



# ***Pathology***

***Subject :***

***Lec no*** ∅ lecture-5 inflammation

***Done By*** ∅ Hala AL Beshtawe


وَقُلْ رَبِّ زِدْنِي عِلْمًا

Granulomatous Inflammation من العكس من الجسم يحس ايه ماده لم يستطع القضاء عليها مثل البكتيريا النمره أو fungal

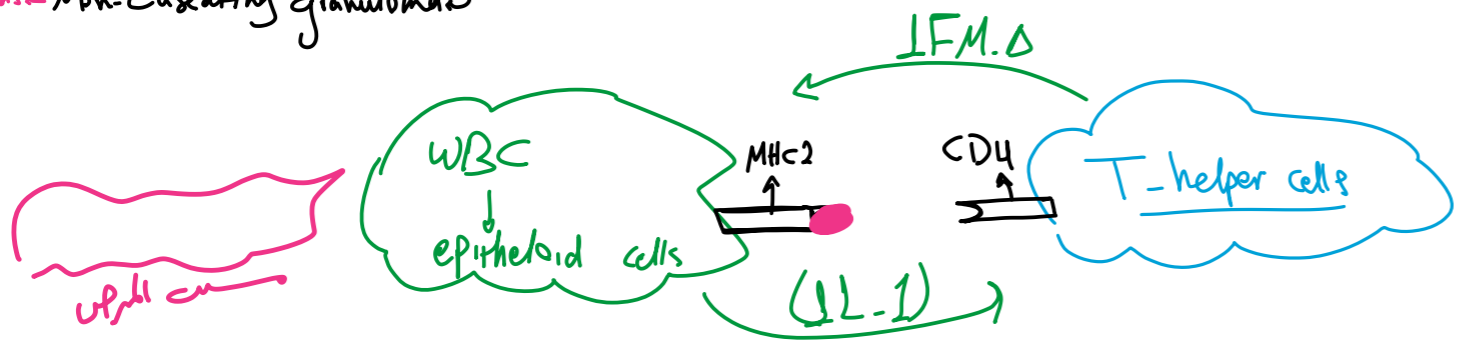
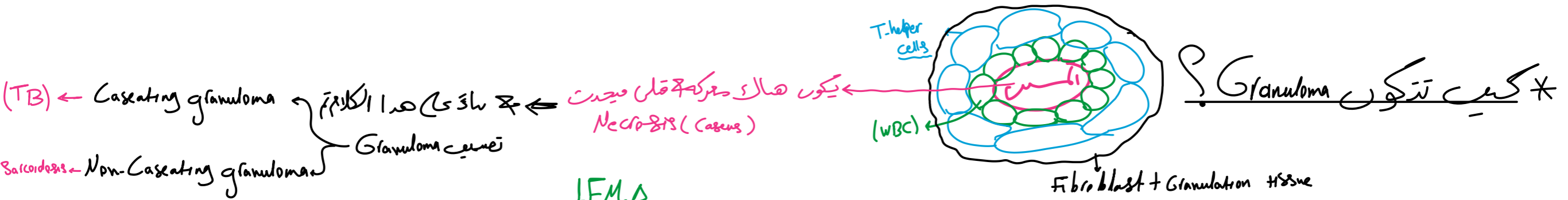
Granulomatous inflammation → chronic Inflammation (تجمع من أشكال) (Granuloma) (تيسر يورد)

Is a distinctive pattern of chronic inflammation characterized by aggregates of activated macrophages called epithelioid cells.

Granulomatous Inflammation is caused by:

- Causes of Granulomatous Inflammation
1. Bacterial infection: Tuberculosis, Leprosy, Syphilitic gumma & Cat-scratch disease. 
  2. Parasitic infections : Schistosomiasis.
  3. Fungal infections : Histoplasma capsulatum & Blastomycosis.
  4. Inorganic metals or dusts: Silicosis & Berylliosis.
  5. Foreign body: Suture, breast prosthesis.
  6. Unknown: Sarcoidosis.

