



## MINERALS

### SODIUM:

#### Source

- Common salt.
- Bakery products, dry fish, nuts etc.

#### Intake & Output

- Total body content of sodium is approx. 92g (60 kg man).
- The daily intake varies between 2.3g to 9.2g.
- Na lost through sweat, faces & urine.

A schematic diagram showing the regulation of sodium is depicted in Fig.1.

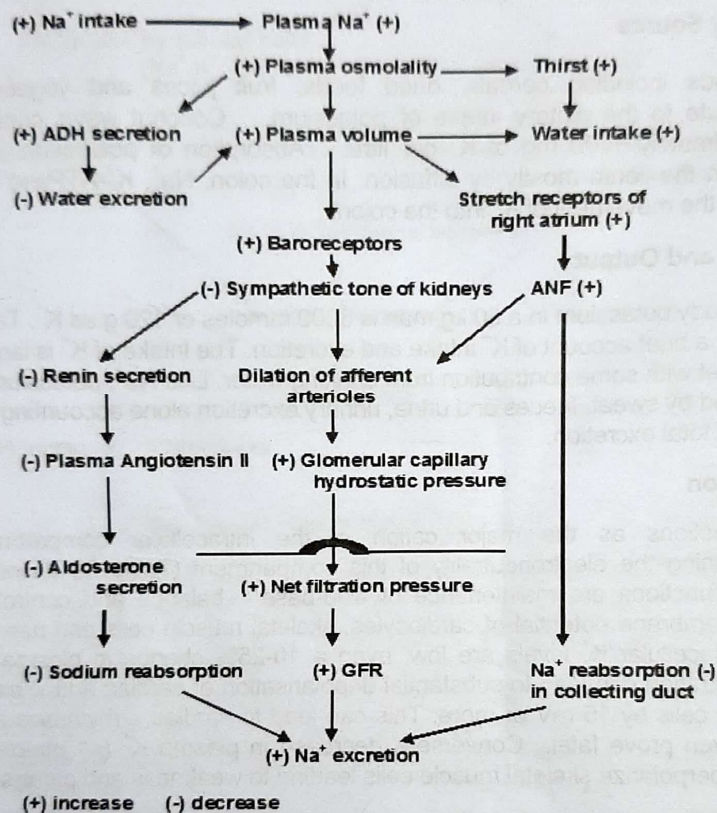


Fig.1. Regulation of Plasma Sodium



## Function

- Maintenance of fluid balance, muscle irritability, acid base balance, nerve conduction & osmotic pressure.
- $\text{Na}^+$  is a cellular activator, plays a decisive role in the cell excitability process in transmission of action potential.
- Acts as an activator of protein fraction in enzymatic reaction.

