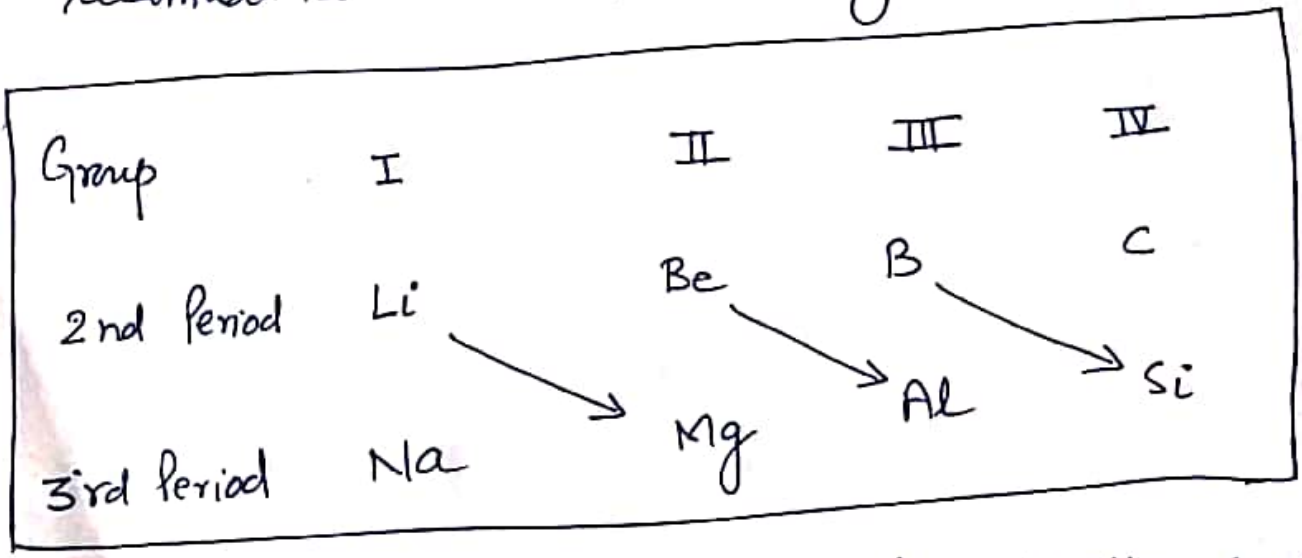
Diagonal relationship: Certain members of second period (specially Li, Be and B) reveal not only reveal similarities with the members of their own groups but show similarities with the elements placed diagonally in the higher groups, (i.e. the members of 3rd group period). Thus Li resembles Mg, Be resembles Al and B resembles Si. This resemblance is termed as diagonal relationship.



The diagonal relationship is due to the reason that these pairs of elements have almost identical ionic radii and polarizing power (i.e. charge/size ratio). Elements of III period, i.e. Mg, Al and Si are known as bridge elements.

Ionic radii

① Li & Mg 760 pm & 72 pm respectively.

② Be & Al 45 pm 54 pm respectively.

③ B & Si 27 pm & 40 respectively.

Role of s-block Elements in Biosystems

The living beings require at least 29 elements out of which macroelements include twelve viz. H, O, C, N, Na, K, Ca, Mg, P, S, Cl and Fe.

⏭ Sodium (Na) and Potassium (K) :

Source : The main source of sodium in the diet is the common salt viz. NaCl. Generally food from plant sources is iow in sodium-potassium occurs in almost all foods both plant and animal. The good sources of potassium include coffee, tea, dried beans, leafly vegetables, milk, fish, chicken, juices of oranges etc.

Absorption : Generally sodium and potassium are absorbed from the gastrointestinal tract.

Functions:

1. Maintaenance of Osmotic pressure
2. Maintenance of Normal acid - Base equilibrium
3. Transport of CO_2
4. Maintenance of Viscosity of Blood
5. In secretion of digestive fluids
6. In ~~stoe~~ storage of protein and glycogen

5. In secretion of digestive fluids : Gastric HCl gets derived from NaCl of blood and the base in alkaline digestive juices like pancreatic juice, gets derived from blood sodium and potassium salts.

6. In the storage of protein and glycogen : Potassium enters the intracellular fluid during the period of cell growth and repair. Deposition of 1 gm of cell protein needs about 0.4 mEq. of potassium. Similarly, storage of 1 gm of glycogen in the liver or muscles causes the passage of about 0.15 m Eq. potassium in the intracellular fluid.

Difference between the role of Na and K : Although there is close similarity of chemical properties between Na and K

yet their biological functions are very different. Na^+ ions are expelled from cells whereas K^+ ions are not. This transport of ion is called **sodium pump** and it involves expulsion of Na^+ ions and take-up of K^+ ions. In animal cells the concentration of K^+ is about 0.15 M and the concentration of Na^+ is about 0.01 M. In body fluid the concentrations of K^+ and Na^+ ions are about 0.003 M and 0.15 M respectively. The energy required for the transport of ions, is obtained by the hydrolysis of ATP. It is known that hydrolysis of one ATP molecule to ADP provides enough energy to move three Na^+ ions out of the cell and two K^+ and one H^+ ions back into the cell.

The different ratio of Na^+ to K^+ inside and outside cells produces an electrical potential across the cell membrane which is essential for the functioning of nerve and muscle cells.

Magnesium (Mg) and Calcium (Ca) : Mg^{2+} ions are concentrated in animal cells and Ca^{2+} ions are concentrated in the body fluids outside the cell. Mg^{2+} ions form a complex with ATP and are constituents of phosphohydrolases and phosphotransferases which are enzymes for reactions involving ATP and energy release. Mg^{2+} ions are important in chlorophyll. Ca^{2+} ions are important for the formation of bones and teeth and for maintaining rythem of heart and for clothing of blood. The enamel on teeth is also a double salt of calcium viz. $3Ca_3(PO_4)_2.CaF_2$.