

CHRONIC INFLAMMATION

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Objectives

- Define chronic inflammation.
- Explain general feature of chronic inflammation.
- Mention types of chronic inflammation.
- Describe sequels of chronic inflammation.
- Describe systemic effects of chronic inflammation

A 41 years old woman complains of excessive menstrual bleeding and pelvic pain of 4 months. She uses an intrauterine device for contraception. Endometrial biopsy reveals an excess of plasma cells and MQ within the stroma. The presence of these cells & scattered lymphoid follicles is evidence of which of the following conditions?

- a. Acute inflammation
- b. Granulation tissue
- c. Mensturation
- d. Chronic inflammation

What is Chronic Inflammation



CHRONIC INFLAMMATION

It is inflammation of prolonged duration (weeks, months or years) in which active inflammation, tissue injury, and healing occur at the same time.

Causes

- i. Progression from acute inflammation
- ii. Recurrent attacks of acute inflammation e.g. repeated acute inflammation of gall bladder leads to chronic cholecystitis.
- iii. Chronic inflammation from the start:
 - Persistent infections by micro-organisms that are difficult to eradicate (e.g. mycobacteria, certain viruses).
 - Autoimmune disease: e.g. Rheumatoid arthritis.
 - Prolonged exposure to potentially toxic agents e.g. inhaled silica and plasma LDL.

General features of chronic inflammation

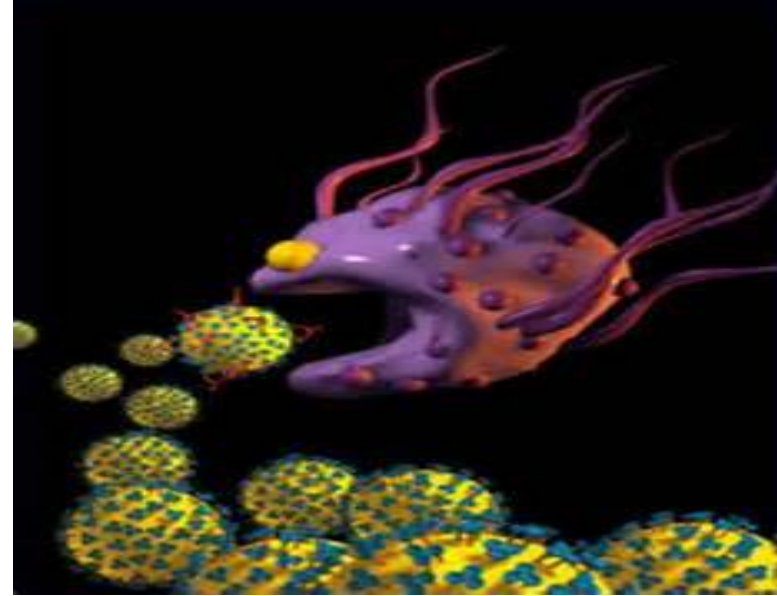
1. Infiltration by mononuclear cells.
2. Tissue destruction or necrosis induced by the products of the inflammatory cells
3. The arterioles near the inflamed site often show fibrous proliferation of intima (endarteritis obliterans 'EAO') leading to narrowing of the lumen.
4. Proliferative changes involving new vessel formation (angiogenesis), fibroblast activation and proliferation with the formation of granulation tissue and fibrosis.



