CHRONIC INFLAMMATION

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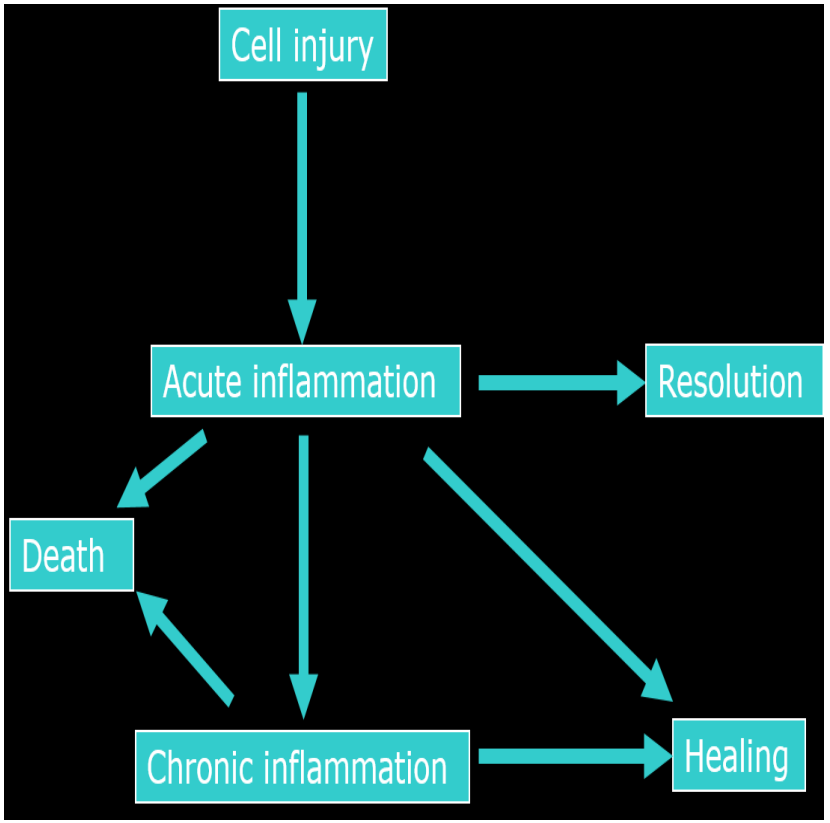
Learning Objectives

