



LIBYAN INTERNATIONAL MEDICAL UNIVERSITY



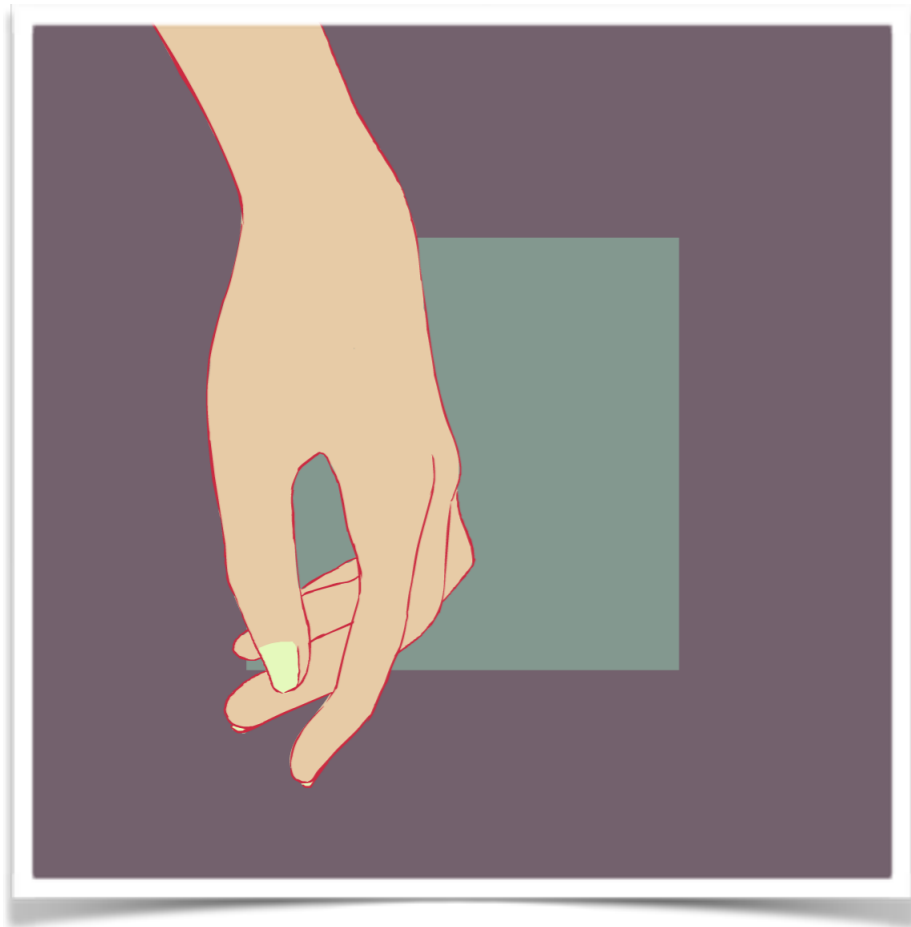
THE JOINTS OF HAND &

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# GOUTY ARTHRITIS

- 1. DESCRIBE THE ANATOMICAL STRUCTURE OF DIFFERENT HAND JOINTS.**
- 2. EXPLAIN THE BIOCHEMICAL BASES OF GOUT.**
- 3. DISCUSS IN BRIEF THE TYPES AND CAUSES OF ARTHRITIS.**
- 4. DESCRIBE THE PATHOGENESIS AND MORPHOLOGY OF GOUT.**
- 5. EXPLAIN THE MECHANISMS OF BOTH IBUPROFEN AND METHOTREXATE.**

