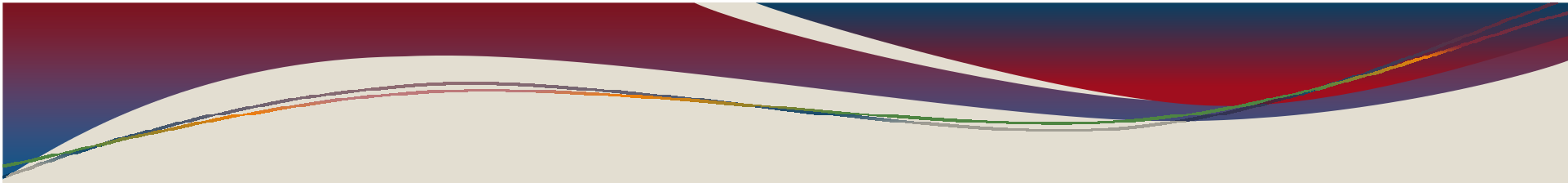


Co-enzyme : Vitamin Derived

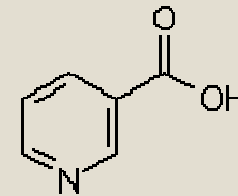
By
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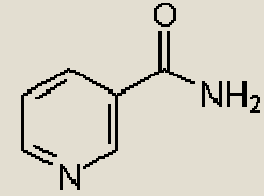
Vitamin	Name	Active Form (co-factor)	Biochemical Function	Physiological/cellular Role
B₅	Pantothenic Acid	Coenzyme A	Acyl Transfer	• Energy production from foodstuff • Fatty acid synthesis
B₆	Pyridoxine	Pyridoxal Phosphate (PLP)	• Transamination • Racemization • Decarboxylation • β/γ-Elimination	• Amino acid breakdown • Glycogen breakdown
B₇	Biotin	Biotin	Carboxylation	• Glucose & fatty acid synthesis • Leucine synthesis
B₉	Folic Acid	Tetrahydrofolate (THF)	One-Carbon Group Transfer	Amino Acid & nucleotide synthesis
B₁₂	Cobalamin	Coenzyme B ₁₂	• Intramolecular Rearrangements • Methyl transfer	• Nucleotide synthesis • Amino acid metabolism • Fatty acids breakdown • Folic acid regeneration
C	Ascorbic Acid	Ascorbic Acid	Proline Hydroxylation	Collagen synthesis
			Reduction	Antioxidation
D	Calciferol	Calcitriol	Gene expression	Bone growth

NAD

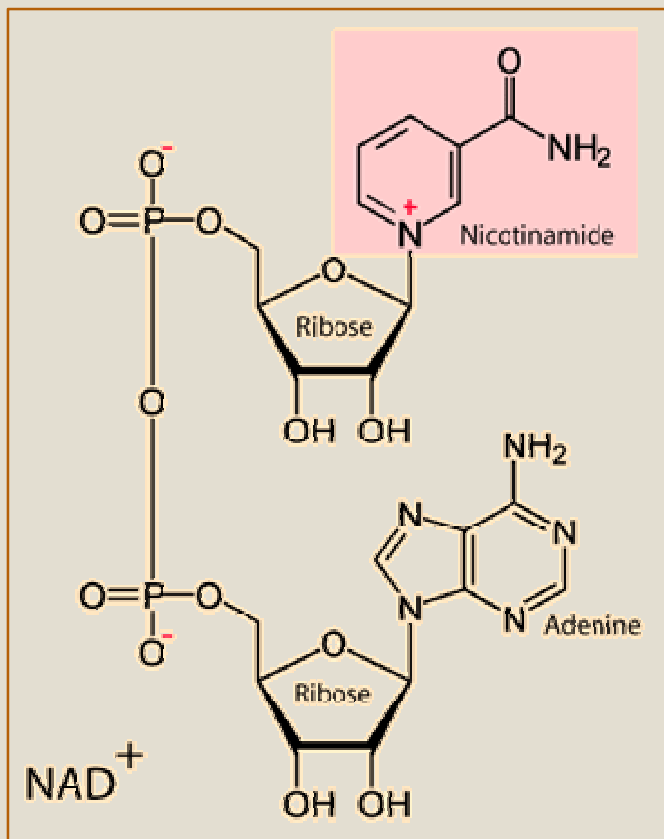
- Nicotinamide adenine dinucleotide, abbreviated NAD⁺, is a coenzyme found in all living cells. The compound is a dinucleotide, since it consists of two nucleotides joined through their phosphate groups.
- One nucleotide contains an adenine base and the other nicotinamide.



