

## Write a note on Gout?

→ Gout is an abnormality of uric acid metabolism that result in deposition of sodium urate crystal in joints, soft tissue and urinary tract.

### Normal uric acid level:-

Male → 3.4 - 7.0 mg/dl  
Female → 2.4 - 6.0 mg/dl

→ This disorder characterized by **Hyperuricemia**.

→ In Gout, the Hyperuricemia result primarily from underexcretion of uric acid.

overproduction of uric acid is less common

and known causes involve certain inborn

error of metabolism or ↑ availability of purines.

intense joint pain, limit range motion

→ Crystal deposition may be seen in soft tissues and in kidney. (urolithiasis)

inflammation & redness

### Treatment:

→ Reduce dietary purines intake and restrict alcohol.

#### → Drugs:

① **Allopurinol**: Block formation of uric acid

② **Uricase**: Break down uric acid

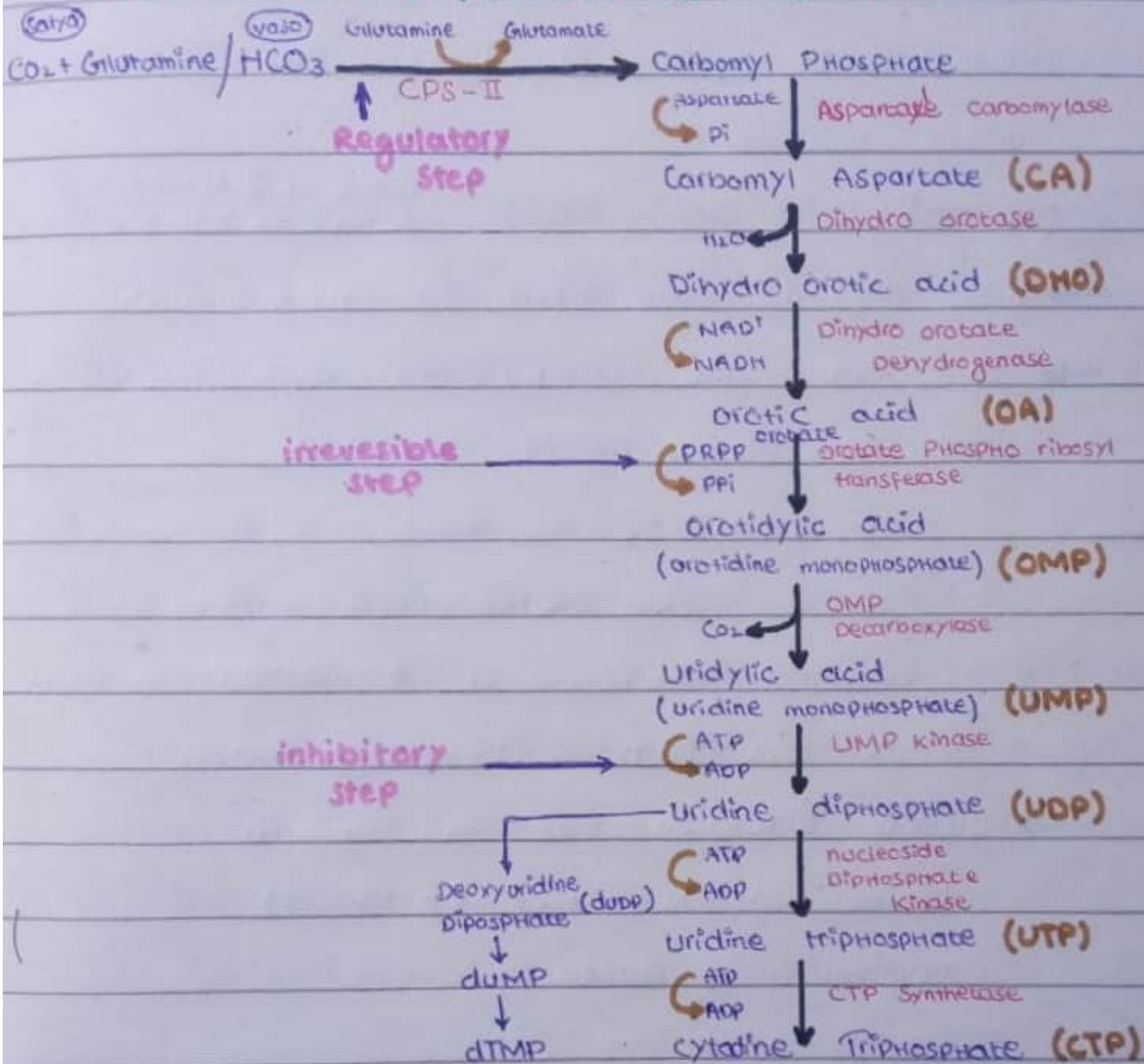
③ **Probenecid**: ↑ excretion of uric acid in urine.

