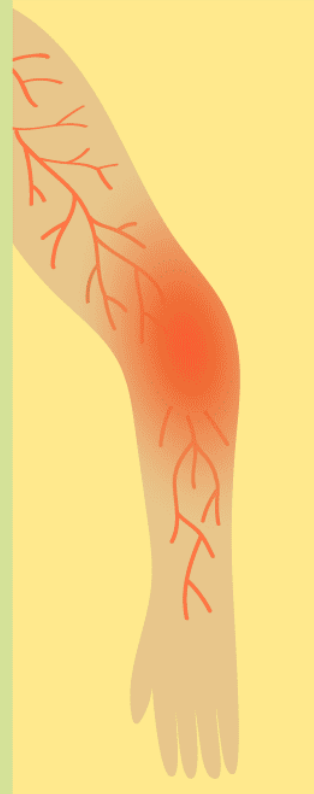


**Pain**



**Heat**



**Redness**



**Swelling**



**Loss of  
Function**

The background of the slide features a light beige, marbled paper texture. On the left side, a dark brown stem extends vertically, with a single, elongated, dried leaf attached. A similar stem and leaf are positioned on the right side, mirroring the one on the left. The overall aesthetic is natural and organic.

# **OVERVIEW TO ACUTE INFLAMMATION**

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# Learning objectives:


- By the end of this lecture student should be able to;
- Describe inflammation
- Discuss general features of acute inflammation



- Inflammation is a Latin word.
- Its Greek counterpart is Phlogosis
- First used by Galen a Greek physician.

- 
- “Inflammation is a protective response needed to remove the cause of cell injury as well as the necrotic cells/tissues resulting from that injury”.

- 
- “Inflammation is a response of vascularized tissues that delivers leukocytes and other molecules to the sites of infection in order to eliminate the offending agents”.

- 
- So serves to remove both the initial cause of cell injury (microbes, toxins) and consequences of injury (necrotic cells and tissues).
  - Thought to be a harmful event.




- But a beneficial host response against foreign invaders, but capable of causing tissue damage.
- Main purpose is to deliver leukocytes and proteins (complement and antibodies).
- To activate leukocytes and proteins.





- No inflammation means no check on infections.
- Wounds would never heal.
- In HIV specific type of leukocytes are damaged which leads to uncommon infections.

- 
- The steps of the inflammatory response can be remembered as the five Rs:

- 1) Recognition of the injurious agent
  - The cells involved in inflammation (phagocytes, and others) have receptors that recognize microbial products and substances released from damaged cells.



- (2) Recruitment of leukocytes and proteins and their activation
3. Removal of the agent
  - Mainly done by phagocytic cells which engulf and destroy microbes and dead cells.
3. Regulation (control) of the response
5. Resolution of the response (repair)