Nicotinic acid

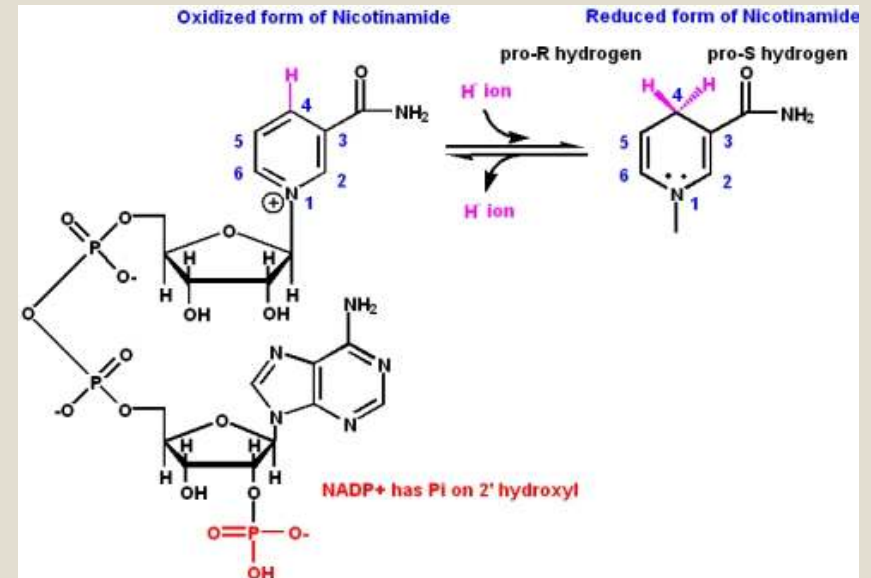


Nicotinamide

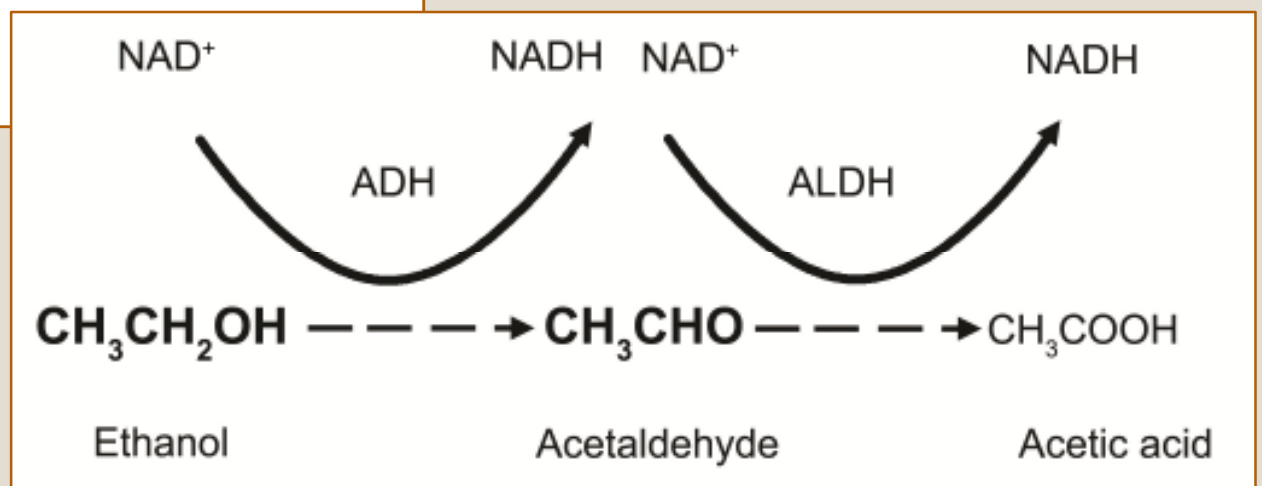
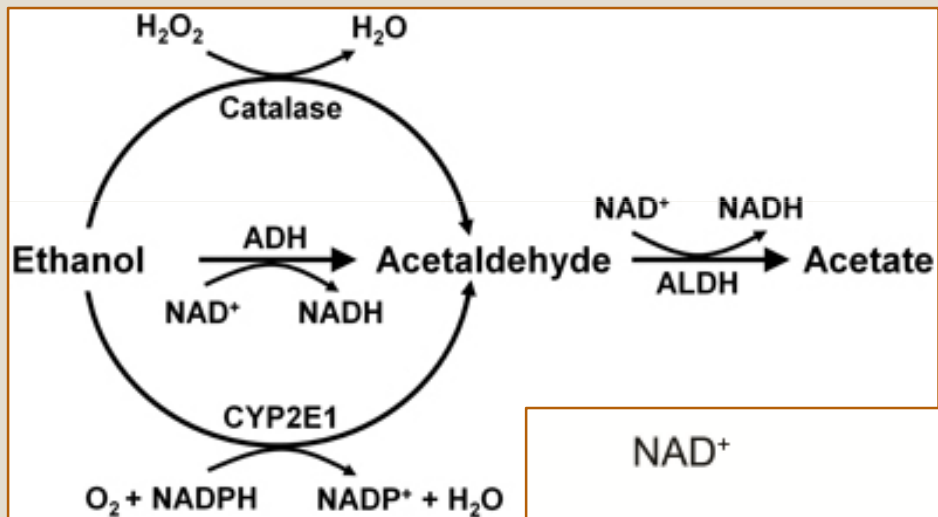


