



OVERVIEW OF BIOCHEMICAL IMPORTANCE OF URIC ACID

Dr. Jaafaru Sani/Tolaz Kadhim

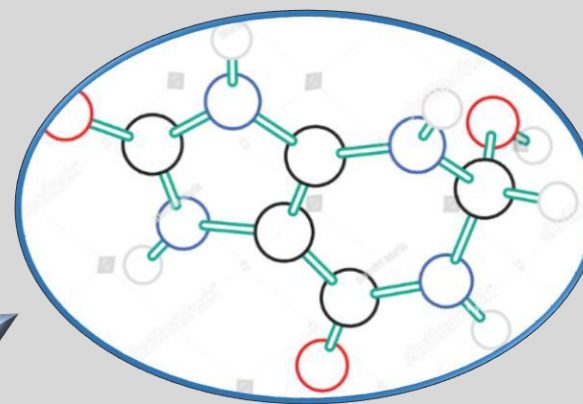
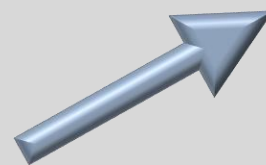
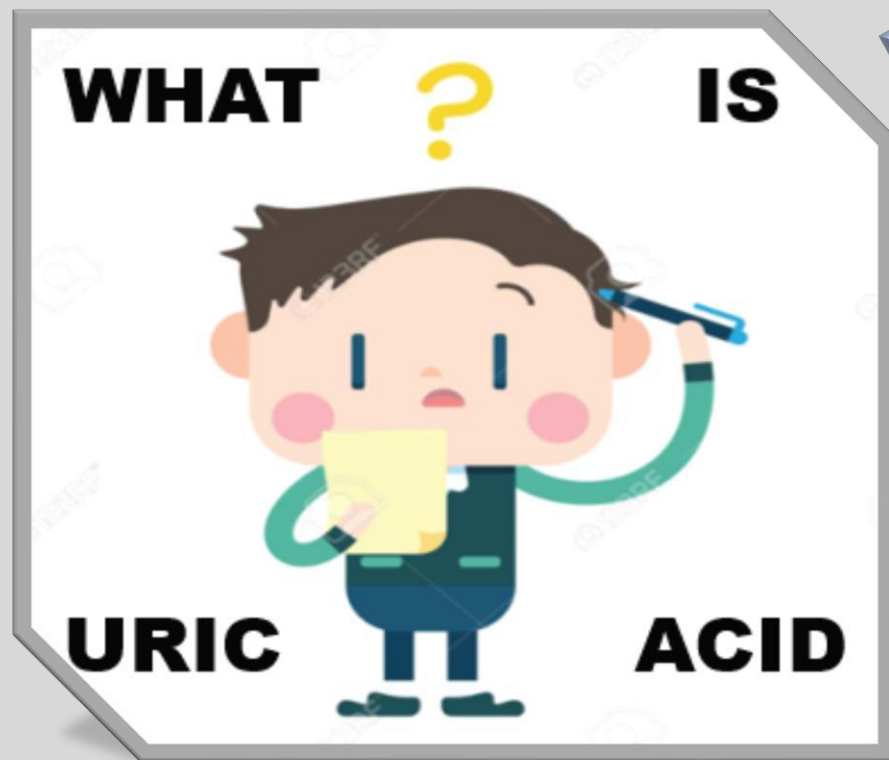
Advance Clinical Biochemistry II (MA 416)

Summer Semester

Practical 1

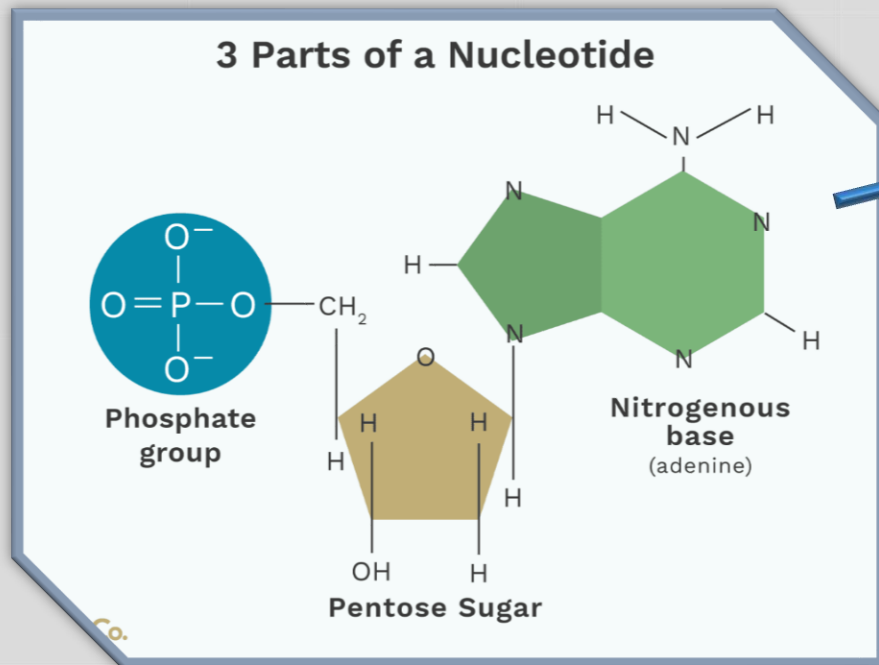
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Introduction