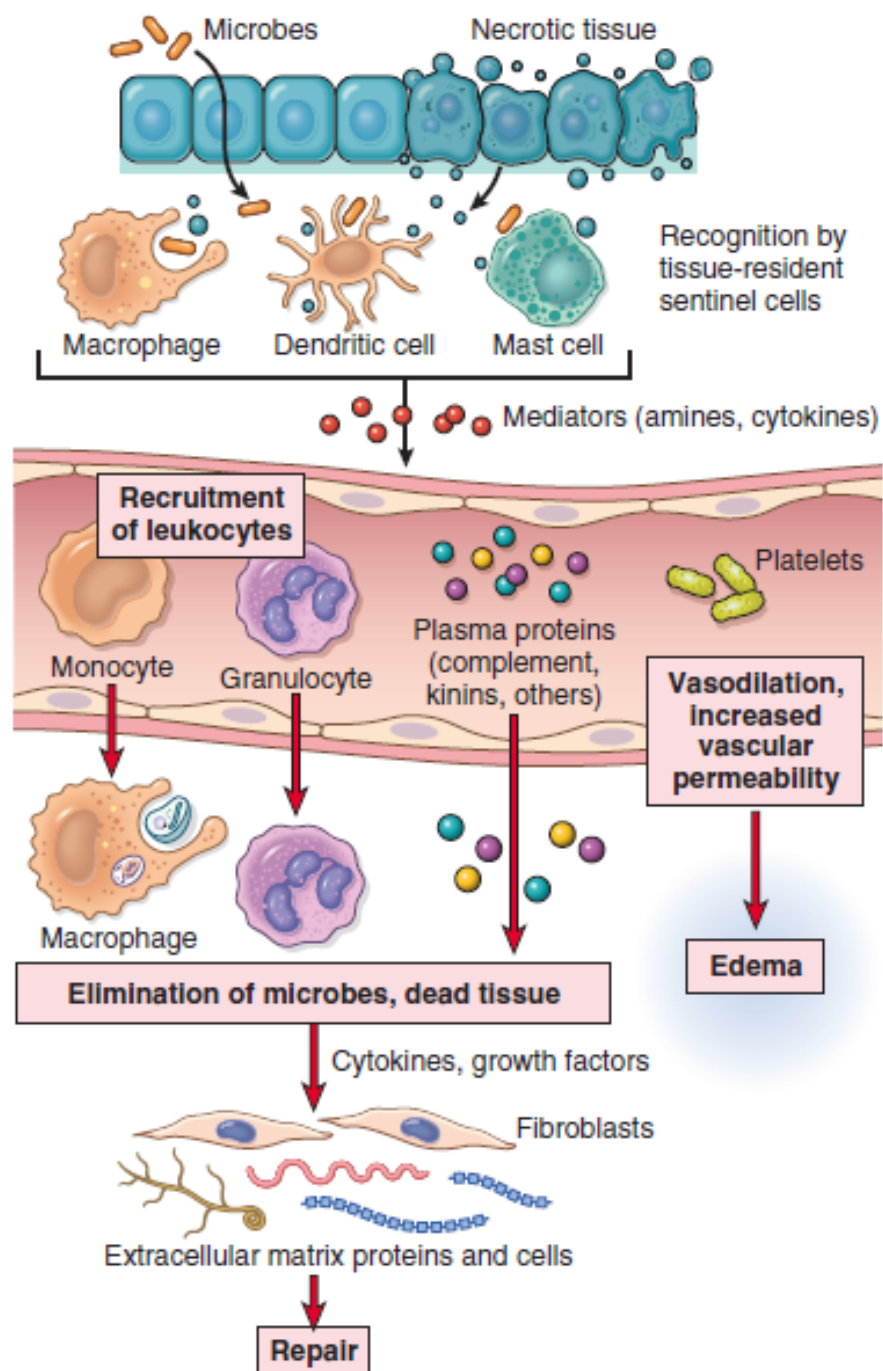



Figure 3.1 Sequence of events in an inflammatory reaction. Sentinel cells



- **Components of inflammation :**
- The major components in the inflammatory response are blood vessels and leukocytes
- **Harmful consequences of inflammation:**

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- Inflammatory response to infections mostly accompanied by local tissue damage and associated signs and symptoms like pain and functional impairment.




- But these are usually mild and resolve with time.
- But at times inflammatory response becomes severe and prolonged when it misdirected e.g. allergic reactions) or directed against self



antigens as in autoimmune diseases.

- Chronic low grade inflammation may lead to atherosclerosis or type 2 DM.
- **Local and systemic inflammation:**
- Local when confined to site of injury or infection.



- 
- Systemic when bacteria or viruses grow in blood causing septicemia/sepsis or viremia.
  - **Mediators of inflammation:**
  - Both cellular and vascular components are governed by



chemical mediators ( cell and plasma protein derived).

Microorganisms and necrotic cells stimulate production of these mediators.



- Inflammation can be
  1. Acute
  2. Chronic.
- Acute inflammation is rapid in onset and of short duration (few minutes to few days).
- There is fluid and plasma protein exudation and neutrophils accumulation.



- Chronic inflammation is of longer duration (days to years), and there is influx of lymphocytes and macrophages.
- There is vascular proliferation and fibrosis.

# Difference between Acute and Chronic Inflammation

Feature	Acute	Chronic
Onset	Rapid, minutes or hours	Slow, days
Duration	Short ( Days)	Long ( Weeks, months and years)
Cardinal signs	Present	Absent
Tissue injury and fibrosis	Mild and self limited	Severe and progressive
Inflammatory cells	Neutrophils Macrophages Others	Macrophages Lymphocytes Plasma cells Others
Local and systemic signs	Prominent	Less signs and symptoms



- The main components of acute inflammation are
  1. A vascular reaction
  2. A cellular response
- Both are activated by mediators/chemicals that are derived from plasma proteins and various cells.



