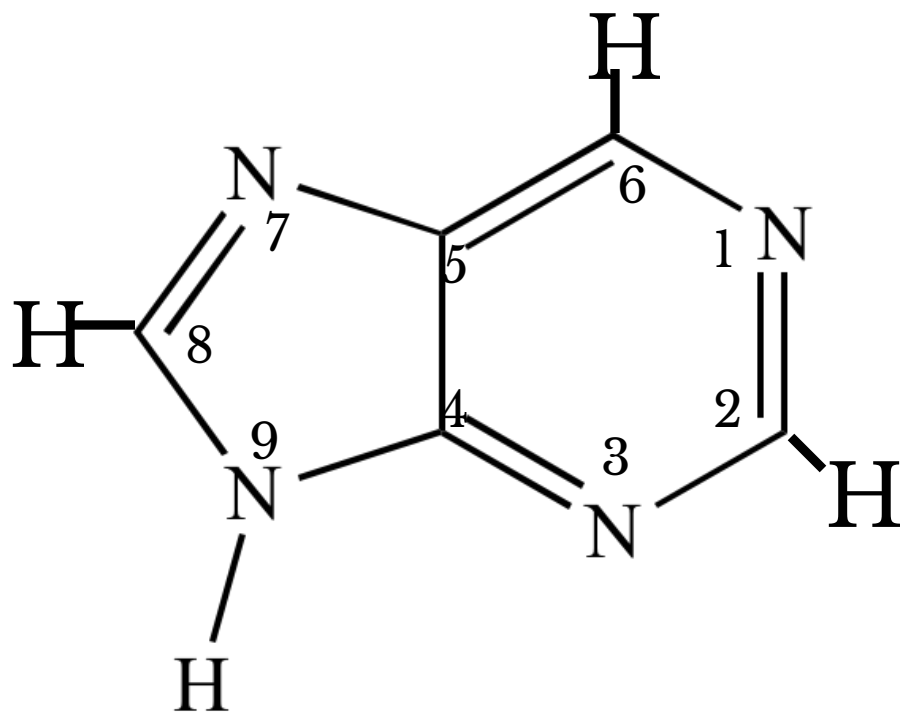




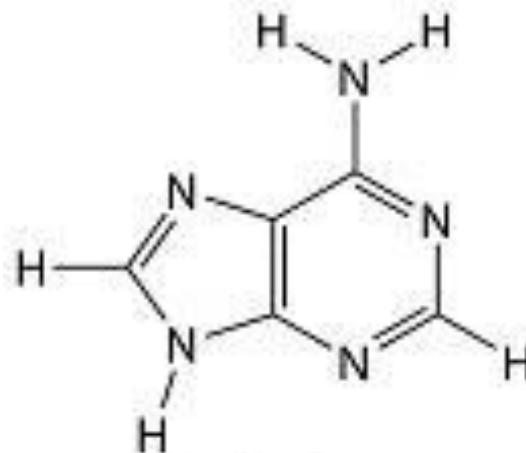
**Biochemistry**  
**Nucleic Acid**  
**Dr. Jilna Alex N**

# NUCLEIC ACID

# Purines, $C_5H_4N_4$

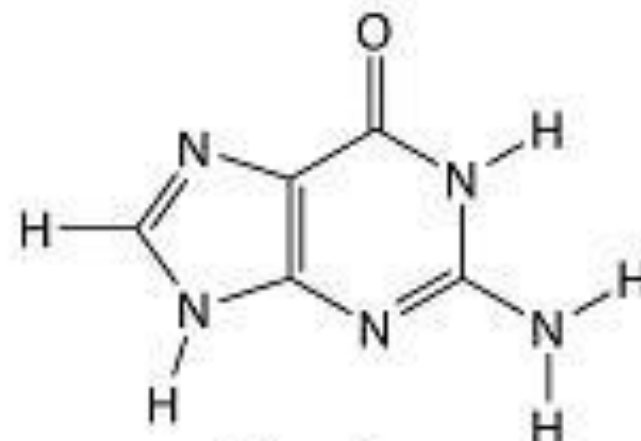


A purine is a heterocyclic aromatic organic compound that consists of a benzene-type ring fused to an imidazole



Adenine  $C_5H_5N_5$

6-amino

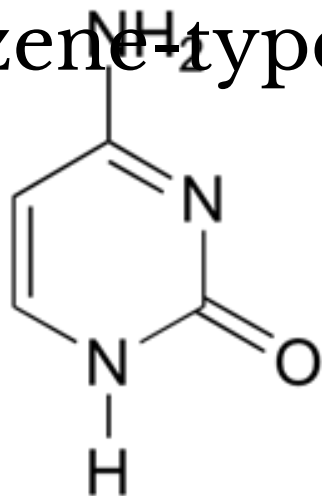
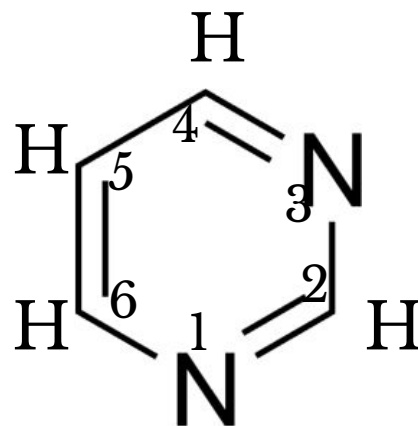


