



**AL-Mustaqbal University College**

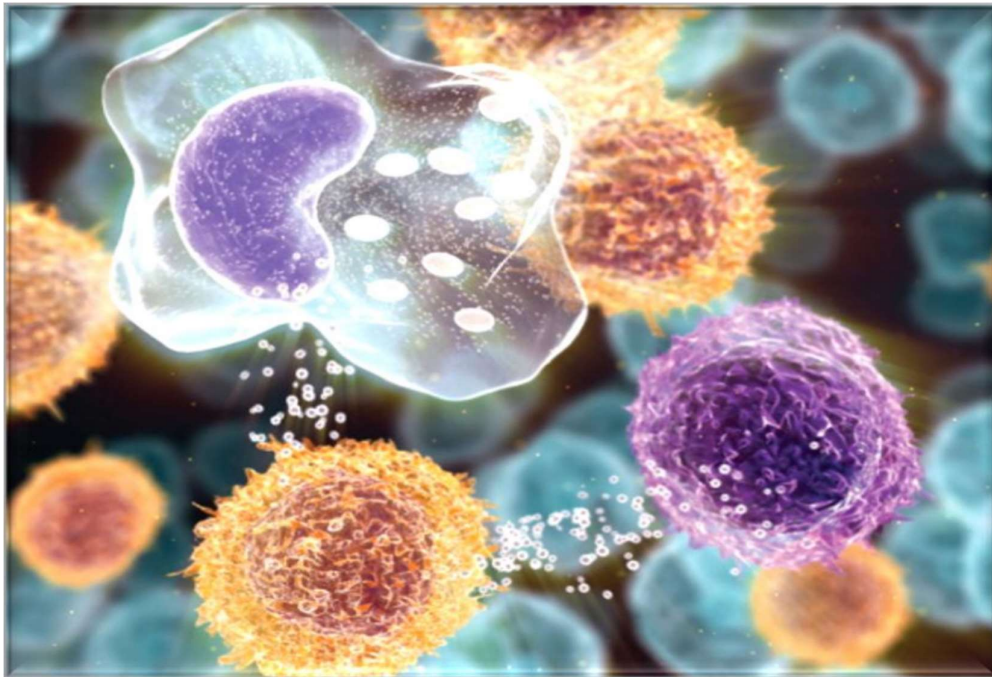
**Pharmacy Department**

**Third stage**

**Practical Pathophysiology**

**(Inflammation)**

**Lab 4**



**Lecturer: Noor Muhsen Jawad**

# Inflammation

**Inflammation:** Is the body's natural defense against injury or disease. The body also uses this process to repair tissue after an injury has taken place. The special cells that take part in inflammation are called **inflammatory cells** and they are part of the body's immune system.

## Causes of Inflammation

The causes of inflammation are many and varied:

### Exogenous causes:

#### + Physical agents

- **Mechanic agents:** fractures, foreign corps, sand, etc.
- **Thermal agents:** burns, freezing

#### + Chemical agents: toxic gases, acids, bases

#### + Biological agents: bacteria, viruses, parasites

### Endogenous causes:

#### + Circulation disorders: thrombosis, infarction, hemorrhage

#### + Enzyme's activation – e.g., acute pancreatitis

#### + Metabolic products – uric acid, urea

## **The steps of the inflammatory response:**

- (1) Recognition of the injurious agent.
- (2) Recruitment of leukocytes.
- (3) Removal or destroy of the agent.
- (4) Regulation (control) of the response.
- (5) The damaged tissue is repaired.

## **Types of inflammation**

**Acute:** Sudden onset and short duration (hours - days)

**Chronic:** Gradual onset and long duration (days -years)

**Acute inflammation:** Caused by an irritant of short duration of action, the tissue response is rapid i.e., sudden onset, inflammation lasts for days or weeks, characterized by fluid exudate and cellular exudate mainly polymorphonuclear leukocyte.

## **Signs of acute inflammation**

The vascular and exudative phenomena of acute inflammation are responsible for the clinical features and were described by Celsus in the first century AD.

**The cardinal signs of Celsus are:**

- Redness (rubor) caused by hyperaemia
- Swelling (tumor) caused by fluid exudation and hyperaemia
- Heat (calor) caused by hyperaemia
- Pain (dolor) resulting from release of bradykinin and PGE<sub>2</sub>.