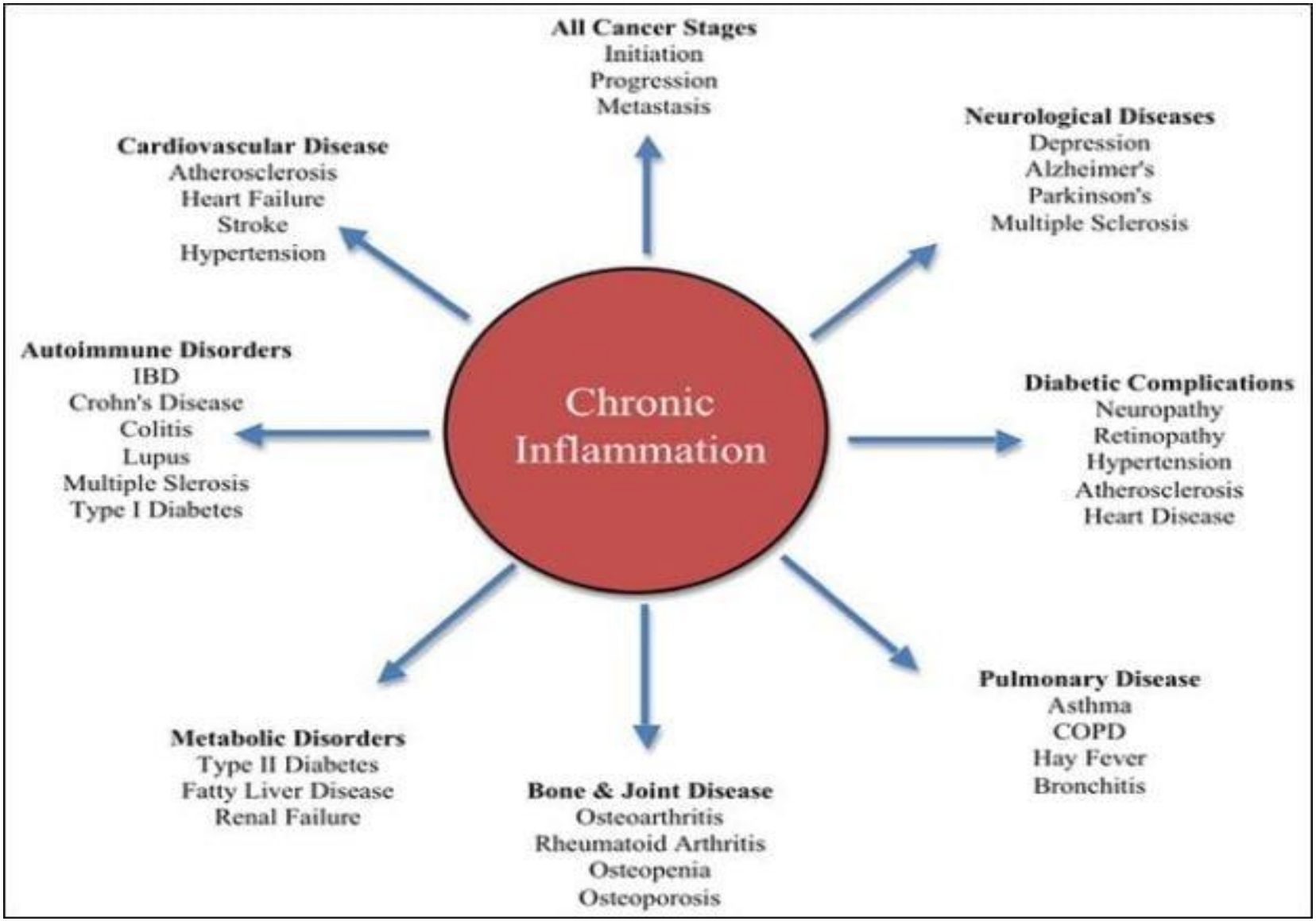
- By the end of this session, students are expected to be able to:
  - Define chronic inflammation
  - Explain general features of chronic inflammation
  - Mention types of chronic inflammation
  - Describe sequels of chronic inflammation
  - Describe systemic effects of chronic inflammation

Definition and causes of Chronic Inflammation

- **Def**: Inflammation of prolonged duration (weeks to months to years)
- Followed simultaneously by
  - active inflammation,
  - tissue injury,
  - Healing
  - Death