Physiological/Cellular role of NAD

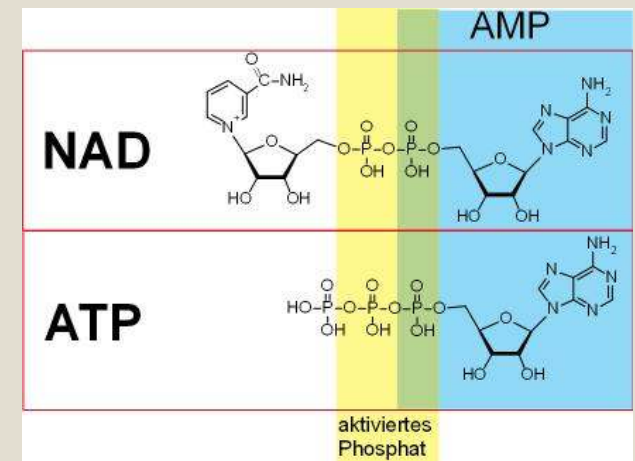
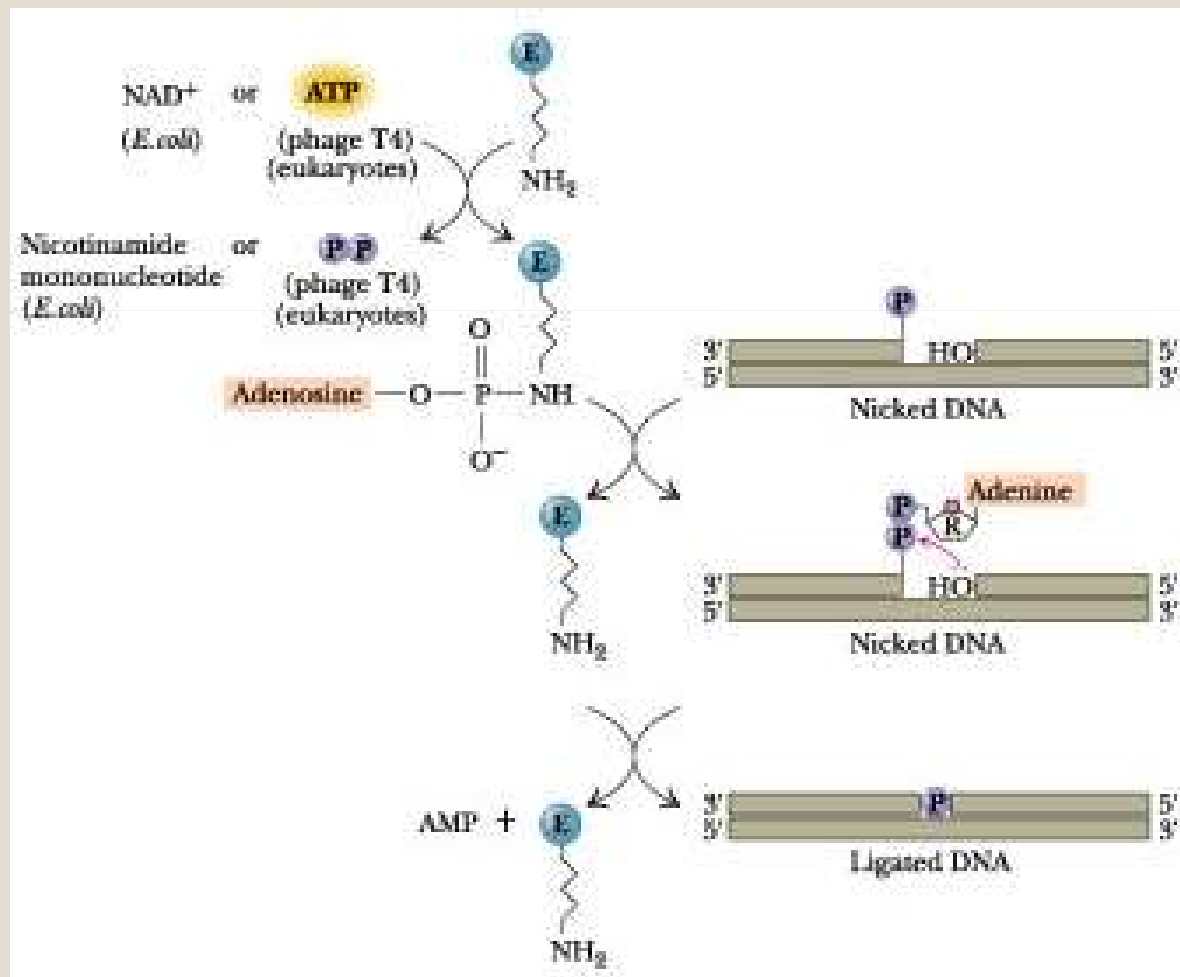
- In metabolism, NAD⁺ is involved in redox reactions, carrying electrons from one reaction to another.
- The coenzyme is, therefore, found in two forms in cells: NAD⁺ is an oxidizing agent – it accepts electrons from other molecules and becomes reduced.
- This reaction forms NADH, which can then be used as a reducing agent to donate electrons.



