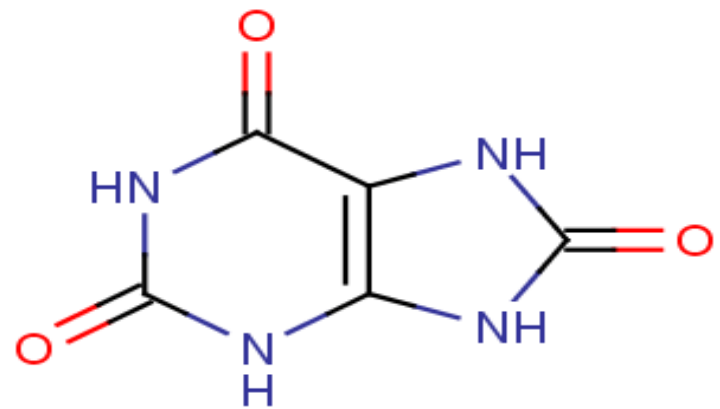


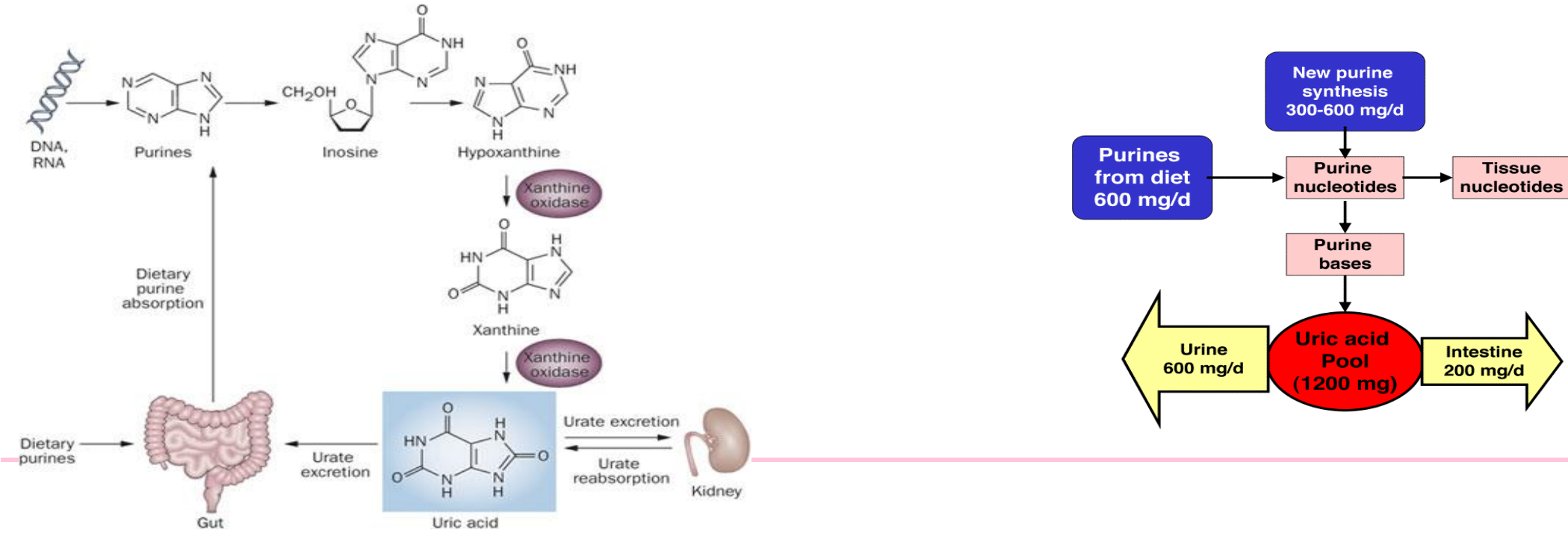
Estimation of Uric Acid in serum

BCH 472

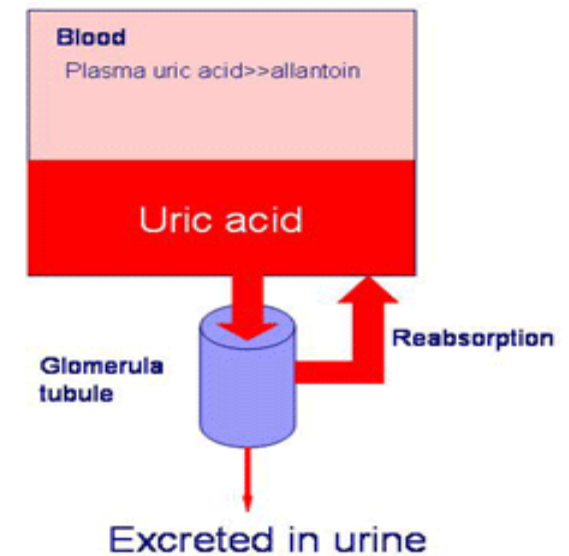


Uric acid production:

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 .