④ **Colchicine**: Anti-inflammatory agent, very useful

to arrest in Arthritis in Gout

# NUCLEOTIDE

## Steps OF Biosynthesis OF Pyrimidine



### Regulation:

(i) In mammalian cell: Carbonyl Phosphate Synthetase - II Domain OF Trifunctional CAD is inhibited by UTP and Activated by PRPP. 5 Phosphoribosyl - 1 pyrophosphate.

(ii) In prokaryotic cell: Aspartate Transcarbamylase is inhibited by CTP and is regulated.

Write down differences b/w CPS I & CPS II ?

variable

CPS-I

CPS-II

• Cellular location

Mitochondria

Cytosol

• pathway involve

urea cycle

Pyrimidine Synthesis

• Source of Nitrogen

Ammonia

$\gamma$ -amide group of Glutamine

• Regulators

Activator: N-acetyl-Glutamate

Activator: PRPP

Inhibitor: UTP

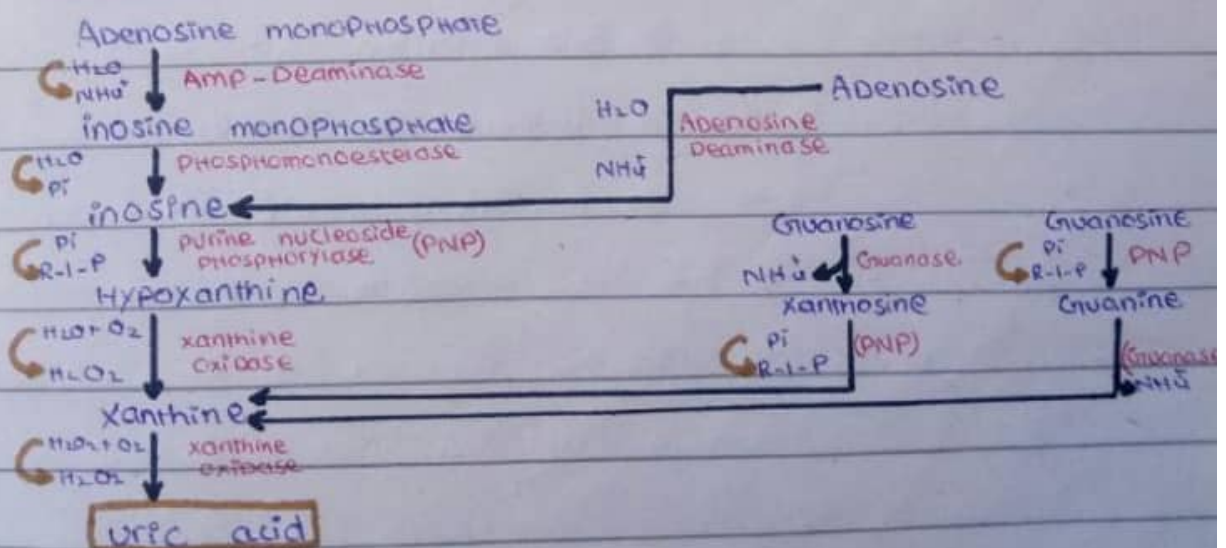
How uric acid Formed From Purine ?

Write down Steps OF Catabolism OF Purine bases ?

The end product of purine bases catabolism is Uric acid.

Occurrence; mainly in Liver.