**LEARNING OBJECTIVES**

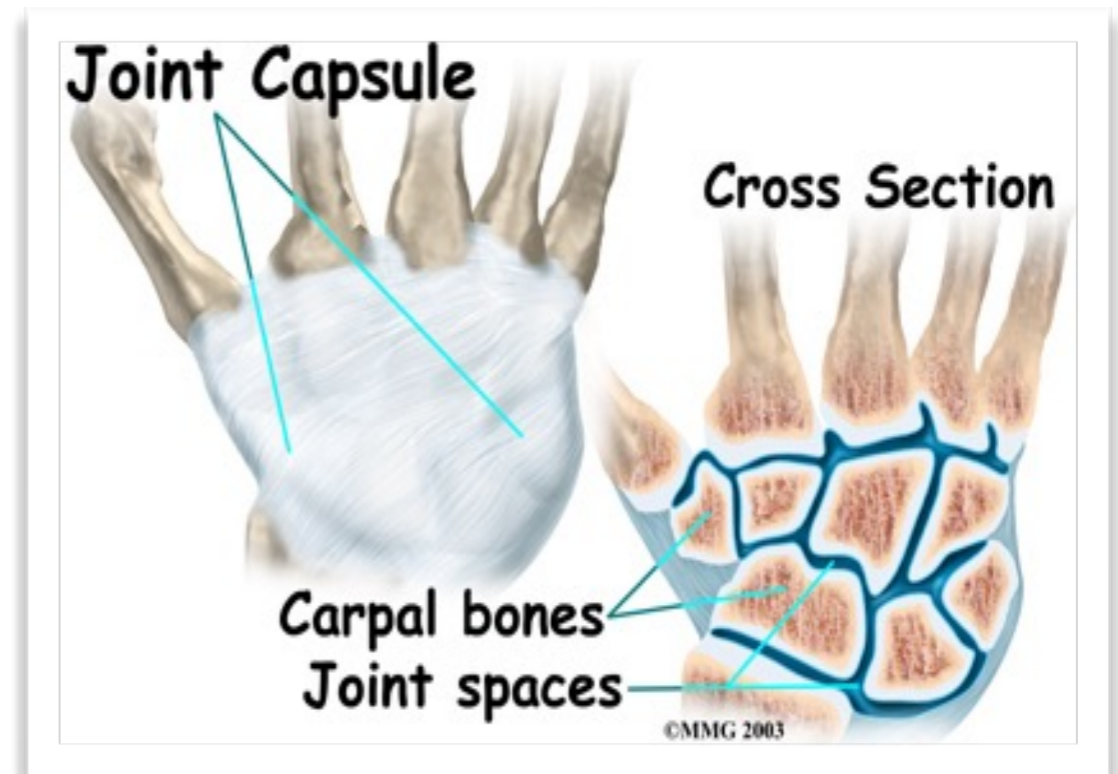


# HAND JOINTS

FATMA ALZAHRAA ALMAJBRI 963

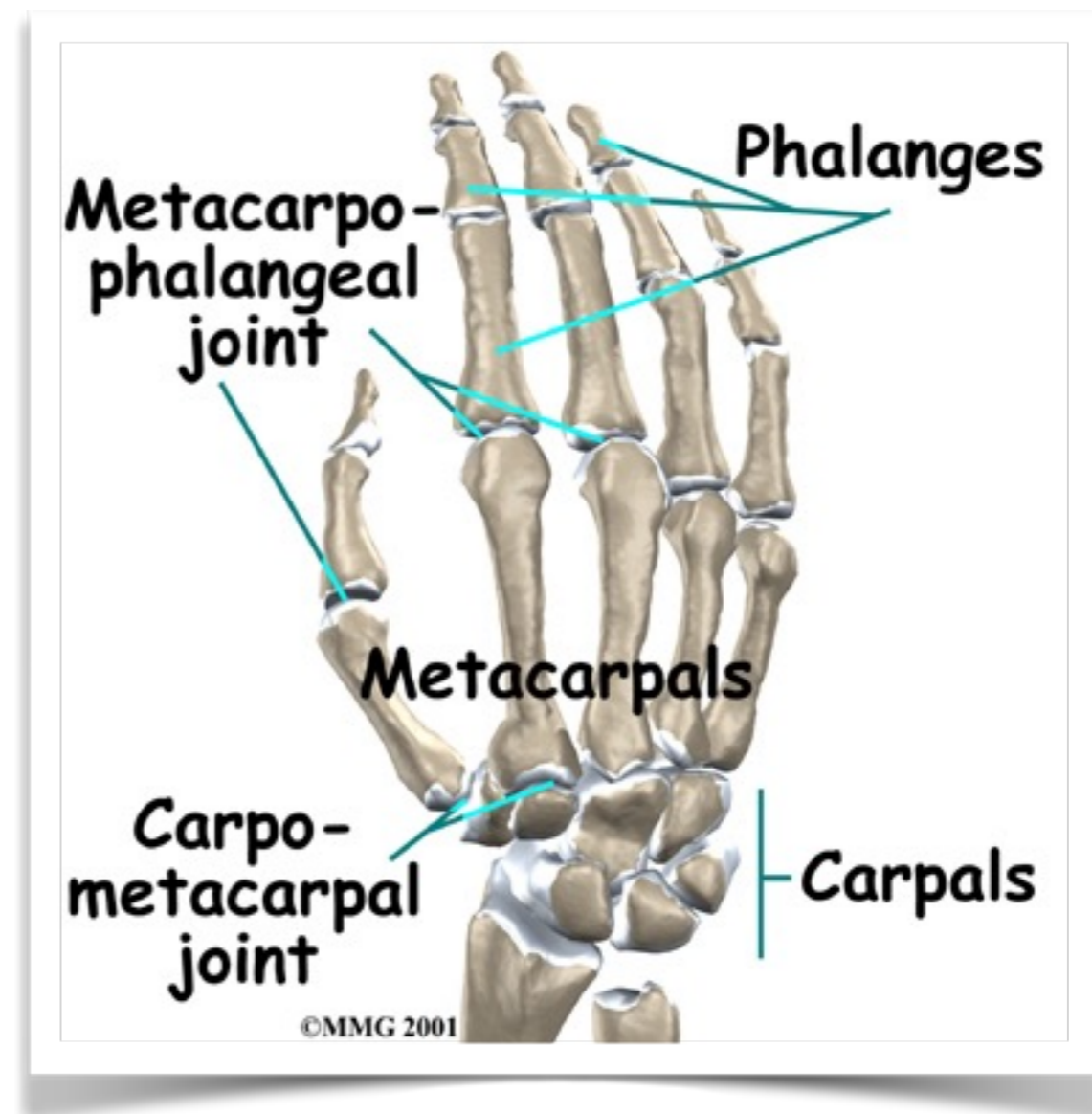
# 1) CARPAL JOINTS

- **Articulations:**  
Intercarpal and Midcarpal joint.
- **Type:**  
Synovial - Plane.
- **Ligaments:**  
Strong anterior, posterior and interosseous ligaments.
- **Movements:**  
Allows slight sliding movements.
- **Nerve Supply:**  
Anterior interosseous nerve, d.b. of the radial nerve, and d.b. of the ulnar nerve.



