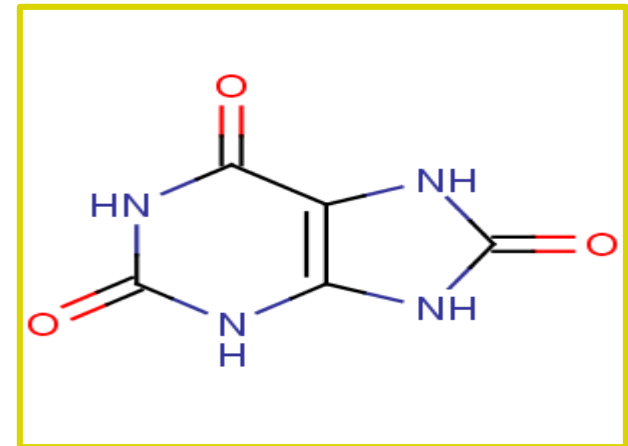


# **Estimation of Uric Acid in serum**

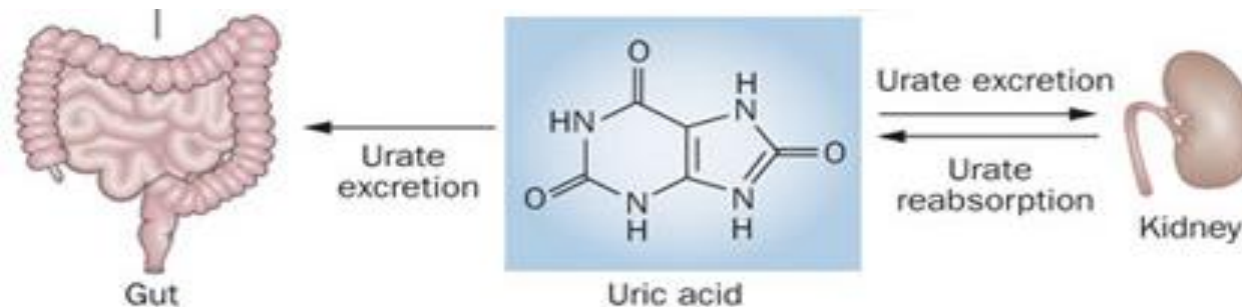
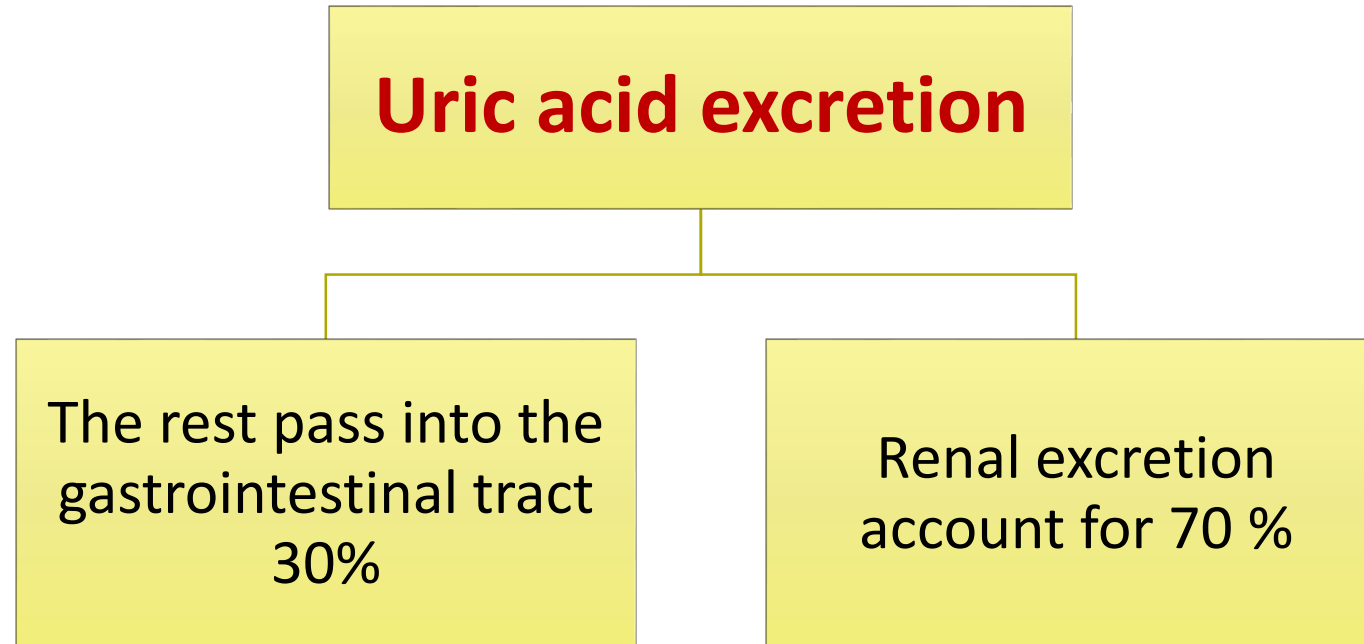
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## -Uric acid production:

- Uric acid is the product of **catabolism of the purine** (adenosine and guanine) that result from the break down of ingested nucleic acid (**exogenous**) or from tissue destruction (**endogenous**).
- Most circulating uric acid is filtered in the **kidney**, with roughly 90% of the filtered load normally reabsorbed, and small part is secreted through tubules.



