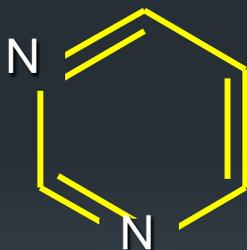
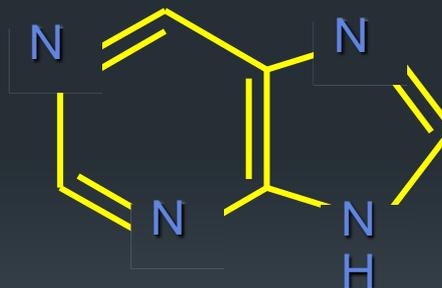


Introduction

- Pyrimidine and purine are the names of the parent compounds of two types of nitrogen-containing heterocyclic aromatic compounds.



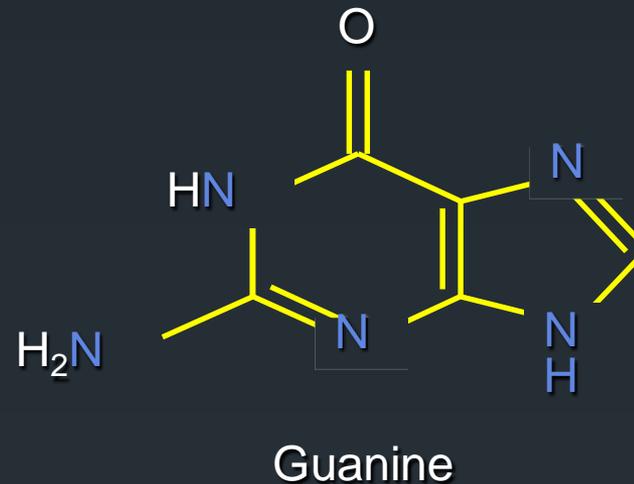
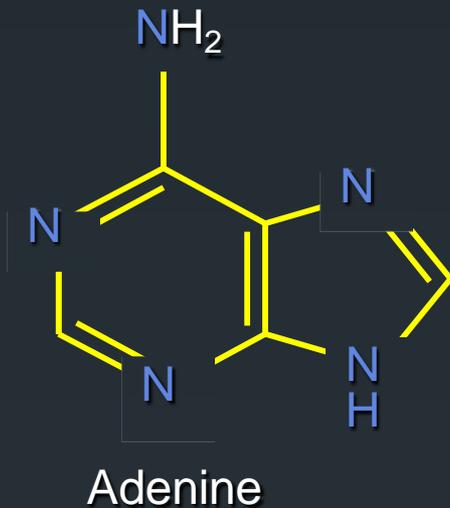
Pyrimidine



Purine

Important Purines

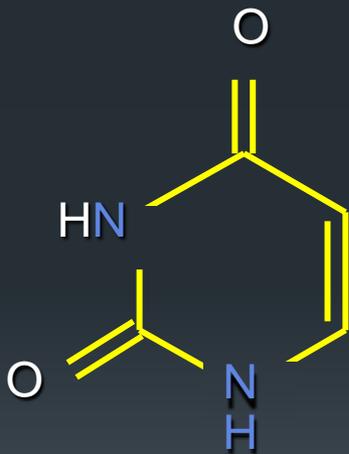
- Adenine and guanine are the principal purines of both DNA and RNA.



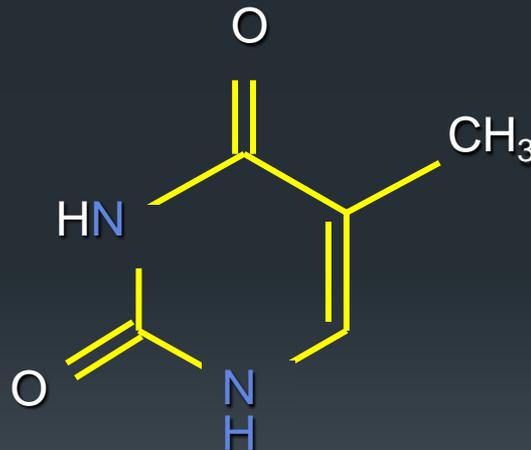
- Caffeine (coffee) and theobromine (cocoa) are naturally occurring purines.

Important Pyrimidines

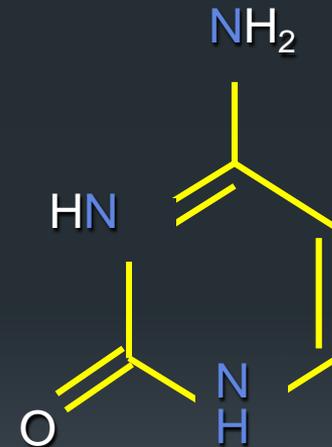
- Pyrimidines that occur in DNA are cytosine and thymine. Cytosine and uracil are the pyrimidines in RNA.



