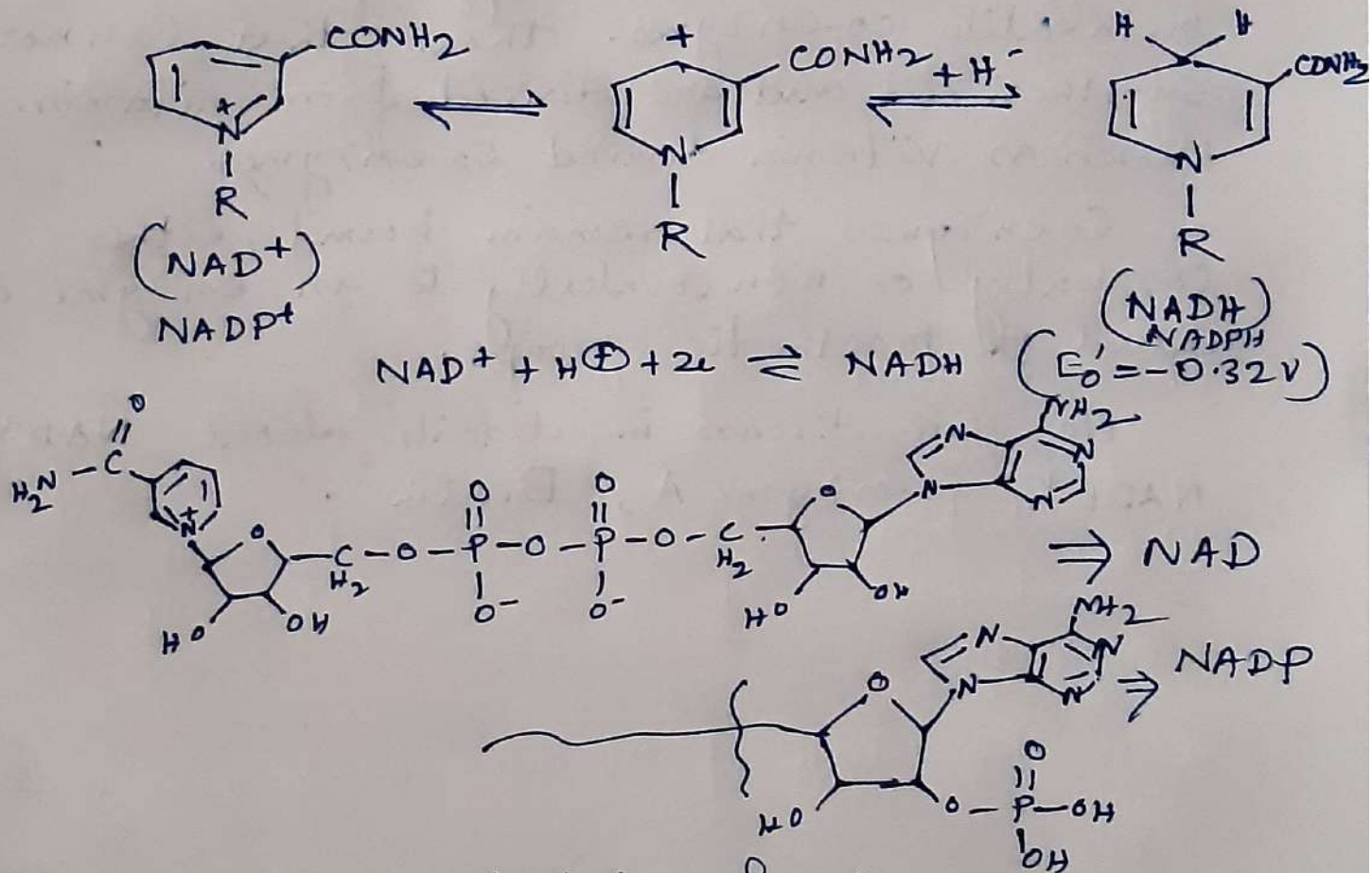
NAD^+ and $NADP^+$

These compounds were the first coenzymes to be recognized. The nicotinamide coenzymes are nicotinamide adenine dinucleotide (NAD^+) and nicotinamide adenine dinucleotide phosphate ($NADP^+$). Both are derived from the vitamin nicotinic acid, the deficiency of which causes the disease pellagra.

The structures of the oxidized (NAD^+ & $NADP^+$) and reduced (NADH & NADPH) forms of the pyridine nucleotide are shown below



The pyridine nucleotides function as electron carriers in oxidation-reduction reactions. In general, NAD^+ is used in reactions where an alcohol group is converted to ketone or aldehyde group. The oxidized forms pick up electrons from substrate in the form of a hydride ion ($H^\ominus$) which is carried out at position 4 of the nicotinamide ring.

Coenzyme A :-

Coenzyme A is an important Co-enzyme that is used to carry acyl groups in numerous reactions of carbohydrates and lipid metabolism. Coenzyme A is composed of 2-mercaptoethylamine, which contains a free -SH group, the vitamin pantothenate (vitamine B_3), and a molecule of ADP in which the ribose 3'-hydroxyl is phosphorylated.

Biotin :-

Biotin is a prosthetic Coenzyme that Catalyzes Carboxyl group transfer and ATP-dependent Carboxylation reactions. It is covalently linked to the active sites of its host enzyme by an amide bond to the lysine residue.