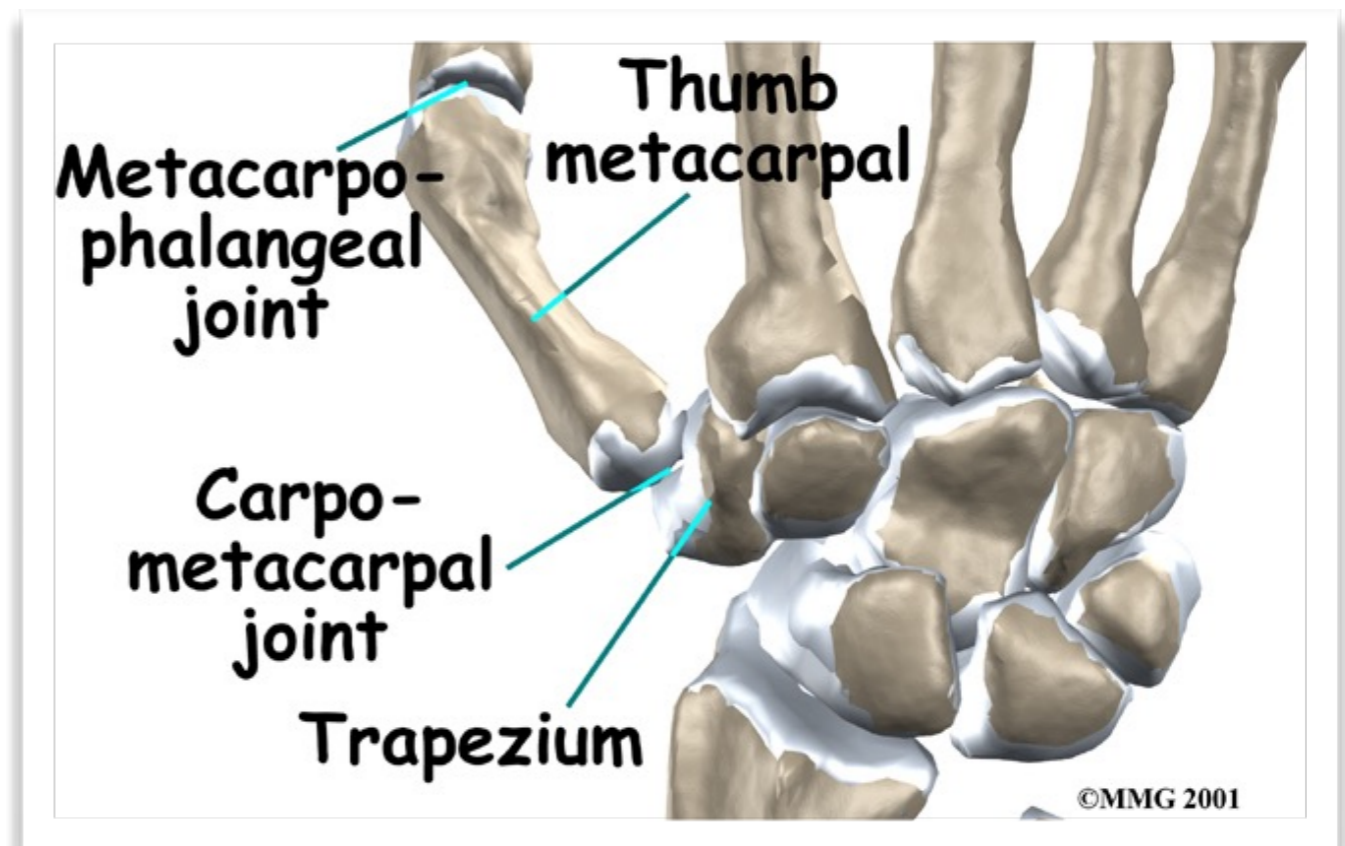
## 2) CARPOMETACARPAL JOINT

- **Type:**  
Synovial - Plane.
- **Movements:**  
Slight gliding movement.

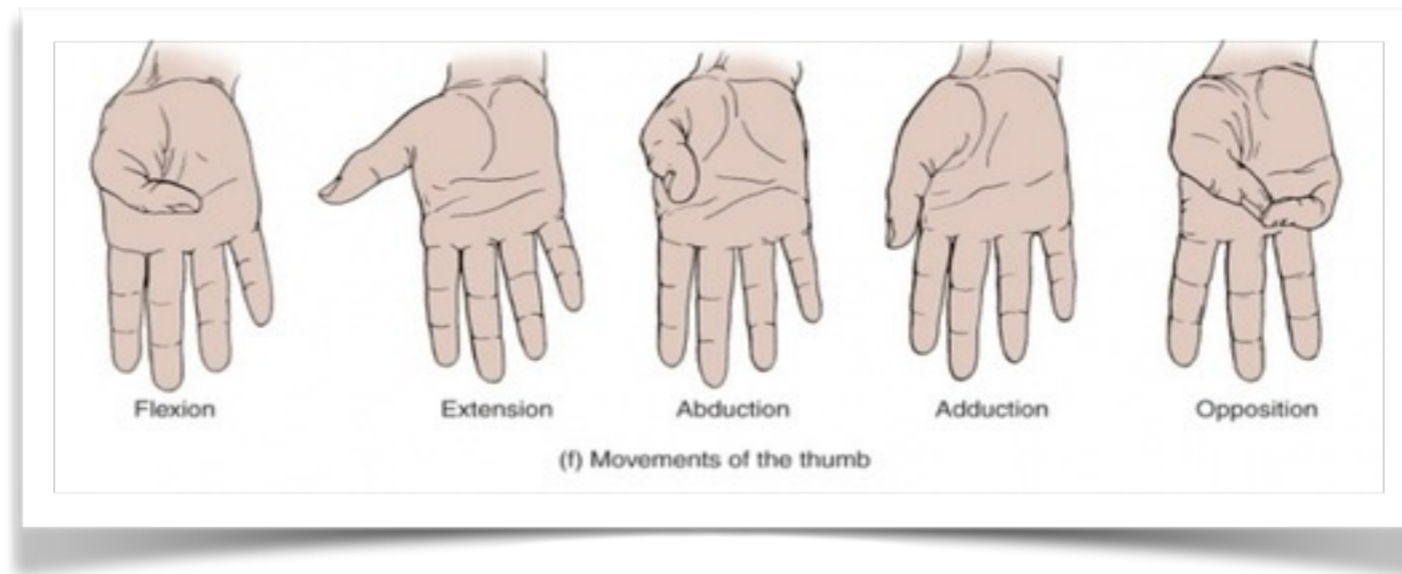


### 3) CARPOMETACARPAL JOINT OF THUMB

- **Articulation:**  
Between trapezium and base of 1st metacarpal bone.
- **Type:**  
Saddle - Synovial.
- **Capsule:**  
The capsule surrounds the joint.
- **Synovial Membrane:**  
This lines the capsule and forms a separate joint cavity.



### 3) CARPOMETACARPAL JOINT OF THUMB

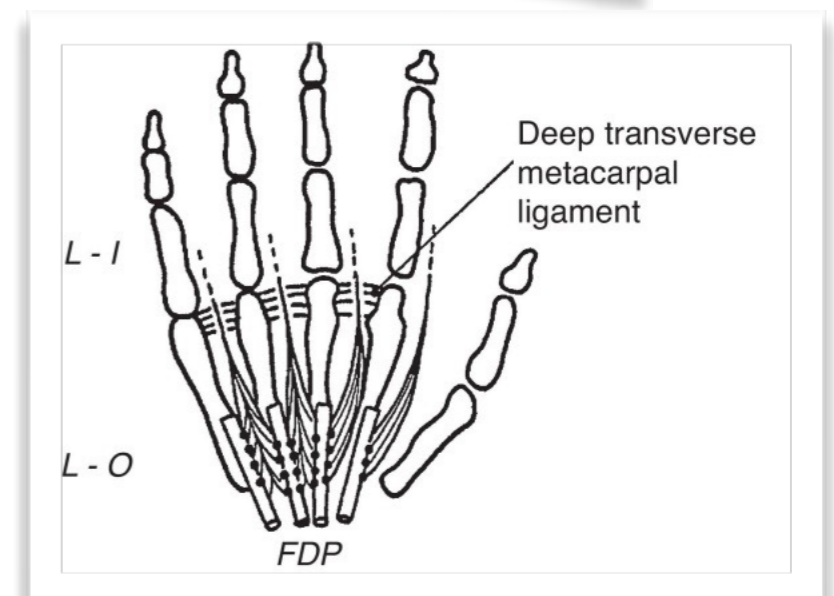
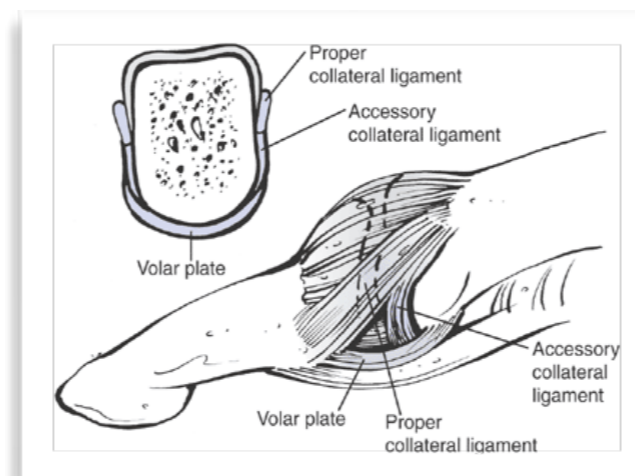
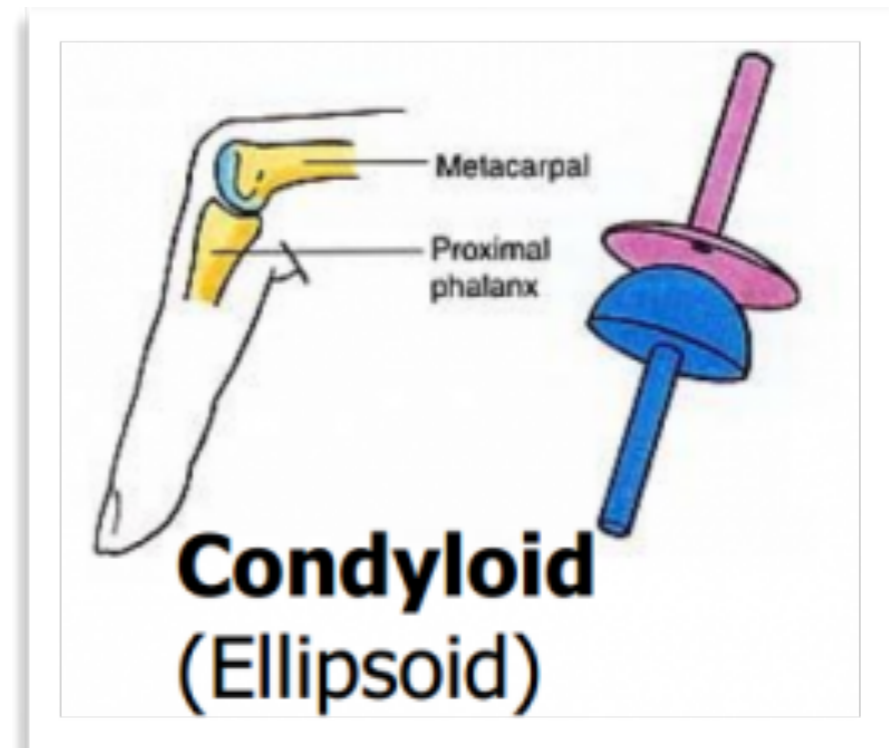