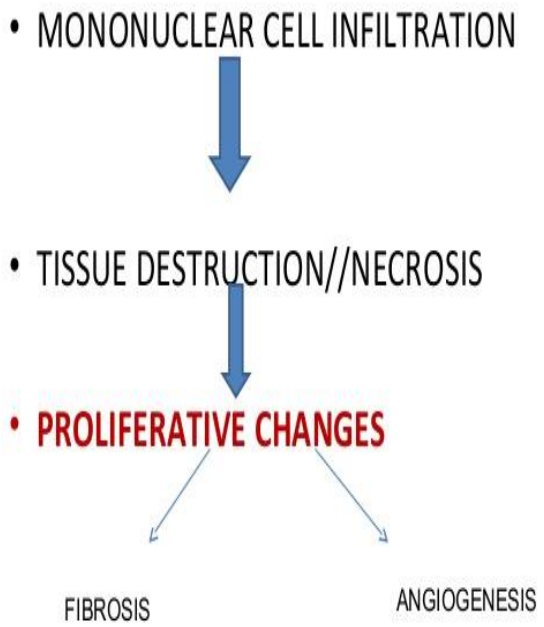


Causes of Chronic Inflammation



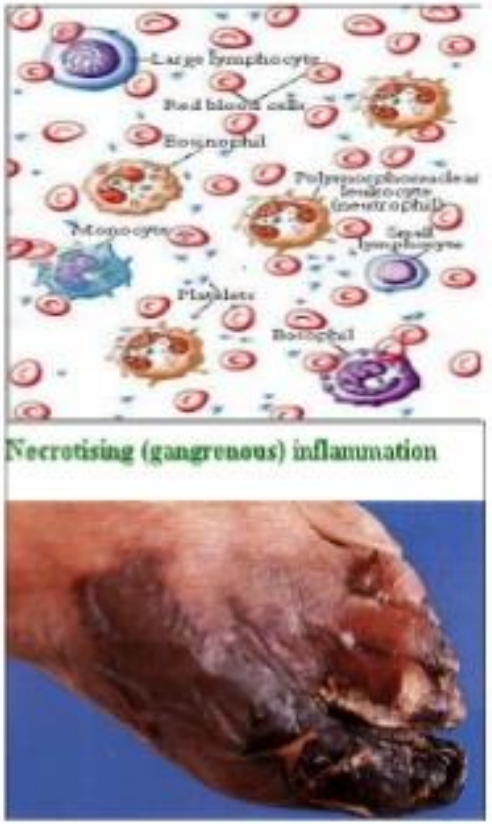
General Features of Chronic Inflammation

- Mononuclear cell infiltration
  - phagocytes and lymphoid cells
- Tissue destruction or necrosis
- Proliferative changes



General features of chronic inflammation

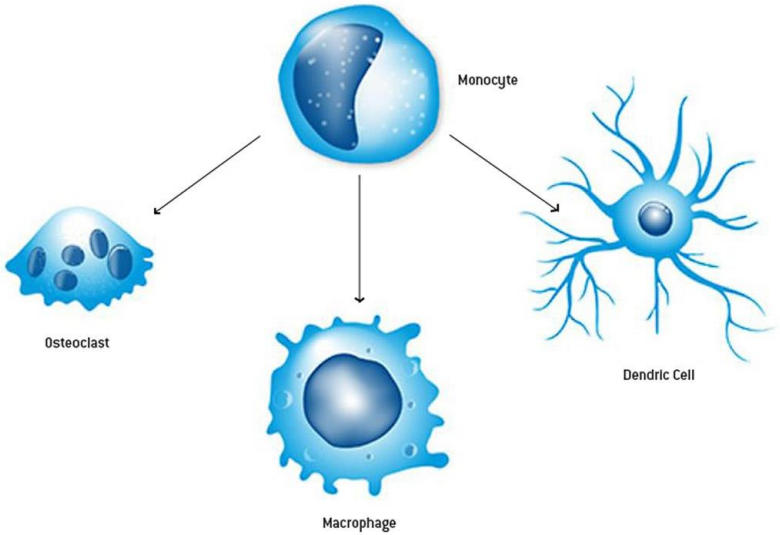
1. Mononuclear cell infiltration- phagocytes, circulating monocytes, macrophages & giant cells.
2. Tissue destruction or necrosis.
3. Proliferative changes- small blood vessels & fibroblasts