Pathway:



## What is Lesch-Nyhan Syndrome?

This is a rare X-linked inherited disorder of Purine metabolism.

Deficient Enzyme: HGPRTase

The deficiency result in an inability to Salvage. Firstly ① Decreased utilization of hypoxanthine or guanine, from which excessive amount of Uric acid, the end product of Purine Degradation.

Second In Addition lack of Salvage pathway causes  $\uparrow$  PRPP level &  $\downarrow$  IMP & GMP level.

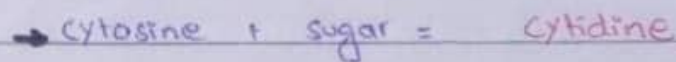
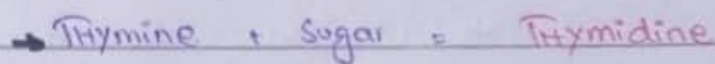
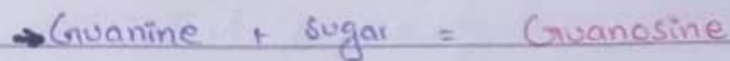
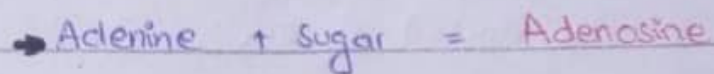
### Consequences:

- ① Mental Retardation
- ② Excessive Uric acid
- ③ Nephrolithiasis
- ④ Motor dysfunction
- ⑤ Self mutilation
- ⑥ Behavioral Disturbance
- ⑦ involuntary muscle movement.

## Difference b/w Nucleoside & Nucleotide?

Nucleoside: Nitrogenous bases + Pentose sugar

The Pentose sugar react with base through a Glycosidic bond resulting in formation of Nucleosides.

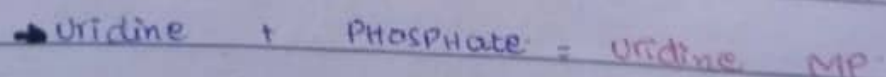
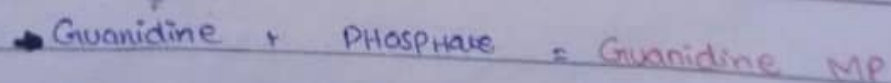
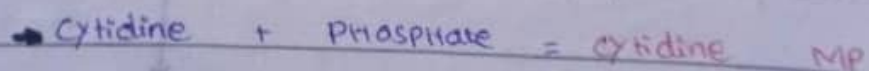
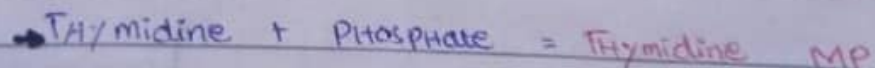
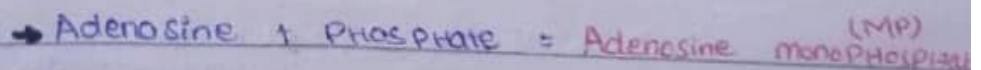


Nucleotides: Nucleoside + Phosphate

Sugar is Pentose monosaccharide

Phosphate group can be 1, 2 / 3.

Nucleotides are monomers joined by Phosphodiester bond form nucleic acid



Sugar is Pentose in both.

oxidized form  
↓  
Ribose

Reduced form  
↓  
Deoxyribose

## Write a note on Orotic Aciduria ?

The condition results from absence of either one or both enzymes, orotate phosphoribosyl transferase & OMP decarboxylase

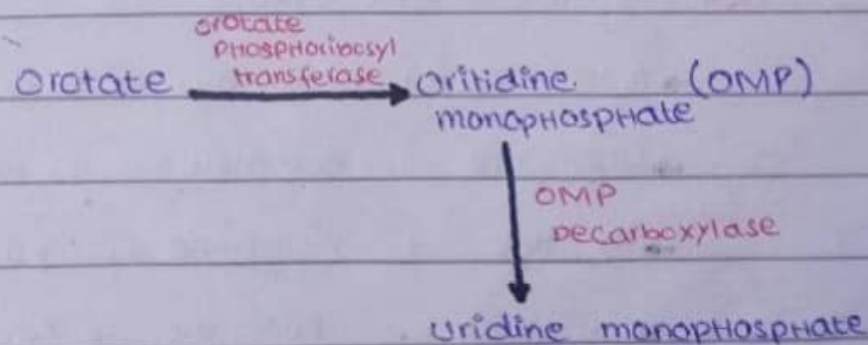
### Causes:

- Retarded Growth
- Megaloblastic Anemia
- Urinary Tract obstruction.

