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Class - P.G. Semester - III

Subject - Chemistry

Paper - C-C-XIII

Unit - 1

Topic - Nomenclature and classi-
fication of enzymes
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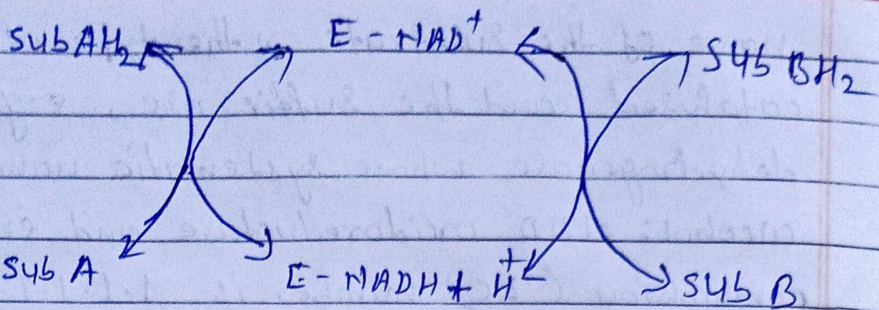
1. Oxidoreductases :— These enzymes are involved in biological oxidations and reductions. This class of enzymes includes several sub-classes like - dehydrogenases, oxidases, oxygenases, hydroxylases, etc. A brief description of the first three sub-classes is given below :-

a. Dehydrogenases :— These are the enzymes that catalyse the removal of hydrogen from one substrate and pass it on to a second substrate i.e. they are not capable of passing the Hydrogen directly to oxygen although the various dehydrogenases differ in the structure of the apoenzyme, they have the same co-enzyme NAD^+ or $NADP^+$. The reaction of the dehydrogenases may be shown schematically as given below :-

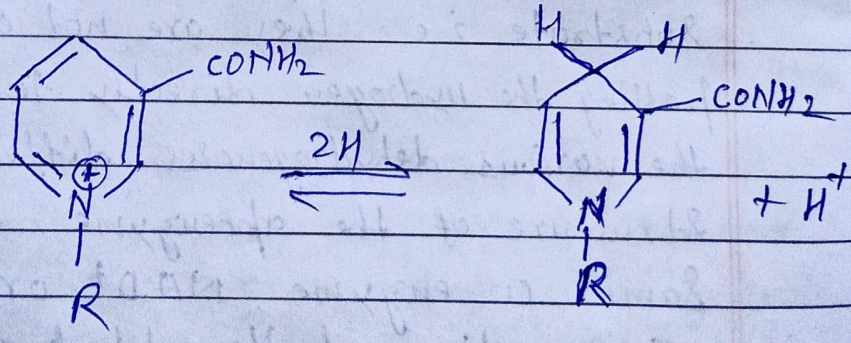


Here Sub = Substrate

E = Enzyme

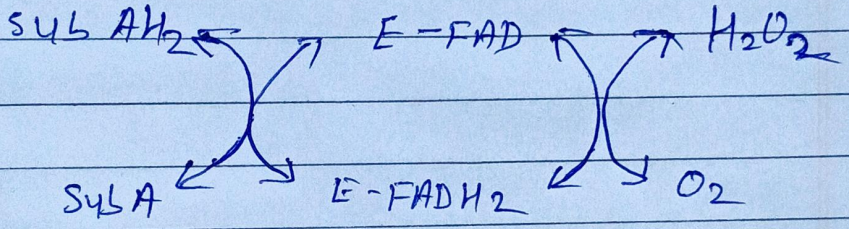
The above equation shows that the Substrate A transfer a Hydrogen atom with it's bonding pair of electrons and a proton (H^+) to the enzyme E having NAD^+ as the co-enzyme. The reduced enzyme ($E-NADH+H^+$) in turn transfer it's hydrogen to another Substrate B.

In NAD^+ or $NADP^+$, the nicotinamide moiety serves as the oxidising agent or hydrogen carrier.

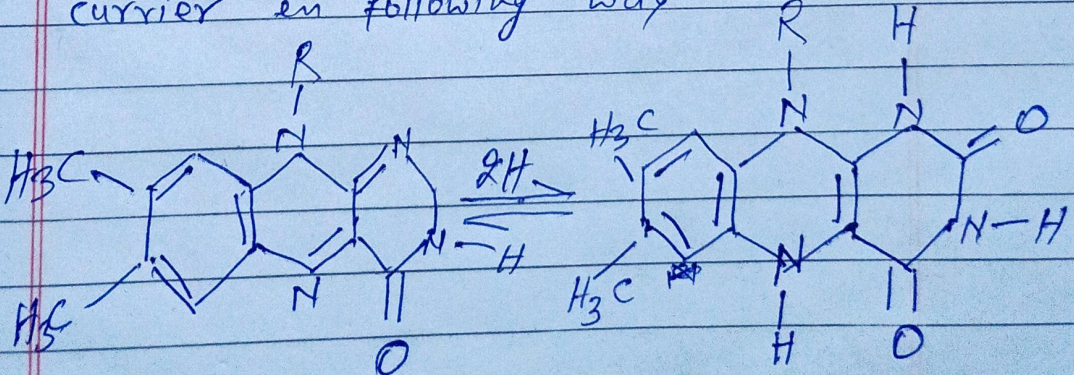


Here R = Rest part of the NAD^+ or $NADP^+$ molecule.

b. oxidases :— These are the enzymes which catalyse the removal of hydrogen from a substrate and pass it directly to oxygen. Again like dehydrogenases, there are further several classes of oxidases differing from each other in the structure of the apoenzyme but usually have same co-enzyme, which in the case FAD (Flavin adenine dinucleotide) the oxidation of a substrate involving an oxidase may schematically as given below :—



in oxidases, the Flavin moiety of the co-enzyme FAD serves as a hydrogen carrier in following way —



c. oxygenases :— These enzymes catalyses the incorporation of oxygen directly into the substrate. These enzymes require the presence of metal ion,