Chronic inflammatory cells and mediators

- Macrophages
- Lymphocytes
- Plasma cells
- Eosinophils
- Mast cells

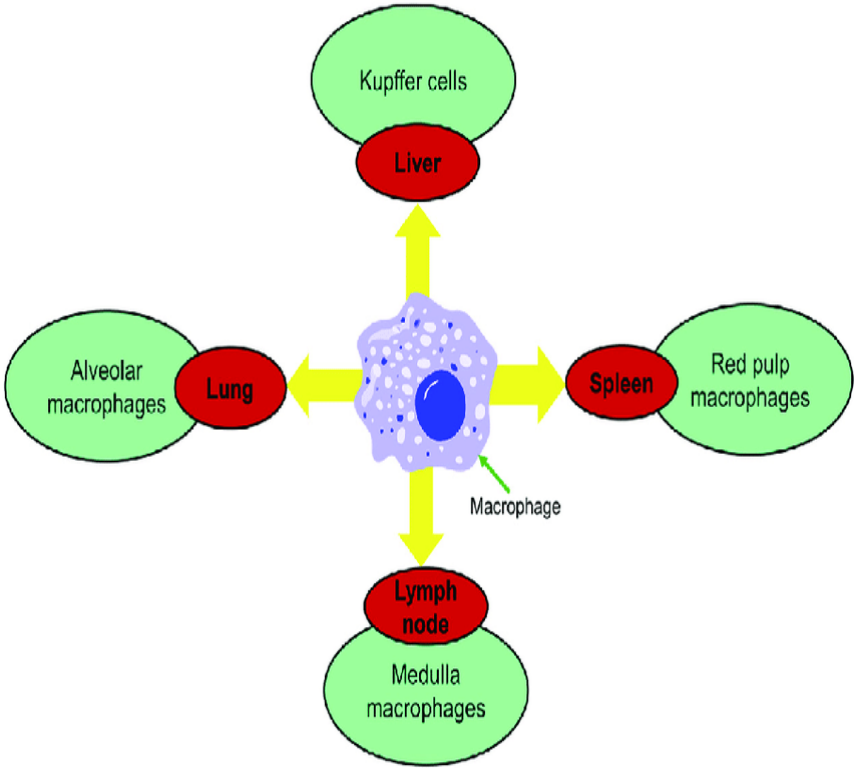
a) Macrophages



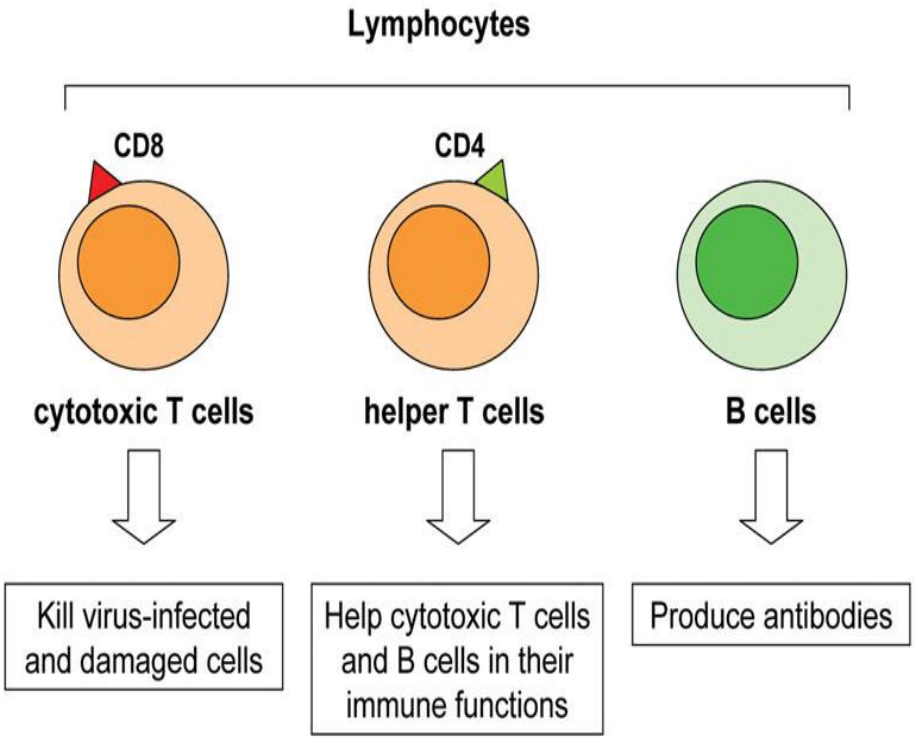
- The dominant cells of chronic inflammation
- Tissue cells derived from circulating **blood monocytes** after their emigration from the bloodstream.

Types of macrophages

- Mononuclear phagocyte system/ reticulo-endothelial system secrtete these cells which act as;
  - **filters** for particulate matter, microbes, and senescent cells
  - **sentinels** to alert the specific components of the adaptive immune system (T and B lymphocytes) to injurious stimuli:
    - Chemotactic factors and adhesion molecule
    - Local proliferation of macrophages