Conversion of Ethanol to Acetaldehyde by NAD

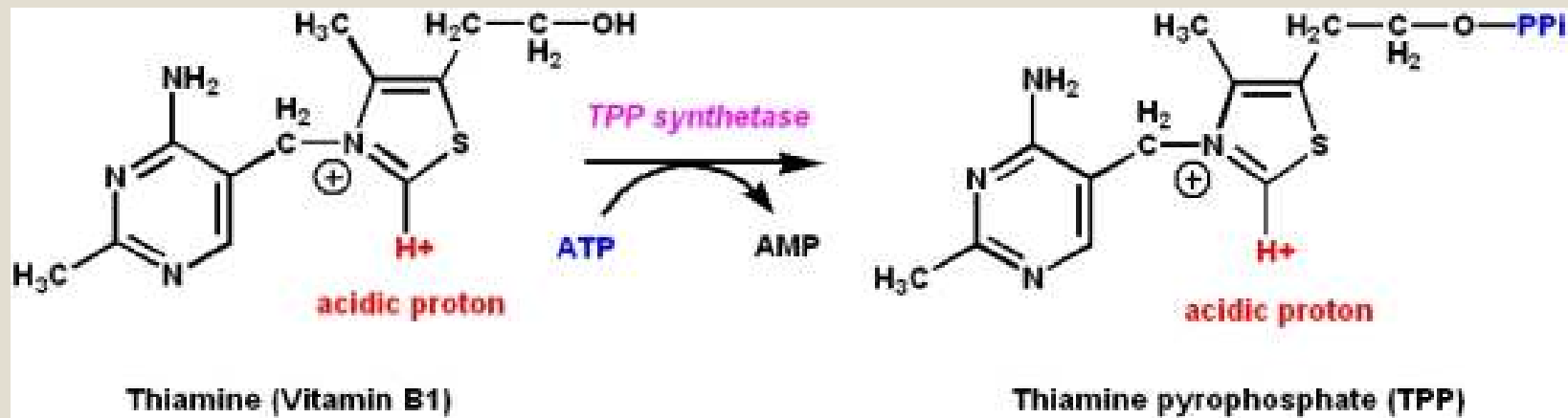


Ligation of DNA

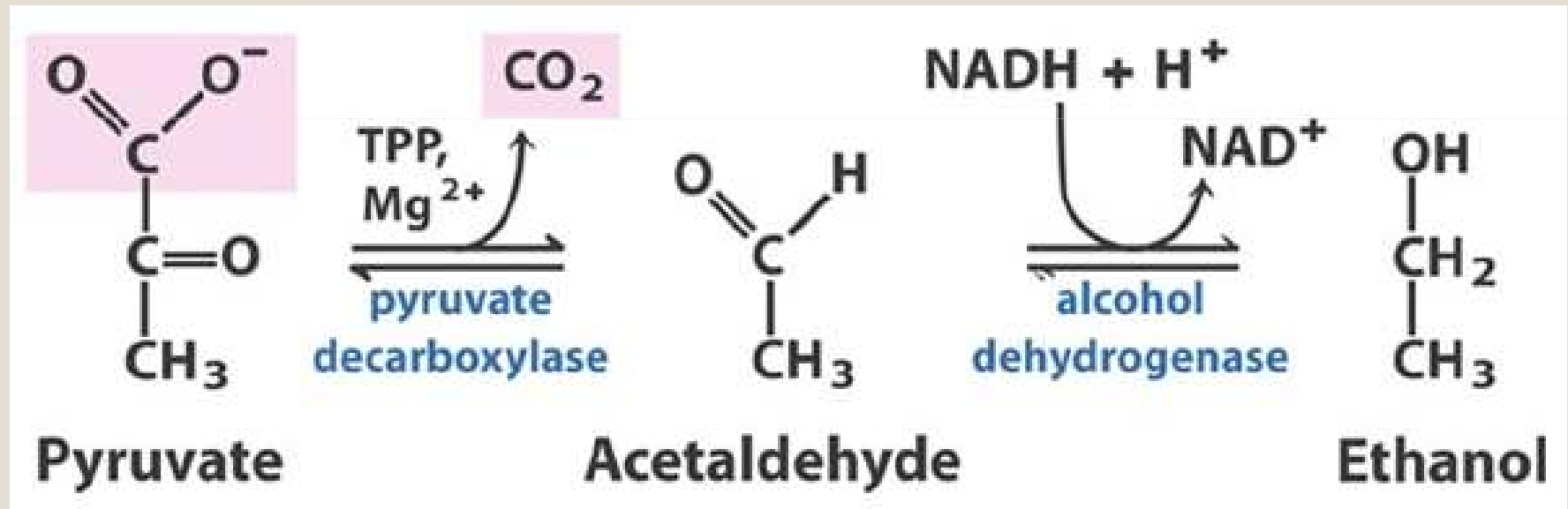


Thiamine pyrophosphate (TPP)

- Thiamine pyrophosphate (TPP or ThPP), or thiamine diphosphate (ThDP), is a thiamine (vitamin B₁) derivative coenzyme.
- Thiamine pyrophosphate is a coenzyme that is present in all living systems, in which it catalyzes several biochemical reactions.



Conversion of Pyruvate to Acetaldehyde

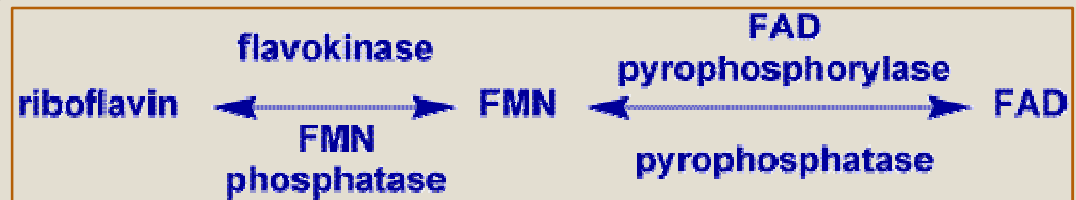
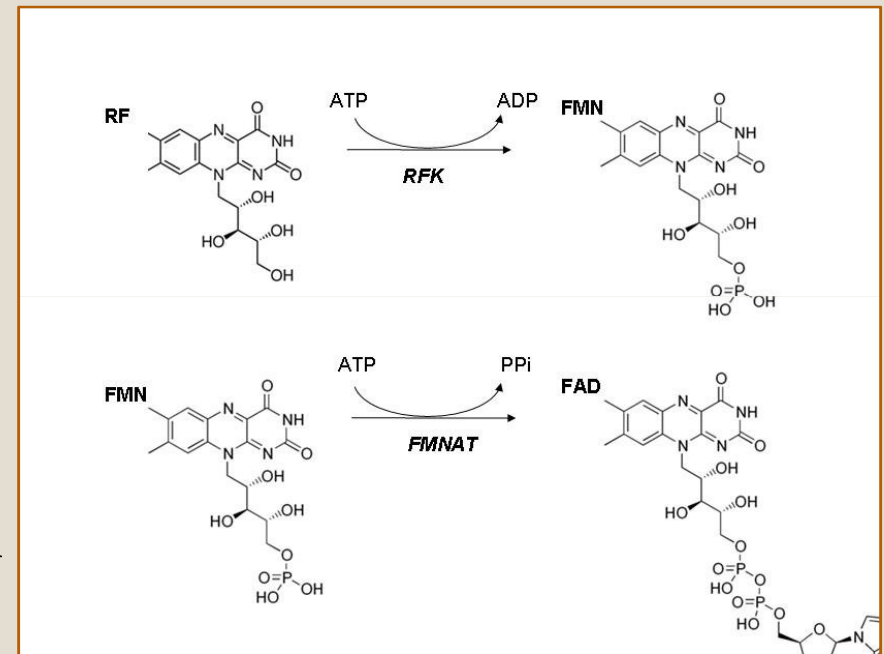


