

## SUPPURATIVE ARTHRITIS: (infectious arthritis)

Suppuration: destruction of tissue, forming liquefactive necrosis, abscess, and pus.

- Due to **bacterial infection**
- **Hematogenous spread** (reaches the joints through the blood stream).
- < 2 years: **H. influenza**
- older children & adults: **S. aureus**
- young adults: **gonococcus**
- Patients who have sickle cell disease have higher incidence of **salmonella** infection. This also can occur in the abdomen causing salmonella peritonitis.
- **Clinically**: sudden acute pain, swollen and **warm joints** mainly **knee** with systemic manifestation (fever, **leukocytosis, elevated ESR**)
- **Dx**: aspiration of joint, we see **pus**
- **Rx**: IV antibiotics.

## LYME ARTHRITIS:

- a specific type of arthritis, a part of systemic disease.

- **cause**: infection by **spirochetes** (borrelia burgdorferi)

- systemic symptoms & complications:

1. fever
2. skin rash called **erythema migrans rash**.
3. **neuritis** with **cranial nerve palsy**.
4. **meningitis** (if reaches the meninges)
5. **carditis** (if reaches the heart)

- The initial infection will induce later on a primary immune response (composed of **IgM** immune response)

- in late stages: **IgG**, **musculoskeletal symptoms**, & **neurological deficits**

**"neuroborreliosis"** post treatment

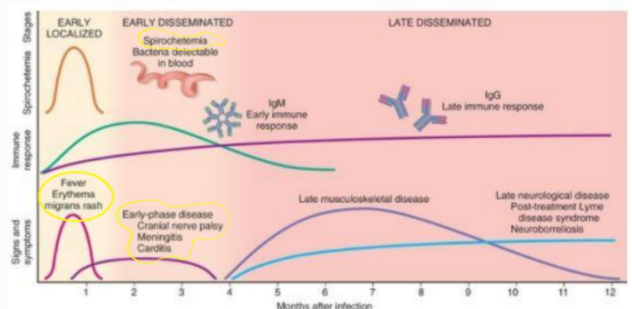


FIG. 21.40 Lyme disease progresses through three clinically recognizable phases: early...

## CRYSTAL-INDUCED ARTHRITIS: (gout & pseudogout)

• Crystals deposited in joints & triggers inflammatory reaction that destroys cartilage, they are endogenous crystals (produced inside the body) such as :

- Monosodium urate crystals (**MSU**), causes **GOUT**
- Calcium pyrophosphate dehydrogenase crystals (**CPPD**) causes **PSEUDOGOUT**

# GOUT:

- Transient attacks of arthritis
- mainly in **big toe** (in acute gout), but the tophi (in chronic gout) can be seen in many organs such as **cartilage, ligaments, bursae and tendons**.
- triggered by deposition of **MSU crystals**

- **hyperuricemia** is the major cause, related to increased production or decreased excretion of **Uric acid** (a purine metabolite) from kidneys.

- along with hyperuricemia, risk increases with 20-30 years of age, obesity, alcohol, genetic predisposition, drugs like **thiazides** a diuretics that increase uric acid in blood.

- deposition of uric acid crystals causes activation of inflammatory cells (thus activation of a inflammasome, release of interleukin-1 beta, chemokines,..etc)

- Macs & neutrophils get stimulated by chemotaxis, this causes **phagocytosis** of crystals causing their lysis, and when they are lysed they'll release more lysosomal enzymes & more proteases leading to tissue injury and destruction in the joints, this cause **acute gouty arthritis attack**.

- Trx: life style modifications,
- NSAIDS & **Colchicine** in acute gout,
- **Xanthine oxidase inhibitors (Allupurinol)** in chronic and prevention

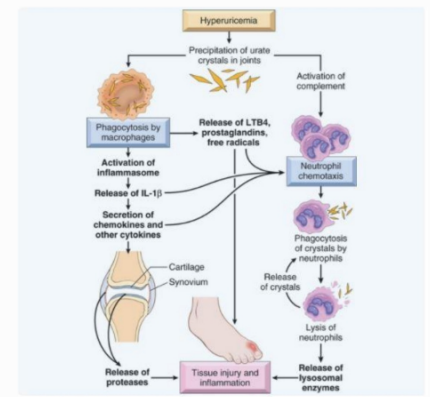
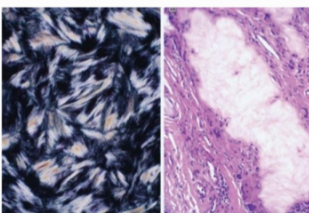


FIG. 21.41 Pathogenesis of acute gouty arthritis. Urate crystals are phagocytosed by m...