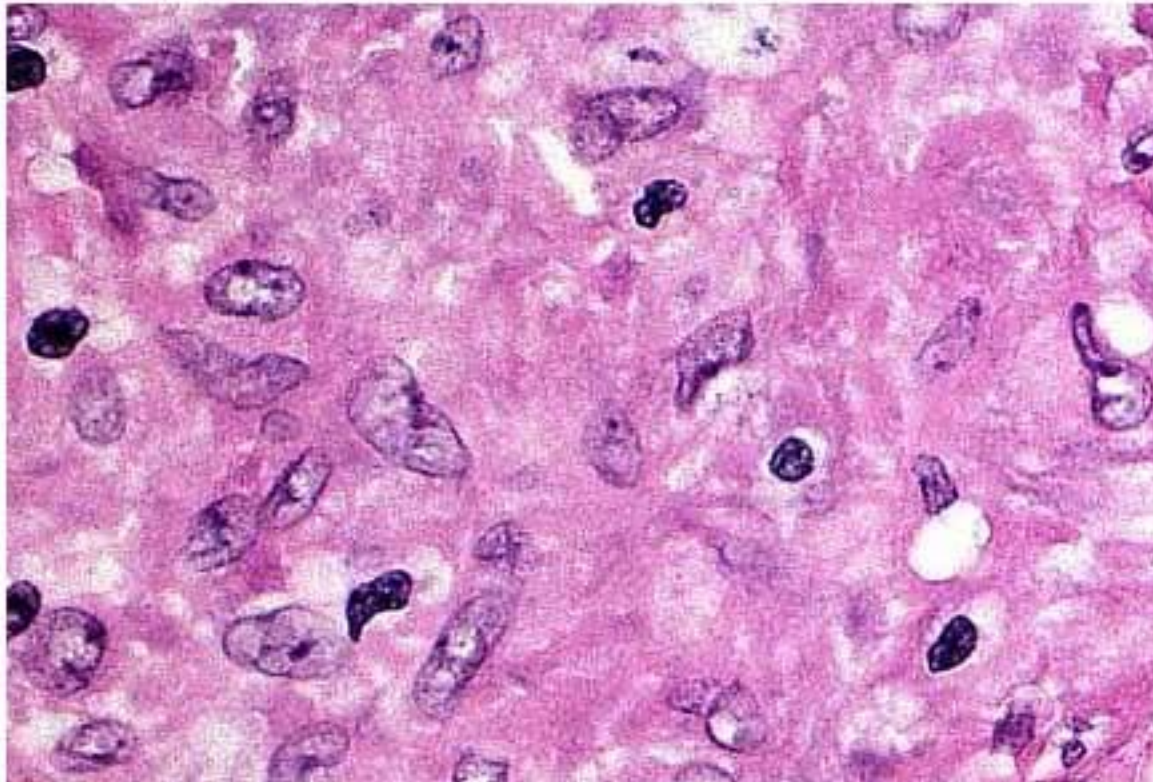
Chronic Inflammatory Cells

Macrophages .1

- * The dominant cells of chronic inflammation
- MQs are tissue cells derived from circulating blood monocytes .
- * MQs may become **activated**, through 2 pathways:
 - Classical pathway(M1): induced by bacterial endotoxin and other microbial product or by cytokines e.g. IFN- γ .
 - Alternative pathway(M2): induced by cytokines e.g. IL-4 & IL-13.



.Once activated, these MQs are called **Epithelioid cells**

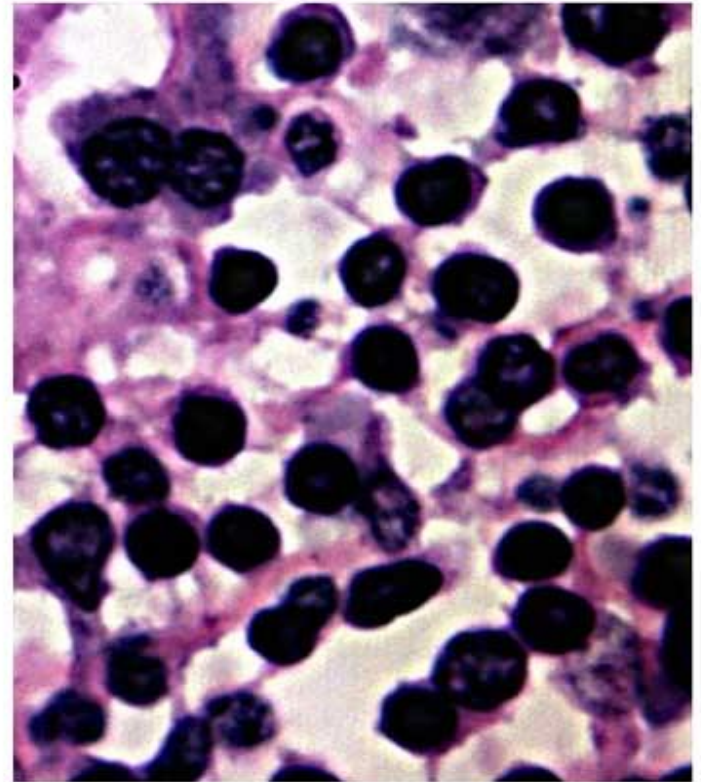


Lymphocytes .2

- Lymphocytes are mobilized to any specific immune reaction (i.e. infection) or non-immune inflammation (e.g. infarction or tissue trauma)