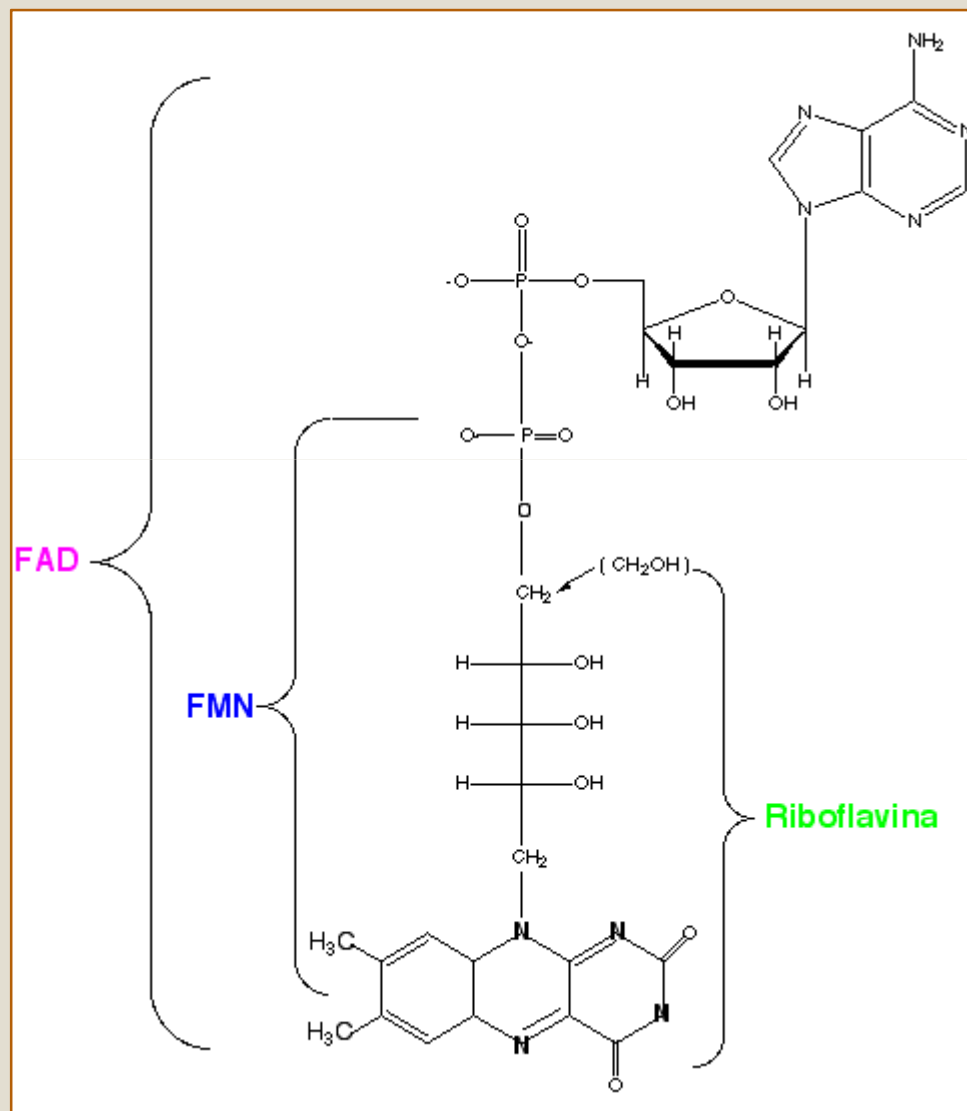
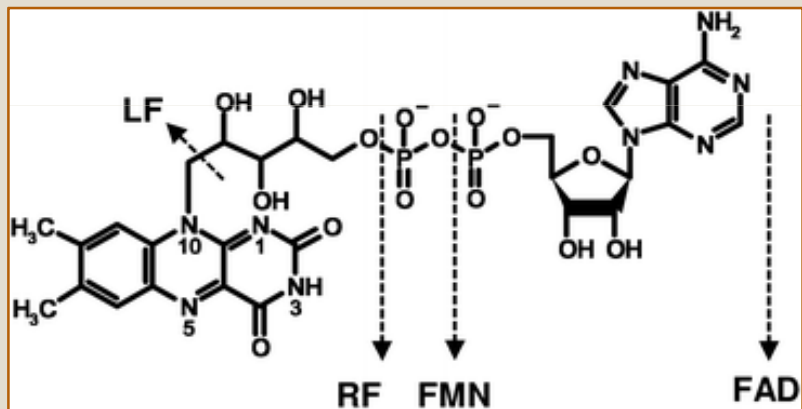
Flavin mono/ dinucleotide (FMN/FAD)

- Flavin mononucleotide (FMN), or riboflavin-5'-phosphate, is a biomolecule produced from riboflavin (vitamin B₂) by the enzyme riboflavin kinase and functions as prosthetic group of various oxidoreductases including NADH dehydrogenase as well as cofactor in biological blue-light photo receptors.

