

Date: 03/06/2021

# HAEMOGLOBIN

Dr. Pradip Kumar

Deptt of Zool.

B.Sc - II (Zool Honr), (2nd PDF)  
Paper III (II)

Shankar College,  
V.K.S. University, Ara.

This is denoted as  $\alpha_2\beta_2$ . The subunits,  $\alpha$  and  $\beta$ , are structurally similar and about the same size. Each subunit has a molecular wt of about 17000 daltons; for a total molecular weight of the tetramer of about 64000 daltons (64458 g/mol). Thus  $1\text{g/dL} = 0.1551\text{mmol/L}$ . Haemoglobin A is the most intensively studied of the haemoglobin molecules.

The four polypeptide chains are bound to each other by salt bridges, hydrogen bonds, and the hydrophobic effect. There are two kinds of contacts b/w the  $\alpha$  and  $\beta$  chains;  $\alpha_1\beta_1$  and  $\alpha_1\beta_2$ .

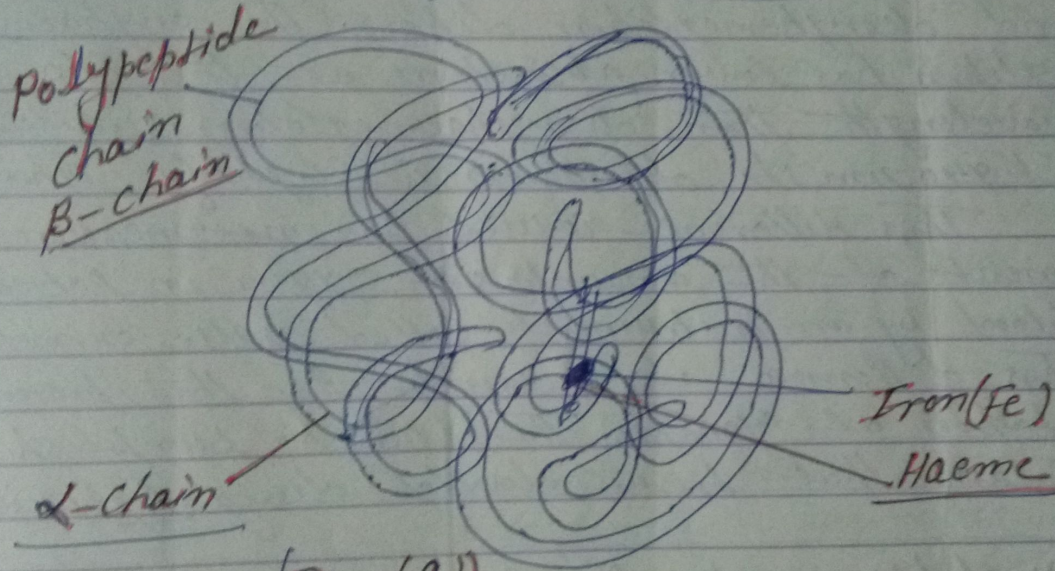
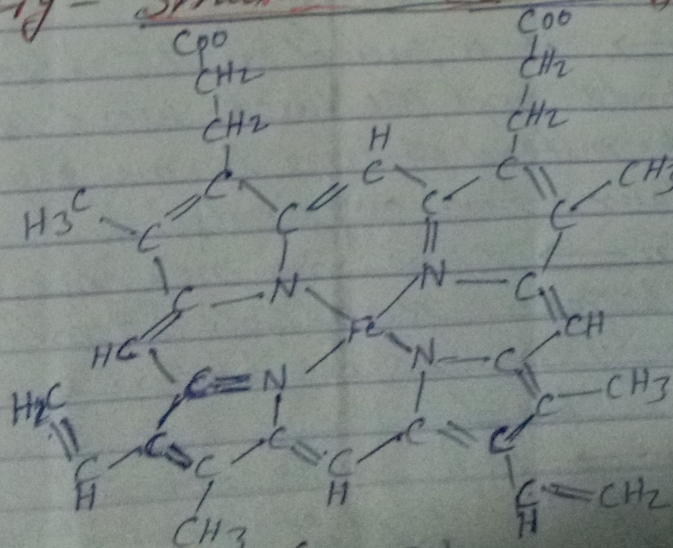


Fig - (a) Structure of (a) Haemoglobin





In general haemoglobin (Hb) or haemoglobin with oxygen molecule (oxyhaemoglobin) is oxidized into oxygen and iron (haemoglobin).

Oxyhaemoglobin:- The product formed in the respiration when oxygen binds to the haemoglobin part of the protein haemoglobin in red blood cells in the pulmonary capillaries adjacent to the alveoli in the lungs. The oxygen then travels through the blood stream to the cells where it is utilized in glycolysis and in the production of ATP by the process of oxidative phosphorylation.

Deoxygenated Haemoglobin:- It is the form of haemoglobin without the bound oxygen. The absorption spectra of oxyhaemoglobin and deoxyhaemoglobin differ. The oxyhaemoglobin has lower absorption at the 550 nm wavelength than deoxyhaemoglobin, while at 940 nm its absorption is slightly higher.

This difference is used for non-invasive measurement of the amount of oxygen in patient blood by an instrument called pulse oximetry. This difference also accounts for the brownish color of cyanosis. The blue to purplish color that tissue develops during hypoxia.

Myoglobin → It is found in the muscle tissue of many vertebrates, e.g. humans.

Haemocyanin → It is found in the blood of many arthropods and molluscs. Uses copper prosthetic groups instead of iron haeme groups. It is blue in colour when oxygenated.

Haemoerythrin → Some marine invertebrates and a few species of annelids (earthworms) have iron containing non-haeme proteins in their blood.

Erythrocrucorin → It is found in annelids, earthworms. It is a giant free-floating blood protein.