### Treatment:

Due to lack of feedback inhibition orotic acid production is excessive and this condition treated by feeding cytidine or uridine

### locate metabolic step involved:



## What is Hyperuricemia mention its causes?

Hyperuricemia: is an abnormal high level of uric acid in blood.

Uric acid passes through liver enter bloodstream

### Causes:

- (i) Burns
- (ii) Crush injuries
- (iii) Severe hemolytic Anemia
- (iv) Plasma cell myeloma
- (v) Myoproliferation disorder

### uric acid level:

Male → 3.4 - 7.0 mg/dl

Female → 2.4 - 6.0 mg/dl

## Write a note on Nitrogenous Bases?

There are two groups of Nitrogenous Bases.

- (i) Purines @ Adenine @ Guanine
- (ii) Pyrimidine @ cytosine @ Thymine @ uracil

### DNA

Thymine is present  
uracil is absent

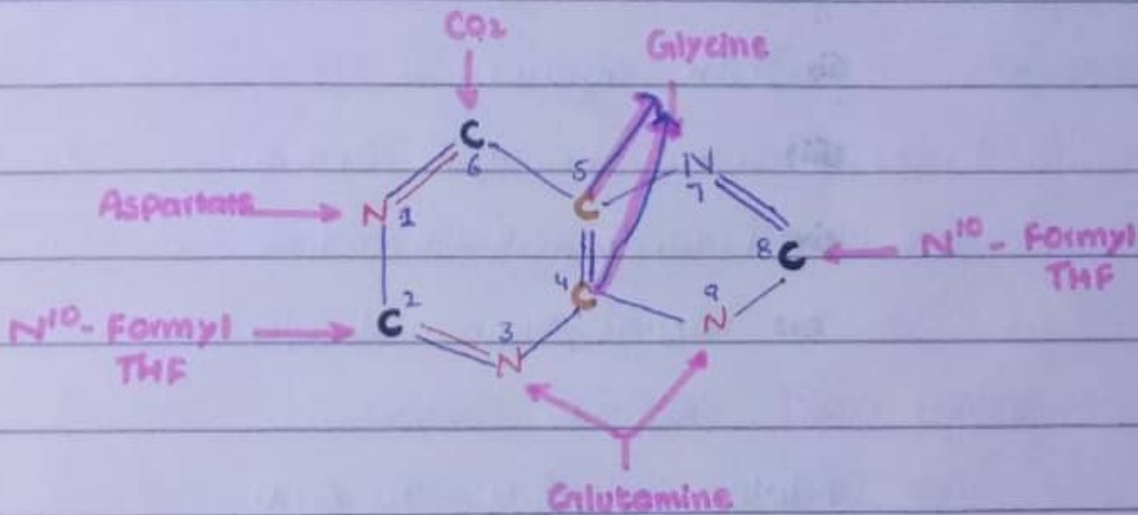
### RNA

Thymine is absent  
uracil is present.

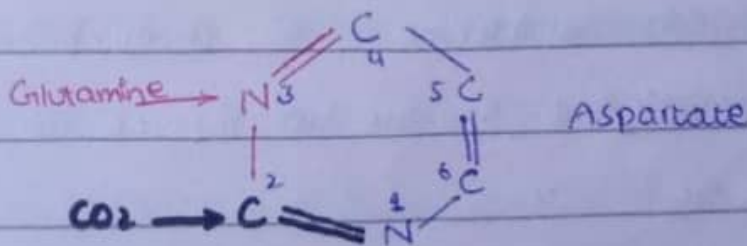
What are two main pathways of purine synthesis in human body?

- (i) De novo synthesis
- (ii) Salvage pathway

Draw structure of purine ring to show its sources of carbon and nitrogen?