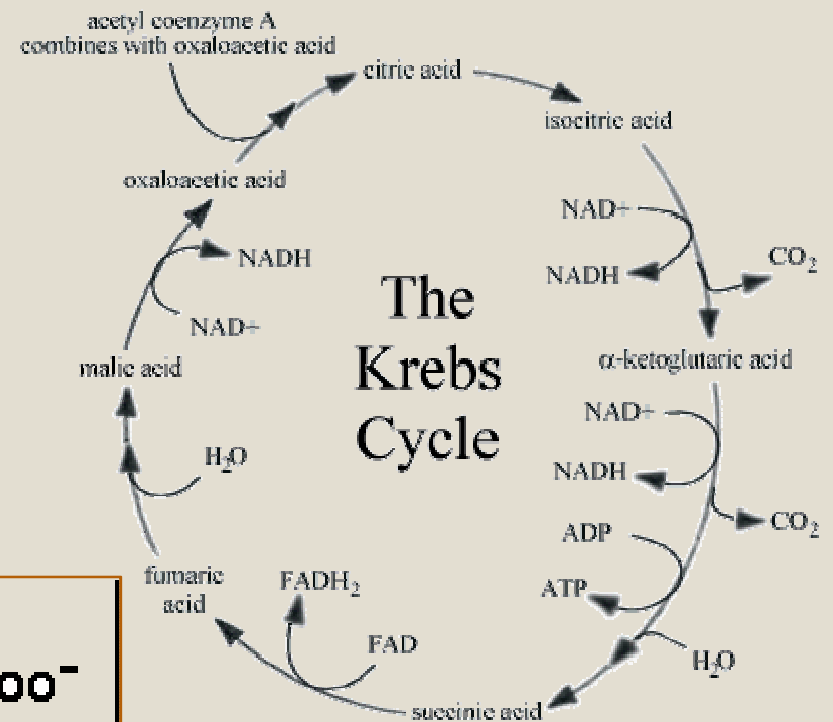
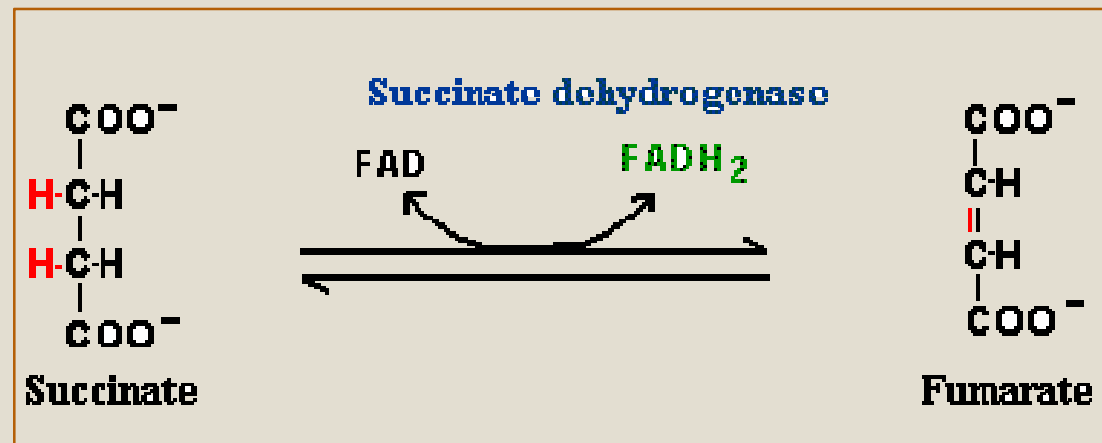
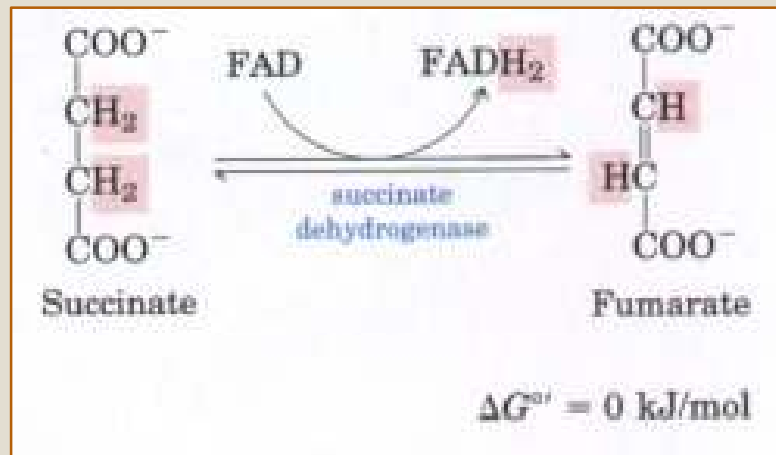
Riboflavin to FMN and FAD

- In biochemistry, flavin adenine dinucleotide (FAD) is a redox cofactor involved in several important reactions in metabolism.
- FAD can exist in two different redox states, which it converts between by accepting or donating electrons.