## MOVEMENTS

Movement	Muscles responsible
Flexion	Flexor pollicis brevis and opponens pollicis
Extension	Extensor pollicis longus and brevis
Abduction	Abductor pollicis longus and brevis
Adduction	Adductor pollicis
Opposition	Opponens pollicis

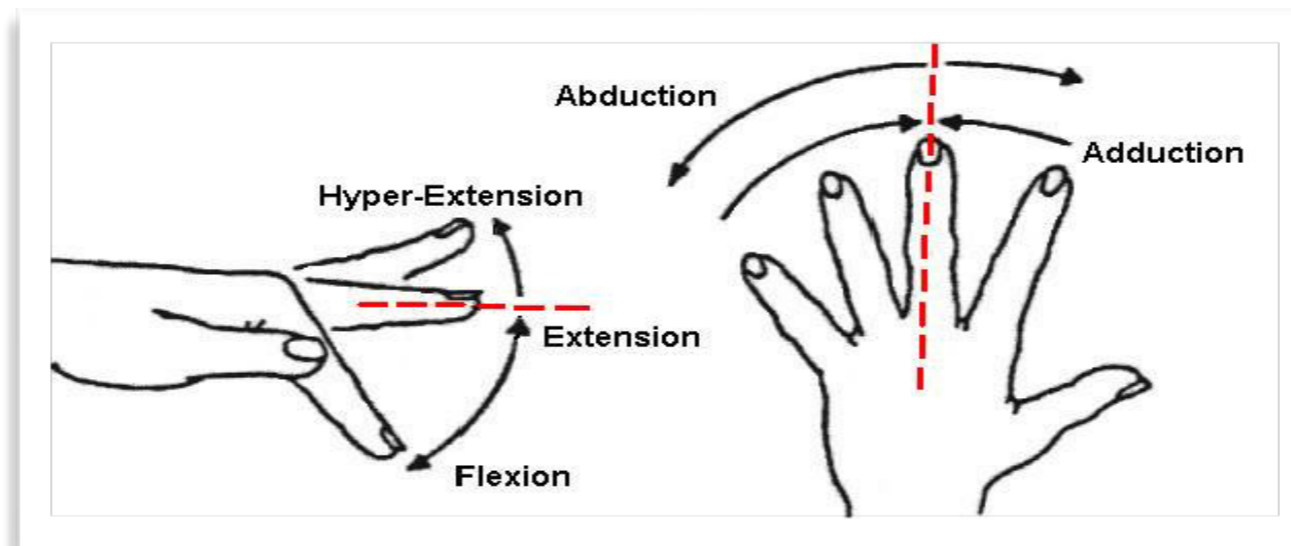
# 4) METACARPOPHALANGEAL JOINTS

- **Articulations:**  
Between the heads of the metacarpal bones and the bases of the proximal phalanges.
- **Type:**  
Synovial - Condyloid.
- **Ligaments:**  
Palmar, deep transverse and collateral.





