

## METABOLIC FUNCTIONS OF MACRO NUTRIENTS

### CALCIUM

1. Calcium along with phosphate constitutes the mineral part of skeleton.
2. Controls the permeability of all membranes. I.e. it decreases the permeability and balances the opposite action of sodium and potassium capillary permeability.
3. Many enzymes are calcium dependent such as ATPases, succinic dehydrogenase etc.
4. It is cofactor of many enzymes that are involved in blood clotting.
5. It causes the excitability of heart muscles.
6. It influences the excitability of nerve fibres and helps in transmission of nerve impulses.

### PHOSPHORUS

1. Formation of bone and teeth.
2. Part of phospholipids in the biological membranes.
3. Constituent of nucleic acids.
4. Increases the energy level of organic compounds for their downstream catabolism. E.g. the glucose-6-phosphate has higher energy content than glucose.
5. Constituent of high energy compounds such as ATP that take part in energy transductions in the process of metabolism.
6. The organic and inorganic phosphates buffer the body fluids.
7. The addition of phosphate group to a protein modulates its activity.

### MAGNESSIUM

1. It acts as a cofactor of large numbers of enzymes that take part in lipid, protein, and carbohydrate metabolism. E.g. phosphorylase, phosphoglucomutase, enolase, peptidase and alkaline phosphatase.
2. It acts as antagonist of calcium in its physiological effects.
3. Excess plasma Mg decreases muscle and nerve irritability and high level induce anaesthesia.
4. Low levels of Mg in blood leads to a type of tetany similar to low levels of calcium.

### SODIUM, POTASSIUM AND CHLORIDE

1. These electrolytes maintain normal osmotic pressure in the body and protect the body against excessive loss of fluid.
2. They maintain the acid base balance in the body. Sodium bicarbonate, sodium phosphate, potassium phosphate form the buffer system of extracellular and intracellular fluid.
3. They maintain the fluid balance in body.
4. Sodium and potassium are involved in normal excitability of muscle.
5. The chlorides in RBCs help in transport of CO<sub>2</sub> from the cell via chloride bicarbonate shift.
6. Chloride helps in formation of gastric acid HCl.
7. Chloride ions are essential for the action of pancreatic amylase and ptyalin.

Students are advised to study the books for details. The above information have been adapted from the book entitled TEXTBOOK OF VETERINARY BIOCHEMISTRY, R.S DHONOTIA