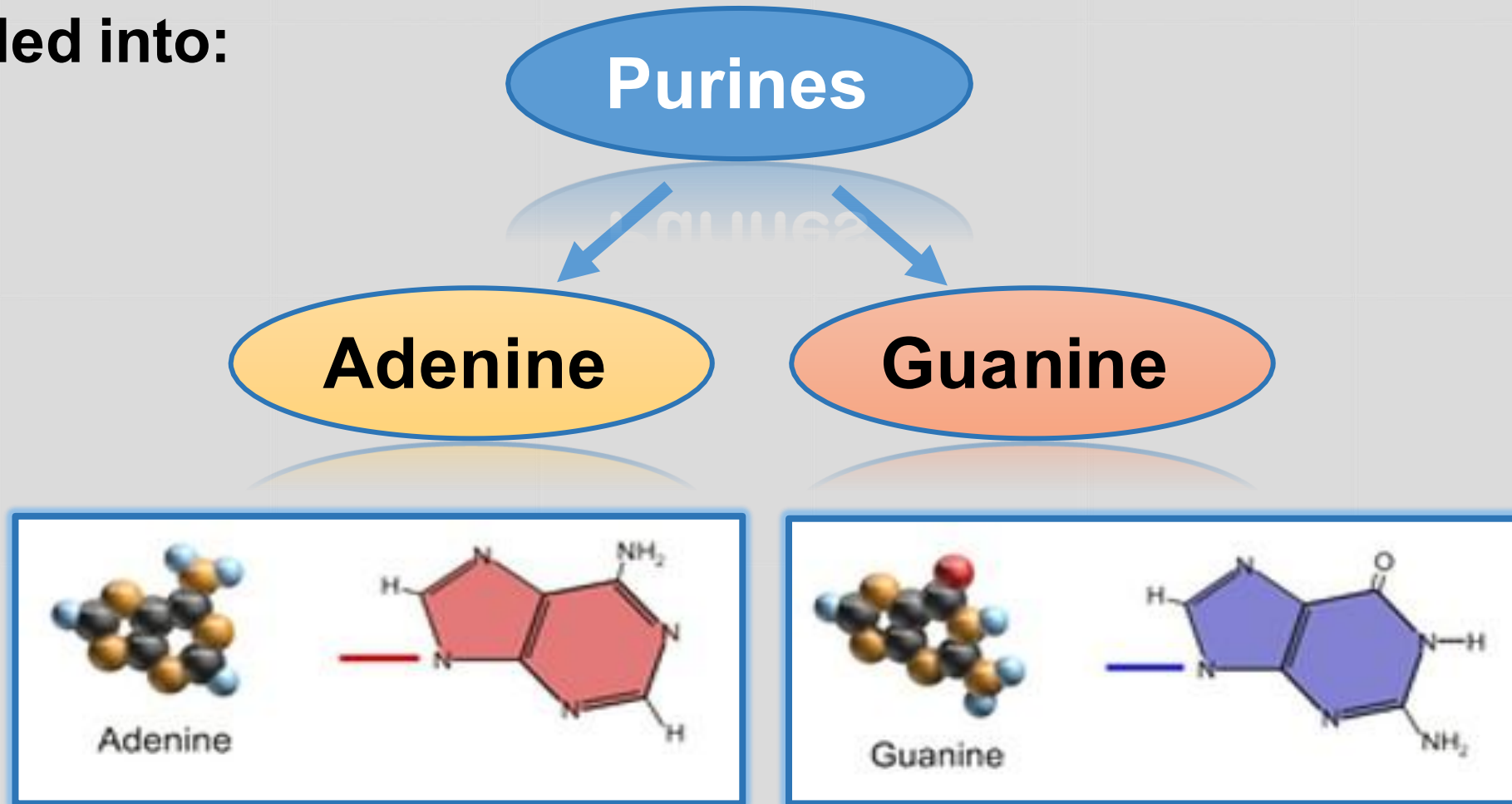
Introduction

❑ Uric acid is the End Product of Purine Catabolism in humanS.