## 4) METACARPOPHALANGEAL JOINTS

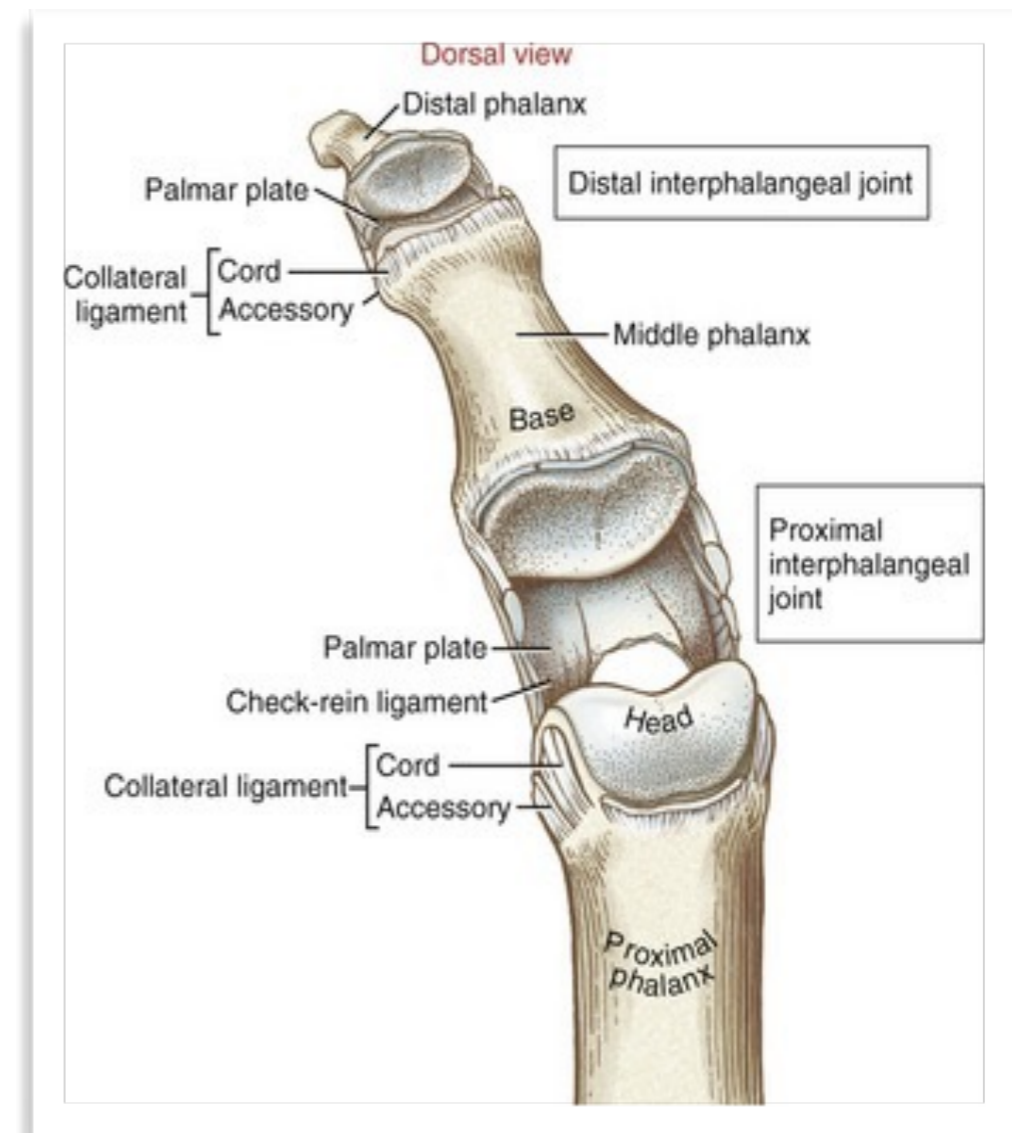


### MOVEMENTS

Movement	Muscles responsible
Flexion	The lumbricals and the interossei flexor digitorum superficialis and profundus.
Extension	Extensor digitorum, extensor indicis, and extensor digiti minimi.
Abduction	dorsal interossei.
Adduction	palmar interossei

## 5) INTERPHALANGEAL JOINTS

- **Articulation:**  
Between the phalanges of the hand.
- **Type:**  
Hinge - Synovial.
- **Ligaments:**  
Capsular, palmar and collateral ligaments.



## 5) INTERPHALANGEAL JOINTS

### MOVEMENTS

Movement	Proximal IP joint	Distal IP joint
Flexion	Flexor digitorum superficialis and profundus	Flexor digitorum profundus
Extension	Extensor digitorum, extensor indicis, and extensor digiti minimi interossei and lambricals	

# ANY QUESTIONS?

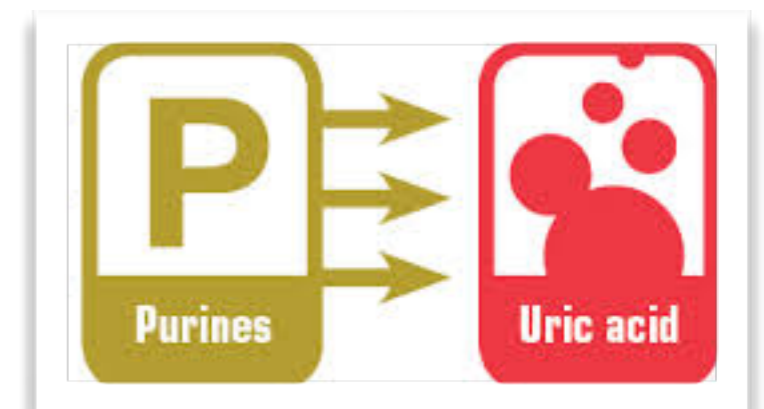


THE BIOCHEMICAL BASES OF  
**GOUT**

# THE BIOCHEMICAL BASES OF GOUT

## GOUT

RESULTS FROM HYPERURICEMIA, WHICH RESULT FROM EITHER AN EXCESS PRODUCTION OR REDUCED EXCRETION OF URIC ACID.  
GOUT IS ASSOCIATED WITH HYPERURICEMIA, BUT HYPERURICEMIA IS NOT ASSOCIATED WITH GOUT.



## ETIOLOGY OF GOUT

- 1) Abnormal PRPP synthesis
  - 2) Glutamyl Amidotransferase (not responding to feedback inhibition)
  - 3) Glucose -6- Phosphatase deficiency
  - 4) Deficiency of one of the salvage pathway enzymes
- APRT  
HGPRT