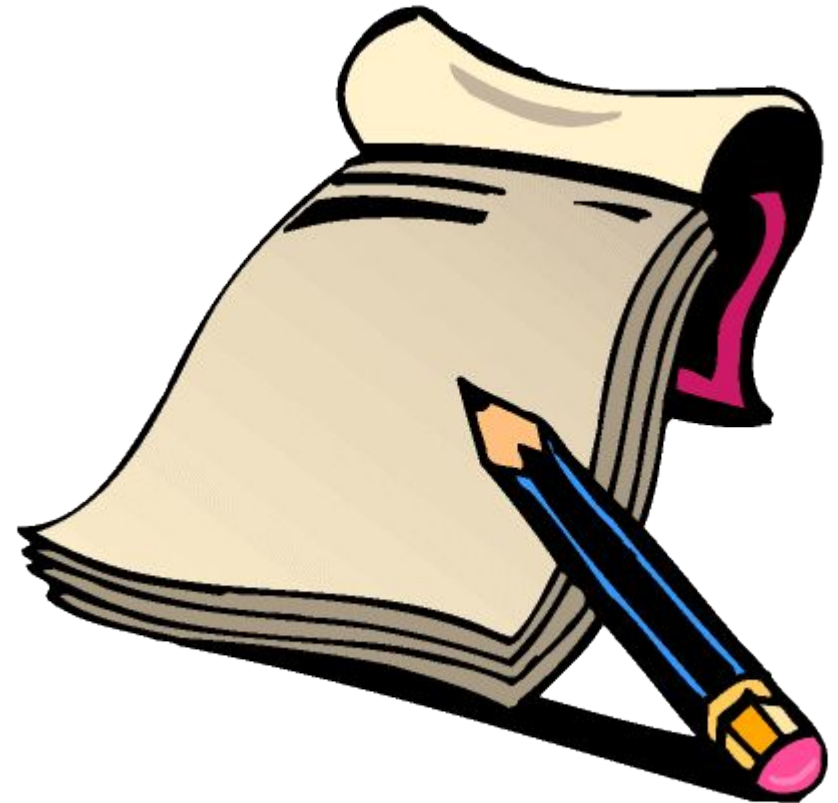
Lymphocytes

Smaller than a granulocyte, with a relatively large dark nucleus, a thin rim of pink cytoplasm and an indistinct cell membrane. Often it is difficult to see any cytoplasm at all.

