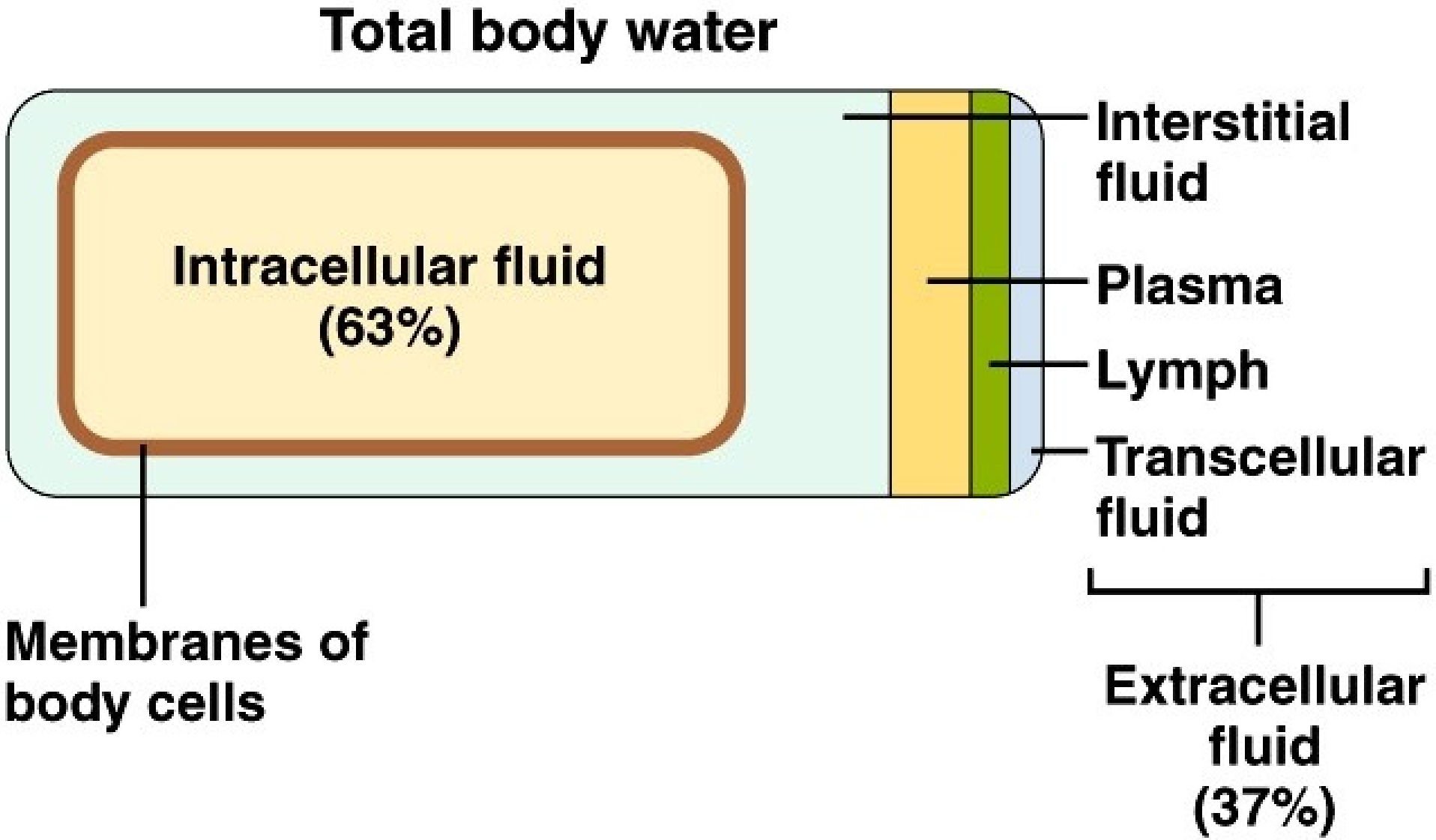
- **Water** is the **chief constituent of human body.**
- Water is the **chief solvent of body.**
- Water **comprises 60-70%** of total body weight
- **Human body cannot exist without Water.**