Uracil



Thymine



Cytosine

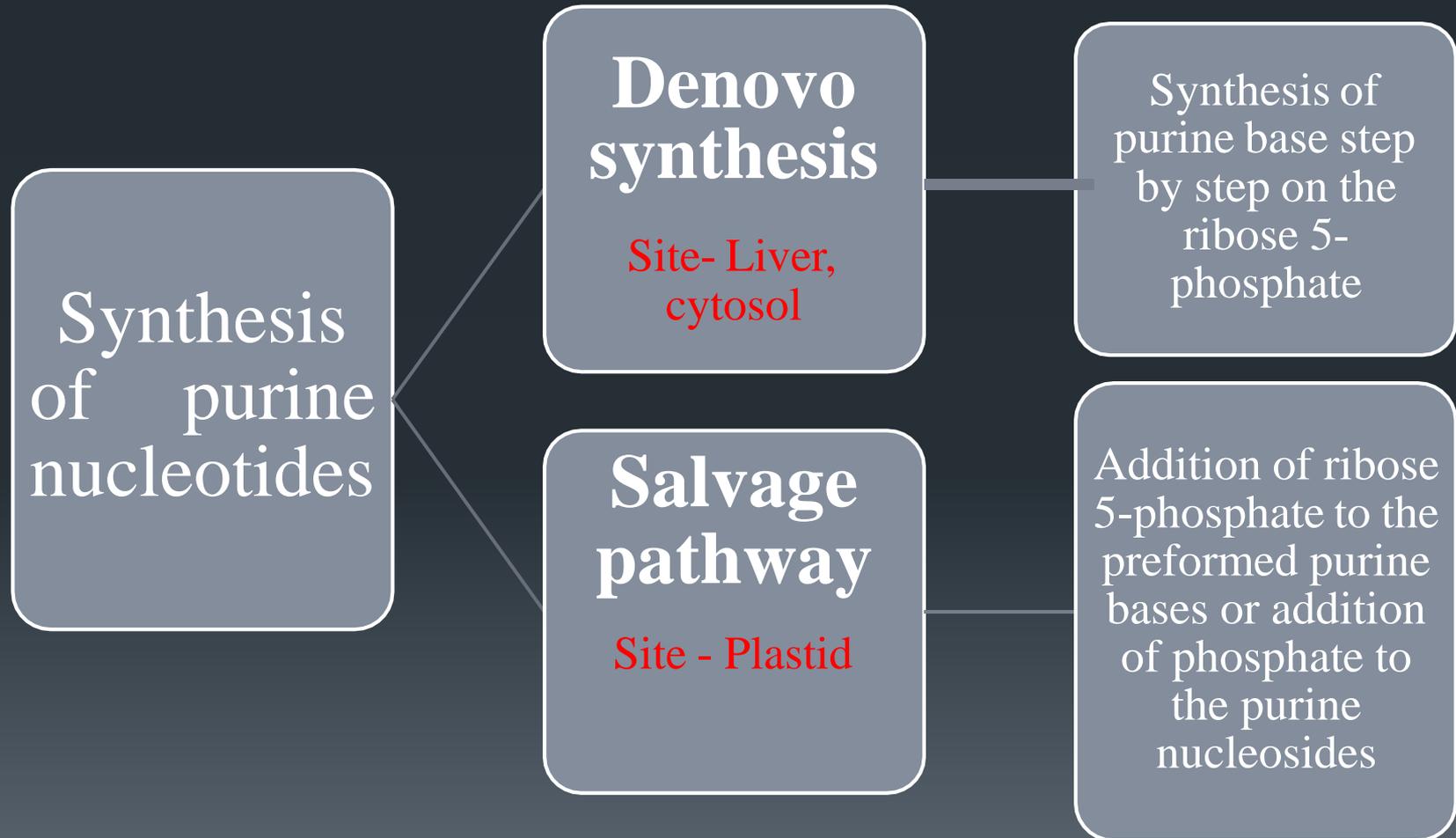
Nucleosides and Nucleotides

7

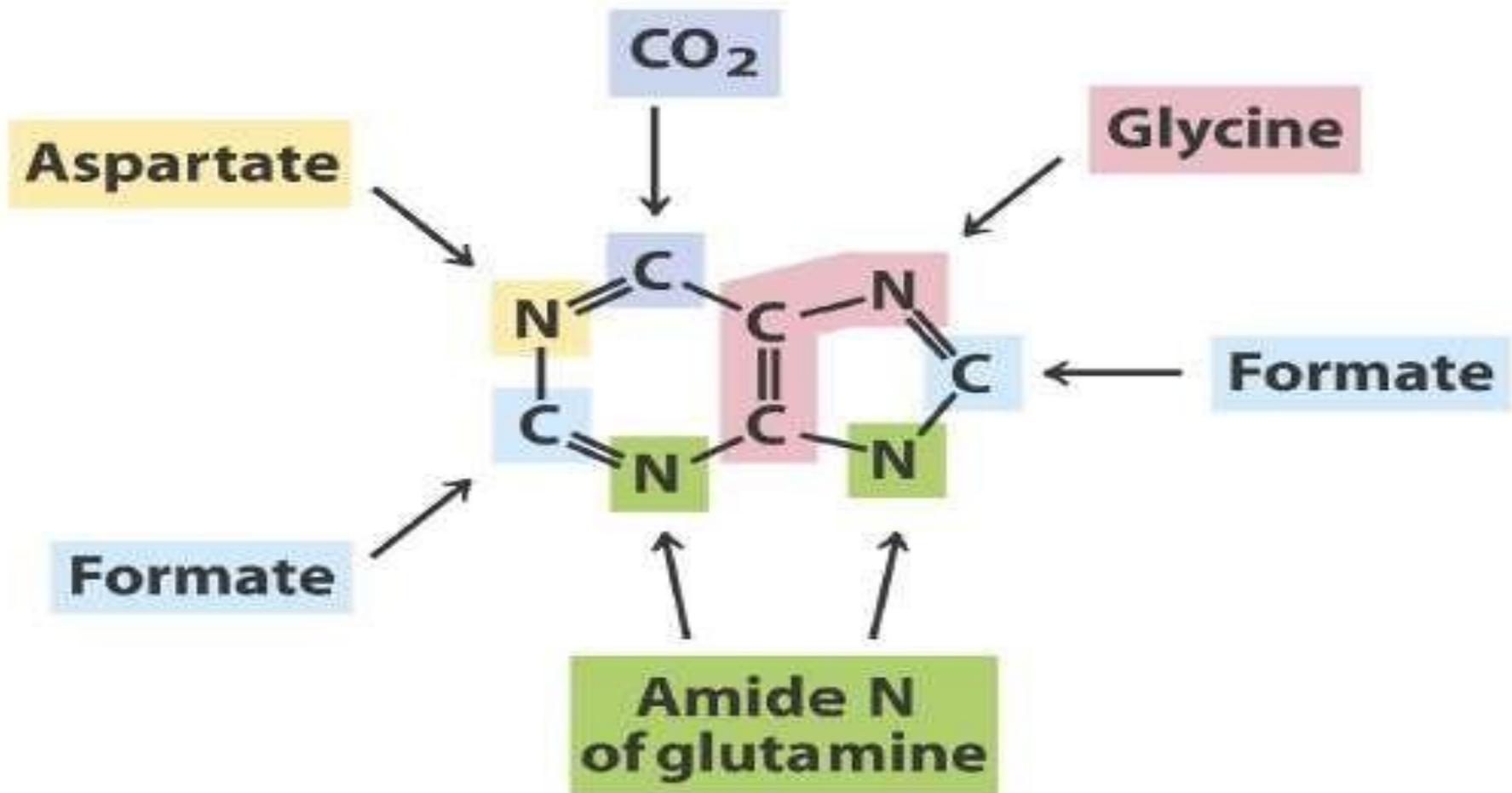
Nucleoside is a structure formed by the combination of nitrogen base and sugar where as Nucleotides are phosphoric acid esters of nucleosides.

N2 base	Sugars	Nucleoside	Nucleoside	Phosphoric acid	Nucleotides
Adenine	Deoxyribose/ Ribose	Adenosine	Adenosine	Phosphoric acid	Adenylate (AMP)
Guanine	Deoxyribose/ Ribose	Guanosine	Guanosine	Phosphoric acid	Guanylate (GMP)
Thymine	Deoxyribose	Thymidine	Thymidine	Phosphoric acid	Thymidylate (TMP)
Cytosine	Deoxyribose/ Ribose	Cytidine	Cytidine	Phosphoric acid	Cytidylate (CMP)
Uracil	Ribose	Uridine	Uridine	Phosphoric acid	Uridylate (UMP)

