

# Joint Disorders Pathophysiology



# RHEUMATOID ARTHRITIS

- ↳ Most common cause of "Chronic Inflammatory Joint Disease"
- ↳ Also a "Systemic Autoimmune disease"
- ↳ characterized by Joint inflammation, Synovial Proliferation, & destruction of articular cartilage

↳ Feature - ① Morning Stiffness ② ↑ ESR

③ A Symmetrical polyarthritis & tenosynovitis

④ Autoantibodies that target Igs in Serum

# It affect 1-3% world wide, 30-50 Y Age

# Woman 4:1 Man

↳ Etiology: - ① Genetic ② Immunological Reaction

③ chronic Inflammation ④ ↑ Serum & Synovium

Rheumatoid factors

↳ PATHOPHYSIOLOGY:-

Immune Complexes - IgM components →

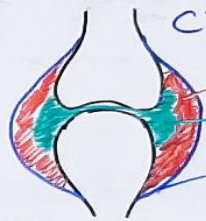
Lysosomes

chemotaxis ← IL-1, TNFα  
(Neutrophil)

PGs

↳ Inflammatory Response

↓  
Damage cartilage & Bone



cross sectional Joint

Inflamed Synovial membrane

Excess Joint Fluid

Joint Capsule

Clinical Pathology:-

stage 1 → # Immune Pathology begin, ↑ ESR, ↑ C-reactive protein, & ↑ Rheumatoid factors

Stage 2 (Synovial) # Vascular Hyperplasia

# Synovial Proliferation # Infiltration

# Thickening of Capsule

Stage 3 (Destruction)

# Destruct<sup>n</sup> of Joint cartilage & tendon

# Swelling & Inflammat<sup>n</sup> Reaction

# Bone is also eroded by granulat<sup>n</sup> tissue invasion and Osteoclastic Resorption

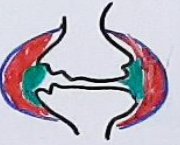
Stage 4 (Deformity)

# Destruct<sup>n</sup> alongwith Deformities

# Inable of functioning

# Synovitis

# Secondary Complication

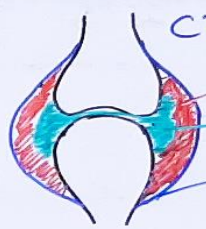


# RHEUMATOID ARTHRITIS

## Clinical Feature -

### • Late Stage →

- ① Pain, deformity, instability
  - ② Joint - restrictive to movements
- Thumb → Z-Deformity
  - Fingers - Swan neck deformity
  - Wrist - Radial & Ulnar displacement
  - Elbo - Limited Extension
  - Knees - Swollen
  - Toes - clawed



cross sectional Joint  
Inflamed Synovial membrane  
Excess Joint Fluid  
Joint Capsule

## DRUGS

### I. Disease Modifying Anti-Rheumatoid drugs (DMARDs)

#### A. Non Biological -

- ↳ Immunosuppressants - Methotrexate, Azathioprine, Cyclosporine
- ↳ Other Immunomodulator - Sulfasalazine, Hydroxychloroquine, etc

#### B. Biological -

- ↳ TNF $\alpha$  Inhibitor - Etanercept, Infliximab
- ↳ other - Anakinra, Rituximab



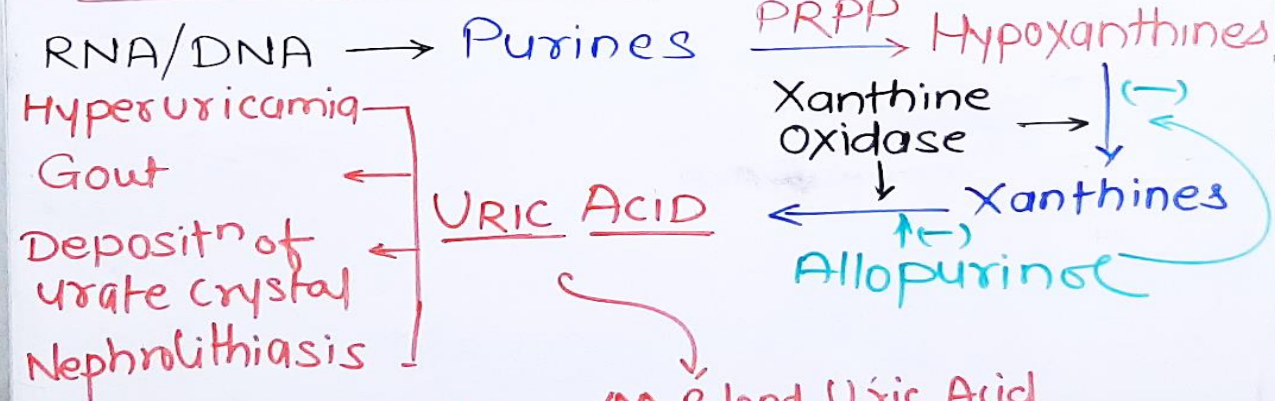
# GOUT

↳ Very painful form of arthritis characterized by formation of "Uric Acid Crystals" & severe inflammation.

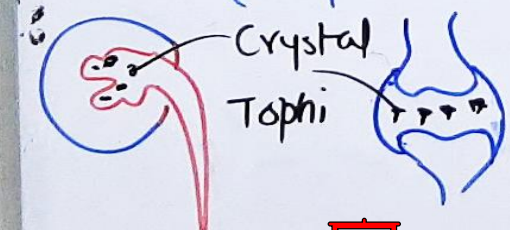
↳ Purine metabolic disorder, leads to "Hyperuricemia" (> 6mg/dL). Hyperuricemia occurs due to ↑ production & ↓ excretion.

