

Sodium (Na^+)

major extracellular cation

Normal level in plasma
= 136 - 145 mEq/L.

functions

1. Largely associated with the regulation of acid-base balance (Na_2CO_3)
2. Regulates blood volume and blood pressure.
3. Maintains normal neuromuscular function
4. Maintains normal permeability of cells.
5. Necessary for initiating and maintaining heart beat

6. Helps in intestinal absorption of glucose, galactose. Sodium chloride (edible salt) is the major dietary source.

Absorption

99% absorbed from the GIT.

Aldosterone increases reabsorption.

Amph Disease state

Increased level

- Hypernatraemia ($>145 \text{ mEq/L}$)

Causes in

- Hyposecreting of adrenal cortex as in Cushing Syndrome.
- Prolonged treatment of corticosteroids ACTH and sex hormone.
- Dehydration.
- In pregnancy, steroid hormone causes Na^+ retention in the body.

Amph Disease state

Increased level

Hyponatraemia ($<135 \text{ mEq/L}$)

Causes in:

- Use of Diuretics
- Sweating
- Kidney disease.
- Addison's disease.
- Renal tubular acidosis.

Potassium (K^+)

Major intracellular cation.
Normal level in plasma = $3.5 - 5 \text{ mmol/L}$.

Sources

Very good source - tender coconut water.
Good source - Banana, orange, apple, pineapple, almond, potato, dates etc.

Function

1. Largely associated with the regulation of acid base balance.
2. Helps in muscular contraction particularly cardiac muscle.
3. Maintains intracellular osmotic pressure.
4. Functions in transmission of nerve impulse.

Absorption Disease state

Increased level - Hyperkalaemia ($>5.5 \text{ mmol/L}$)

Causes in:

- Decreased K^+ excretion } Renal failure.
- Entry of K^+ to extracellular space } Excess K^+ supplementation
- Redistribution of K^+ - metabolic acidosis

Drugs $\rightarrow$ epiconalactone

Pseudohypokalemia.

$\rightarrow$ Improper blood
collection (hemolysis)

Symptoms

Depression of CNS.

Mental confusion.

Numbness.

Bradycardia.

Decreased heart sounds.

Cardiac arrest.

ECG changes.

$\rightarrow$ ECG

Treatment:

Give intravenous glucose
and insulin.

Decreased level

Hypokalemia ($< 3.5 \text{ mEq/L}$)

occurs in:

Renal losses - eg. Renal tubular
acidosis.

$\rightarrow$ Prolonged use of diuretics

$\rightarrow$ Overactivity of adrenal cortex
(Cushing's syndrome) which
causes increased excretion of
K in urine.

$\rightarrow$ Redistribution of K
eg. Metabolic alkalosis,
Insulin therapy.

Symptoms

$\rightarrow$ Irritability

$\rightarrow$ Tachycardia

$\rightarrow$ Muscle weakness

$\rightarrow$ Cardiomegaly

$\rightarrow$ Cardiac cardiac arrest.

Chloride

functions

$\rightarrow$ Maintaining fluid balance

$\rightarrow$ Component of gastric HCl.

$\rightarrow$ Helps the immune system.

Normal level in plasma: -
96 - 106 mEq/L.

• Increased level - Hyperchloremia
seen in

$\rightarrow$ severe diarrhea.

$\rightarrow$ respiratory acidosis

$\rightarrow$ Cushing's syndrome.

• Decreased level - Hypochloremia
seen in.

$\rightarrow$ Vomiting.

$\rightarrow$ Respiratory alkalosis

$\rightarrow$ Addison's disease.

Importance
Iron

$\rightarrow$ Blood contains 14.5g of
Hb per 100mL.

45% of total iron $\rightarrow$ Hb.

5% myoglobin.

15% Ferritin (storage
form)