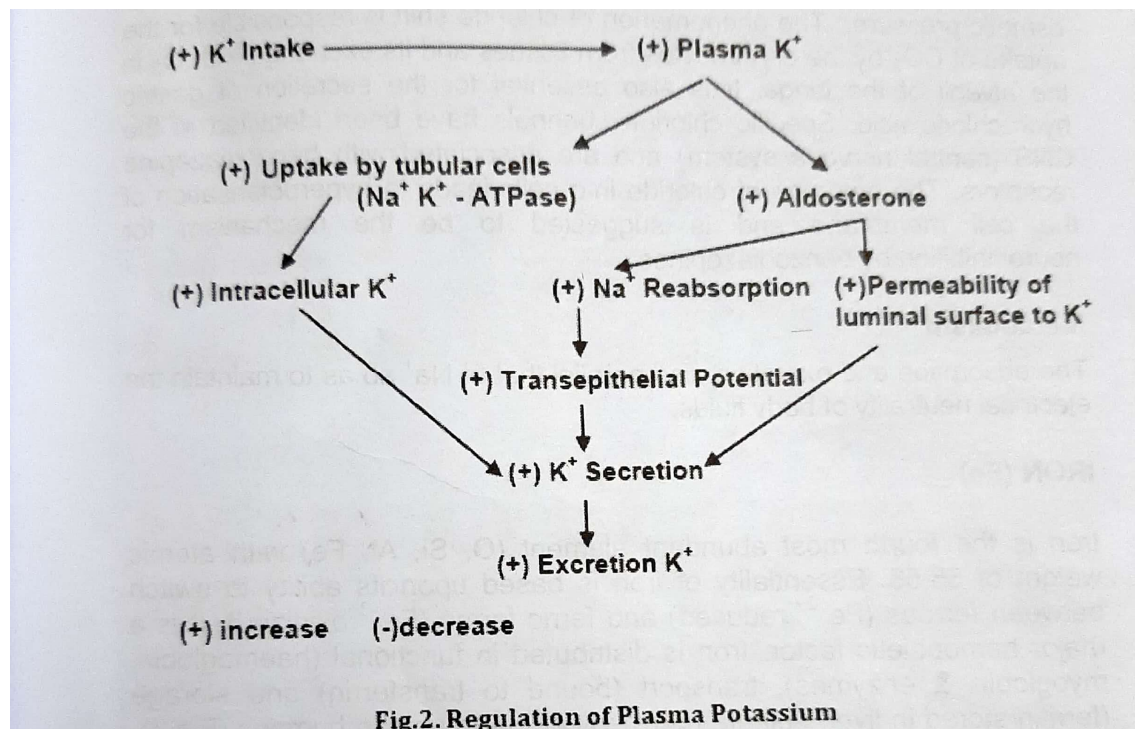
## POTASSIUM

### Source

- All foods including dried foods, fruit juices, vegetables.
- Coconut water.

### Intake & Output

- Total body  $\text{K}^+$  is 120g (60 kg man).
- Potassium is excreted by sweat, faces, urine.



## Function

- As a major cation of the intracellular compartment maintaining the electro neutrality of this compartment.
- Maintenance of acid base balance.
- Control of skeletal muscle cells & nerves.



## *CALCIUM*

### **Source**

- Major source milk & milk products.
- Plant based foods include cereals, pulses, green leafy veg (low content).
- Fish with soft bones.

### **Function**

- Building strong bones & teeth.
- Muscle contraction.
- Blood clotting.
- Normal heart rhythm.

### **Regulation of Calcium**

- Regulated by two hormones.
- Parathyroid & calcitonin hormone.
- Secretion of parathyroid hormone is inversely proportion to calcium level in blood: stimulates bone to release calcium in-to blood.
- Calcitonin lowers the calcium level in blood.

### **Excess & Deficiency**

- Excess may cause kidney stones.
- Deficiency may cause osteoporosis etc.

## *PHOSPHORUS*

### **Source**

- Milk, milk products.
- Egg, liver.
- Vegetables.
- Total body content is about 600-800g.



## Function

- Important component of phosphoprotein, phospholipid, & nucleic acid.
- The regulation of many enzymes is achieved by phosphorylation & dephosphorylation.
- Essential for bone formation.
- Maintenance of acid base balance.
- Organic phosphate is converted to inorganic phosphate of  $Na^+$ ,  $K^+$  &  $Ca^{++}$  & absorbed in upper small intestine.
- Balance and use vitamins B & D.
- Minerals like- iodine, magnesium & zinc.
- Maintain regular heartbeat.

## Regulation

- Regulated through its renal excretion.
- Free ionic phosphate of plasma is filtered at the kidneys.

## EXCESS & DEFICIENCY

- Excess cause diarrhoea, hardening of organs.
- High level can affect others minerals use on body like calcium, magnesium & iron, zinc.
- Deficiency cause joint or bone pain, loss of appetite, fatigue, poor bone development in children.

## IRON

### Source

- Available from animal source as a muscle haemoglobin is readily available to the body as iron present in haem form.
- Iron present as phytoferritin in plant foods (non haem part not readily available).
- Good source of non-haem iron are cereals, legumes & pulses & nuts.

### Forms of Iron

- Iron has the ability to switch between ferrous<sup>++</sup> & ferric form<sup>+++</sup>.
- It is a major hemopoietic factor.



## General Overview

- Iron is distributed in functional transport and storage compartments of human.
- Total iron content of the body varies with age, sex, nutrition.
- Normal adult man body contain 4.5g of iron.
- 60 to 70% as blood haemoglobin, 3% as myoglobin iron.

## Function

- Transferring of oxygen in blood from lungs to tissue.
- Myoglobin in muscle cells accept, sores, transport and release oxygen.
- Component of certain protein, essential for respiration & energy metabolism.
- Need for proper immune function.

## Deficiency and Excess

- Iron store exhausted called iron depletion.
- Further decreases called erythropoiesis.
- Still deficiency cause iron deficiency anaemia.
- Excess iron may cause liver disease, heart problem etc.

## ZINC

### Source

- Lean red meat and shell fish rich source.
- Whole grain cereals, pulses and legumes.
- Green leafy veg are poor source.
- Zinc in food present as complex form.
- Phytate & dietary protein source is determining factors for zinc bioavailability.

### Function

- Acts as physiologically through enzymatic and regulatory mechanism.
- Involved in catalytic function of a large number of enzymes of lipid, protein and nucleic acid.



## Excess and Deficiency

- Excess cause nausea and vomiting.
- Stomach pain and diarrhoea.
- Lowers good cholesterol.
- Change in taste.
- Cu deficiency.
- Frequent infection.
- Deficiency cause hair loss, appetite loss, problem in wound healing, weight loss.