# 1° Hyperuricemia Vs 2° Hyperuricemia

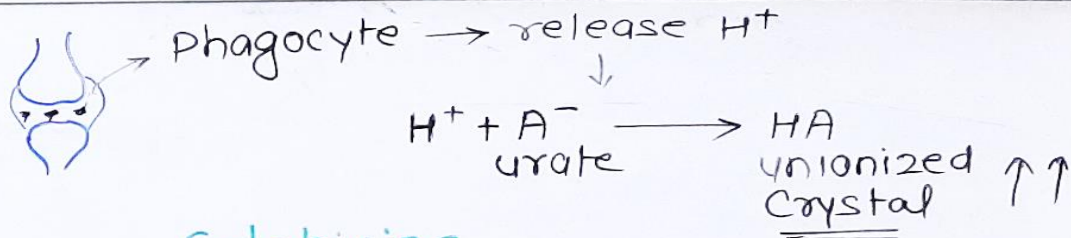
## # Uric Acid Metabolism -



PATHOPHYIOLOGY: - ↑↑ Blood Uric Acid  
↓ Sodium  
Sodium Crystals (Tophi)  
(Deposition in soft tissue & Joints)



↓ (-) NSAIDS  
INFLAMMATORY



## Colchicine

Inflammatory → Free Radicals → Tissue Damage  
Pain/U. Crystal - lactic acid → Release of lysozyme → Release Proteolytic Enz → Joint Destruction

Risk Factor: -- Red meat, Beans, Alcohol, Fish

## Etiology -

- ① Enzyme Defect - ↑ product<sup>n</sup> of UA
- ② Diet
- ③ Renal failure - ↓ excret<sup>n</sup> of UA
- ④ Cancer Treatment - Chemo / Radio
- ⑤ Diabetes Malitus / Obesity

Types -

① Acute	① Primary
2. Chronic	② Secondary



# OSTEOPOROSIS

Osteoporosis is a condition characterised by a decrease in density of bone, decreasing its strength & resulting in **Fragile bone**,

↳ lead to porous & spongy bone → easily breakable

# Symptoms - After long time, Bones have been weakened by osteoporosis, & have sign & symp. →

↳ Back pain, caused by fractured or collapsed vertebra

↳ loss of height over time

↳ A stooped posture

↳ Easily breakdown the bone

# Risk Factors

↳ Sex → Women > Men

↳ Age → Older age > Younger

↳ Race → White & Asian

↳ Family history

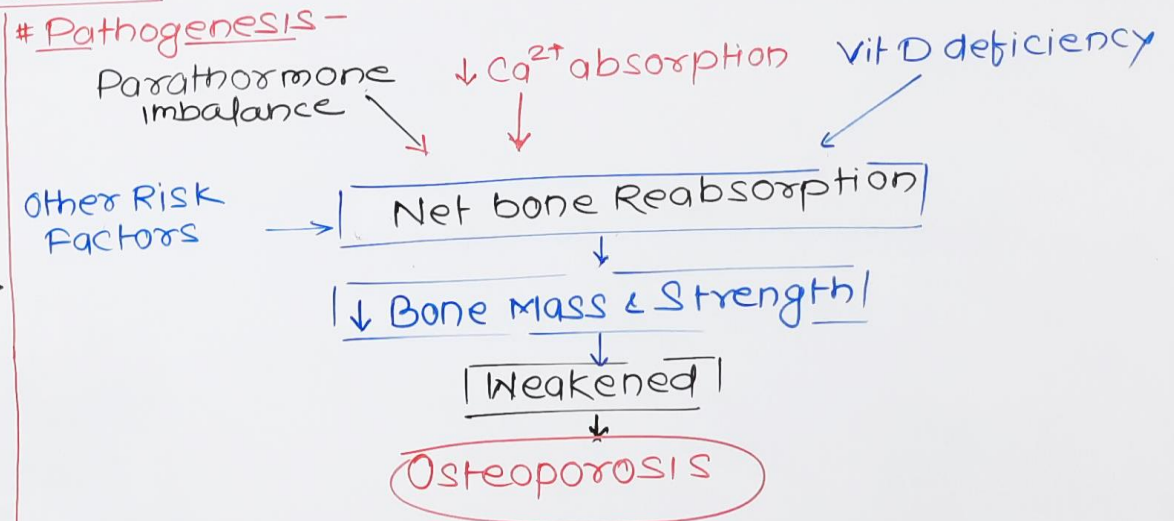
↳ Body Frame Size - Small body frames

↳ **Hormonal changes** → ↓ Sex hormone (estrogen & testosterone), ↑ Thyroid hormone, & overactive of parathyroid & adrenal glands

↳ **Dietary Factors** → \* low calcium intake,  
\* Eating disorder  
\* GI surgery

↳ **Drug/diseases** → Steroids, anticancer drugs  
→ Arthritis, Cancer, Inflammatory bowel disease, kidney disease

# Pathogenesis -



# Treatments -

↳ Biophosphonates - Alendronate, Risodronate, Ibandronate, Zoledronic acid

↳ Monoclonal antibody - Denosumab


↳ Hormone Related Therapy - Estrogen, Raloxifen, Testosterone

↳ Bone building medication - Parathyroid hormone related drugs - (Teriparatide, Abaloparatide)

↳ Nutritional Supplements - Ca<sup>2+</sup>, Vit. D



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