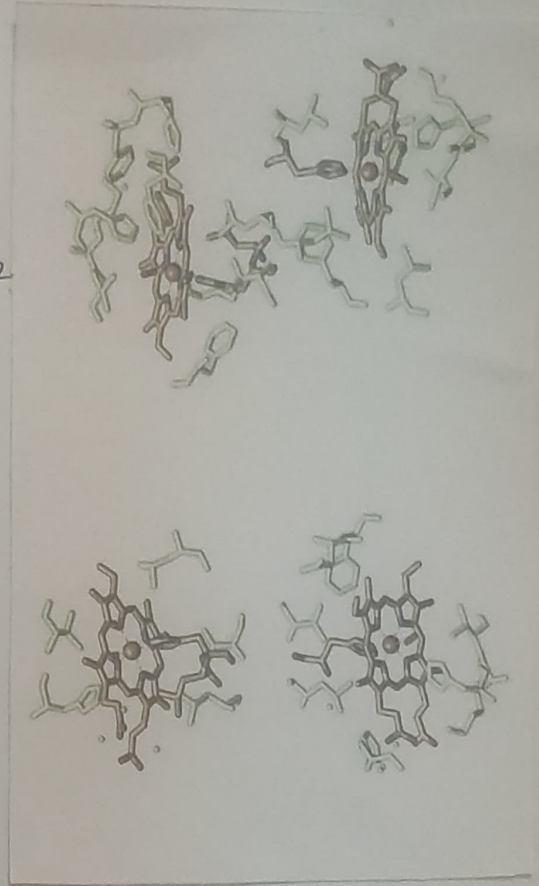
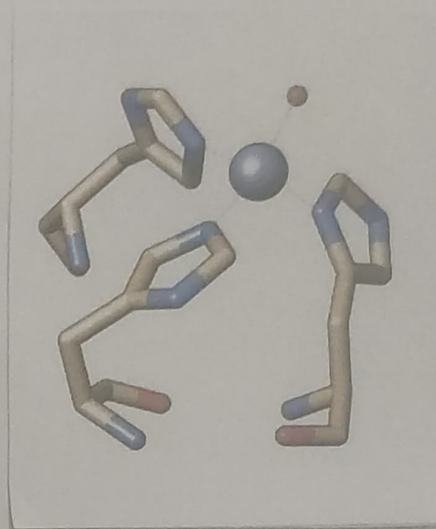
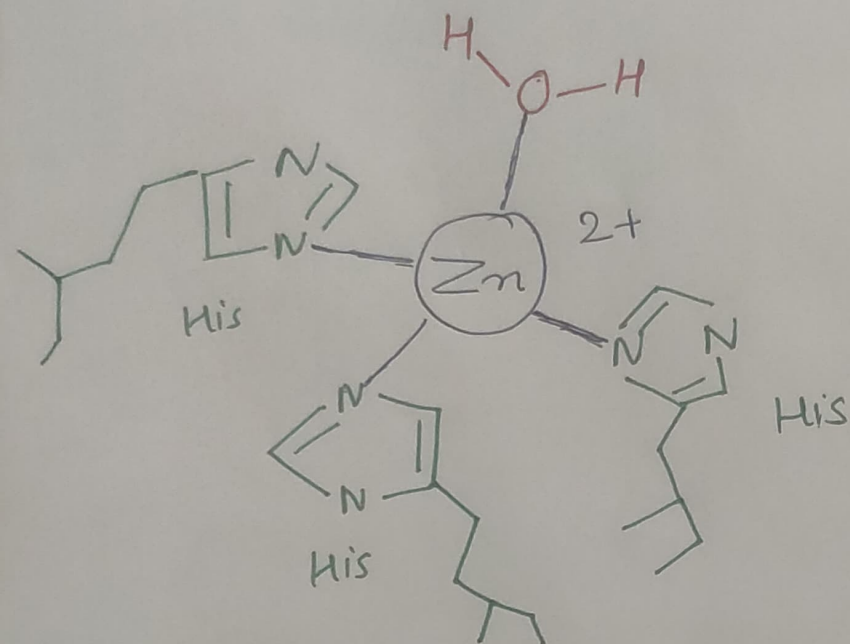


1 unit of Heme group.