Guanine  $C_5H_5N_5O$

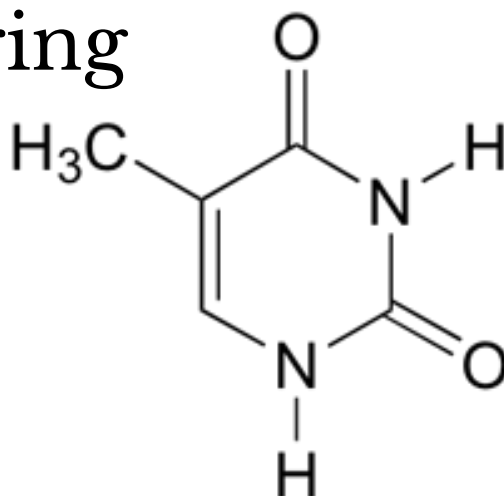
2-amino, 6-hydroxy  
purine

# Pyrimidines, $C_4H_4N_2$

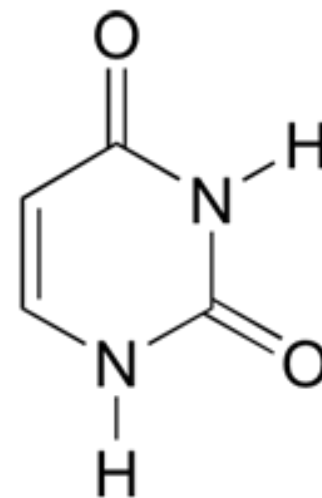
Are monocyclic molecules formed of a six-membered benzene-type ring



cytosine,  $C_4H_5N_3O$   
2-hydroxy, 4-amino  
pyrimidine

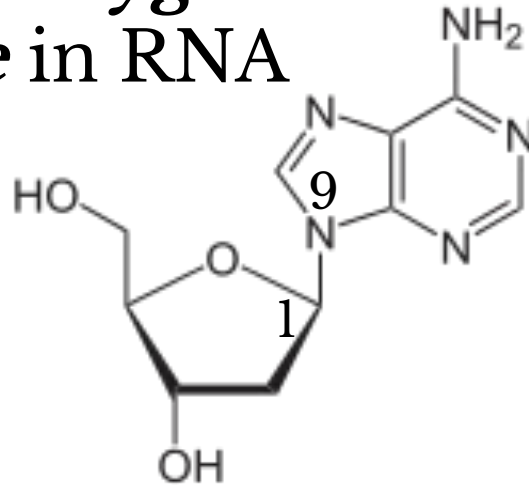


thymine,  
 $C_5H_7N_2O_2$   
2,4- dihydroxy, 5-methyl  
pyrimidine

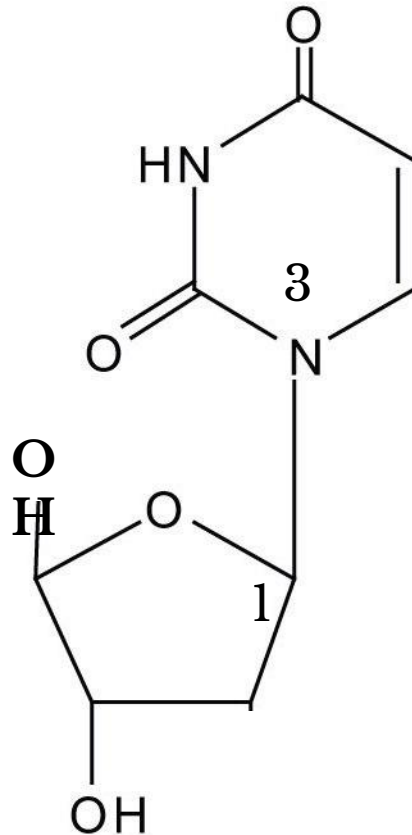


uracil,  
 $C_4H_4N_2O_2$   
2,4- dihydroxy pyrimidine

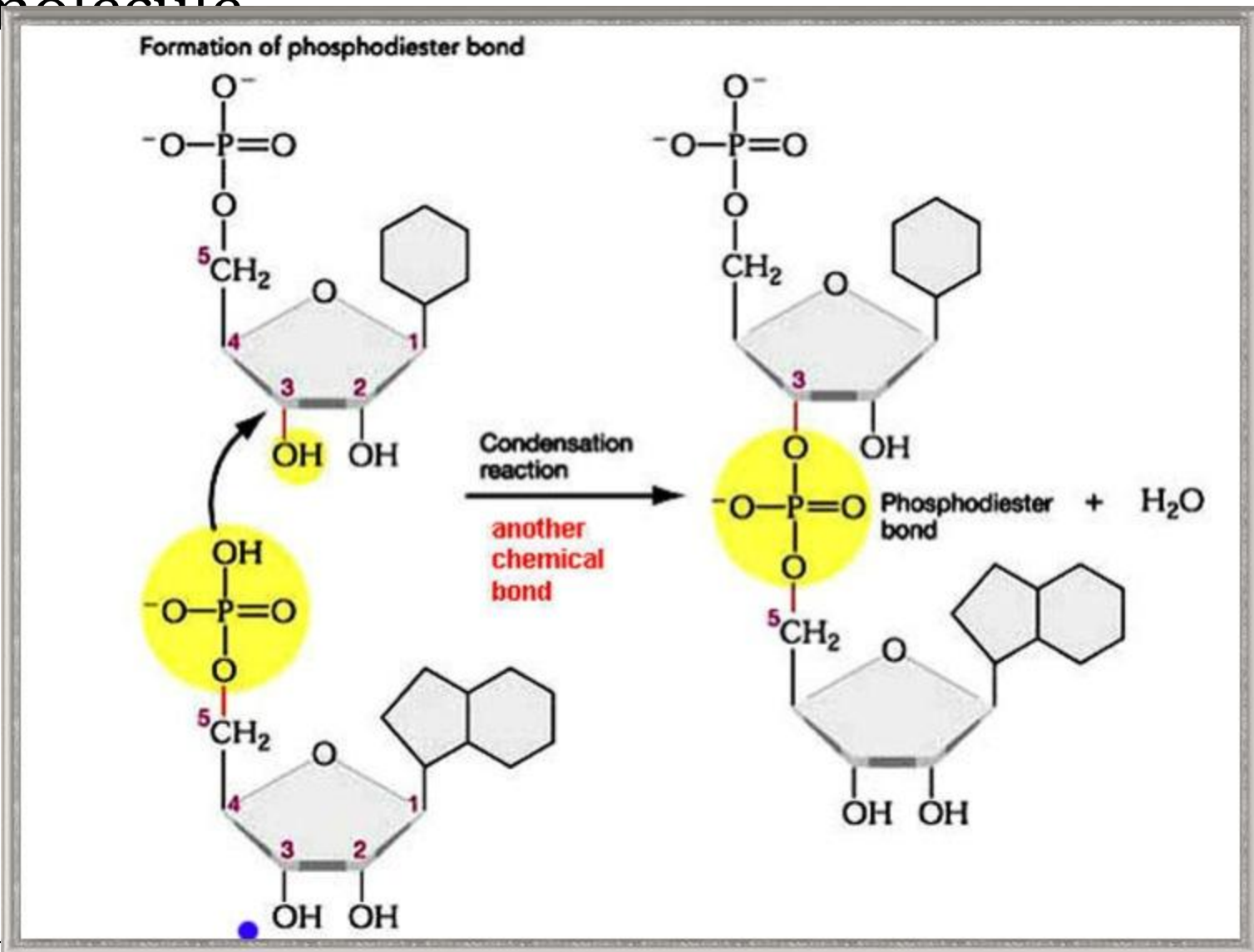
- ***Nucleoside***: Is a product of glycosidic bond between a pentose sugar and a purine/pyrimidine molecule
- N-9 of purine links with C-1 of sugar through glycosidic bonding forming
- Eg: *Deoxyadinosine* in DNA and *Adenosine* in RNA, *Deoxyguanosine* in DNA and *Guanosine* in RNA



