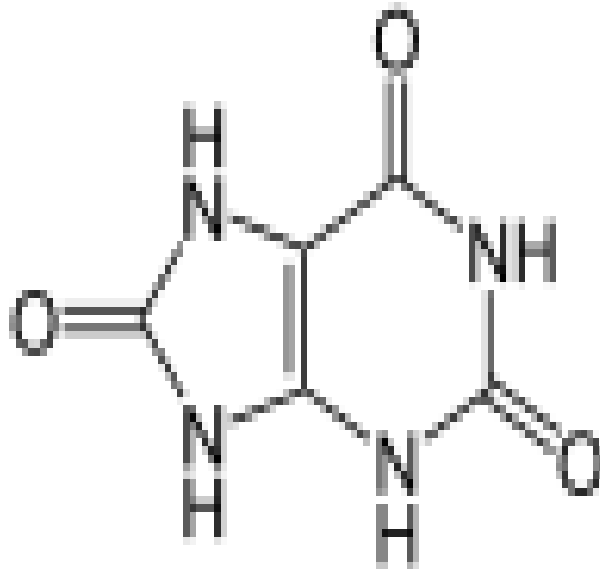





## Hyper urecemia and Gout

د. محمد عيسى السبعراوي

■ Uric acid is a heterocyclic compound of carbon, nitrogen, oxygen, and hydrogen with the formula



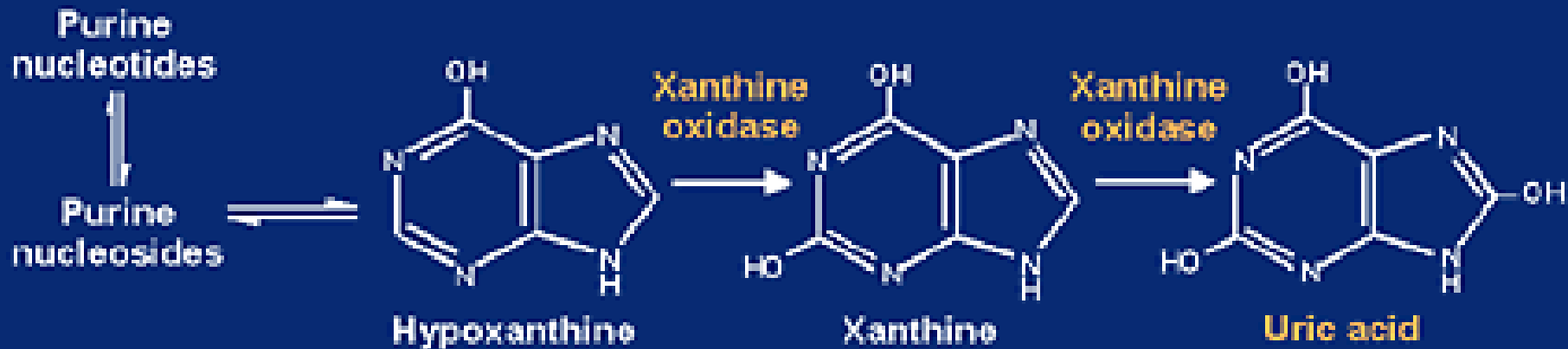
 **Urates; is the ionized forms of uric acid, predominate in plasma, extracellular fluid (ECF) and synovial fluid.**