### Hemoglobin

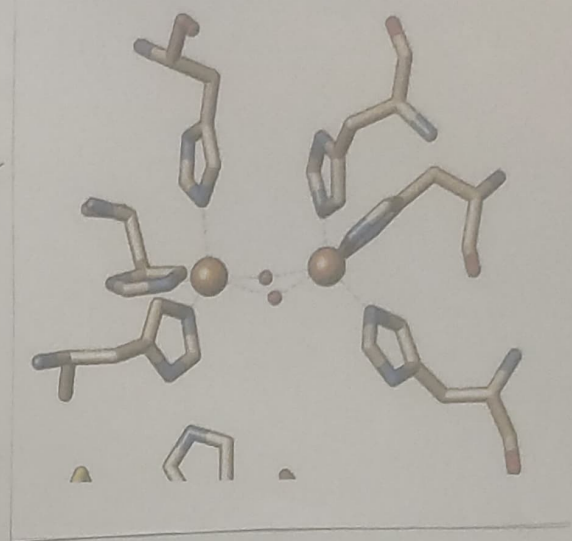
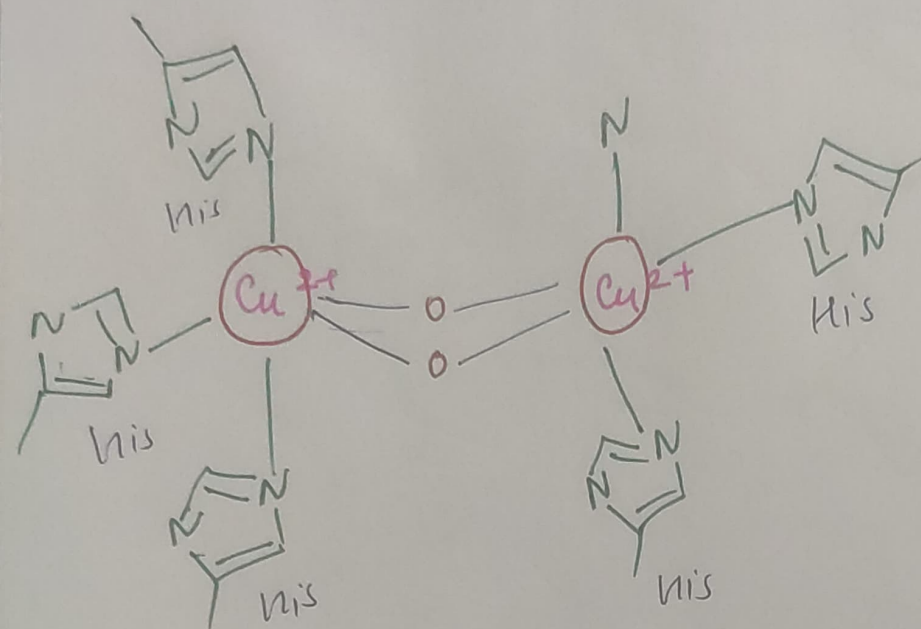
1. Hemoglobin (Hb) is quite important to transferring  $O_2$  in our blood from the lungs to the tissues. It takes dioxygen from the air in the lungs and delivering it to Mb myoglobin in tissue.
2. Hemoglobin is a multisubunit protein with  $\alpha$  and  $\beta$  two unit each polypeptide chains.
3. In deoxy Hb, the (Fe) iron lies  $0.36 - 0.40 \text{ \AA}$  out of the porphyrin ring plane but moves within  $\pm 0.12 \text{ \AA}$  of the plane upon binding of dioxygen.
4. Hb molecule exhibits lower affinity for the first molecule of  $O_2$  to bind. Its affinity increases as subsequent oxygen molecules bind. Cooperative binding.  $K_1 > K_2 > K_3$



