

UNIT - II → Natural oxygen carrier :-

HAEMOGLOBIN :- →

Haemoglobin is the combination of two words, Heme + globin. Heme means blood and globin means protein :-

Haemoglobin → Heme + globin  
Heme → blood,  
globin → protein.

The red colouring material of blood is because of haemoglobin. It is present in red blood cells. Haemoglobin contains four polypeptide chain and four prosthetic group. In which the iron atoms are in the ferrous ( $Fe^{2+}$ ) state. Heme is the prosthetic group. In which the iron and the protein portion called globin consists of two  $\alpha$ -chain and two  $\beta$ -chain. It has a molecular wt. of 64,500. It can combine with oxygen and acts as the transport mechanism for oxygen within the blood. In globin  $\alpha$ -chain contains 141 amino acid where as  $\beta$ -chain contains 146 amino acid. In all there are 574 amino acid in the globin molecule.

The haemoglobin molecule is roughly spherical with a diameter of about 5-5 nm. The four polypeptide chain in haemoglobin fit together in an approximately tetrahedral arrangement one heme is found to each

polypeptide chain of hemoglobin. The oxygen bonding sites are rather far apart given the size of the molecule about 2.5 nm from one another.

Myoglobin have nearly the same tertiary str.

### Varieties of human hemoglobin: →

(1) Normal human hemoglobin: → It possess a common half molecule i.e. a pair of peptide chain. The other half consist of a pair of different type of peptide chain, one type for each hemoglobin.

(2) Fetal hemoglobin: → It is present in very small amount. It is represented by 'F'. It comprises 50 to 90% of the total hemoglobin in the new born. It is gradually replaced by hemoglobin during the first 6 month.

(3) Abnormal hemoglobin: → Over one hundred different types of abnormal hemoglobins have been described. Acidic amino acid is replaced by a basic or neutral amino acid for the formation of abnormal hemoglobin. The abnormal hemoglobins are named in alphabetic order as, C, D, E, F, G, H, K, L, M, N, O, P, Q, S etc.

### PROPERTIES OF HEMOGLOBIN: →

(1) Oxyhemoglobin: → It forms oxyhemoglobin in combination with oxygen. By this way blood carries  $O_2$  to diff. part of body.

(2) Formation of carbamino compound: →