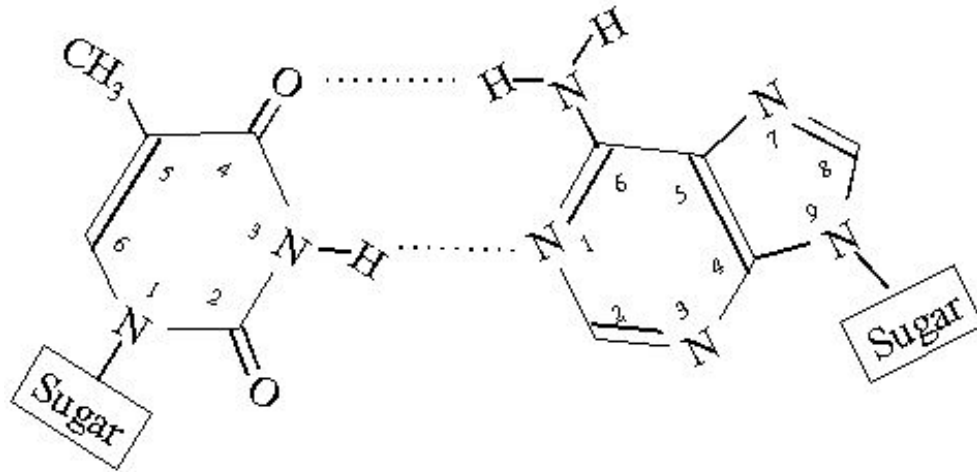
- N-1 of pyrimidine links with C-1 of sugar through glycosidic bonding
- Eg: *Deoxycytidine* in DNA and *Cytidine* in RNA, *Deoxythymidine* in DNA, *Uridine* in RNA



- **Nucleotide**: Is a product of phosphodiester bond between a nucleoside and a phosphate molecule

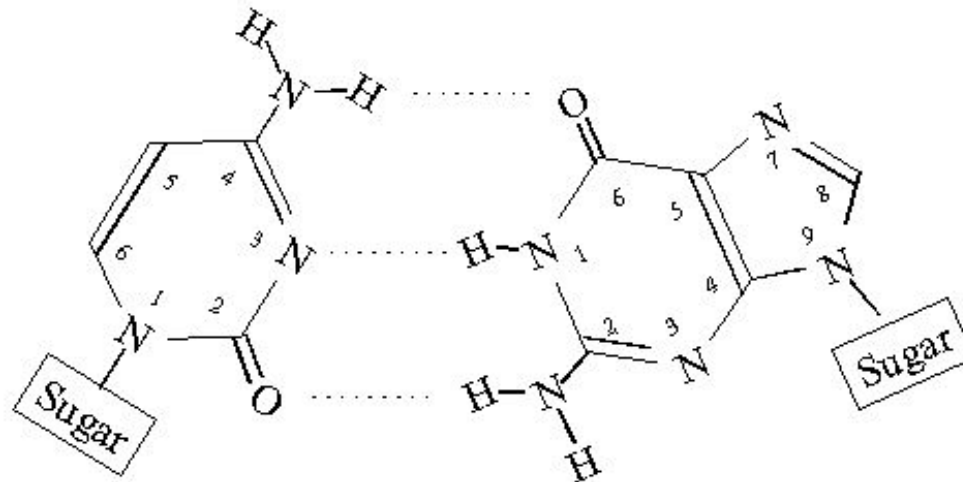


# DNA Double helical structure



Thymine (T)