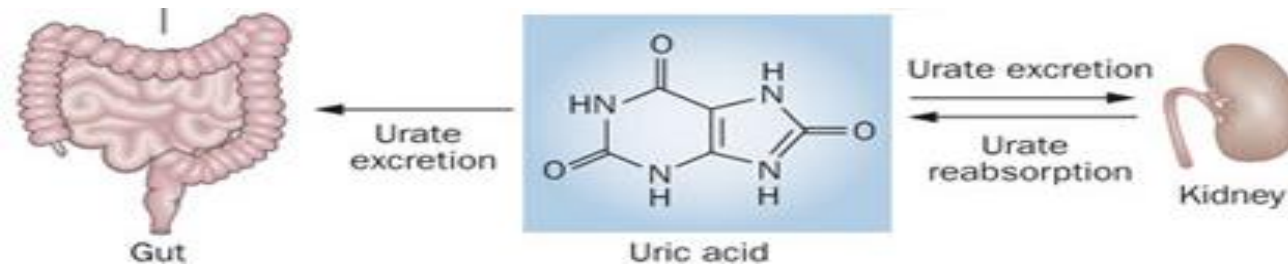


Uric acid excretion

Uric acid excretion

The rest pass into the
gastrointestinal tract 30%

Renal excretion account for
70 %



Clinical application:

- Uric acid is measured to assess inherited disorders of **purine metabolism**.
 - to conform diagnosis and monitor treatment of **gout**.
 - to assist the diagnosis of **renal calculi** .
 - to detect **kidney dysfunction**.
-

Uric acid –Serum:

Case	Cause
Increased uric acid serum (Elevated uric acid levels (hyperuricemia))	<ul style="list-style-type: none">• Gout (the amount of increase is not directly related to the severity of the disease)
	<ul style="list-style-type: none">• Renal diseases and renal failure, (decreased excretion of uric acid)
	<ul style="list-style-type: none">• Leukemia, multiple myeloma, lymphoma (over production)
	<ul style="list-style-type: none">• Lesch-Nyhan syndrome (hereditary gout result from an enzyme deficiency in purine metabolism)
Decreased uric acid serum (hypouricemia)	<ul style="list-style-type: none">• Liver disease(Decreased Production)
	<ul style="list-style-type: none">• Fanconi syndrom (Increased excretion) Due to defect in the reabsorption

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	
Increased urine uric acid (uricosuria) occurs in:	Tubular reabsorption defect (fanconi syndrom)
	multiple myeloma, lymphoma
	Lesh-Nayan syndrom
Decreased urine uric acid	Kidney disease (decreased excretion)

Gout:

- **Excess uric acid crystals** in the joints, soft tissues, and organs. caused by an increased conversion of purine bases to uric acid or a decreased excretion of uric acid by the kidney.
- This will lead to inflammation of tissues. This inflammation is responsible for the crisis symptoms acute **gouty arthritis**.
- **Notes:**
- **Hyperuricemia** does not always lead to gout.
Less than 20% of cases develop into arthritic gout disease.
- Uric acid level is just one of several criteria necessary for diagnosis.
- 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

Objective:

To estimate the amount of uric acid in blood.

Principle:

Kit contains:

The **reagent** used includes: uricase, peroxidase, 4-Aminoantipyrine.

URIZYME BUFFER: Polyhalogenated benzoic acid in Tris buffer at pH 7.5.

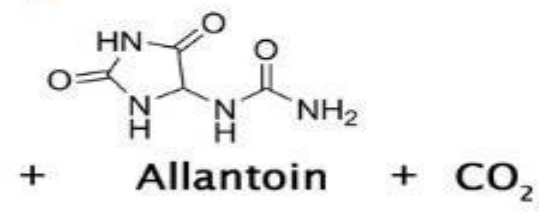
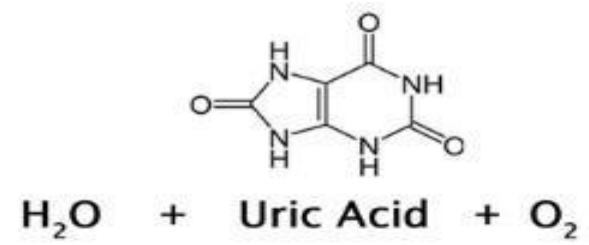
1. Uric acid in the sample oxidized by **uricase** to allantoin and hydrogen peroxide.



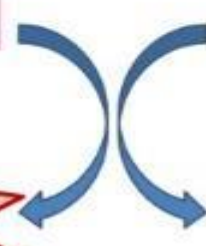
2. Hydrogen peroxide reacts with polyhalogenated benzoic acid (PHBA) and 4-aminoantipyrine (4-AAP) in the presence of **peroxidase** (Hydrogen peroxide oxidoreductase) to yield a **quinoneimine dye** (chromogen).



* The (intensity of the dye) absorbance is measured and is **directly proportional** to the concentration of uric acid present in the sample.



4-AAP + PHBA



Method:

	Blank	Standard	Test
Urizyme Reagent	1000 μ l (1ml)	1000 μ l (1ml)	1000 μ l (1ml)
Standard	—	20 μ l	—
Sample	—	—	20 μ l

-Water bath at 37°C for 5 min.

-Read absorbance at **520 nm** .

Calculations:

- $\frac{\text{absorbance of sample}}{\text{absorbance of standard}} \times \text{concentration of standard (8 mg/dl)}$

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

Discussion :

Comment on your result and mention if there are any abnormalities.

Questions

Explain how uric acid measurement can be useful .

What are the causes and main symptoms of gout?