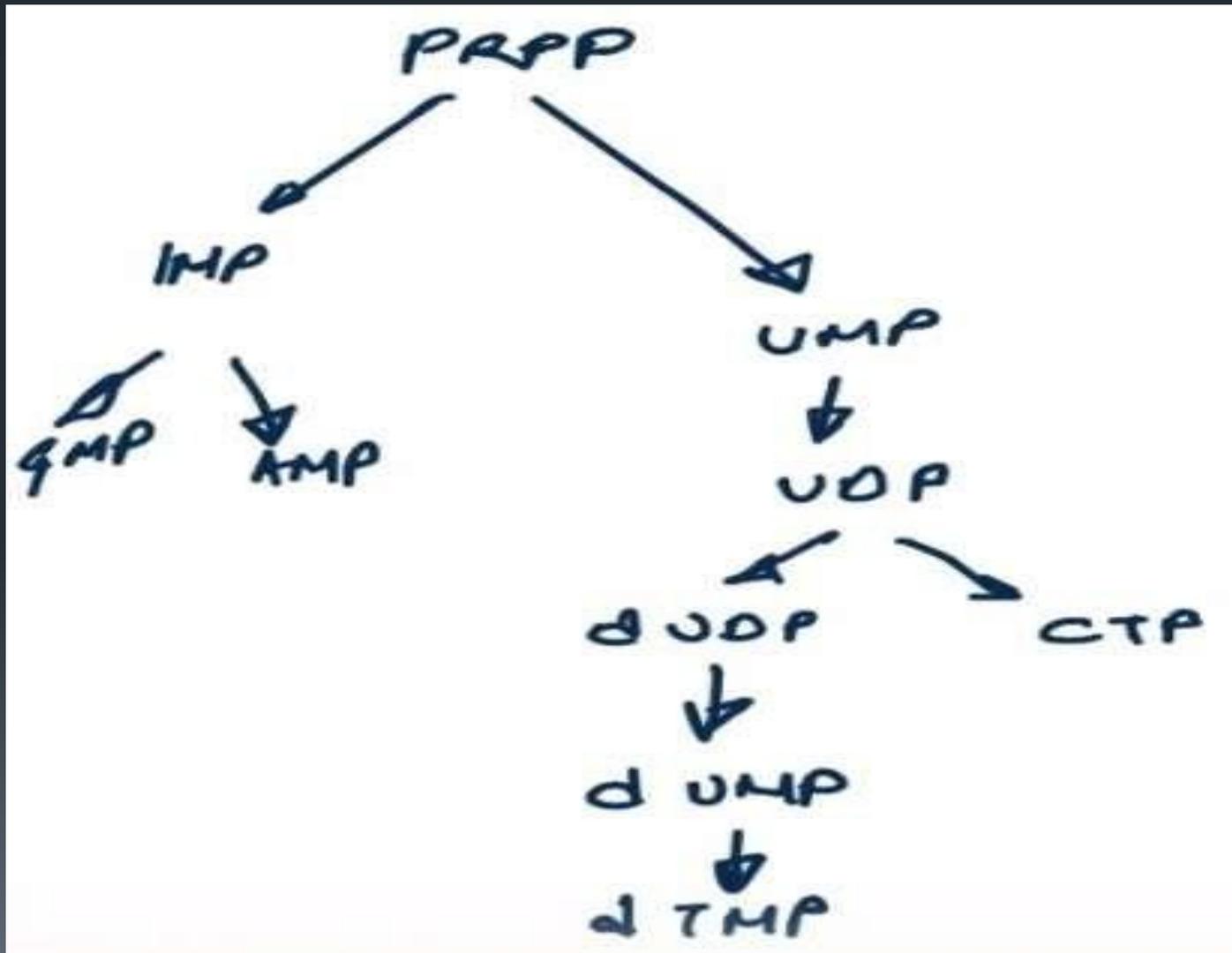
Synthesis of Purine Nucleotides



Sources of Different Atoms of Purine Ring

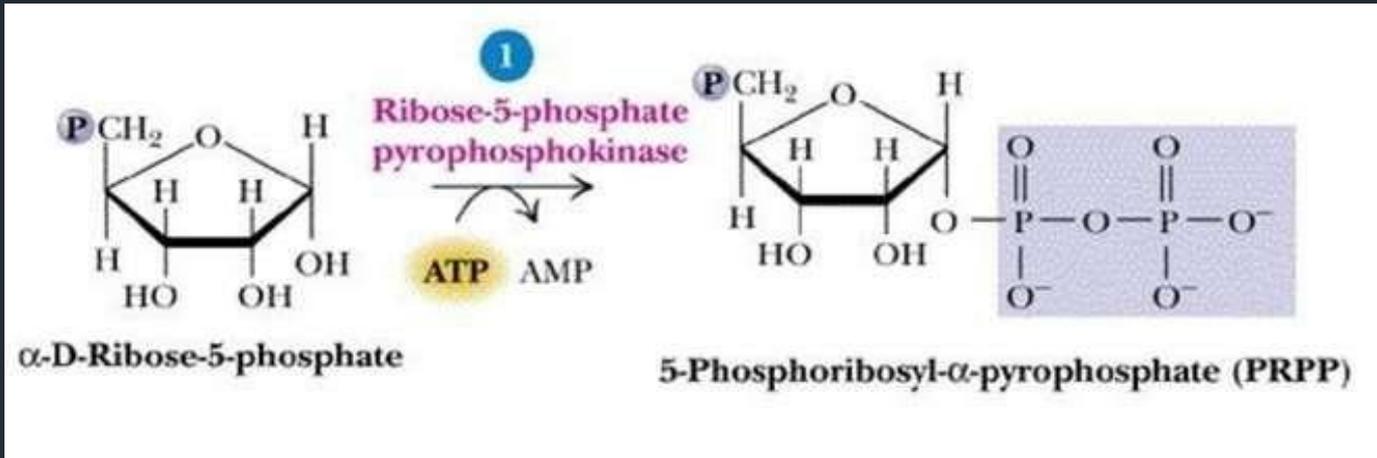


De novo Synthesis of Purine And Pyrimidine

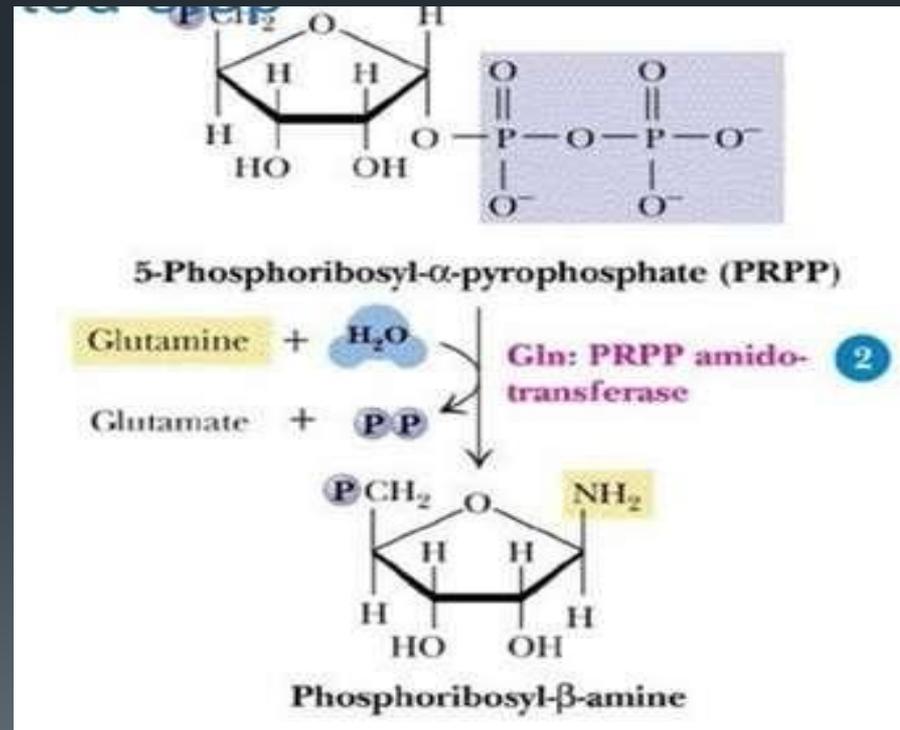


Purine Synthesis

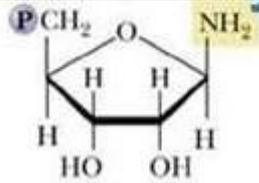
STEP-1



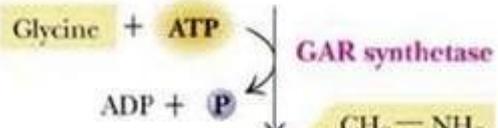
STEP-2



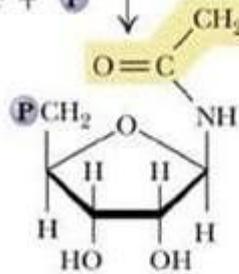
STEP-3