 **With ~98% existing as monosodium urate (MSU) at pH 7.4.**

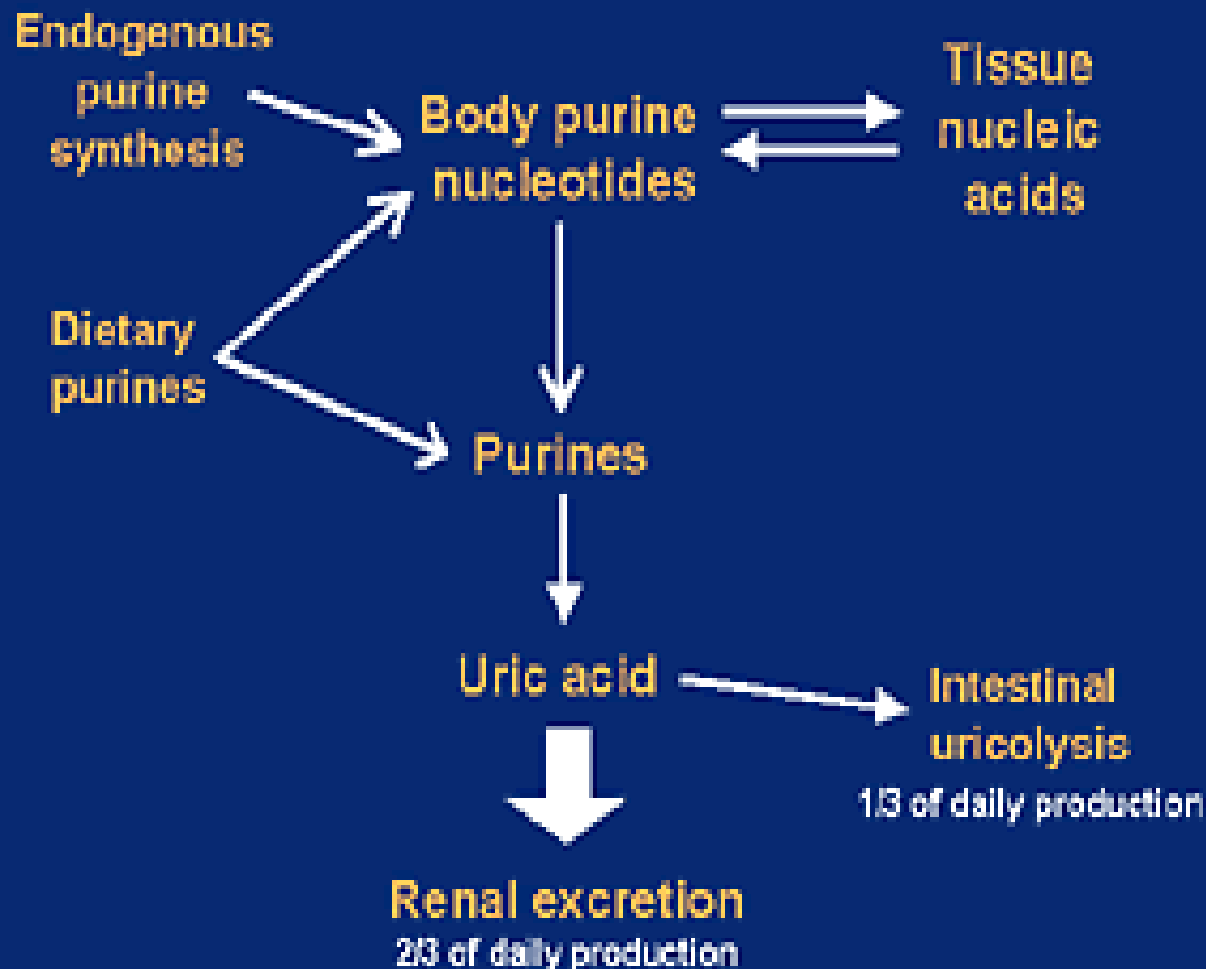
# Purine Degradation to Uric Acid


- **Xanthine oxidase** catalyzes the final conversions to uric acid



# Schematic Overview of the Production and Elimination of Uric Acid

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 The vast majority of **mammalian** species have extremely low serum urate levels (**about 1 mg/ dL= 60 $\mu$ mol/L**) because uric acid is converted to allantoin, (by **uricase** enzyme) a highly soluble excretory product.