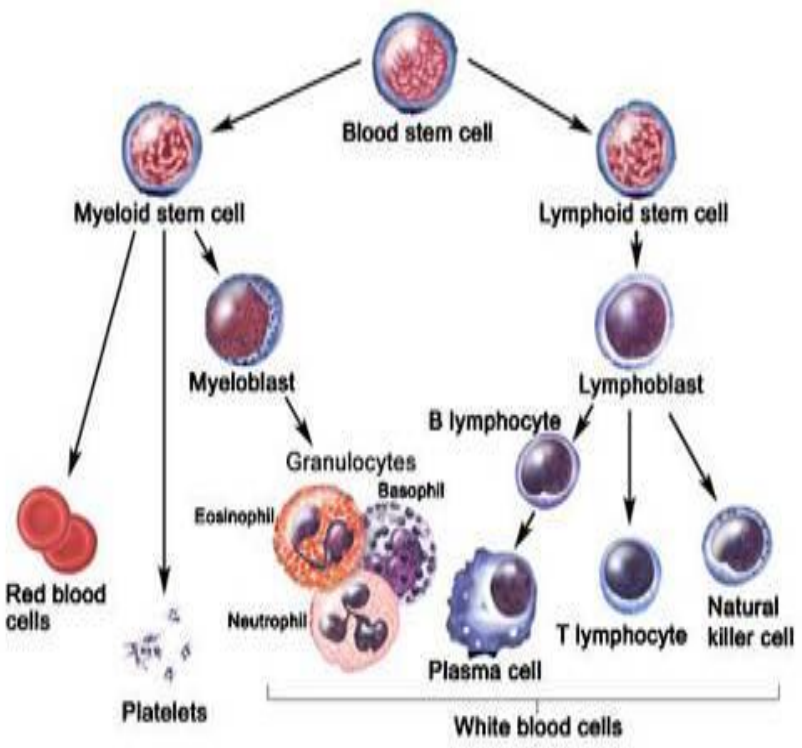
b) Lymphocytes



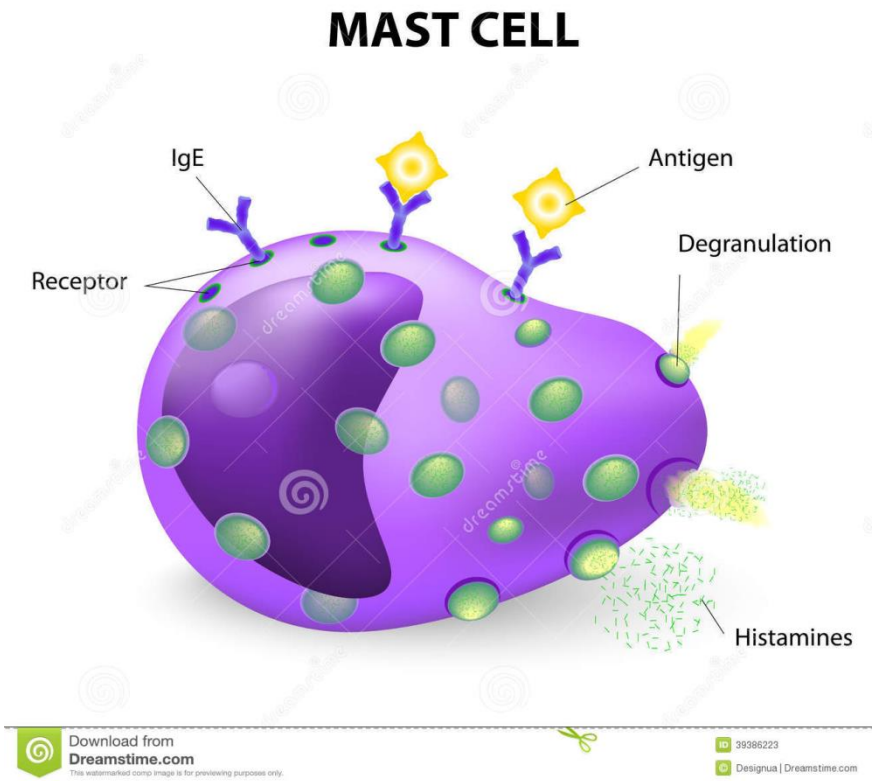
- lymphocytes and eosinophils influence each other and release **mediators** of inflammation.

c) Plasma Cells

- Plasma cells, also called **plasma B** cells, are white blood cells that originate in the bone marrow and secrete large quantities of proteins called **antibodies** in response to specific substances called **antigens**