Phosphoribosyl- β -amine

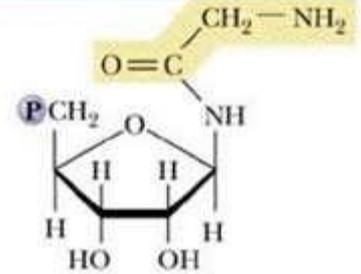


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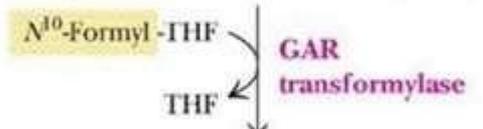


Glycinamide ribonucleotide (GAR)

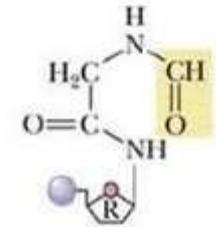
STEP-4



Glycinamide ribonucleotide (GAR)

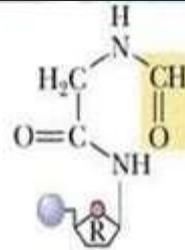


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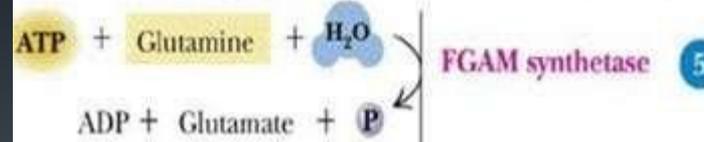