**ANY QUESTIONS?**



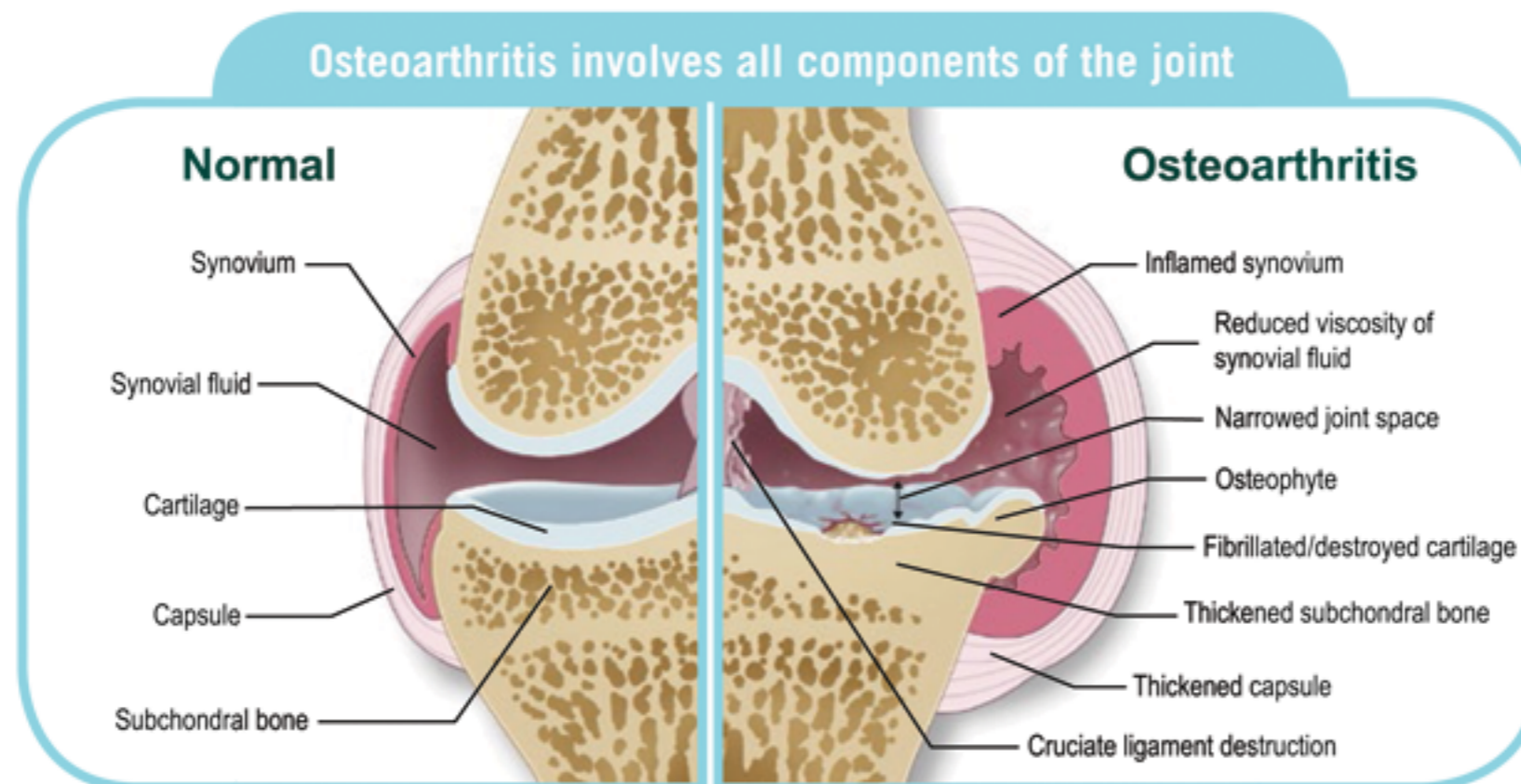
TYPES AND CAUSES  
**ARTHRITIS**



# 1) DEGENERATIVE ARTHRITIS

## A) OSTEOARTHRITIS (Degenerative Joint Disease)

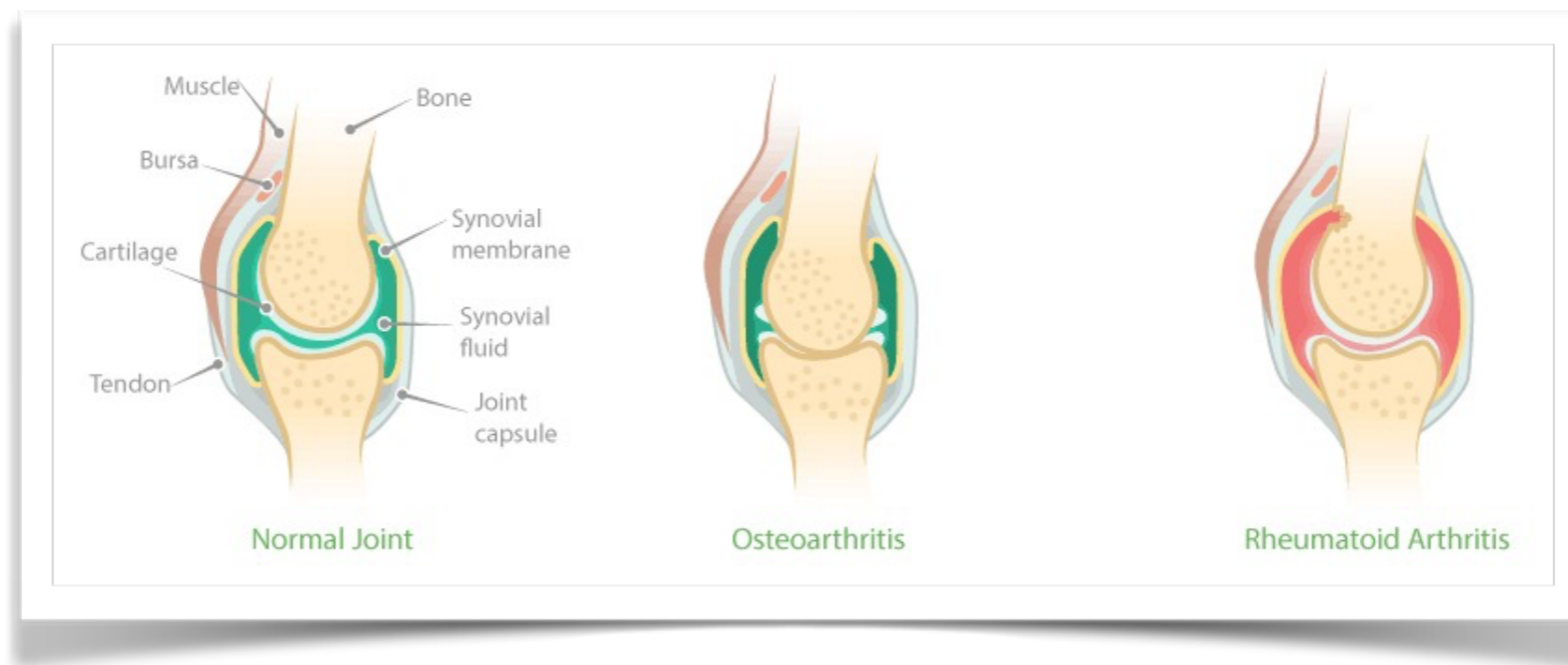
>50y, knees and hands in women, hips in men.



## 2) INFLAMMATORY ARTHRITIS

### A) RHEUMATOID ARTHRITIS

40-70y, F>M 3:1 , autoimmune disease, affects small joints.



### B) REACTIVE ARTHRITIS

20-30y, M>F , autoimmune reaction initiated by a prior infection usually in the genitourinary tract or GIT, affects knees, ankles.

