Sodium (Na^+)

- Regulates fluid balance and blood pressure.
- Essential for nerve signal transmission and muscle contraction.

Sodium, an osmotically active cation, is a crucial electrolyte found in extracellular fluid. It plays a vital role in maintaining the volume of extracellular fluid and in regulating the membrane potential of cells. The exchange of sodium and potassium across cell membranes is a key component of active transport.[1] The regulation of sodium occurs primarily in the kidneys, with the proximal tubule being the main site for sodium reabsorption. Additionally, sodium is reabsorbed in the distal convoluted tubule through sodium-chloride symporters, a process that is regulated by the hormone aldosterone.[2] Among electrolyte disorders, hyponatremia is the most common. It is diagnosed when serum sodium levels fall below 135 mmol/L and can lead to neurological symptoms. Patients may experience headaches, confusion, nausea, and delirium.[3] Conversely, hypernatremia is identified when serum sodium levels exceed 145 mmol/L, with symptoms including tachypnea, difficulty sleeping, and restlessness. Rapid correction of sodium levels can result in serious complications such as cerebral edema and osmotic demyelination syndrome (ODS). Additionally, factors such as chronic alcohol misuse and malnutrition can contribute to the onset of ODS.[4]

References:

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