Formylglycinamide ribonucleotide (FGAR)

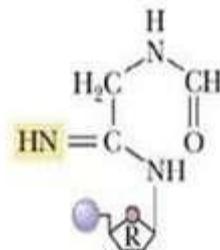
STEP-5



Formylglycinamide ribonucleotide (FGAR)



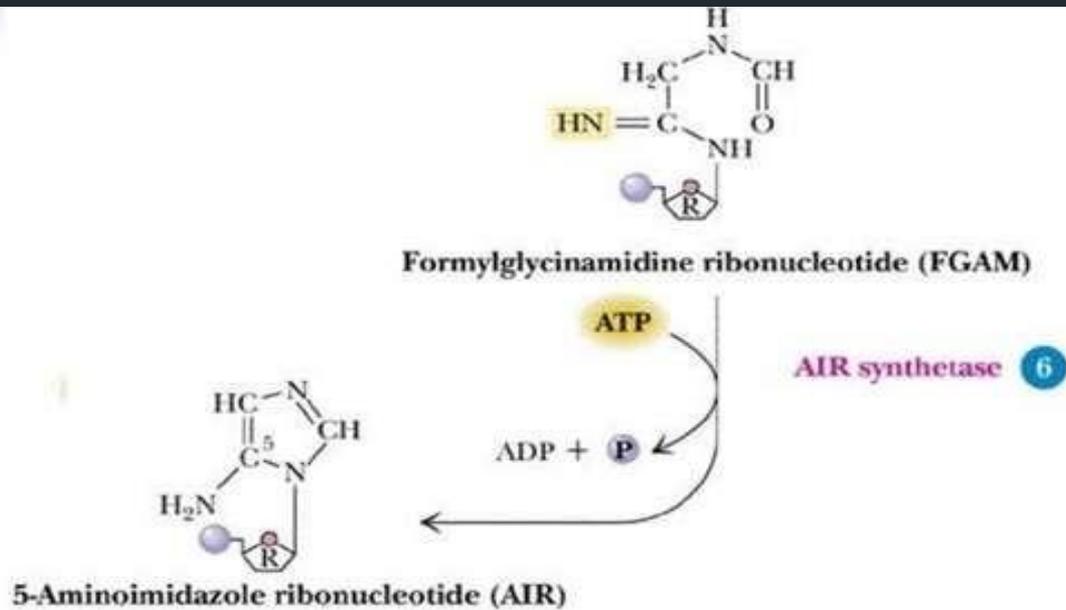
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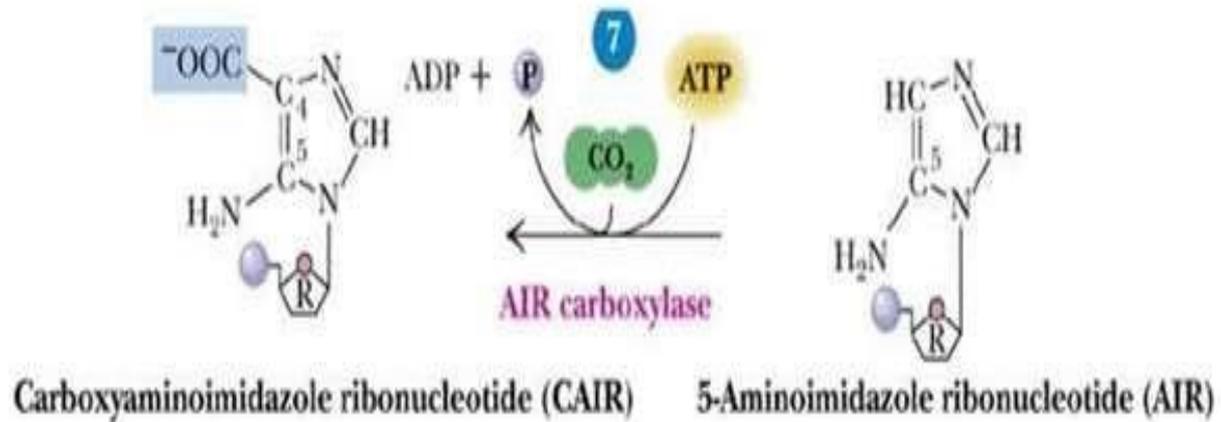
Formylglycinamide ribonucleotide (FGAM)

STEP-6

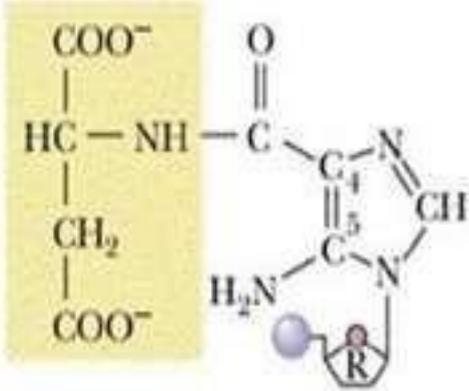
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STEP-7