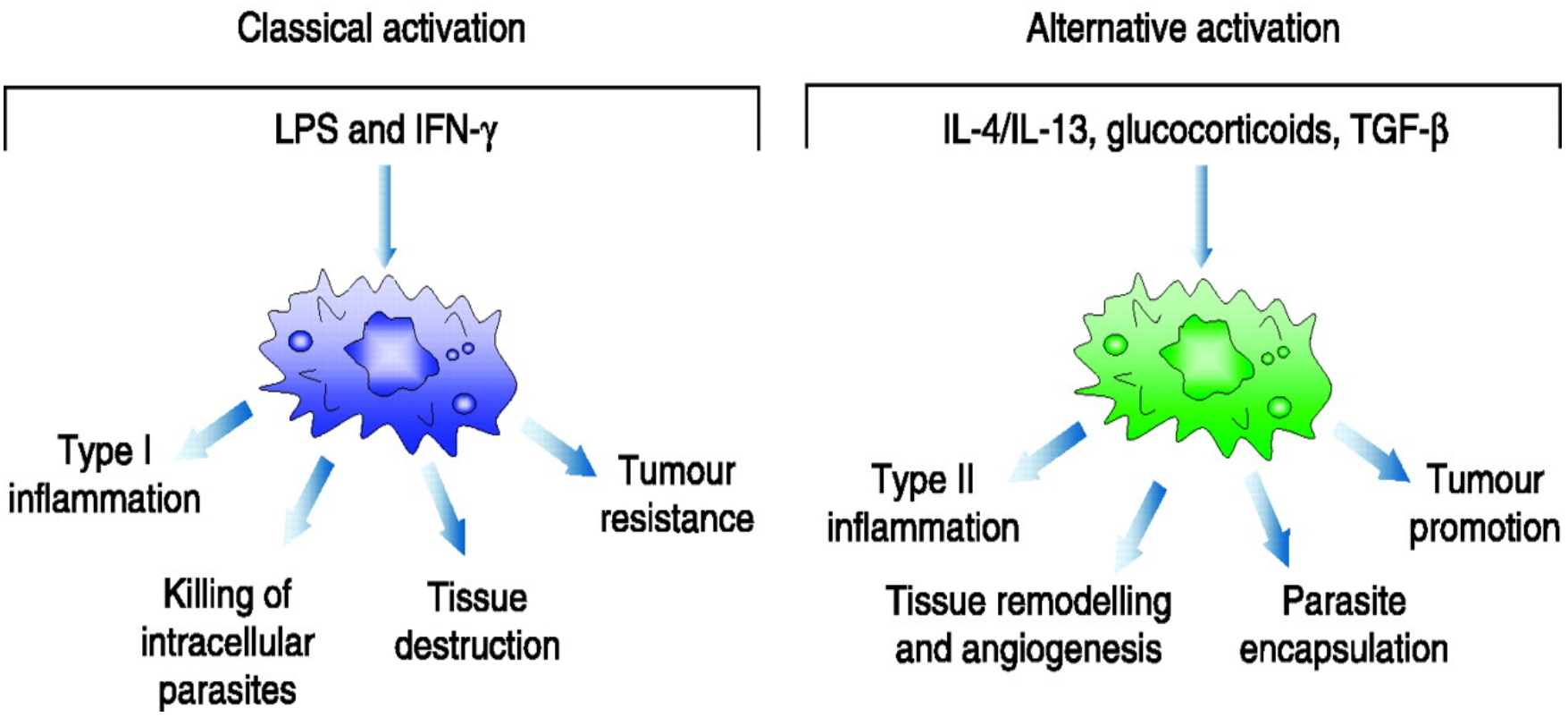
d) Mast Cell



- They are sentinel cells widely distributed in connective tissues throughout the body, and
- They can participate in both acute and chronic inflammatory responses.

Tissue Destruction or Necrosis

- These are the central features of most forms of chronic inflammatory lesions.