## MORPHOLOGIC CHANGES OF GOUT:

Acute arthritis	Dense inflammation of synovium, MSU crystals in neutrophils, -ve birefringent
Chronic tophaceous arthritis	Repetitive attacks & crystals deposition in the joint; thick synovium, pannus
Tophi in various sites	Cartilage, ligaments, bursae and tendons
Gouty nephropathy	MSU crystals deposition in kidney; nephrolithiasis & pyelonephritis



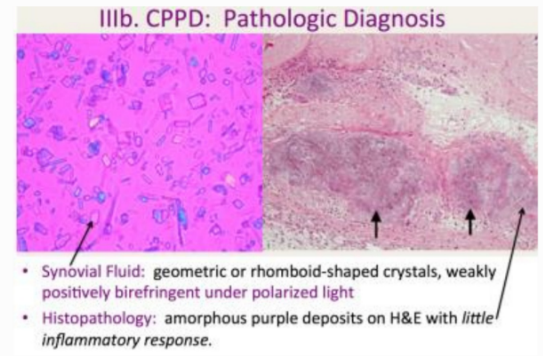
→ pannus formation in **chronic tophaceous arthritis**.



→ amputated toe that is completely destroyed by **chronic gout**, the chalky white materials are calcified monosodium urate crystals (**tophi**)

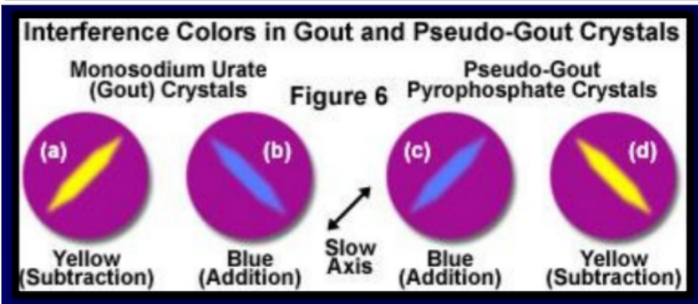
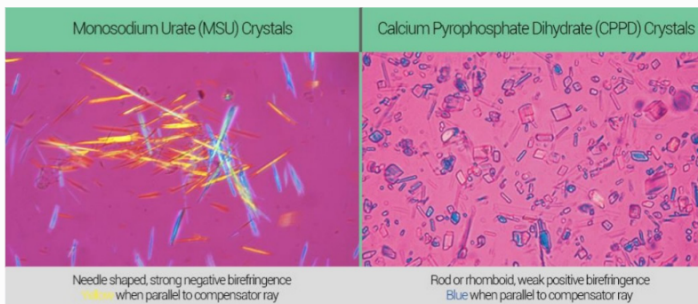
# PSEUDOGOUT:

- in >50 years patients; increase with age.
- Idiopathic (genetic) or secondary to other causes.
- induced by **CPPD crystals**.
- secondary pseudogout cases are usually associated with DM, previous joint damage, HPTH (hyperparathyroidism), hemochromatosis.
- can be acute, subacute and chronic
- Trx: supportive.



# NEGATIVE VS POSITIVE BIERFRINGENCE

- \* depends on the polarizing angle of the microscope
- **MSU crystals** (indicate gout) are **needle shaped, perpendicular, strong negative birefringence** and **yellow** when parallel to compensatory ray.
- **CPPD crystals** (indicate pseudogout) are **rod or rhomboid, weak positive birefringence** and **blue** when parallel to compensatory ray.



## Summary

### Arthritis

- **Osteoarthritis (OA, degenerative joint disease)**, the most common disease of joints, is a degenerative process of articular cartilage in which matrix breakdown exceeds synthesis. Inflammation is minimal and typically secondary. Local production of inflammatory cytokines may contribute to the progression of joint degeneration.
- **Rheumatoid arthritis (RA)** is a chronic autoimmune inflammatory disease that affects mainly small joints, but can be systemic. RA is caused by a cellular and humoral immune response against self-antigens, particularly citrullinated proteins. TNF plays a central role and antagonists against TNF are of clinical benefit.
- **Seronegative spondyloarthropathies** are a heterogeneous group of likely autoimmune arthritides that preferentially involve the sacroiliac and vertebral joints and are associated with HLA-B27.
- **Suppurative arthritis** describes direct infection of a joint space by bacterial organisms.
- **Lyme disease** is a systemic infection by *Borrelia burgdorferi*, which manifests, in part, as an infectious arthritis, possibly with an autoimmune component in chronic stages.
- **Gout and pseudogout** result from inflammatory responses triggered by precipitation of urate or calcium pyrophosphate, respectively.