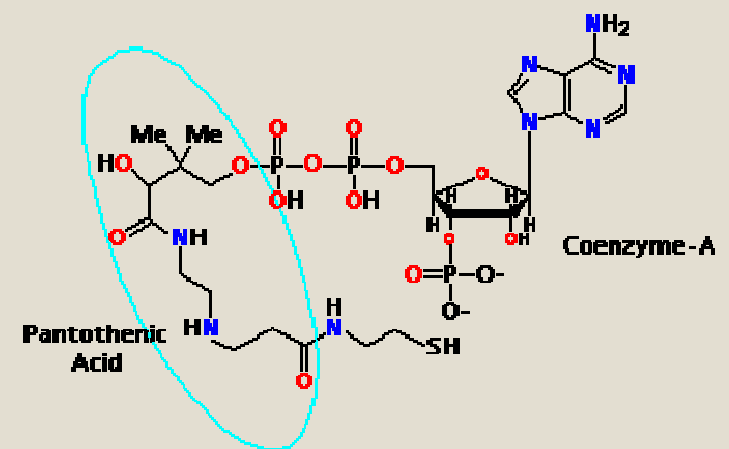
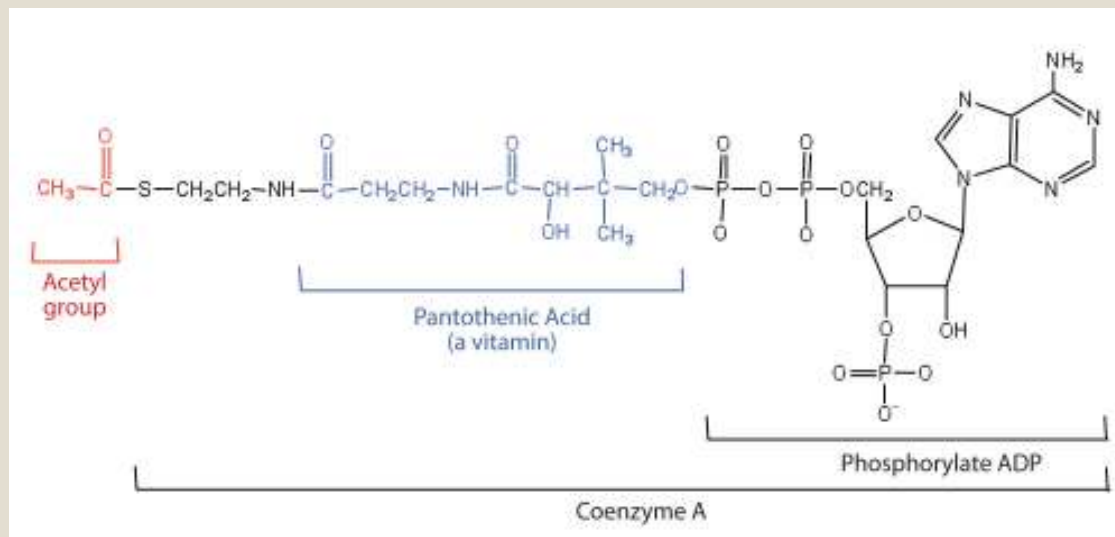


Conversion of Succinate to fumarate



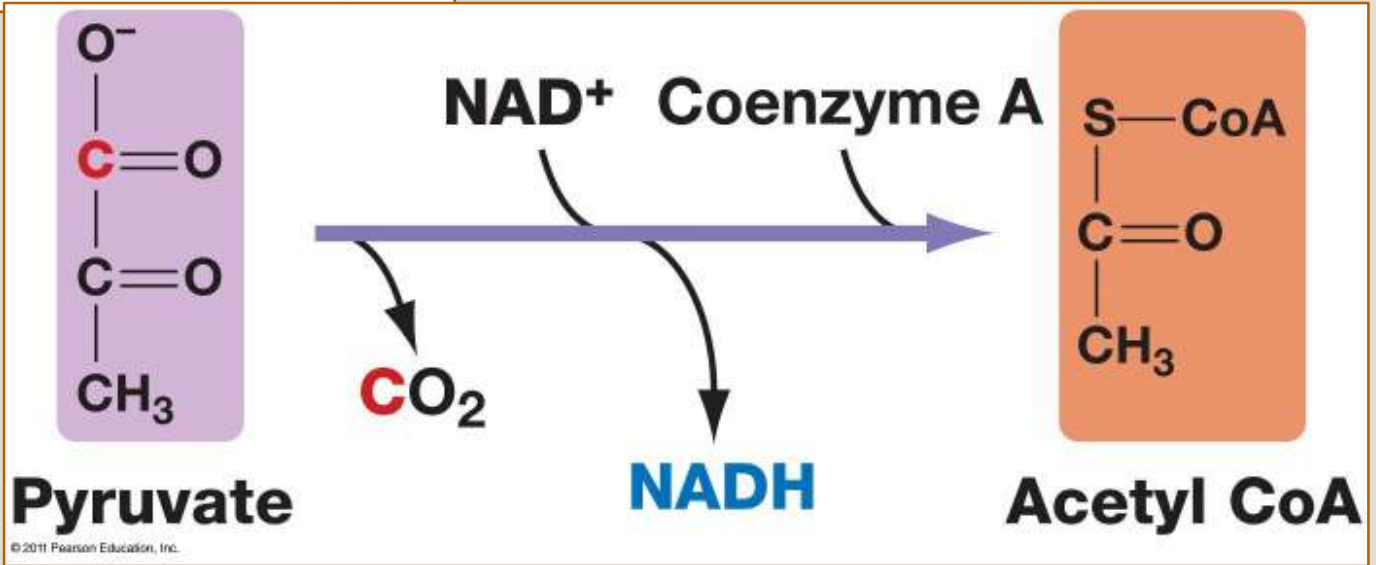
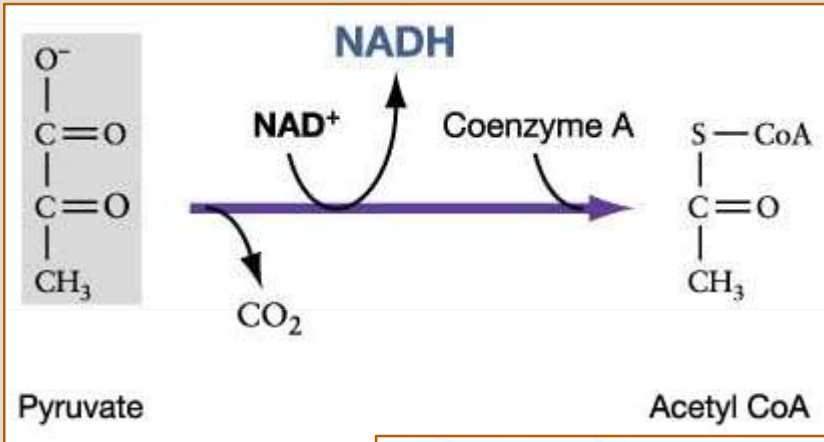
Coenzyme A