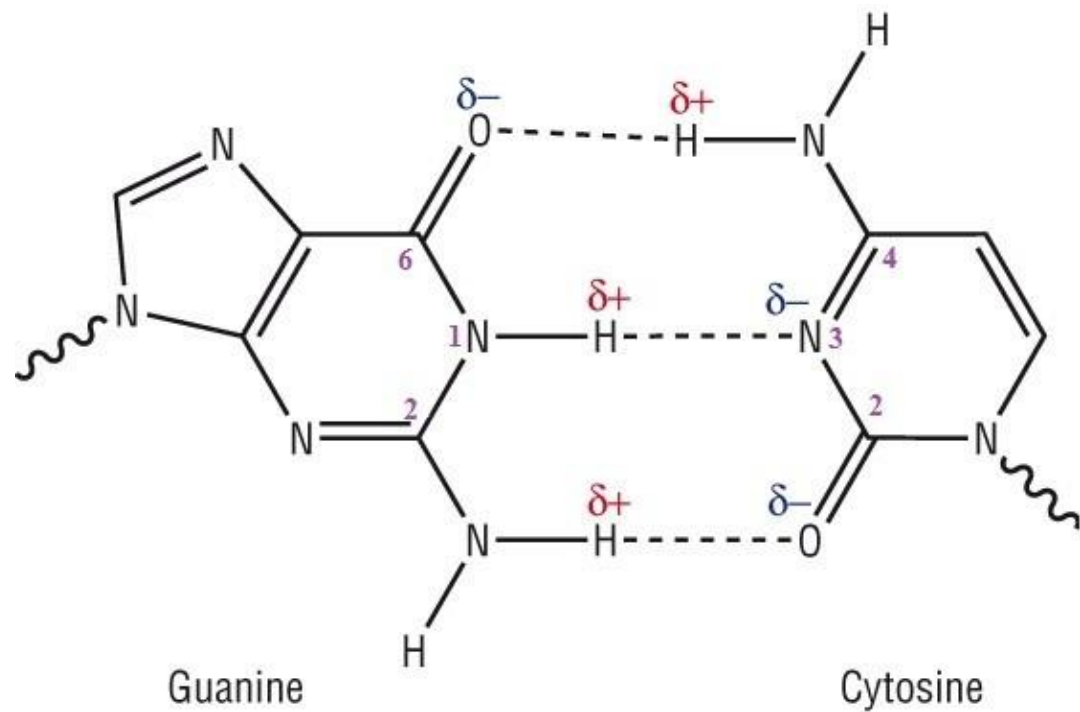
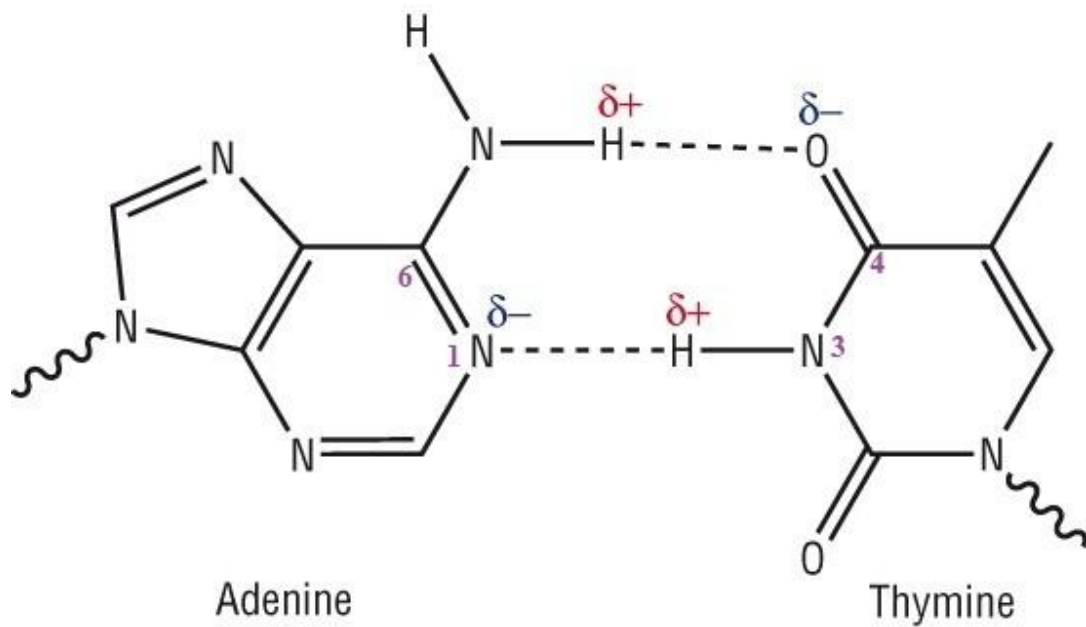
Adenine (A)



Cytosine (C)

Guanine (G)