## 2) INFLAMMATORY ARTHRITIS

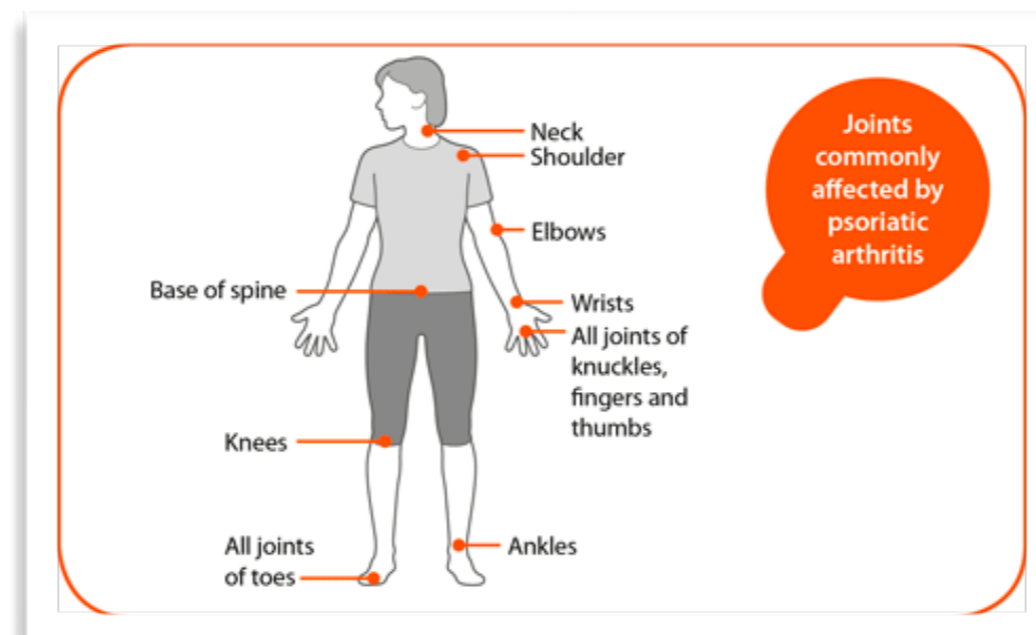
### C) CRYSTAL INDUCED ARTHRITIS

**PSEUDOGOUT** >50, F=M , mono or poly articular, usually affects knees and wrists.

**GOUT** >30y, M>F , small joints of feet, wrists and ankles.

### D) PSORIATIC ARTHRITIS

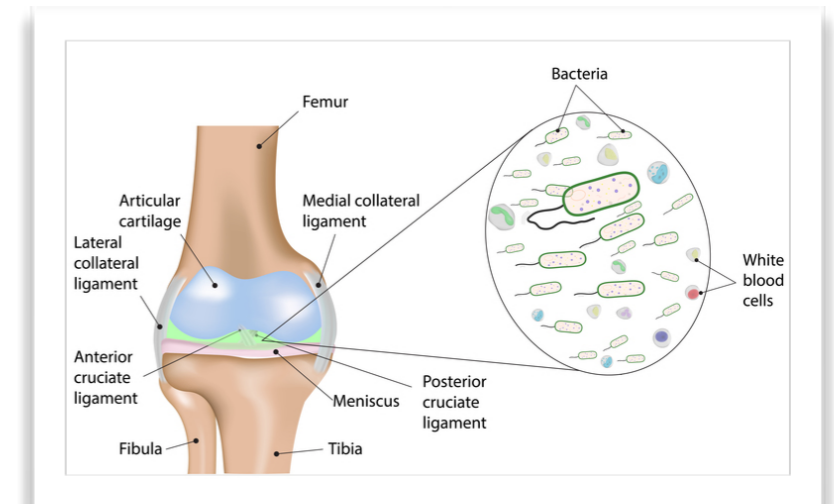
30-50y, associated with **psoriasis**, not severe, can affect all joints.



## 3) INFECTIOUS ARTHRITIS

### A) SUPPURATIVE ARTHRITIS

Age depends on bacterium, F=M.



### B) LYME ARTHRITIS

Caused by the spirochete *Borrelia burgdorferi*, transmitted by deer ticks, involves multiple organ systems.

### C) VIRAL ARTHRITIS

Caused by different viruses, range from acute to subacute might generate an autoimmune reaction.

### D) TUBERCULOUS ARTHRITIS

All age groups especially adults, chronic, progressive monoarticular disease usually results as a complication of osteomyelitis.

**ANY QUESTIONS?**



PATHOGENESIS AND MORPHOLOGY OF  
**GOUTY ARTHRITIS**

# PATHOGENESIS OF GOUT

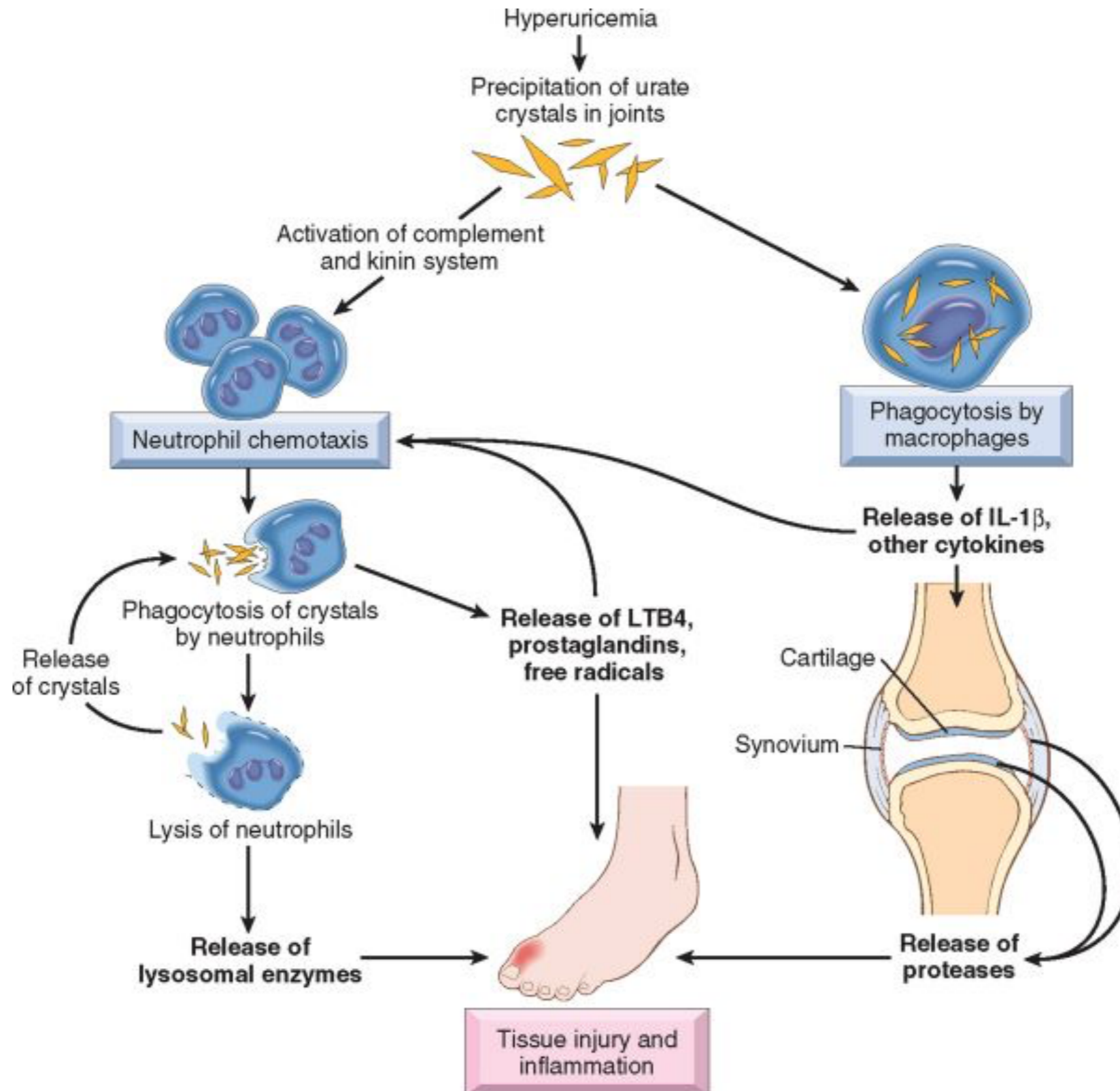
- Caused by **hyperuricemia** (more than **7**mg/dl).
- The arthritis result from the precipitation of monosodium urate crystals (**MSU**) crystals in joints.
- MSU crystals are less soluble in the synovial fluid than in the plasma.
- Doesn't usually cause symptoms before 30y, and has **two** types.