 Serum urate levels vary with age and sex:

**Children:-----3- 4 mg/dl ( 180-240  $\mu$ mol/L).**

**Adult men:-----3.4-7.2 mg/dl (200-430  $\mu$ mol/L).**

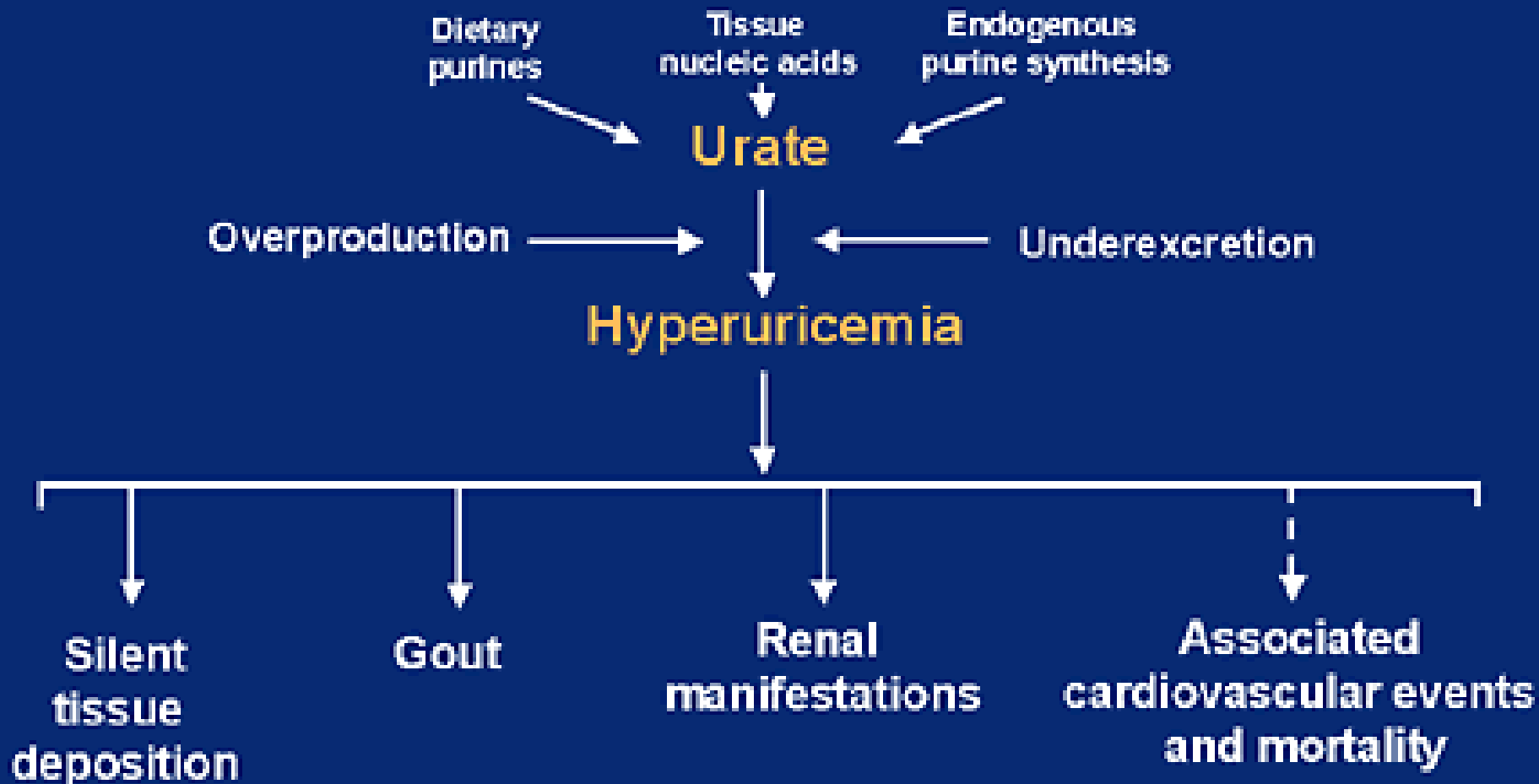
**Adult women:--2.4-6.1mg/dl(140-360  $\mu$ mol/L) (1 mg/dl =59.48  $\mu$ mol/L).**

## Uric acid as an anti oxidant( beneficial effect):

-  Uric acid has profound beneficial effects since it scavenges potential harmful radicals in our body; over half the antioxidant capacity of blood plasma comes from uric acid.

