

Classification of inflammation

- **1. Exudative inflammation :**
 - a. Serous inflammation
 - b. Catarrhal inflammation
 - c. Fibrinous inflammation
 - d. Purulent (suppurative) inflammation
 - e. Haemorrhagic inflammation
- 2. Necrotic (alterative) inflammation**
- 3. Productive (Granulomatous) inflammation**

1. Exudative inflammation

a. Serous inflammation

- Accumulation of fluid relatively rich in protein on body surfaces, especially serous surface, represents serous inflammation.
- Etiological factors:
 - Hypersensitivity reactions
 - Bacterial and viral tissue injury
 - Physical and chemical tissue injury
- Pus in the exudate → seropurulent inflammation
 - Mucus in the exudate → seromucous inflammation
 - Fibrin in the exudate → serofibrinous inflammation

b. Catarrhal inflammation

- Exudative inflammation occurring on the mucous membranes of the respiratory and gastrointestinal tracts and producing a watery exudate of serum and mucus.
- Etiological factors:
 - Bacteria and viruses
 - Chemical substances like phenol and cresol
- Grossly the surface appears reddened and swollen and may be covered with or contain, a clear to slightly opaque, thick fluid.
- Microscopically, the vessels of the Lamina Propria and the submucosa are hyperemic and desquamated epithelial cells and neutrophils can be seen.

c. Purulent inflammation

- Inflammation with exudate consisting primarily of died neutrophils and cellular debris.
- The predominant feature of the exudate is the formation of pus, a creamy liquid.
- Etiological factors:
 - Pyogenic bacteria: Staphylococci, Streptococci,...
 - Chemical substances like silver nitrate and turpentine

Abscess: a circumscribed collection of pus.

Phlegmon: Diffuse suppurative inflammation that spreads primarily in loose fibrous connective tissue without sharp demarcation.

Pyogenic membrane: the inner lining of an organising abscess, histologically characterised by granulation tissue, fibrinous and necrotic debris and polymorphonuclear leukocytes.

Fistula: opening through the skin

Pyemia: Septicemia caused by pyogenic microorganisms in the blood, often resulting in the formation of multiple abscesses.

Metastatic abscess: a secondary abscess formed, at a distance from the primary focus, as a result of the transportation of pyogenic bacteria by the lymph or bloodstream.

Cellulitis: bacterial infection involving the inner layers of the skin. It specifically affects the dermis and subcutaneous fat.

Pyorrhea: the purulent inflammation of the tissues surrounding the teeth.

Pustule : A small inflamed elevation of the skin that is filled with pus.

Folliculitis: The purulent inflammation of the hair follicles of the skin.

Furuncle: the purulent inflammation of the hair follicles and the sebaceous glands of the skin.

Acne: inflammation of the hair follicles and accompanying sebaceous glands of the skin and subcutaneous connective tissue.

Carbuncle: Carbuncles are clusters of furuncles connected subcutaneously.

d. Haemorrhagic inflammation

- Hemorrhagic inflammation is characterized by large numbers of erythrocytes in the exudate.
- Etiologic factors:
 - Microorganisms like bacillus anthracis, hemolytic streptococci, clostridium species etc.
 - Viruses like **Infectious** canine **hepatitis** and Infectious **laryngotracheitis** (ILT)
 - Pathogenic Leptospira spp
 - Some chemical substances that cause acute poisoning like phenol arsenic and phosphorus, etc.
 - Some protozoa
- This type of inflammation arises quickly and is often fatal. There is massive damage to endothelium.
- The inflamed area is usually necrotic and filled with blood.

e. Fibrinous inflammation

- Exudative inflammation with exudation of fibrinogen containing serum that polymerizes to fibrin outside the blood vessels.
- Fibrinous inflammation occurs in more severe conditions.
- When fibrin forms a distinct layer covering an ulcer, it is referred to as a *fibrinous pseudomembrane*.
- If there is extensive necrosis of underlying areas so that the fibrin is tightly adhered to the tissue and is harder to peel away, it is called a diphtheritic membrane. This term diphtheritic membrane came from human diphtheria, caused by *Corynebacterium diphtheria*.

2. Necrotic (alterative) inflammation

- Necrotic inflammation is characterized largely by necrosis and degeneration.
- Inflammations characterized by tissue loss (alteration= tissue loss) are examined into two groups:
 - **Necrotic inflammation of epithelial surfaces:** (such as the trachea, intestine, nasal passages).
Examples: necrobacillosis in cattle, Rinderpest, ecthyma disease
 - **Necrotic inflammation of organs:** characterized by the formation of necrosis in organs and, in some cases, the formation of caverns resulting of necrosis melting.
Examples: necrobacillosis, pulmonary tuberculosis, Campylobacteriosis in sheep, etc.

3. Productive (Granulomatous) inflammation

- Granulomatous inflammation is a distinct type of chronic inflammation.
- It is marked by the formation of granulomas, which are small collections of modified macrophages called epithelioid cells and are usually surrounded by lymphocytes. Granulomas often contain giant, or Langhans, cells that form from the coalescence of epithelioid cells.
- Granulomas are seen in a wide variety of diseases, both infectious and non-infectious.
- Examples of infections characterized by granulomas include tuberculosis, paratuberculosis, glanders, brucellosis,...
- Examples of non-infectious agents causing granulomas formation are Cholesterine crystals, uric acid crystals, splinters of wood or iron, operation residues.

Formation of a Granuloma. Circulating monocytes that become attracted by chemokines and inflammatory mediators to the extravascular lesion adhere to the vascular wall and transmigrate between endothelial cells into the perivascular extracellular matrix stroma and migrate to form the granuloma.

Classification of inflammation according to the duration

❑ **Acute inflammation** – has a short duration, ranging from a few hours to a few days. Vascular and exudative processes predominate. Marked clinically by the signs of heat, redness, swelling, pain, and loss of function. Neutrophils are often predominant, lymphocytes may be present.

❑ **Chronic inflammation** –inflammation of prolonged duration, usually weeks to months and even years.

The response is characterized predominantly by lymphocytes and macrophages, tissue necrosis, and accompanied by tissue repair, such as healing, fibrosis, and **granulation tissue formation**, all of which may occur simultaneously.

❑ **Subacute inflammation** – a condition intermediate between chronic and acute inflammation.