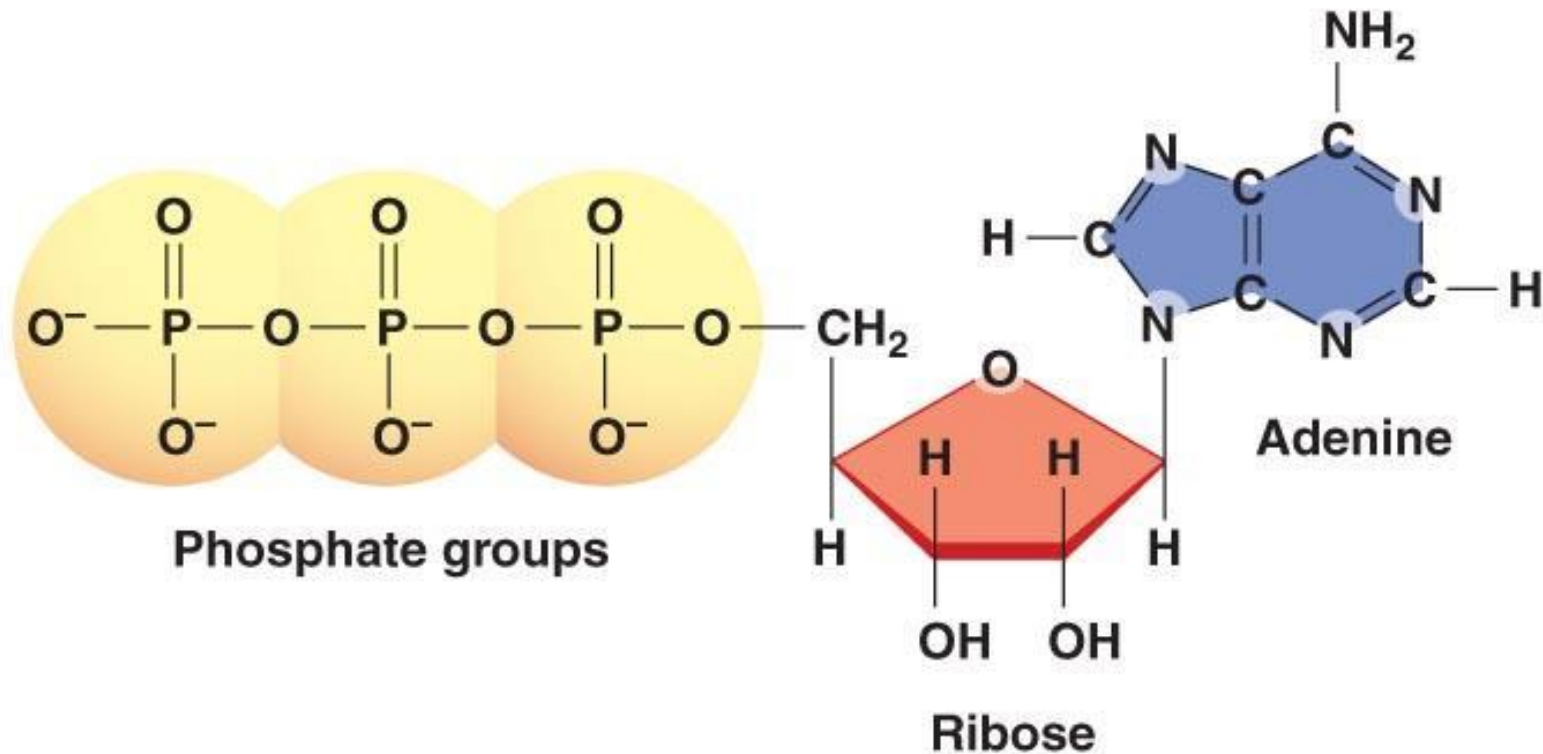


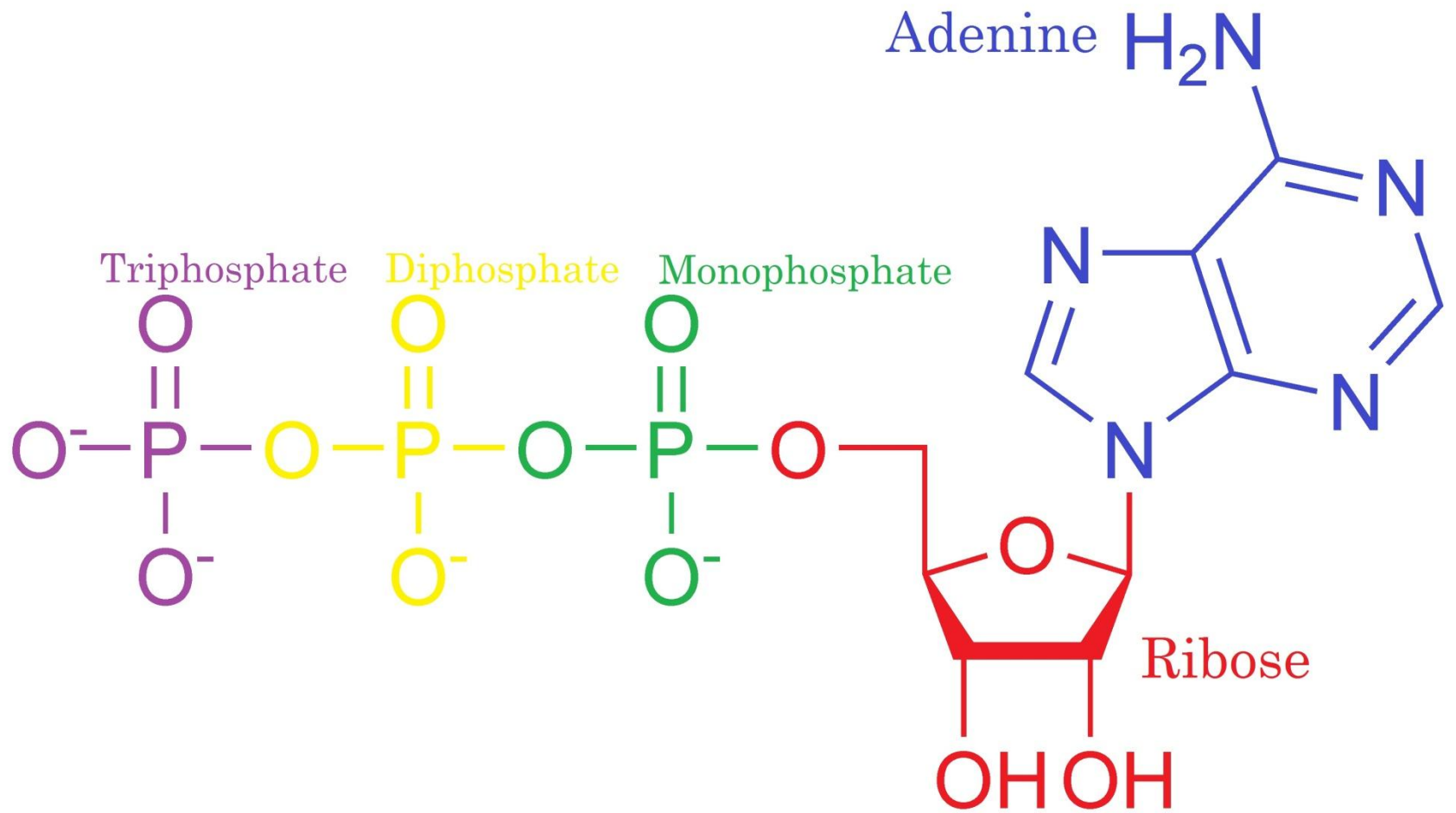




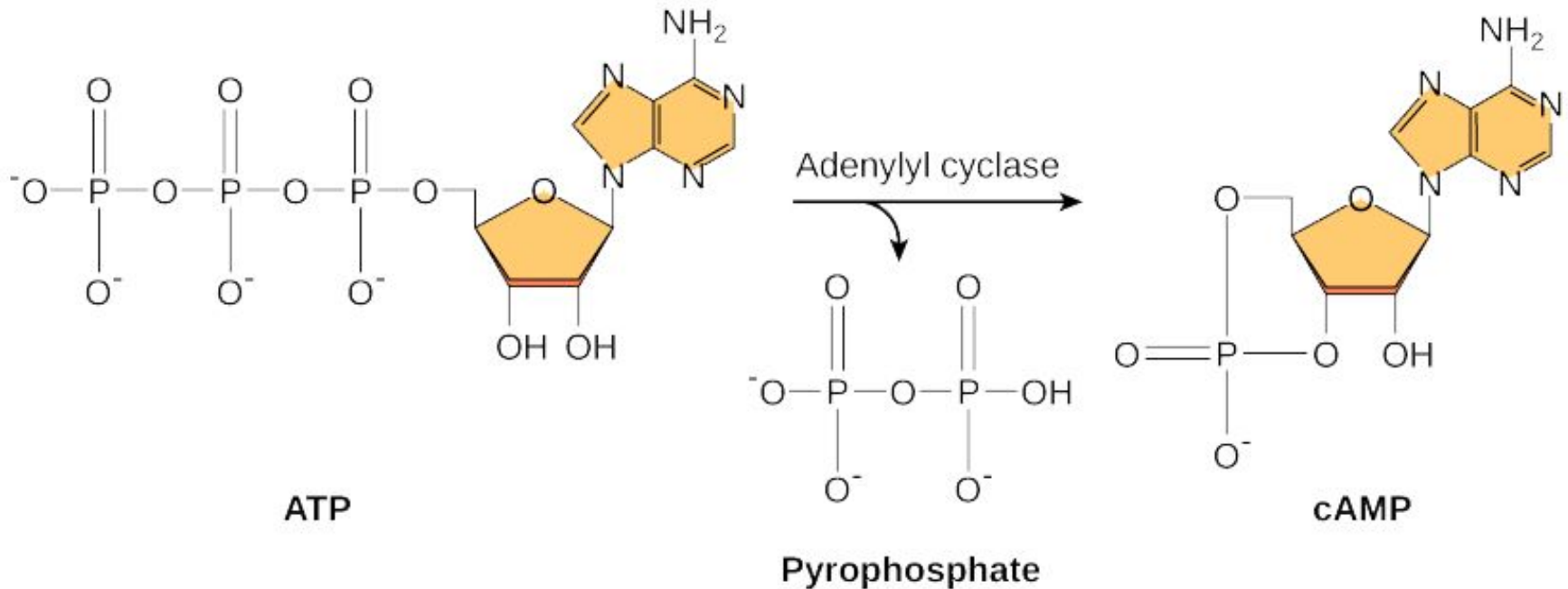


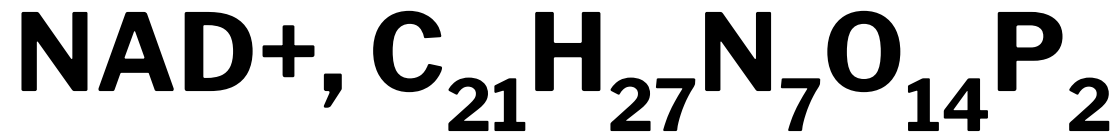
(a) ATP consists of three phosphate groups, ribose, and adenine.



