

Chronic inflammation

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Prolonged process in which tissue destruction and inflammation occur at the same time

- Chronic inflammation may occur by one of the following 3 ways:

1. following acute inflammation

when the **tissue destruction is extensive**, or the bacteria survive and persist in small numbers at the site of acute inflammation e.g. In osteomyelitis, pneumonia terminating in lung abscess.

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2. **Recurrent attacks of acute inflammation** when repeated bouts of acute inflammation culminate in chronicity of the process e.g. In recurrent urinary tract infection leading to **chronic pyelonephritis**, repeated acute infection of gallbladder leading to **chronic cholecystitis**.

- 3. Chronic inflammation starting **de novo** when the infection with organisms of **low pathogenicity** is chronic from the beginning e.g. Infection with mycobacterium tuberculosis

GENERAL FEATURES OF CHRONIC INFLAMMATION

- Though there may be
- differences in chronic inflammatory response depending upon the tissue involved and causative organisms,
- There are some basic similarities amongst various types of chronic inflammation.

Following general features characterize any chronic inflammation

1. MONONUCLEAR CELL INFILTRATION

- Chronic inflammatory lesions are infiltrated by mononuclear inflammatory cells like phagocytes and lymphoid cells.
- Phagocytes are represented by circulating monocytes, tissue macrophages, epithelioid cells and sometimes, multinucleated giant cells.

The macrophages comprise the most important cells in inflammation from:

- i) **chemotactic factors** and adhesion molecules for continued infiltration of macrophages;
- ii) local **proliferation** of macrophages; and
- iii) **longer survival** of macrophages at the site of inflammation

- The **blood monocytes** on reaching the extravascular space transform into tissue macrophages.
- Besides the role of macrophages in **phagocytosis**, they may get **activated** in response to stimuli such as cytokines (lymphokines) and bacterial endotoxins.
- On activation, macrophages release several biologically active substances e.g. **acid and neutral proteases, oxygen-derived reactive metabolites and cytokines**.
- **These products bring about tissue destruction, neovascularisation and fibrosis.**

- Other chronic inflammatory cells include lymphocytes, plasma cells, eosinophils and mast cells.
- In chronic inflammation, lymphocytes and macrophages influence each other and release mediators of inflammation.

2. TISSUE DESTRUCTION OR NECROSIS

- Central features of most forms of chronic inflammatory lesions.
- This is brought about by **activated macrophages** which **release**
- A variety of biologically active substances e.g. **Protease, elastase, collagenase, lipase, reactive oxygen radicals,**
- Cytokines (IL-1, IL-8, tnf-a),
- Nitric oxide,
- Angiogenesis growth factor etc

3. PROLIFERATIVE CHANGES

- As a result of necrosis, proliferation of **small blood vessels** and **fibroblasts** is stimulated resulting in formation of **inflammatory granulation tissue**.
- Eventually, healing by fibrosis and collagen laying takes place.

SYSTEMIC EFFECTS OF CHRONIC INFLAMMATION

- associated with following systemic features:
- 1. **Fever** Invariably there is mild fever, often with loss of weight and weakness.
- 2. **Anaemia** chronic inflammation is accompanied by anaemia of varying degree.
- 3. **Leucocytosis** generally there is relative lymphocytosis in these cases.
- 4. **ESR** elevated in all cases of chronic inflammation.
- 5. **Amyloidosis** Long-term cases of chronic suppurative inflammation may develop secondary systemic (AA) amyloidosis.

TYPES OF CHRONIC INFLAMMATION

- Conventionally into 2 types:
- 1. **Chronic nonspecific inflammation** When the irritant substance produces a non-specific chronic inflammatory reaction with formation of granulation tissue and healing by fibrosis, it is called chronic non-specific inflammation e.g. chronic osteomyelitis, chronic ulcer, lung abscess.
- A variant of this type of chronic inflammatory response is chronic suppurative inflammation in which infiltration by polymorphs and abscess formation (which are seen in acute inflammation) are additional features e.g. actinomycosis.

- **2. Chronic granulomatous inflammation** In this, the injurious agent causes a characteristic histologic tissue response by formation of granulomas e.g. tuberculosis, leprosy, syphilis, actinomycosis, sarcoidosis etc

- Chronic inflammation may result either following acute inflammation or after its recurrent attacks, or may start afresh. ☹
- A few general features of chronic inflammation are infiltration by mononuclear cells, tissue destruction and proliferation of blood vessels and fibroblasts. ☹
- Chronic inflammation may produce systemic features such as fever, anaemia, leucocytosis, raised ESR and development of secondary amyloidosis in long standing cases. ☹
- Chronic inflammation is of 2 main types: non-specific and granulomatous type