Sources Of Body Water

- Drinking Water, Beverages -1000 to1500 ml
- Water from Cooked Foods
- Water intake through mouth is highly variable 1-5 Liters this depend on :
  - Social habits
  - Climatic condition

Endogenous Sources of Water

- **Metabolic Water - 400 ml**
- Produced during **metabolism oxidation of food substances.**
- In an adult of 70 kg body
- **Total Body Water – 60 to 70%**
- **Intracellular Fluid -65 %**
- **Extracellular Fluid -35%**
  - **Interstitial Tissue Fluid -25%**
  - **Plasma /Intra Vascular Fluid -8%**
  - **Transcellular Fluid- 2%**



- Body water content in percentage of a body weight is lowest in.

(A)Well built man

(B) Fat woman

(C)Well nourished child

(D) Fat Man

Functions Of Body Water

- **Involved in Biochemical reactions**
  - Water act as reactant in many hydration Hydrolytic reactions of metabolic pathways.
- **Transporting media of body:**
  - Transportation of nutrients and waste metabolites through media of blood and tissue floods.
- **Regulates body temperature**

- Water transports **Hormones**, Enzymes, **blood platelets,** and **red and white blood cells**
- Water **act as a solvent** for **Electrolytes** and **Non electrolytes**
- Water Facilitates **Digestion** and promoting **Elimination of ingested food**
- Water serve as a tissue **Lubricant**