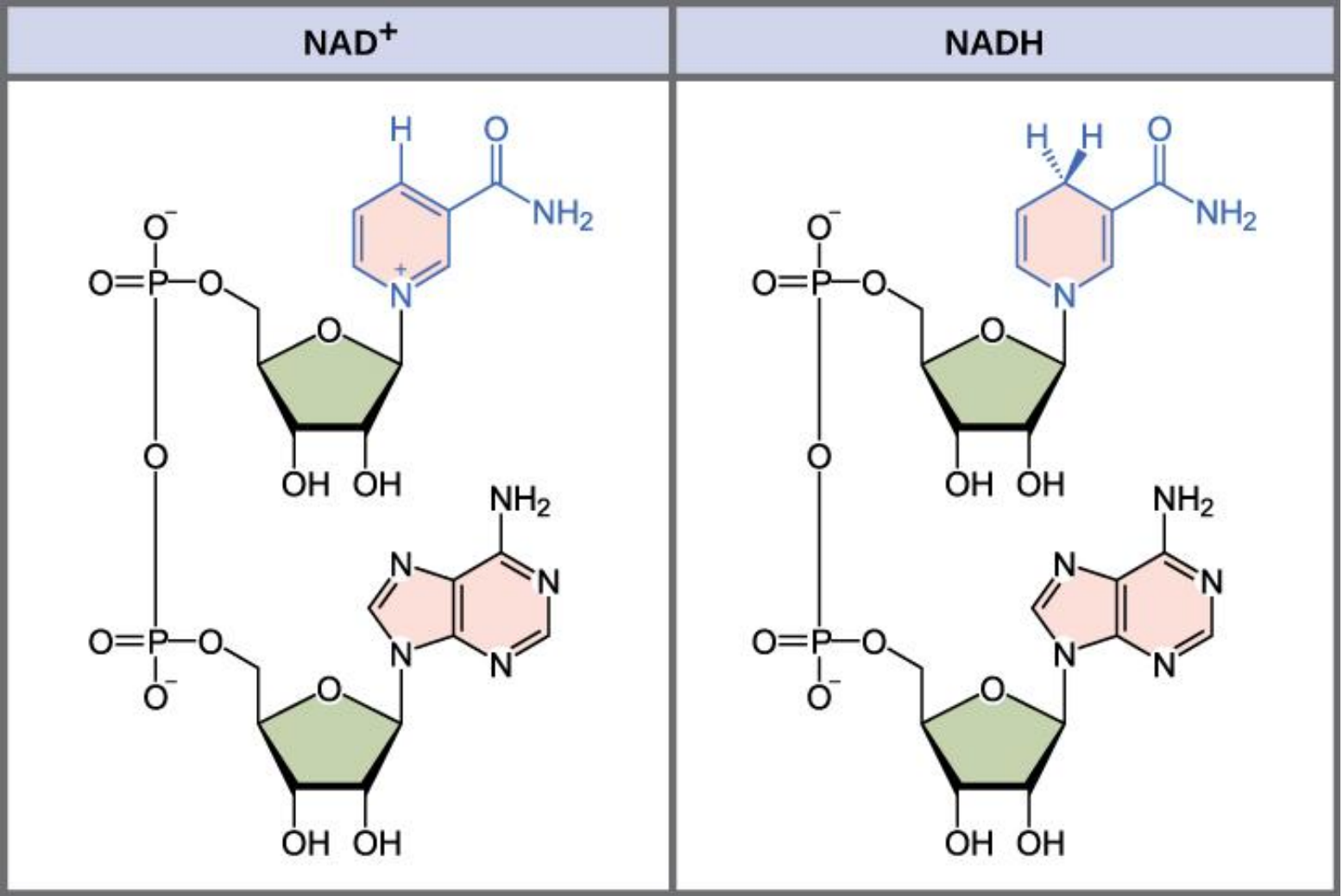


# cAMP – Cyclic Adenosine Monophosphate, $C_{10}H_{12}N_5O_6P$





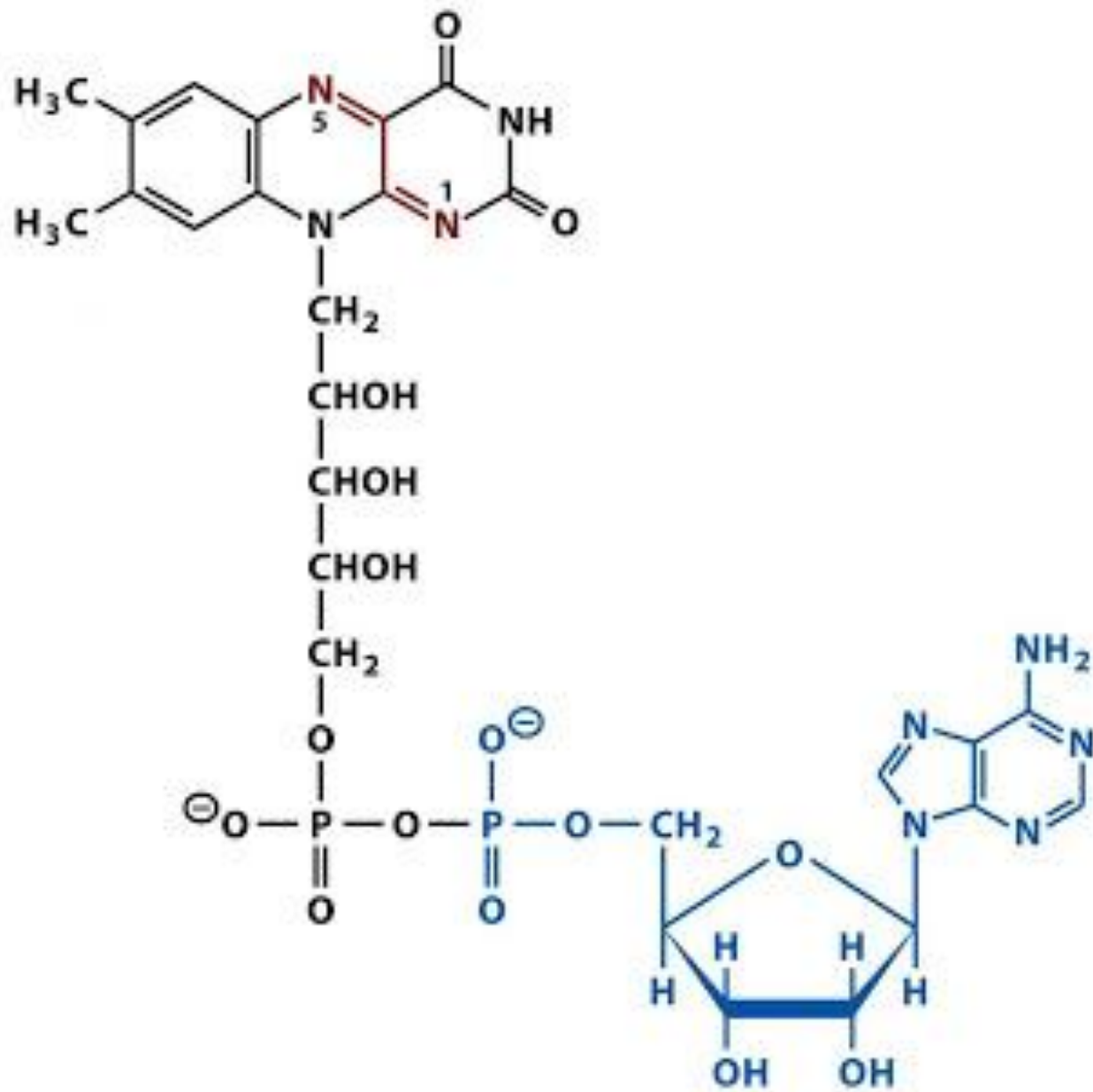
- Nicotinamide adenine dinucleotide is a coenzyme found in all living cells. The compound is a dinucleotide, because it consists of two nucleotides joined through their phosphate groups
- Niacinamide (**nicotinamide**) is a form of vitamin B3 (niacin) and is used to prevent and treat niacin deficiency (pellagra).
- **Nicotinamide mononucleotide** ("NMN" and " $\beta$ -NMN") is a **nucleotide** derived from ribose and **nicotinamide**.