## -Uric acid excretion:



## -Clinical application:

1. Uric acid is measured to assess inherited disorders of purine metabolism.
2. To conform diagnosis and monitor treatment of **gout**.
3. To assist the diagnosis of **renal calculi** (uric acid kidney stones.).
4. To detect kidney dysfunction.

## -Uric acid -Serum:

Case	Cause
<b>Increased</b> uric acid in serum (Elevated uric acid levels (hyperuricemia))	<ul style="list-style-type: none"><li>• Gout (the amount of increase is <u>not</u> directly related to the severity of the disease).</li></ul>
	<ul style="list-style-type: none"><li>• Renal diseases and renal failure, (decreased excretion of uric acid)</li></ul>
	<ul style="list-style-type: none"><li>• Leukemia, multiple myeloma, lymphoma.</li></ul>
	<ul style="list-style-type: none"><li>• Lesch-Nyhan syndrome (rare hereditary gout result from an enzyme deficiency hypoxanthine-guanine phosphoribosyltransferase (HGPRT)).</li></ul>
<b>Decreased</b> uric acid in serum (hypouricemia )	<ul style="list-style-type: none"><li>• Fanconi syndrom (Increased excretion).</li></ul>

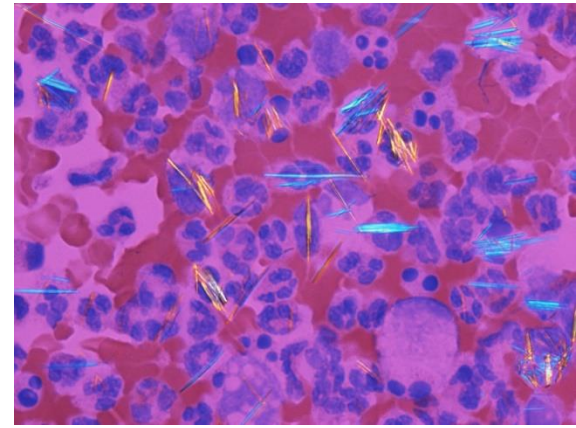
## -Uric acid -Urine:

- This test evaluates uric acid metabolism in gout and renal calculus formation.
- The uric acid urine test measured in a sample of urine collected over 24 hours.
- A **high level of uric acid** in the urine means that the patient is **more** likely to develop uric acid kidney stones.

Case	Cause
Increased urine uric acid (uricosuria) occurs in:	Tubular reabsorption defect (fanconi syndrom)
	multiple myeloma, lymphoma
	Lesch-Nayan syndrome
Decreased urine uric acid	Kidney disease

## - Gout:

- Excess **monosodium urate crystallizes** and deposits (needle like crystals) in the joints, soft tissues, and organs.
- This will lead to inflammation of tissues → **This inflammation is responsible for the crisis symptoms acute gouty arthritis.**



Monosodium urate crystals

### ▪ Notes:

- Hyperuricemia **does not** always lead to gout.
- Less than 20% of cases develop into arthritic gout disease.
- Blood test results can be misleading, though → Some people have high uric acid levels, but never experience gout, and some people have signs and symptoms of gout, but don't have unusual levels of uric acid in their blood.

# Practical Part

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## -Objective:

- To estimate the amount of uric acid in blood.

## -Principle:

- **Kit contains:**

-The Urizyme reagent used includes: uricase, peroxidase, 4-Aminoantipyrine,

-Urizyme buffer: polyhalogenated benzoic acid in addition to stabilizer and preservatives

1. Uric acid in the sample oxidized by **uricase** to allantoin and hydrogen peroxide.



2. Hydrogen peroxide reacts with **polyhalogenated benzoic acid (PHBA)** and 4-aminoantipyrine (4-AAP) in the presence of **peroxidase** (Hydrogen peroxide oxidoreductase ) to yield a quinoneimine dye (**chromogen**). The intensity of the dye is measured at 510nm and it is directly proportional to the concentration of uric acid present in the sample.



## -Method:

	Blank	Standard	Test
Reconstituted Reagent	1ml	1ml	1ml
Standard	--	20 µl	--
Sample	--	---	20 µl



Water bath at 37°C for 5 min.



Read absorbance at 520 nm.

## -Calculations:

- **Uric acid concentration**=  $\frac{\text{absorbance of sample}}{\text{absorbance of standard}}$  X concentration of standard (**5 mg/dl**)
- **Reference value in serum:**
  - Men: 3.4–7.0 mg/dl or 202–416 mol/L
  - Women: 2.4–5.7 mg/dl or 143–357 mol/L