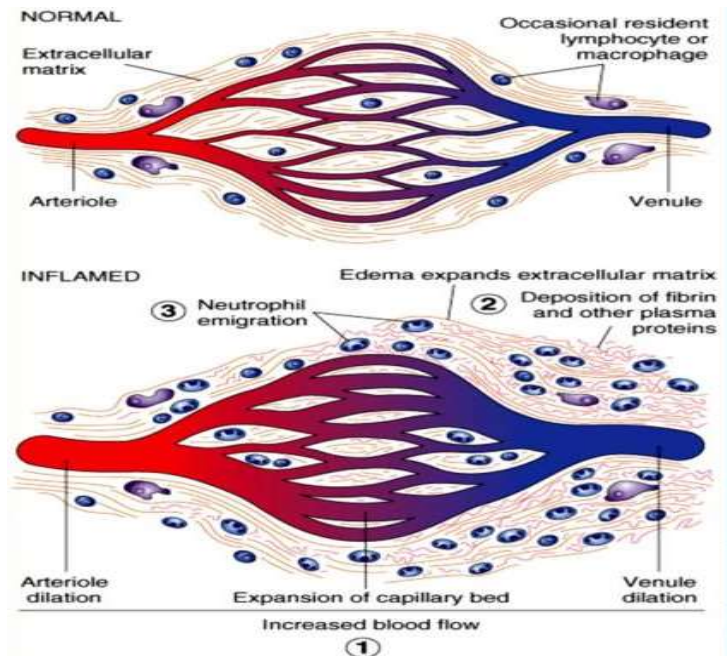
**Virchow later added:**

- Loss of function (functio laesa) caused by the combined effects of the above.

## Major events in inflammation

### Vascular events in inflammation

- Vasodilatation of arterioles and capillaries
- Increased blood flow
- Slowing of blood stream
- Increased capillary permeability

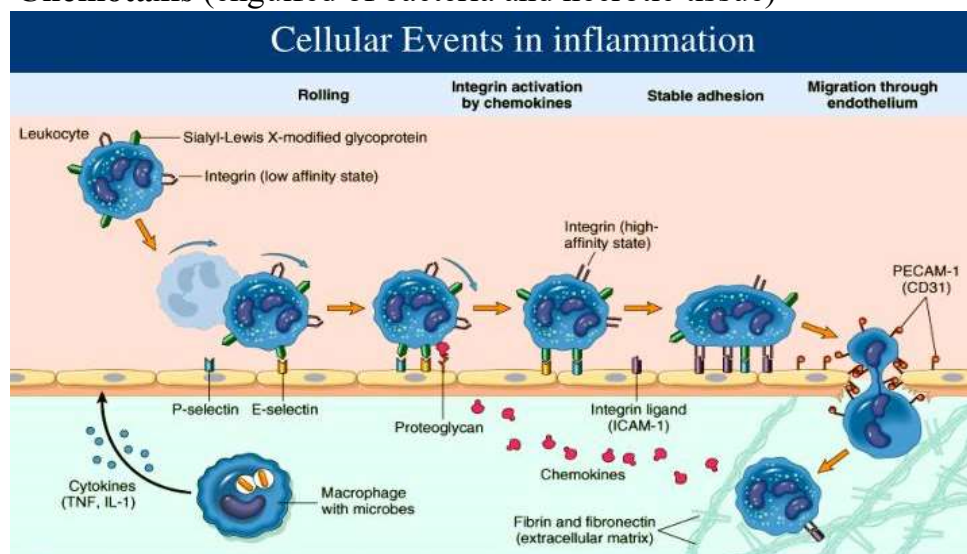


### Cellular events in inflammation

- Migration, rolling, adhesion of leukocytes
- Transmigration of leukocytes
- Chemotaxis & phagocytosis

**Chemotaxis** (directed movement toward area of inflammation)

**Chemotaxis** (engulfed of bacteria and necrotic tissue)



## **Fate of Acute inflammation**

- Complete resolution
- Healing by scarring
- Progression and spread: (direct, lymphatic & blood spread)
- Chronicity

**Chronic inflammation:** Is a long lasting inflammation (weeks or months) due to persistent aggressive stimuli and is characterized by: active inflammation with mononuclear cells, tissue destruction and repair. It can follow acute inflammation or can be chronic right from the beginning.

### **Characterized by:**

- Mild irritant with a prolonged action
- Tissue response is gradual and prolonged (mild vascular dilatation and congestion)
- Tissue destruction is progressive and gradually replaced by fibrous tissue with thickening and narrowing of blood vessels (endarteritis obliterans)
- Scanty fluid exudate

## **Types of Chronic Inflammation**

### **1- Chronic non-specific inflammation**

- Different irritants produce inflammatory reaction of the same microscopic picture e.g., Chronic peptic ulcer.

### **2- Chronic specific inflammation**

- Each irritant produces inflammation of a characteristic microscopic picture e.g., granulomatous

## **Granuloma**

• **Definition:** A type of chronic inflammation characterized by focal accumulation of large number of macrophages together with lymphocytes, plasma cells, giant cells and fibroblasts forming tiny granules.

### **Types of Granulomas**

#### **1-Infective granuloma**

- a. Bacterial e.g., leprosy & syphilis
- b. Parasitic e.g., Bilharziasis
- c. Fungal e.g., Madura foot

#### **2- Non-infective granuloma**

- a. Silicosis and asbestosis
- b. Foreign body granuloma 3

#### **3-Granuloma of unknown cause**

- Sarcoidosis