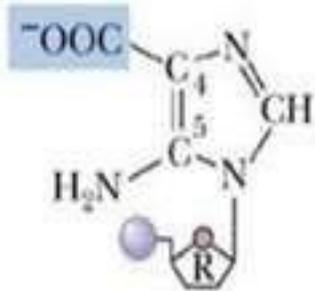
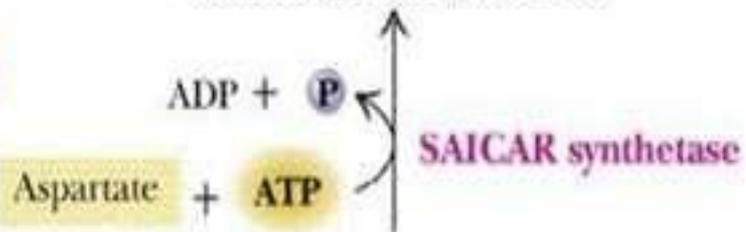


STEP-8



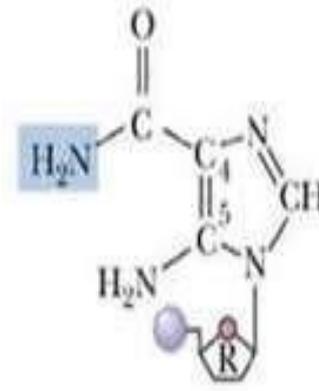
N-succinyl-5-aminoimidazole-4-carboxamide ribonucleotide (SAICAR)

8



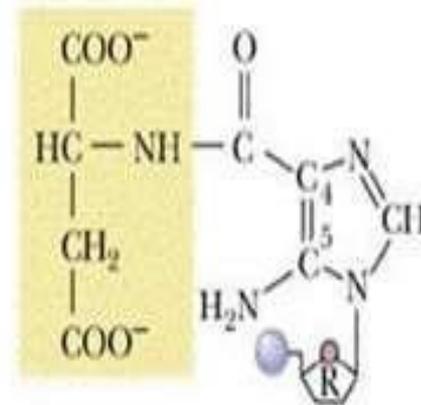
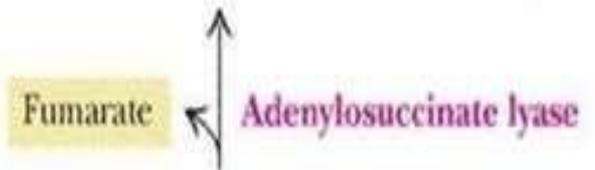
Carboxyaminoimidazole ribonucleotide (CAIR)

STEP-9



5-Aminoimidazole-4-carboxamide ribonucleotide (AICAR)

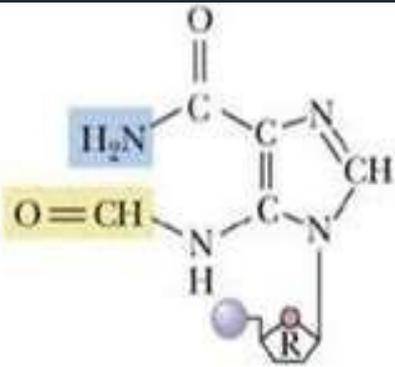
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N-succinyl-5-aminoimidazole-4-carboxamide ribonucleotide (SAICAR)

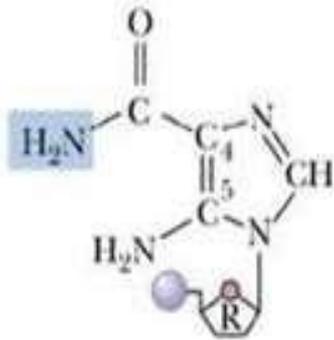
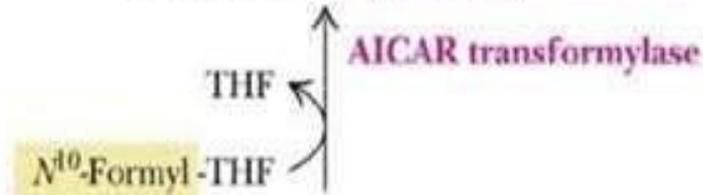
STEP-10