# FAD

- In biochemistry, flavin adenine dinucleotide is a redox cofactor, more specifically a prosthetic group, involved in several important reactions in metabolism
- **Formula:**  $C_{27}H_{33}P_2N_9O_{15}$
- **Flavin mononucleotide (FMN)** is a biomolecule produced from riboflavin (vitamin B2) by the enzyme riboflavin kinase

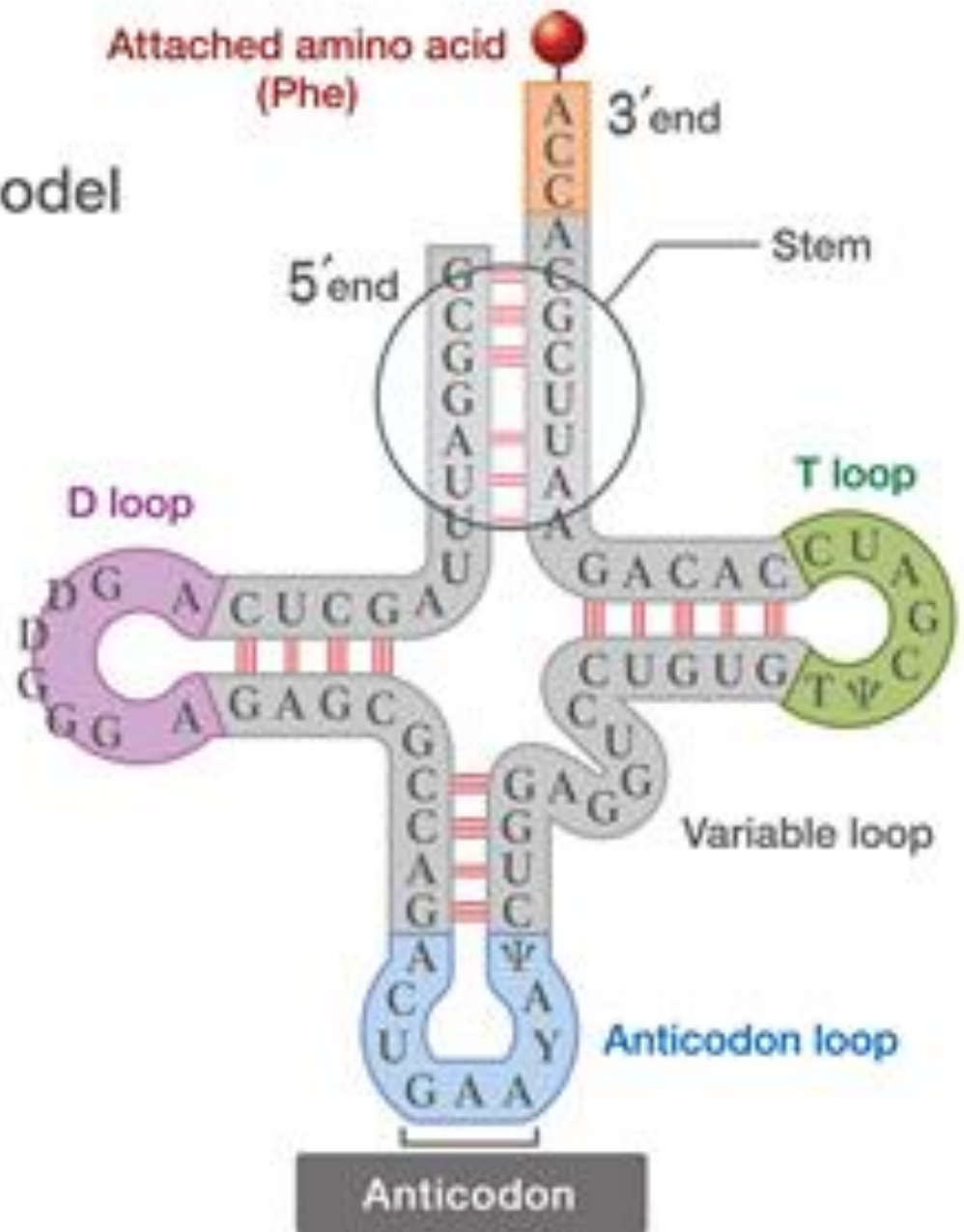




# tRNA

A)

## Cloverleaf model



+ ZOOM