RESPIRATORY PIGMENTS

Respiratory Pigments are coloured substances present in blood transporting O_2 and CO_2. Respiratory pigments may be present in blood plasma or corpuscles or in both.

Some special peculiarities of Respiratory Pigments-

1) They are coloured pigments.
2) They have special affinity for respiratory gases.
3) They are distributed either in the blood or in the body fluid.
4) They are coloured protein which contain the metal ions.
5) They play important role in transport of O_2 and CO_2.
6) The oxygen affinity of the pigment increases from the blood compartments near the environmental source to an inner compartment, such as muscle tissue containing the metabolic sink. This stepwise arrangement of affinities from low to high as one moves from outside to inside the animal, create a cascade down which oxygen is transferred from blood to coelom to tissues.

Important Respiratory Pigments:-

Following are the important respiratory pigments present in the blood.

1) Haemoglobin
2) Haemocyanin
3) Chlorocruorin
4) Pinnaglobin
6. Vanadium
7. Echinochrome
8. Molopadin.

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1. Haemoglobin:

- Haemoglobin is a red coloured respiratory pigment present in the blood.
- Haemoglobin occurs in all vertebrates, a few holothurians, several crustacean, chironomous insects, Planorbis, annelids, parasitic nematodes, flatworms, protozoans and also in the root nodules of some leguminous plants.
- It occurs in the blood corpuscles of vertebrates.
- The haemoglobin is also found in the muscle of birds and mammals. The haemoglobin that present in the muscles is called myoglobin. It helps to store oxygen temporarily in the muscles.
- It has a molecular weight of 68000 daltons.
- Haemoglobin is a chromoprotein.
- It composed of two components a protein called globin and a non-protein component called haem.
- globin is formed of four polypeptide chains. Of these chains, two are identical and are called α-chain. An α-chain is formed of 141 amino acids
- The two other identical chains are called β-chains. Each β-chain contain 146 amino acids
- The haem is non-Protein and is formed of Iron and porphyrin
- The porphyrin is the pigment

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and it gives red colour to haemoglobin.

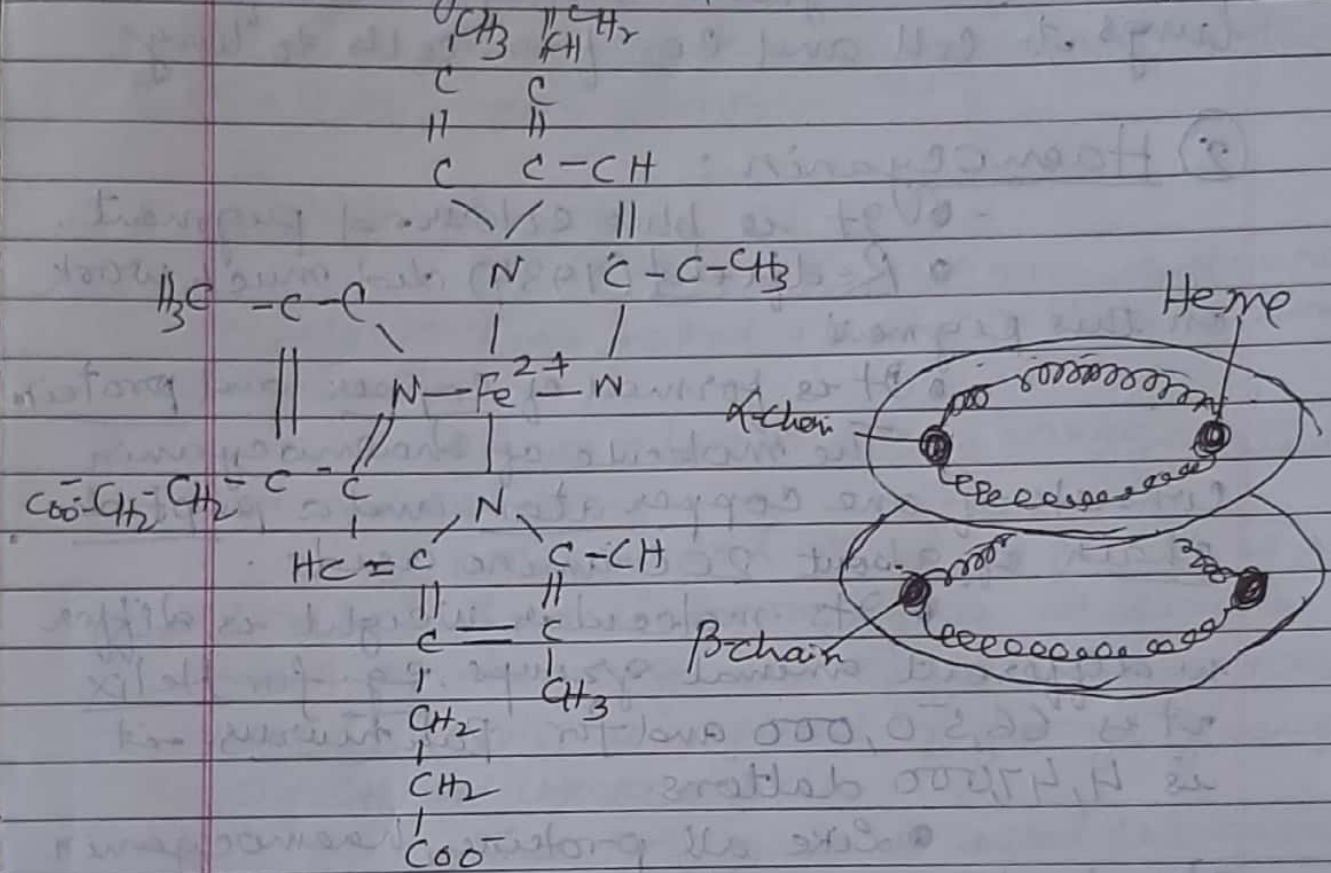

Fig - Haemoglobin

- Haemoglobin combines to oxygen to form oxyhaemoglobin. At low oxygen pressure, it leaves oxygen forming reduced haemoglobin. One haemoglobin molecule can bind with 4 molecule of O_2.
- When haemoglobin is treated with hydrochloric acid, it form brown coloured pigment called acid haematin.
- When haemoglobin is treated with glacial acetic acid, it form haemin crystals.

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