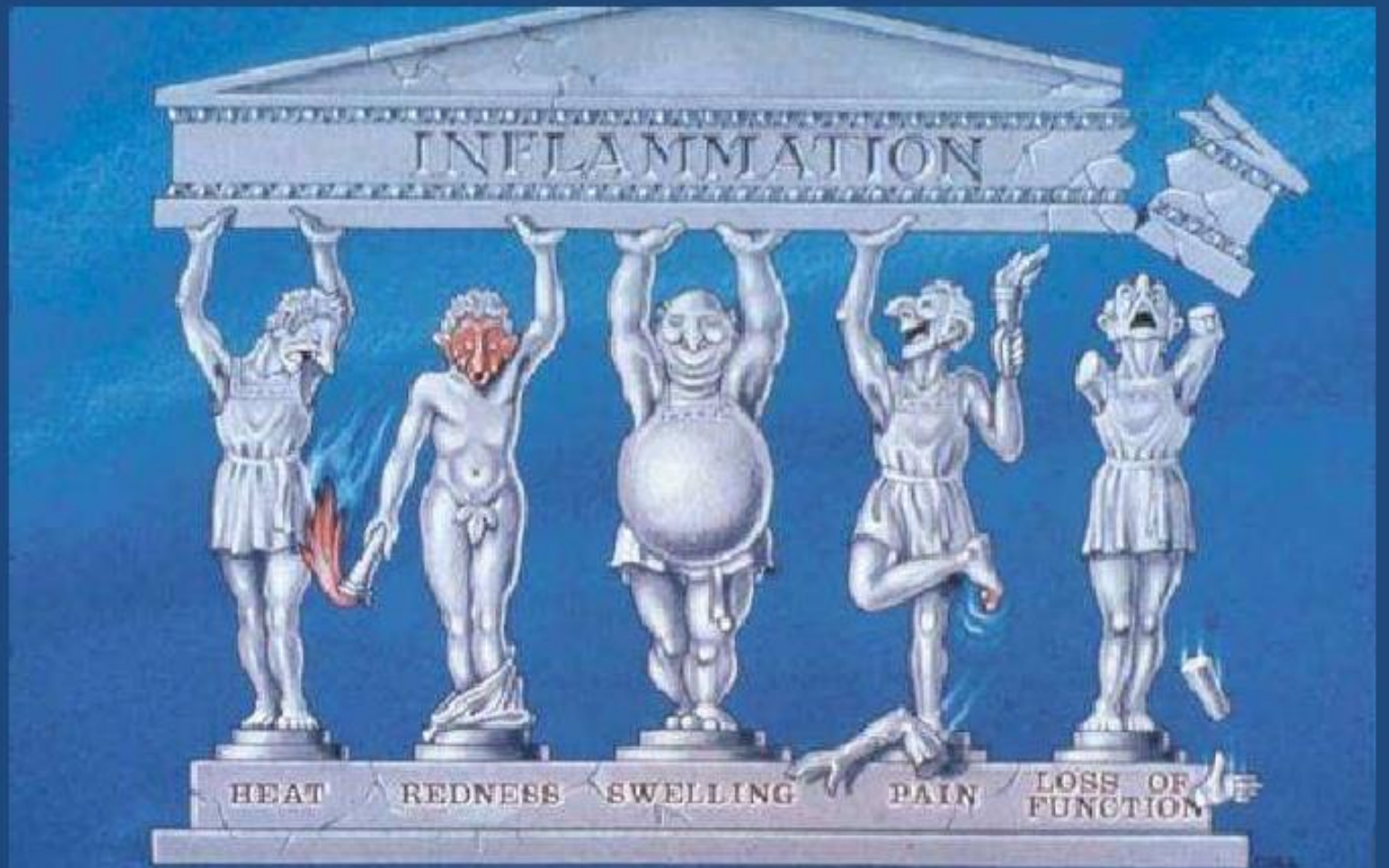
- The outcome of acute inflammation is either
  1. Elimination of the injurious stimulus or
  2. Persistent injury resulting in chronic inflammation.
- The external manifestations of acute inflammation (cardinal signs)



1. Heat (calor)
  2. Redness (rubor)
  3. Swelling (tumor)
  4. Pain (dolor)
- Aulus Celsus (2000 years)
5. Loss of function (functio laesa)  
(Rudolph Virchow).
- These signs occur due to vascular changes and cell recruitment.



# The Cardinal Signs of Inflammation





- Stimuli or causes of Acute Inflammation:

1. Infections (bacterial, viral, fungal, parasitic) are most common and medically important causes.
2. Trauma (blunt and penetrating)
3. Physical and Chemical agents (thermal injury, e.g., burns or frostbite,  $\text{CCl}_4$ , drugs etc.).



4. Tissue necrosis (from any cause) triggers inflammation.
  - Certain molecules released from necrotic cells.
5. Foreign bodies (splinters, dirt, sutures)
  - Even endogenous substances can be harmful (gout).



- Immune reactions (hypersensitivity reactions).
- These are reactions in which body's immune system damages the individual's own tissues (allergic reactions and autoimmune diseases).