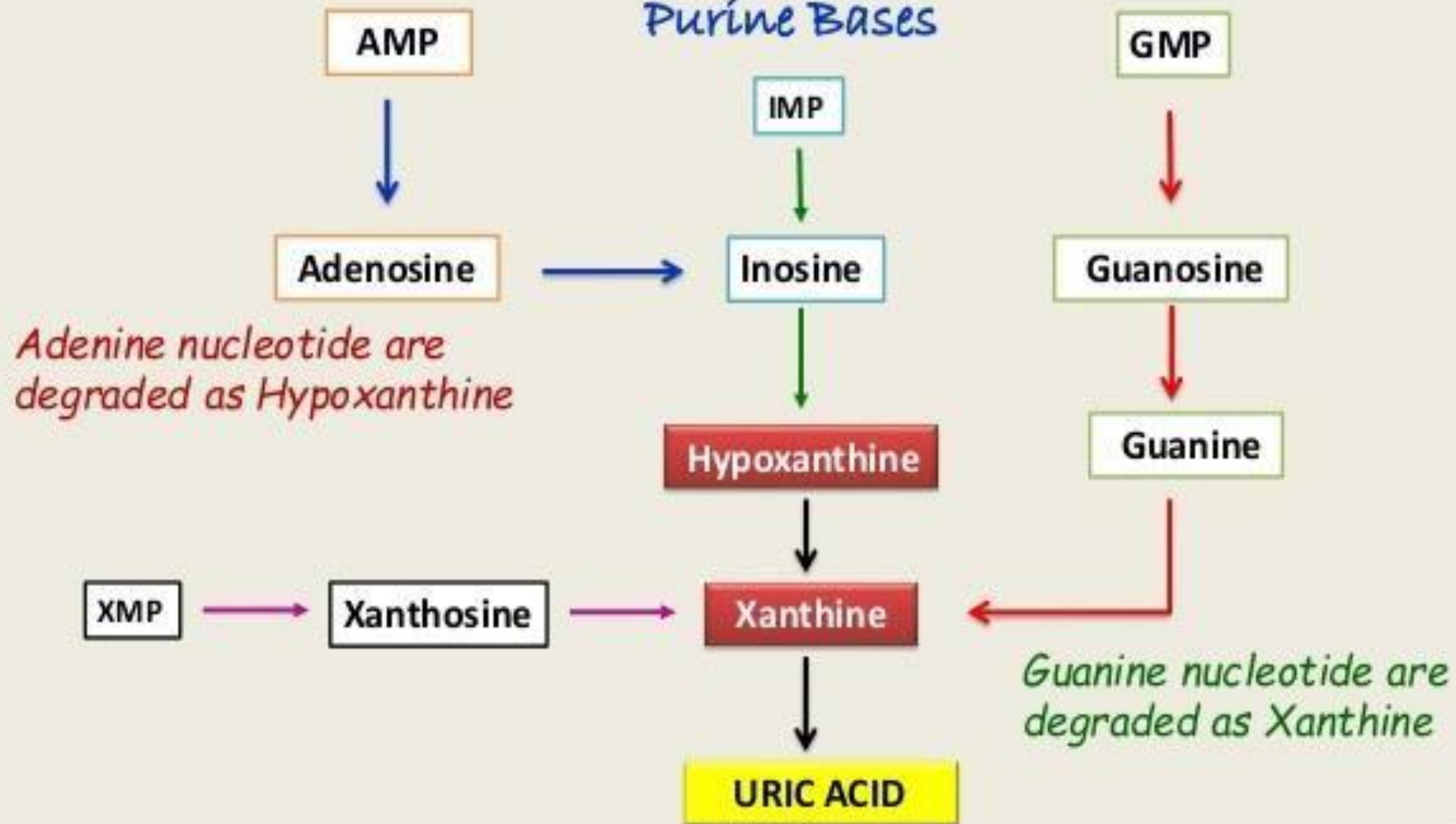


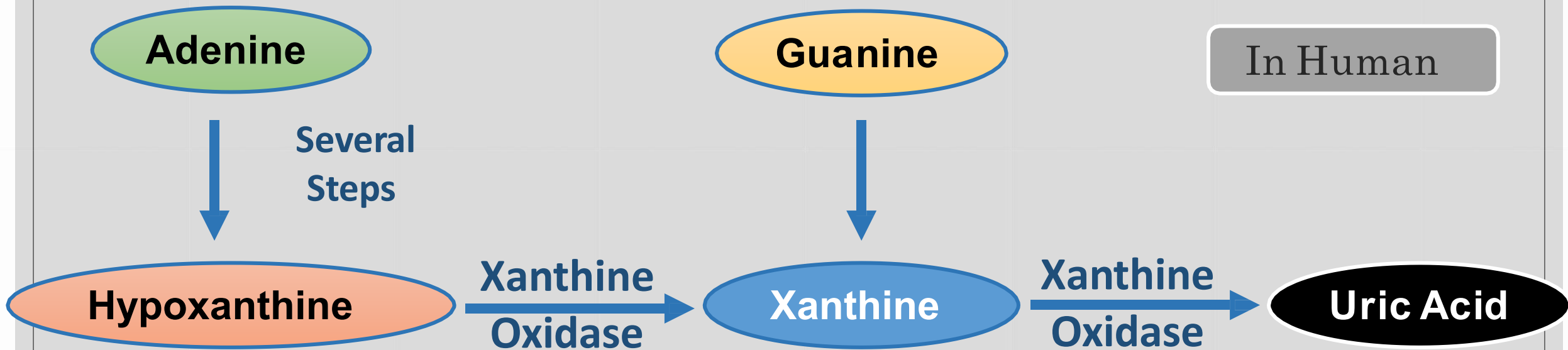
❑ Purines are the important constituents of Nucleic Acids (DNA, RNA)

- ❑ Purines: are Nitrogen Base formed with Sugar and Phosphate a Nucleotide (the essential unit of DNA, RNA) and can be divided into:



Purine Bases





❑ Purines are converted into Uric Acid, primarily in the Liver.

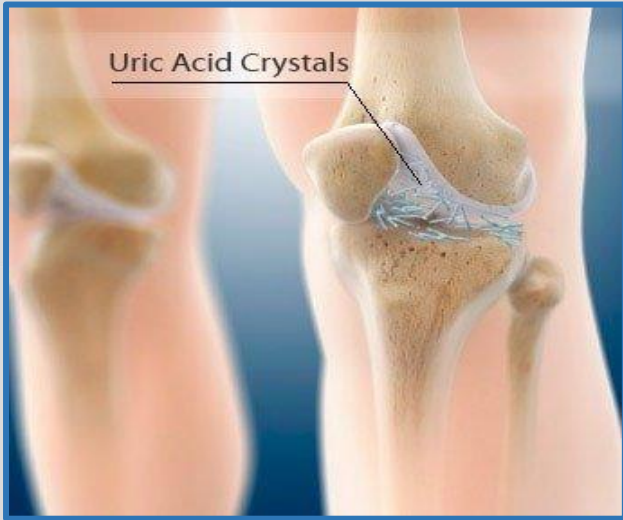


❑ Allantoin is more water-soluble End product.

- **Uric acid is transported in the Plasma from the Liver to the Kidney, where it is filtered by the Glomerulus.**
- **Although it is filtered by the Glomerulus and secreted by the Distal tubules into the Urine, most of the Uric acid is Reabsorbed in the Proximal tubules and reused.**
- **Renal excretion is about 70% of Uric acid elimination; the remainder passes into the Gastrointestinal tract and is degraded by Bacterial enzymes.**