# The Hyperuricemia Cascade

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**GOUT**

## **Patho physiology of gout :**

**Gout is a disorder of purine metabolism, and occurs when its final metabolite crystallizes in the form of monosodium urate (MSU), precipitating in joints, tendons, and in the surrounding tissues.**

**These crystals then trigger a local immune -mediated inflammatory reaction, with one of the key proteins in the inflammatory cascade being interleukin(IL-1 $\beta$ ).**

## 🌐 Symptoms

- The signs and symptoms of gout are almost always acute, occurring suddenly — often at night — and without warning.
- They include: Intense joint pain; usually affects the large joint of big toe (**podagra**), but it can occur in ankles, knees, hands and wrists. The pain is likely to be most severe within the first 12 to 24 hours after it begins.



❖ An acute attack of gout can wake up the patient in the middle of the night with the sensation that the big toe is on fire.

❖ The affected joint is hot, swollen and so tender that even the weight of the sheet on it may seem intolerable.



# **Investigations:**

## **Blood tests:**

- **Hyper uricemia is a classic feature of gout.**
- **Gout can occur nearly half of the time without hyper uricemia.**
- **Most people with raised uric acid levels never develop gout.**

**Thus, the diagnostic utility of measuring uric acid level is limited.**

## © Synovial fluid

■ A definitive diagnosis of gout is based upon the identification of monosodium urate crystals (MSU) in synovial fluid or a tophus.

■ Under polarized light microscopy, they have a needle-like morphology and strong negative birefringence.

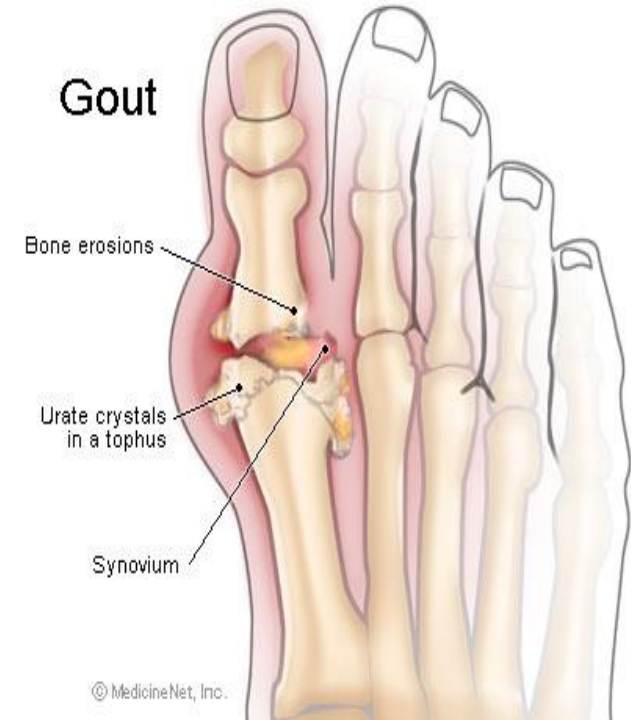


## @ Radiological feature:

- Soft tissue swelling at the lateral border of the feet.

- Bony erosions with an **over hanging edge**.

- The joint space is preserved in gout until very late in the disease process.