## Carbonic Anhydrase.

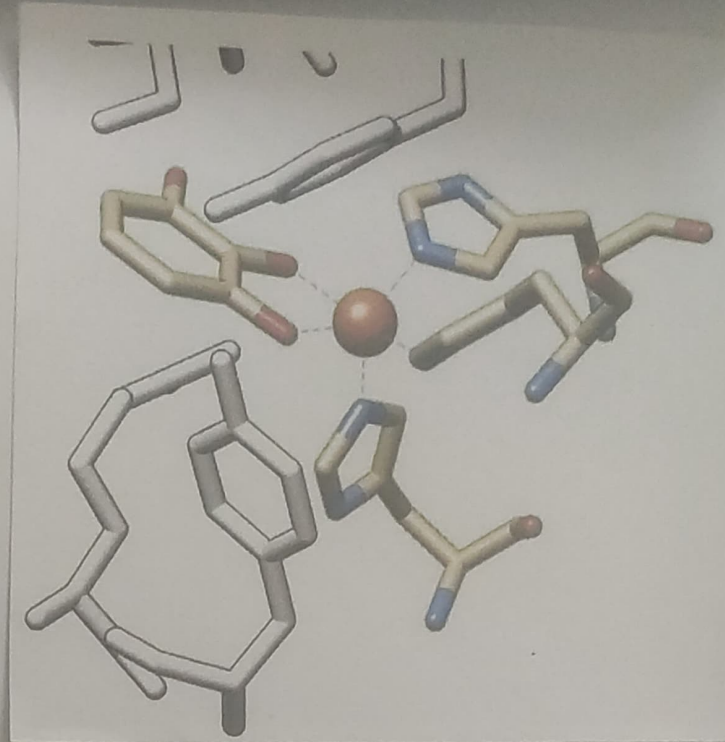
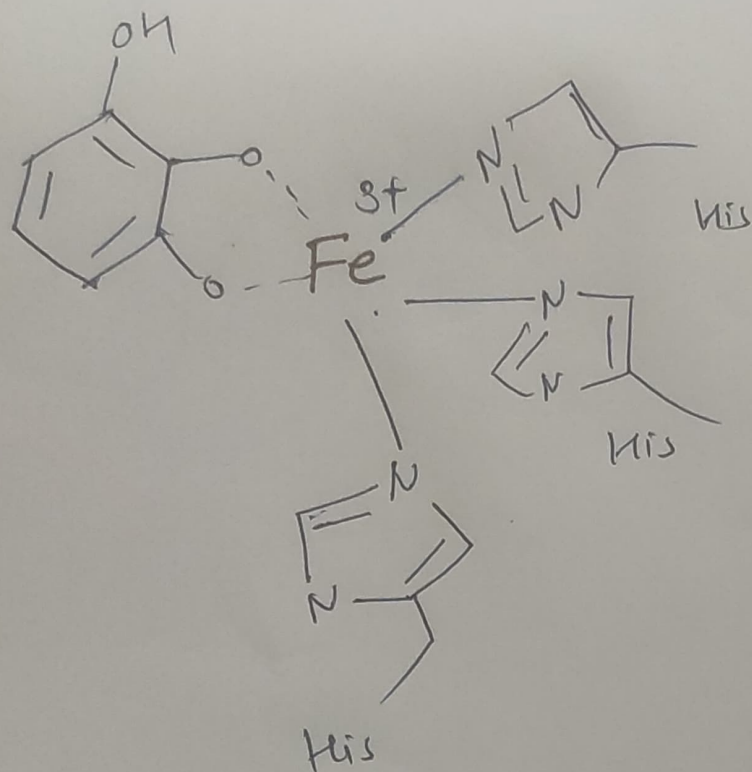
1. The Active site contains of  $Zn^{2+}$  ion, tetrahedrally coordinated. 3 sides are ligated by histidine with zinc and fourth position is water molecule.
2. Carbonic Anhydrase is a metalloenzyme. It catalyses the reversible hydration of carbon dioxide.
3. Primary function of enzyme is to interconvert  $CO_2$  & bicarbonate to maintain acid-base balance in blood and tissue.
4. It helps to transport  $CO_2$  out of the tissue.
5. A  $pK_a$  value of 7 has been assigned to the zinc-bound water molecule which must be hydroxyl ion after that at pH 8.5, that is the pH of crystallization medium.