**PRIMARY**  
(90% of cases)

**SECONDARY**  
(10% of cases)

- Atherosclerosis and hypertension are common in patients with gout.
- **Hyperuricemia** doesn't necessarily cause gout, these are some of the factors that lead to the conversion of asymptomatic hyperuricemia into gouty arthritis:

(**AGE, ALCOHOLISM, OBESITY AND SOME DRUGS**).





# MORPHOLOGY OF GOUT

- Gout has four distinctive morphologic changes, and those are:

## 1) ACUTE ARTHRITIS

**High neutrophils infiltrate**, MSU in both synovium and neutrophils, long, needle shaped crystals, edematous and congested synovium.

## 2) CHRONIC TOPHACEOUS ARTHRITIS

Results from repetitive precipitation of MSU crystals during acute attacks, ureates encrust the art. surfaces. Hyperplastic, fibrotic and thickened by inflammatory cells > pannus, and in severe cases > ankylosis.

# MORPHOLOGY OF GOUT

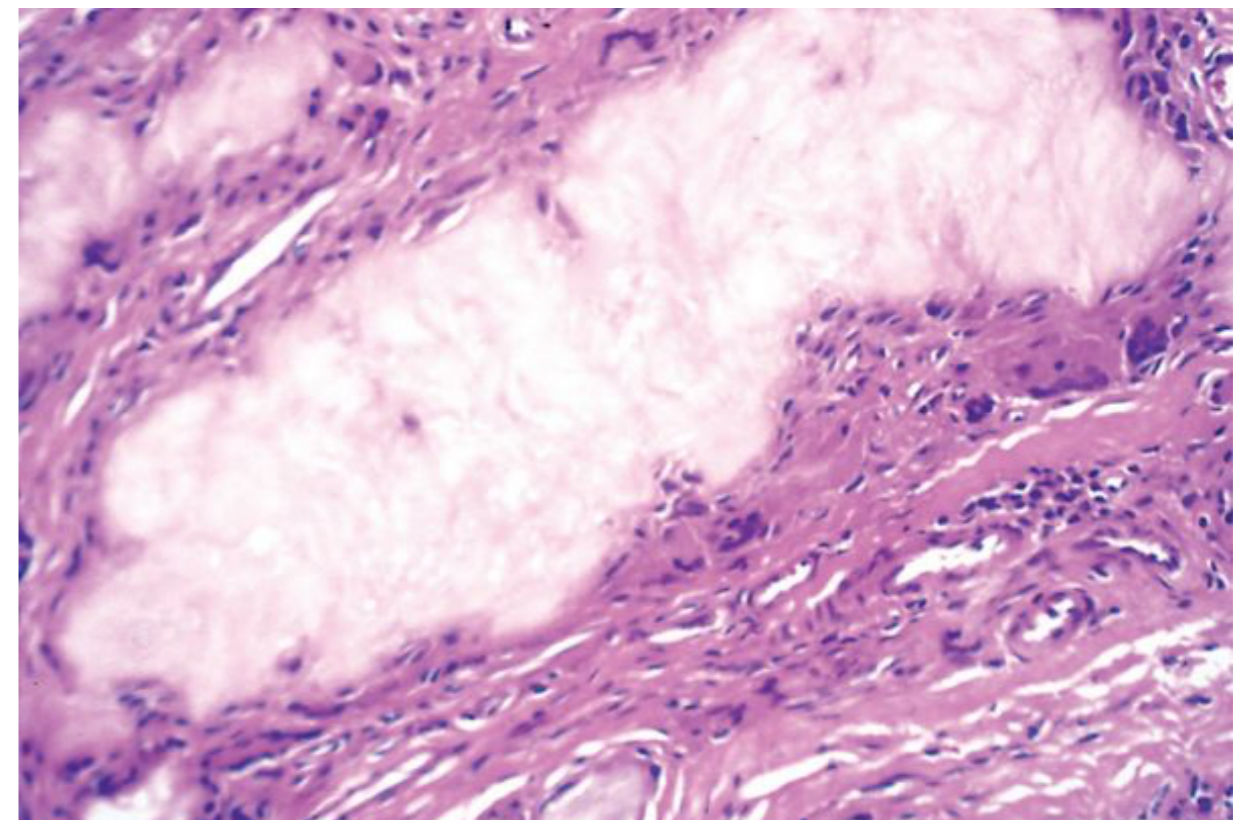
## 3) TOPHI (pathognomonic hallmark of gout)

Aggregates of MSU crystals surrounded by an intense inflammatory reaction of **lymphocytes, macrophages** and **foreign body giant cells**.

AND SOMETIMES  
4) GOUTY NEPHROPATHY



Amputated great toe with white tophi involving the joint and soft tissues



An aggregate of dissolved urate crystals surrounded by reactive cells

# ANY QUESTIONS?



# MECHANISMS OF METHOTREXATE AND IBUPROFEN

# IBUPROFEN

- NSAID, used as an analgesic, antipyretic and anti-inflammatory
- Non-selective COX enzyme inhibitor.
- Inhibits the synthesis of PGs via arachidonic acid pathway.



# METHOTREXATE

- Anti-inflammatory and anti-neoplastic, used in the treatment of chronic gout.
- DHFR inhibitor, enters the cell by active or passive transport.
- 1000 folds stronger than the natural substrate, S phase specific.



# ANY QUESTIONS?



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## REFERENCES

JOINTS OF HAND AND GOUTY ARTHRITIS

FATMA ALZAIDI

FATMA ALZAHRAA ELMAJBRI

FATMA ALSAHLI

**THANK YOU**

MOHAMED T. SHEMBESH

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