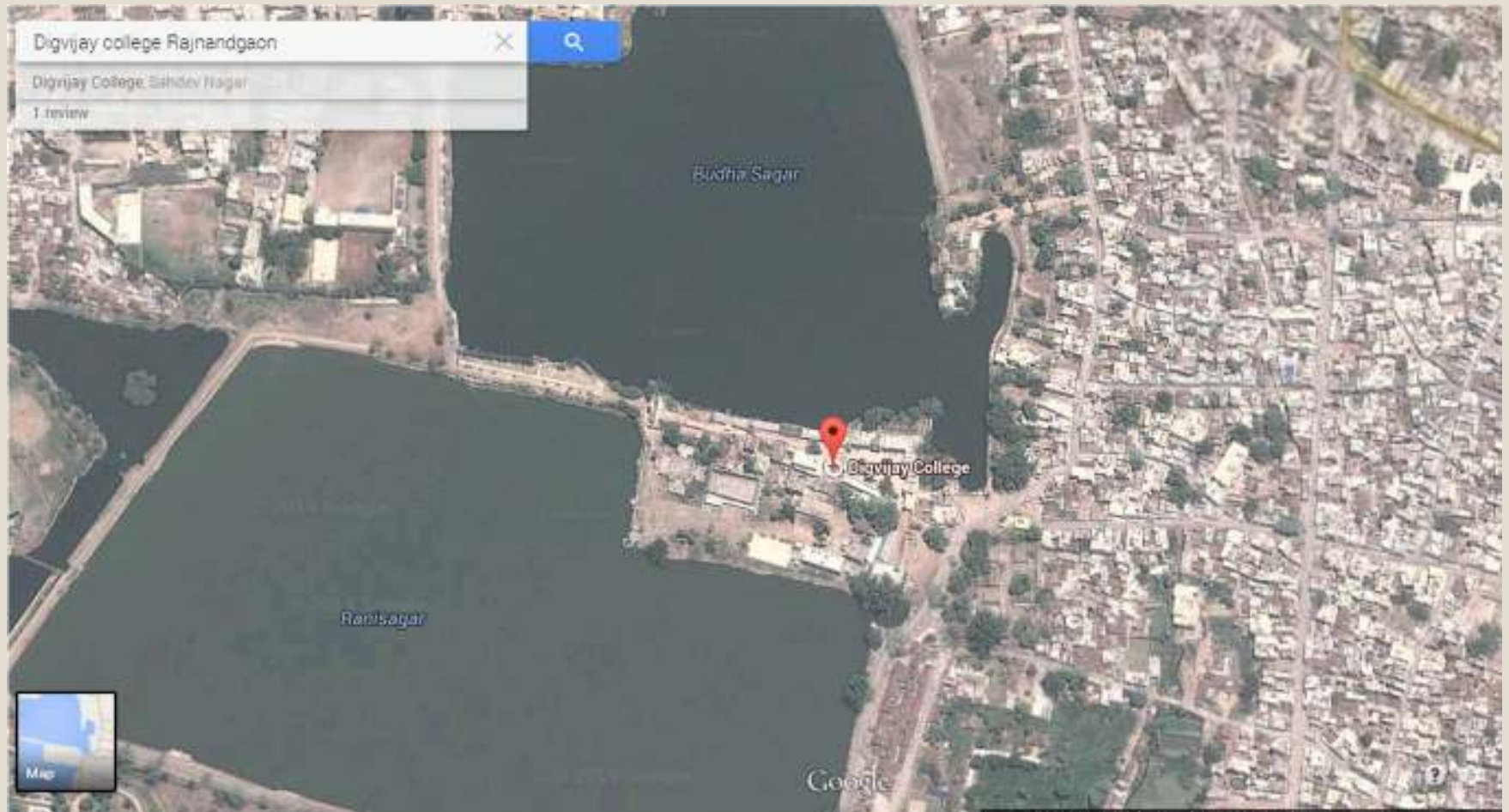
- Coenzyme A (CoA, CoASH, or HSCoA) is a coenzyme, notable for its role in the synthesis and oxidation of fatty acids, and the oxidation of pyruvate in the citric acid cycle.
- It is derived from Pantothenic acid.





Conversion of Dinitro to Acetal





Thank you