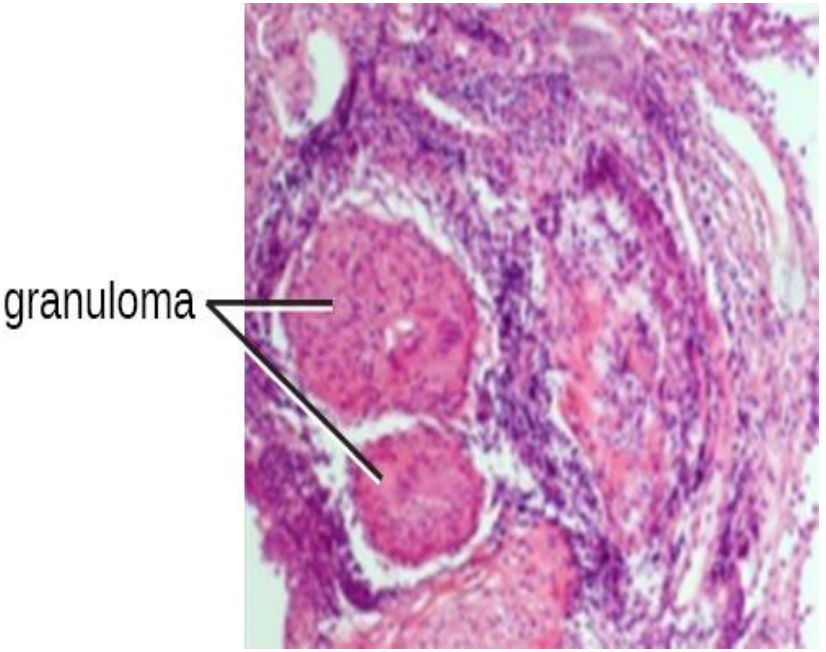


Tissue Destruction & Necrosis

- Brought about by **activated macrophages** which release a variety of biologically active substances e.g.
  - protease,
  - elastase,
  - collagenase,
  - lipase,
  - reactive oxygen radicals,
  - cytokines (Interleukin[IL]-1,
  - Interleukin [IL]-8,
  - Tumour Necrosis Factor [TNF]),
  - Nitric oxide,
  - angiogenesis
  - growth factor

Types of Chronic Inflammation

- **Chronic non-specific inflammation**
  - Presence of non-specific inflammatory cell infiltration such as chronic osteomyelitis and lung abscess
- **Chronic granulomatous Inflammation**
  - aggregates of activated macrophages that assume an epithelioid appearance.



Sequels of Chronic Inflammation

- Granulomatous inflammation/ or formation of **granulomas**
- **Factors that Favours Granuloma Formation**
  - Presence of poorly digestible irritant which may be organisms like MTB
  - Presence of cell mediated immunity to the irritant,
- **Examples of Diseases with Granulomatous Inflammation**
  - **Tuberculosis** (causative organisms - Mycobacterium tuberculae)
  - **Leprosy** (causative organisms - Mycobacterium leprae)
  - **Syphilis** (causative organism - Treponema pallidum)
  - **Cat-scratch disease** (Gram-negative bacillus)

- **Sarcoidosis** (Unknown aetiology)
- **Crohn's disease or inflammatory bowel disease** (Immune reaction against intestinal bacterial, self-antigens)
- Schistosomiasis
- Histoplasmosis
- Cryptococcal
- Foreign bodies such as sutures

Outcomes of Chronic Inflammation

- **Scarring healing with fibrosis** (e.g. pyloric stenosis in peptic ulcer disease, valvular heart damage in rheumatic heart disease and contractures in burn wounds).
- **Chronic discharging sinus** commonly seen in chronic osteomyelitis.
- **Pathological fractures**

Systemic Effects of Chronic Inflammation

- **Fever**
  - Invariably there is mild fever, often with loss of weight and weakness.
- **Anaemia**
  - Chronic inflammation is accompanied by anaemia of varying degree.
- **Leucocytosis**
  - There is an increase in white blood cells (leucocytes)
- **Elevated Erythrocytes Sedmentation Rate (ESR)**
  - ESR is elevated in all cases of chronic inflammation.
- **Amyloidosis**
  - chronic suppurative inflammation may develop secondary to systemic amyloidosis.

END