## ❖ How is gout treated?

**1) Some home remedies may help ease gout pain.**

**Rest the affected joint and apply ice packs or cold compresses.**

**2) Colchicine: This medicine can be effective if given early in the attack.**



### **3) Non steroidal anti-inflammatory drugs (NSAIDs):**

- **Indomethacin (Indocin).**
- **Naproxen (Naprosyn).**

**have become the treatment choice for most acute attacks.**

**4) Corticosteroids: such as.**

**prednisone and triamcinolone are useful options for patients who cannot take NSAIDs. Given orally or by injection.**

**5) anakinra (Kineret): an “interleukin 1 beta antagonist,” for very severe attacks of gout.**

**6) Xanthine oxidase inhibitors:** allopurinol and febuxostat

**(Uloric).** Medications that block uric acid production:

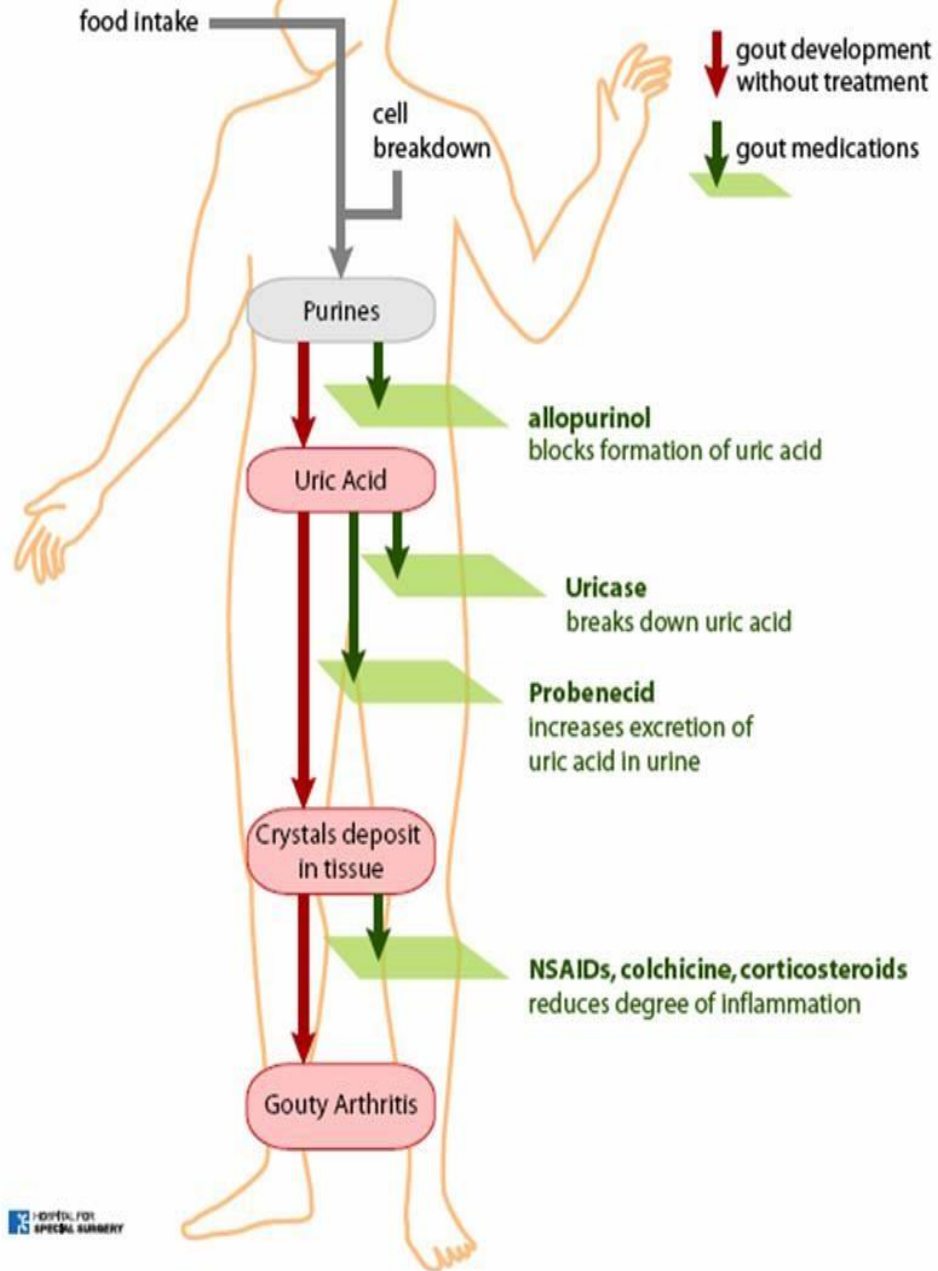
**7) Probenecid (Probalan):** Medicatons that increase

**kidneys' ability to remove uric acid from the body.**

**8) Pegloticase ( Krystexxa): this drug breaks down uric acid given for patients who do not respond to other treatments or cannot tolerate them.**

**Once the uric acid levels drop below 6 mg/dL (normal), crystals tend to dissolve and new deposits of crystals can be prevented. You probably will have to stay on this medicine long term to prevent gout attacks.**

## How Gout Medications Work





Thank you