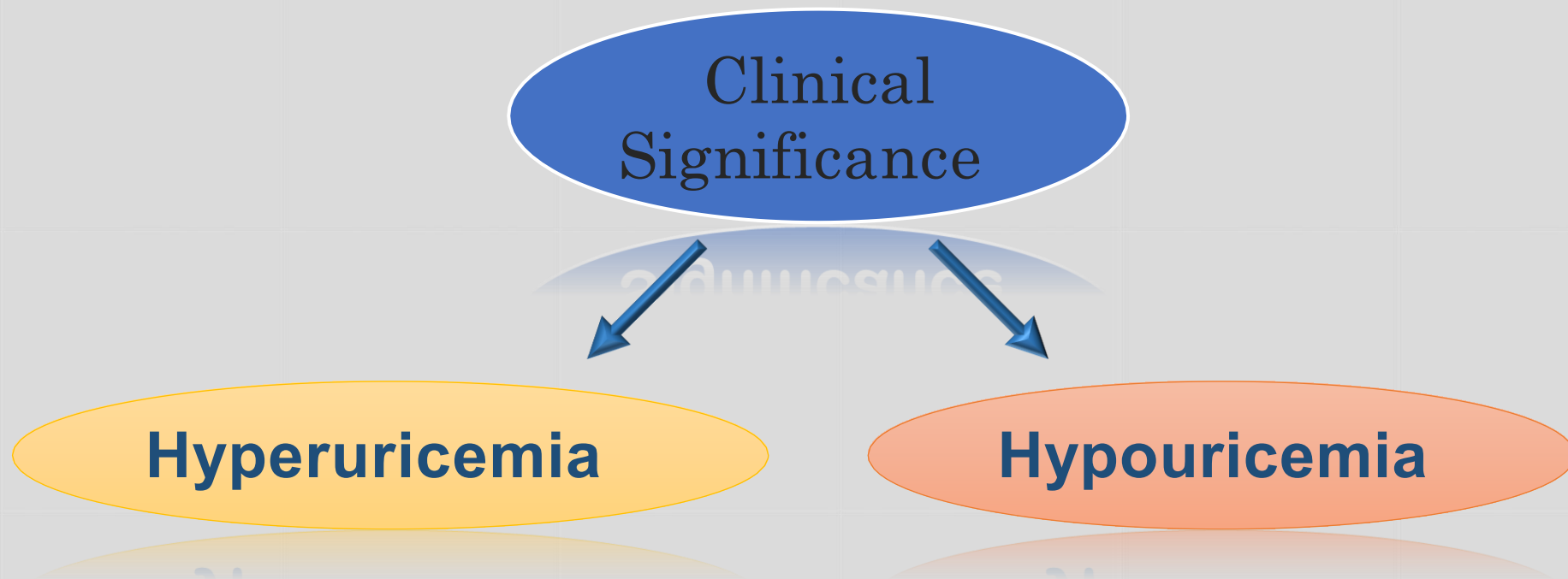
- Uric acid is relatively Insoluble in Plasma and nearly all of it presents in Plasma as Monosodium Urate.
- At high concentrations (greater than 6.8 mg/dL) the Plasma is Saturated, Uric Acid will be Precipitate in the Joints and Tissue, causing Painful Inflammation.





Clinical Application

- ❑ Uric acid is measured to:**
 - ✓ Assess Inherited Disorders of Purine Metabolism.**
 - ✓ Confirm Diagnosis and Monitor treatment of Gout.**
 - ✓ Assist in the Diagnosis of Renal Calculi.**
 - ✓ Prevent Uric acid Nephropathy during Chemotherapeutic treatment.**
 - ✓ Detect Kidney Dysfunction.**



❑ **Elevated Plasma Uric acid Concentration is found in:**

Gout – Increased Catabolism of Nucleic acids – Renal Disease

Hyperuricemia

1. Gout is a disease found Primarily in Men and usually is first diagnosed between 30 and 50 years of age. Affected individuals have Pain and Inflammation of the Joints caused by Precipitation of Sodium Urates.

Patients with Gout are very susceptible to the development of Renal Calculi, although not all persons with high serum Urate concentrations develop this complication.

2.Increased Metabolism of Cell Nuclei, as occurs in patients on Chemotherapy (Leukemia, Lymphoma, Multiple Myeloma).

3. Chronic Renal Disease.

4. Ingestion of a purines rich Diet.

5.Increased tissue catabolism due to inadequate Dietary intake (Starvation).

6.Inherited disorders of purine metabolism (Lesch-Nyhan syndrome).

7. Hyperuricemia is a common feature of Toxemia of Pregnancy and Lactic Acidosis.

8. Drugs such as Salicylates and Thiazides.

Hypouricemia

- **Hypouricemia is less common than Hyperuricemia.**
- 1. Liver disease.**
- 2. Defective tubular reabsorption (Fanconi Syndrome).**
- 3. Chemotherapy with Azathioprine or 6-mercaptopurine.**
- 4. Overtreatment with allopurinol (Drug using to decrease the Uric Acid level).**

Reference Range



Serum or Plasm		Mg/dL	μmol/L
Children (higher in newborn)		2.0 – 5.5	119 - 327
Men		3.5 – 7.2	208 - 428
Women (higher at pregnancy)		2.6 – 6.0	150 0 357
Urine	250 – 750 mg/24 h	1.48 – 4.43 mmol/24 h	