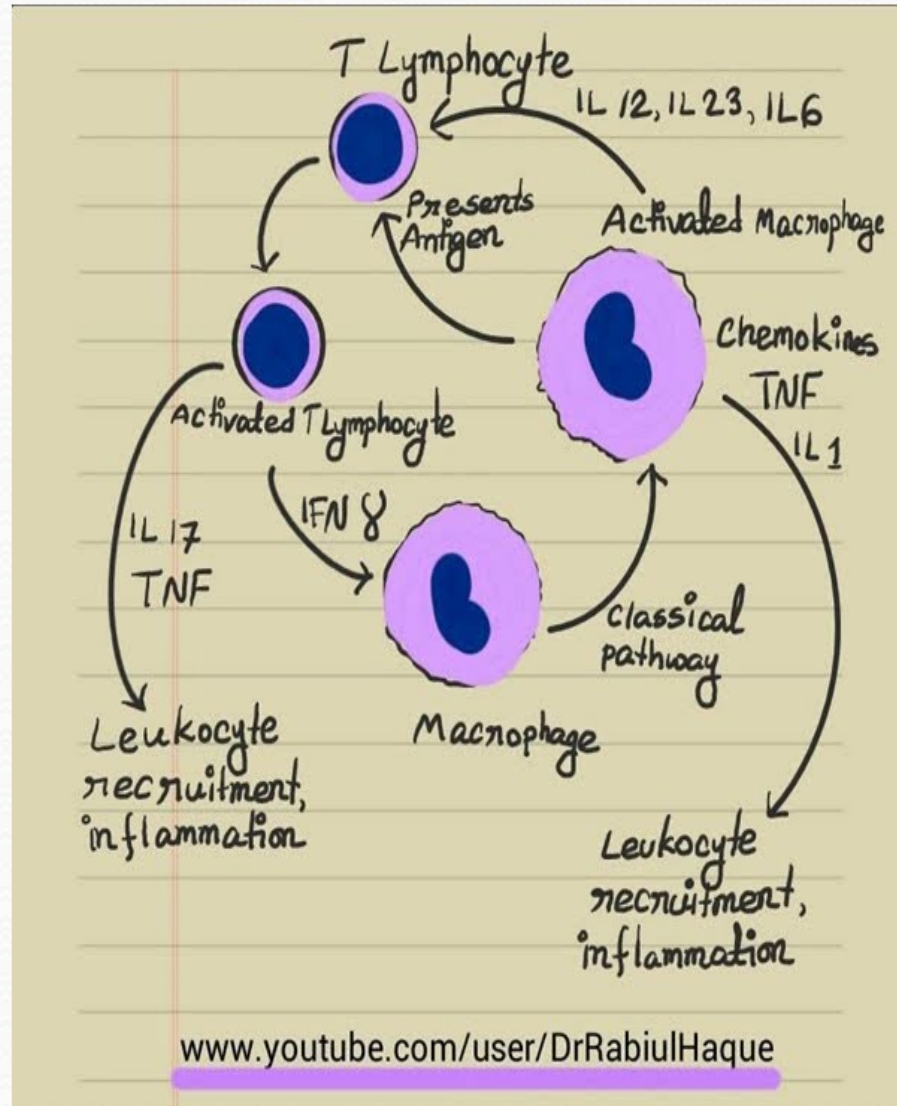


Lymphocytes

- Lymphocytes and MQs interact in a bidirectional way, and these interactions play an important role in chronic inflammation.



Bi-directional interaction of T Lymphocyte and Macrophage



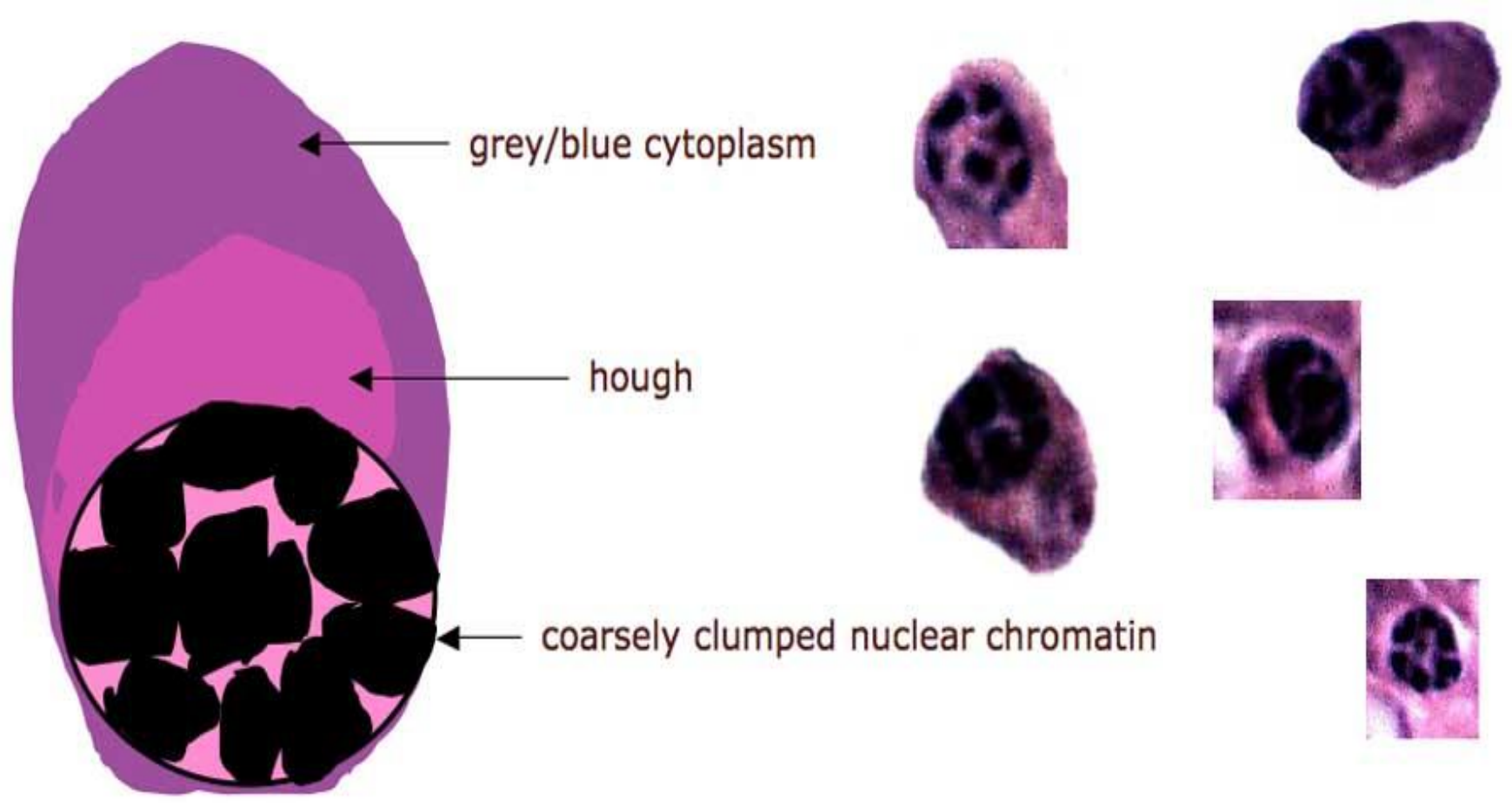


Note

Although the presence of neutrophils is the hallmark of acute inflammation , many forms of chronic inflammation may continue to show extensive neutrophilic infiltrates, as a result of either persistent microbes or necrotic tissues, or mediators elaborated by MQs. Such inflammatory lesions are called “ acute on chronic” inflammation.