Draw structures of pyrimidine

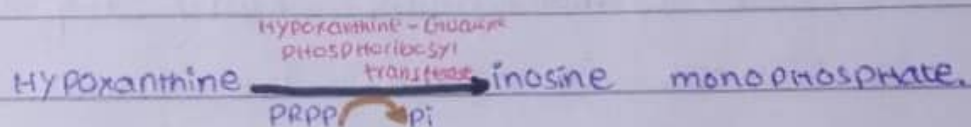
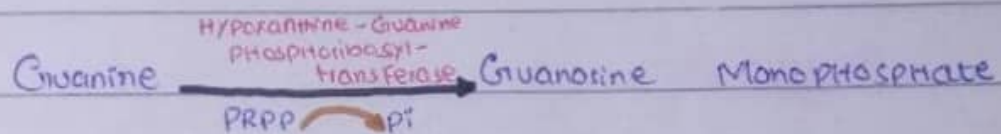
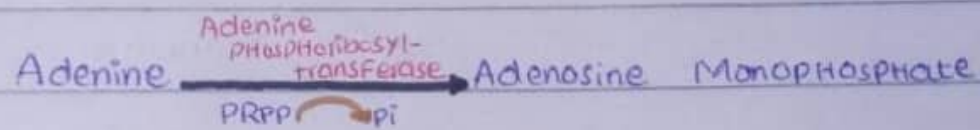




## Write a note on Salvage Pathway of Purines?

### Salvage Pathway:

Purines can be converted directly to the corresponding nucleotides, this process known as Salvage Pathway.



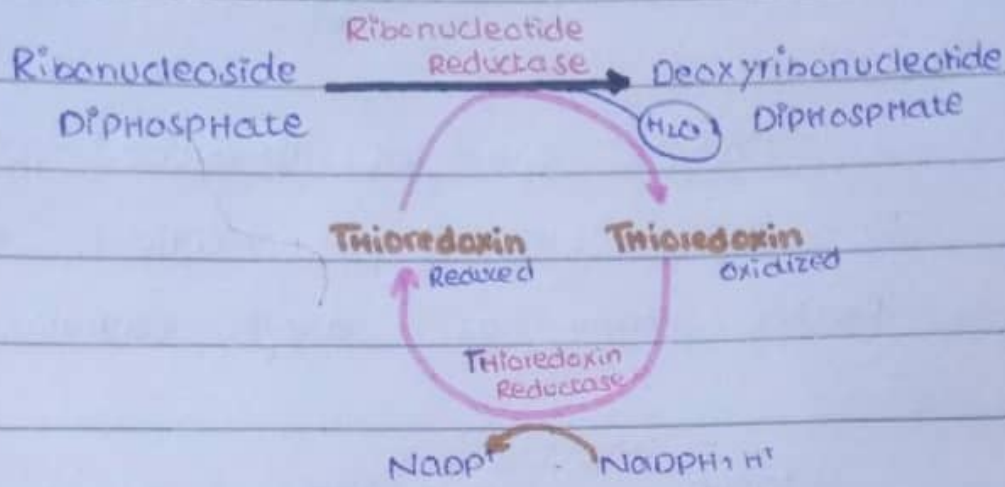
The Salvage Pathway is particularly important in certain tissue such as Erythrocyte and brain where De-novo synthesis is not operat

## Write a note on Formation of Deoxyribonucleotides from Ribonucleotides?

The Synthesis of Purine & Pyrimidine Deoxyribonucleotide occurs from Ribonucleotide.

By reduction of at C<sub>2</sub> of Ribose moiety.

This reaction is catalyzed by the multisubunit (B<sub>1</sub> & B<sub>2</sub>) by ribonucleotide reductase.



### Regulation:

Deoxyribonucleotide is mostly required for synthesis of DNA. The activity of enzyme ribonucleotide reductase maintains an adequate supply of deoxyribonucleotides.

**Drug:** Hydroxyurea  
 ↓  
 inhibits ribonucleotide reductase by destroying free radicals required by this enzyme.

Hydroxyurea is used in the treatment of cancer, specifically chronic myelogenous leukemia.