## Tyrosinase

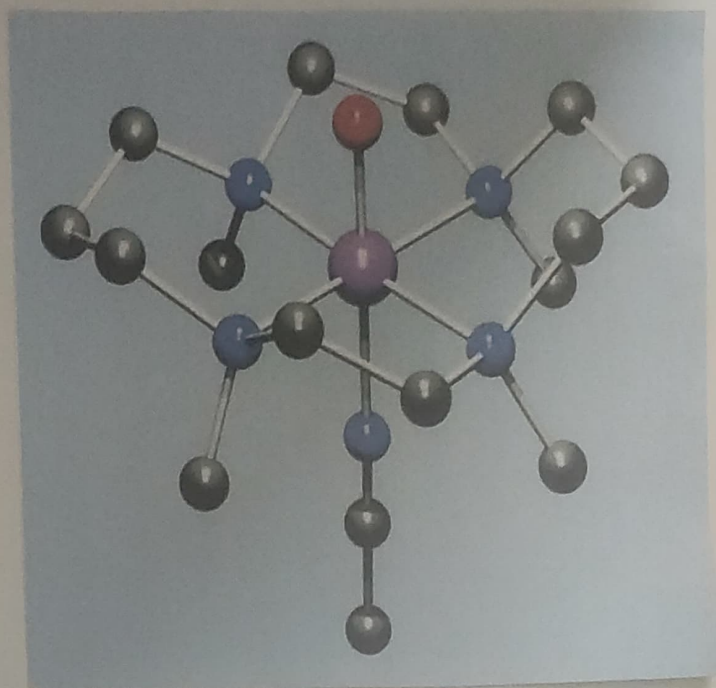
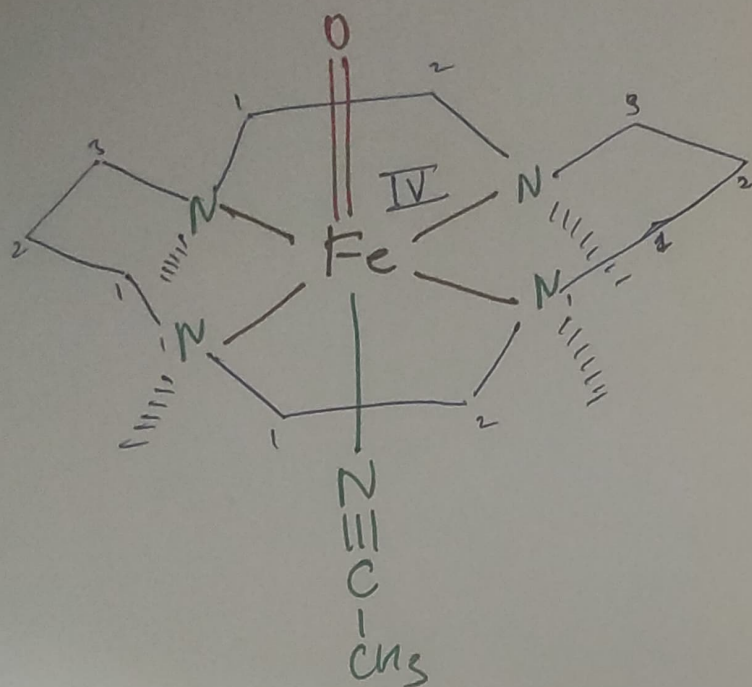
1. There are two copper center and a center is ligated with three histidine and in between  $O_2^{2-}$  which shown above.
2. Tyrosinase actually oxidize phenol from monophenol to diphenol and from diphenol to quinone (brown in color)
3. Browning on the surface of potato and apple is very important because it protects that fruits and other to destroy the surface, if we want to eat, we can cut and eat.
4. Diccopper units is work like bridge with this peroxides.
5. Tyrosinase contain two copper ions in close proximity in its active site and which has deoxy, oxy, and met states that closely resemble comparable state of hemocyanin in their spectroscopic properties.



### Catechol 1,2-dioxygenase

1. Catechol dioxygenase cleaves the bond between the phenolic hydroxyl groups of catechol using an  $\text{Fe}^{3+}$  cofactor.
2. We can also convert benzene to catechol in presence of dioxygen so this catechol dioxygenase is responsible for clearing the ~~eth~~ catechol.
3. Two type of cleave (1) Extradiol - outside the diol over Extradiol dioxygenase in presence of  $\text{Fe}(\text{II})$  ion enzymatic system  
(2) Intradiol dioxygenase - it cleave b/w two diol group and  $\text{Fe}(\text{II})$  ions is involved in the enzymatic system.





### Non-heme Fe(IV) oxo

1. High-valent iron-oxo intermediates are frequently invoked in the catalytic cycles of mononuclear iron enzymes that activate  $O_2$  to effective metabolically important oxidative transformation.
2. These species are characterized for heme enzymes such as cytochrome P450 and peroxidase (referred to Compound I/II)
3. We can isolate and characterized a non-heme complex with a terminal  $Fe(IV)=O$  unit. To find ligand environment, which increase the life of  $Fe(IV)=O$  moiety. and crystallization as well as its oxidative reactivity