Plasma cells .3

- Develop from activated B lymphocytes and produce Ab directed against persistent antigens in the inflammatory site.



4. Eosinophil

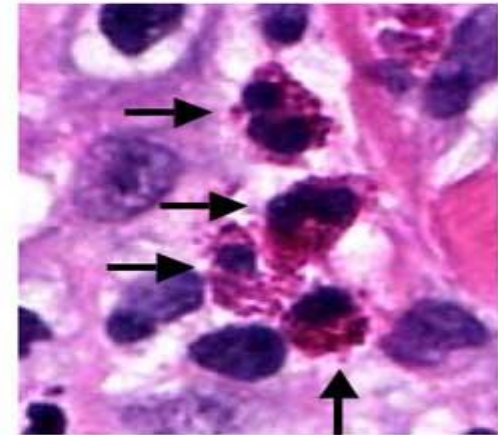
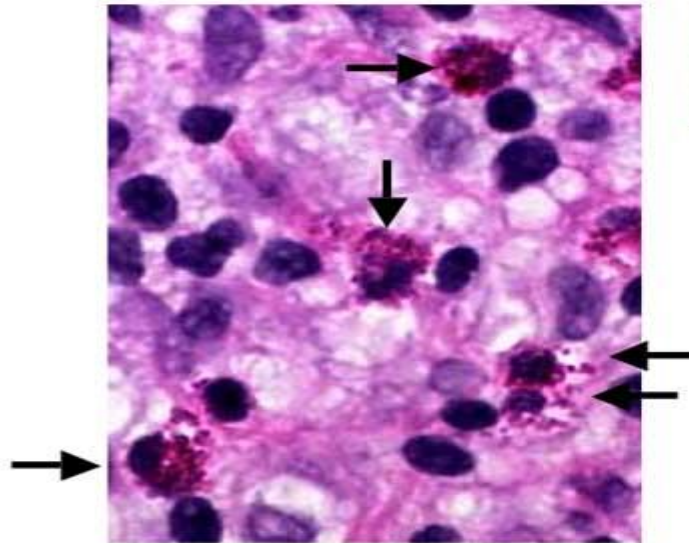
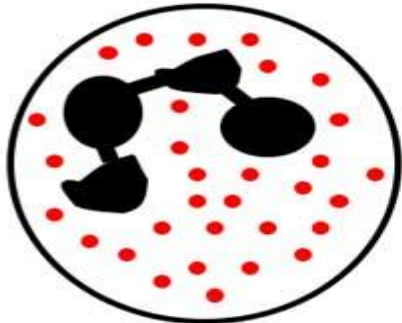
- Characteristically found in inflammatory sites around parasitic infection or associated with allergies. Eosinophil granules contain major basic protein, a highly charged cationic protein that is toxic to parasites but also causes epithelial cell necrosis.

Eosinophils

Virtually the same morphology as a neutrophil but with bright eosinophilic granules in the cytoplasm in an H & E stain (only a few are shown here).

As with neutrophils, the bands linking the nuclear lobes are seldom discernible in an H & E section and are best seen in a Giemsa or similarly stained slide.

If a basophil could be shown it would have dark basophilic granules.



Types Of Chronic Inflammation

1. Chronic non-specific inflammation

- ❑ They show the characteristic microscopic features of chronic inflammation i.e. chronic inflammatory cells, tissue destruction, fibrosis and EAO.
- ❑ They usually follows acute inflammation.

2. Chronic specific (granulomatous) inflammation

- ❑ It also shares the common microscopic features of chronic inflammation . It is characterized by aggregates of activated MQs , forming granuloma. Each granuloma has a specific microscopic feature distinguishing it from others e.g. -Caseation in TB -Bilharzial ova in Bilharziasis
- ❑ They usually start as chronic.

Systemic effects of chronic inflammation

1. Fever: low grade fever.
2. Leukocytosis : as in acute inflammation, but generally there is relative lymphocytosis.
3. Cachexia (wasting & weakness): which is mainly the result of TNF- mediated appetite suppression and mobilization of fat stores.
4. ESR: is elevated in all cases of chronic inflammation.
5. Amyloidosis : (secondary systemic amyloidosis 'AA')



**THANKS
FOR
LISTENING**