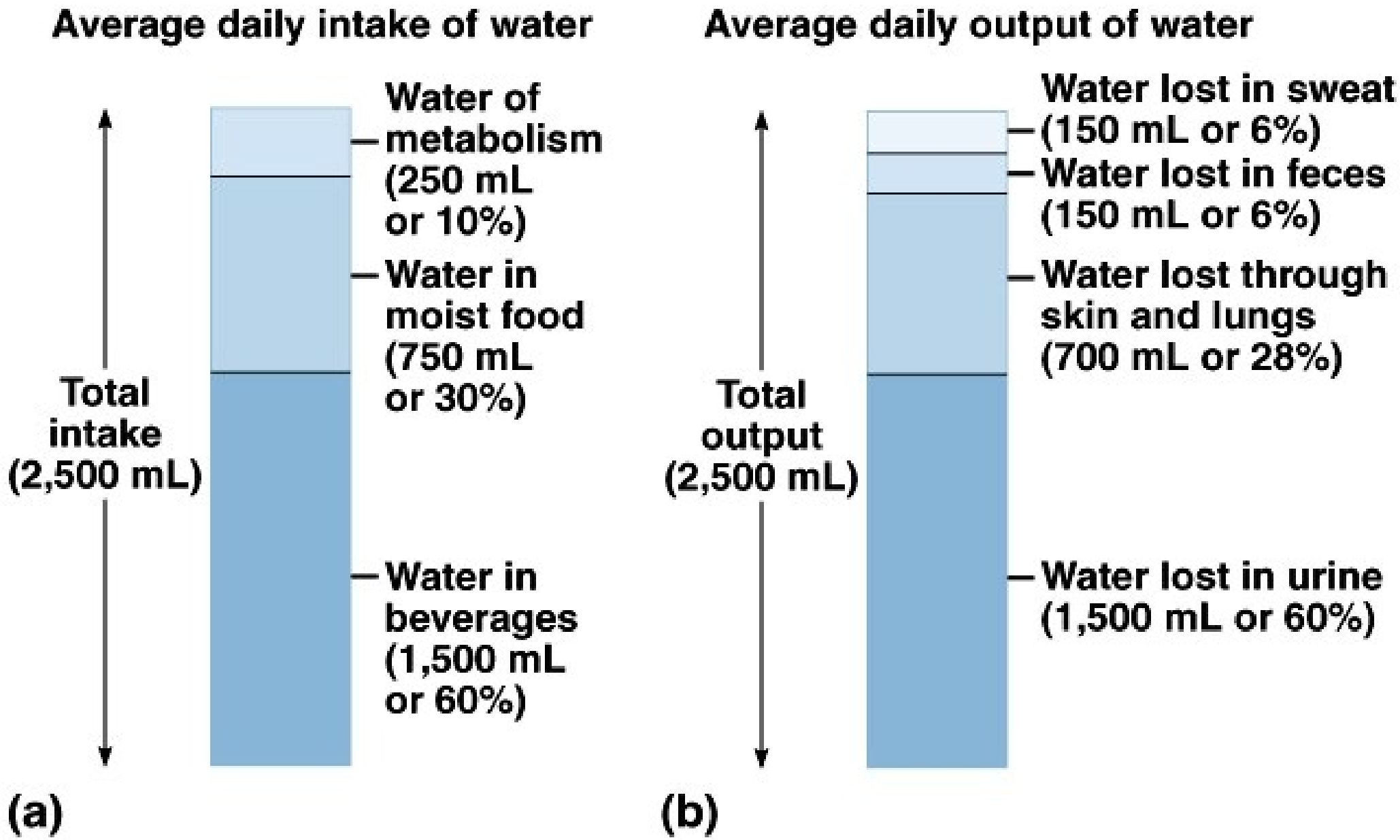
Body Water Input and Output

Body Water Input

- Body can gain water by :
  - **Ingestion** of liquids and moist foods (**2300mL/day**)
  - **Metabolic** synthesis of water during cellular respiration **(200mL/day)**

Body Water Output

- Body losses water through:
  - Kidneys (1500mL/day)
  - Evaporation from Skin (600mL/day)
  - Exhalation from Lungs (300mL/day)
  - Feces (100mL/day)


Average daily intake of water
Water of metabolism (250 mL or 10%)
Water in moist food (750 mL or 30%)
Water in beverages (1,500 mL or 60%)
Total intake (2,500 mL)
(a)
Average daily output of water
Water lost in sweat (150 mL or 6%)
Water lost in feces (150 mL or 6%)
Water lost through skin and lungs (700 mL or 28%)
Water lost in urine (1,500 mL or 60%)
Total output (2,500 mL)
(b)

BODY ELECTROLYTES

- Substance when dissolved in solution **dissociates into ions.**
- These ions are able to **carry an electrical current.**
- **An Electrolyte** is a substance which **develops an electrical charge when dissolved in water.**
- Salts like **NaCl** and **KCl** in aqueous solutions gets dissociated to **Charged ions Na^+ and Cl^- called as Electrolytes.**
- The **concentration of these Electrolytes is expressed** as **mEq/L.**

Types Of Electrolytes

- **CATION -** Positively charged Electrolyte

- **ANION -** Negatively charged Electrolyte
- **Predominant Cations and Anions of ECF: Na^+ and Cl^- respectively**.

Distribution Of Body Electrolytes In ECF and ICF

INTRACELLULAR Electrolytes	EXTRACELLULAR Electrolytes
POTASSIUM	SODIUM
MAGNESIUM	CHLORIDE
PHOSPHOROUS	BICARBONATE

Functions Of Body Electrolytes

- **Electrolytes are well distributed in the body compartments**.
- Electrolytes in the medium/compartments **produce osmotic pressure**.
- This osmotic pressure **helps in maintaining water balance.**

ELECTROLYTES

- **Na^+:** Most abundant electrolyte in the ECF.
- **K^+:** Essential for normal membrane excitability for nerve impulse
- **Cl^-:** Regulates osmotic pressure and assists in regulating acid-base balance
- **Ca^{2+}:** Promotes nerve impulse and muscle contraction/relaxation
- **Mg^{2+}:** Plays role in carbohydrate and protein metabolism, storage and use of intracellular energy and neural transmission. Important in the functioning of the heart, nerves, and muscles.

THANK YOU