STEP-11



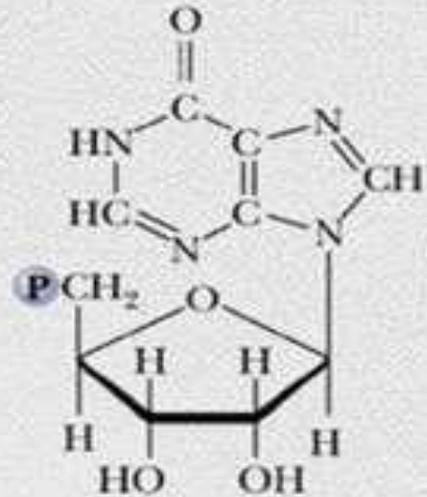
N-formylaminoimidazole-4-carboxamide ribonucleotide (FAICAR)

10

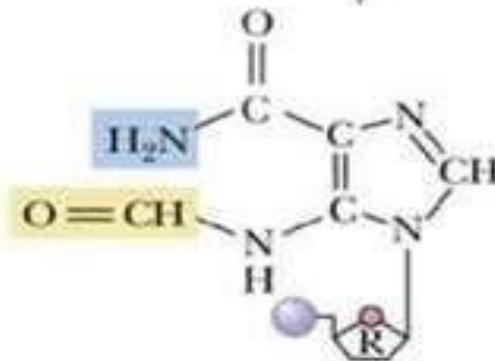
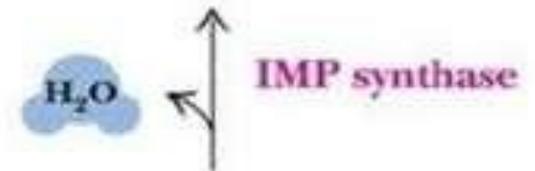


5-Aminoimidazole-4-carboxamide ribonucleotide (AICAR)

Inosine monophosphate (IMP)

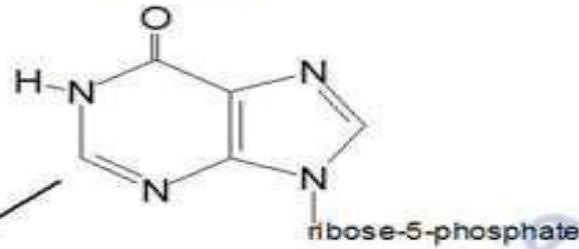


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N-formylaminoimidazole-4-carboxamide ribonucleotide (FAICAR)

IMP



adenylosuccinate synthetase

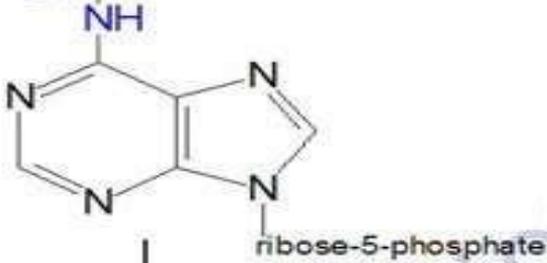
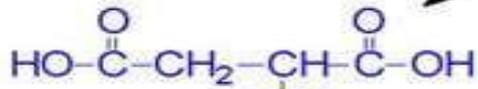
aspartate + GTP

GDP + P_i

NAD⁺ + H₂O

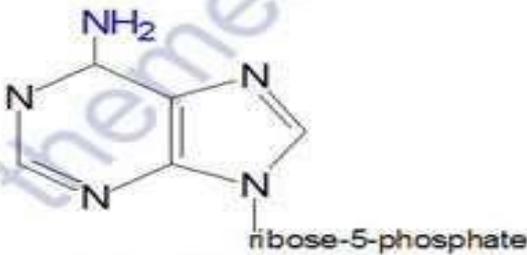
NADH + H⁺

IMP dehydrogenase

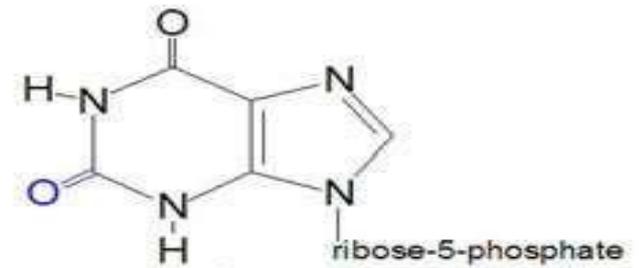


adenylosuccinate lyase

fumarate



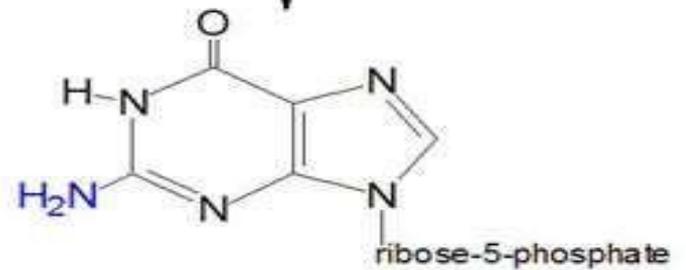
AMP



glutamine + ATP + H₂O

glutamate + ADP + PP_i

GMP synthetase



GMP