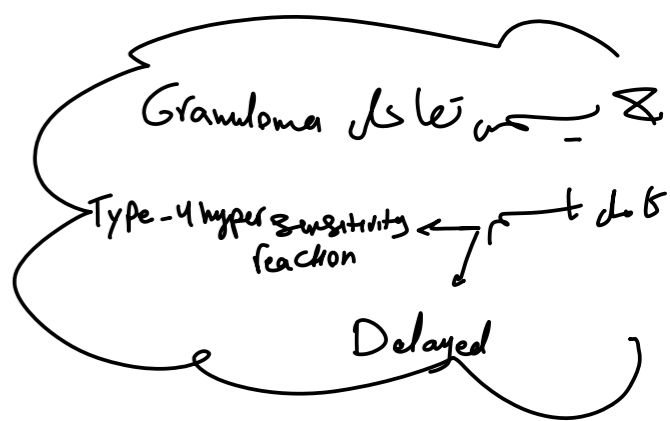
↳ Idiopathic



ال Macrophages تفرج حمض نووي السكاريدي تظهر على (MHC 2) نقل الحماض بها  
 و يأتي معها T-helper cells التي تحتوي على مستقبل (CD4) يرتبط بالبروتين و نقل الحماض من (WBC)  
 هذا الارتباط يحفز ال T-helper cells على افرار  $IFN-\gamma$  فتعمل activation of Macrophages  
 الذي يحمي التعبير ال  $IL-1$  فتعمل **Bidirectional-activation**

Functions of  $IFN-\gamma$

- 1) Activation of Macrophages ( $M_1$ )
  - larger epithelium cells
  - pink squamous
  - epithelioid cells
- 2) Stimulate Macrophages fusion
  - ادماج اكثر من خلية مع بعضها فيوجد اكثر من نواة فتكون Giant cells و Multi-Nucleated
  - lungers cells



The most Important mediator in Granulomatous Inflammation?? ( $IFN-\gamma$ ) Interferon - Gamma

Microscopically the granuloma consists of :


A central aggregate of epithelioid cells <sup>activated macrophages</sup> or activated macrophages, (large, & flat with pink granular cytoplasm & indistinct cell boundaries), surrounded by

<sup>T-helper cells type 1</sup> A collar of lymphocytes secreting cytokines responsible for ongoing macrophage activation. <sup>IFN-γ</sup>

A surrounding rim of fibroblasts & connective tissue (scarring), due to cytokines elaborated by the activated macrophages; this rim is useful in containing the causative injurious agent, **But** it may cause harmful tissue injury!

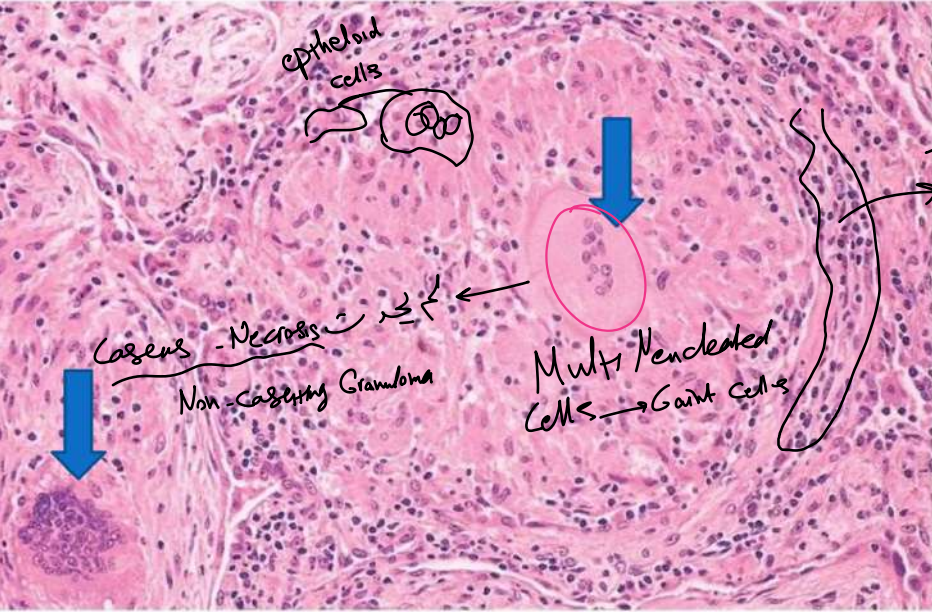
<sup>Macrophages</sup> A multinucleated giant cell (s) measuring 40 to 50 microns in diameter may be found in some granulomas, with two or more nuclei {e.g., Langhans giant cell in TB granuloma}. <sup>تحت تاثير IFN-γ</sup>

**Sometimes, caseous necrosis is seen, especially in TB** granulomas due to combine effects of hypoxia & FR injury. Identification of T.B. bacilli in such granuloma, using special ZN stain is necessary to confirm the diagnosis of TB.

 <sup>تدید</sup> <sup>Caseous - Necrosis</sup> <sup>اداکان</sup> <sup>TB</sup> <sup>اولا</sup> <sup>بیم</sup> <sup>که</sup> <sup>علت</sup> <sup>صفت</sup>

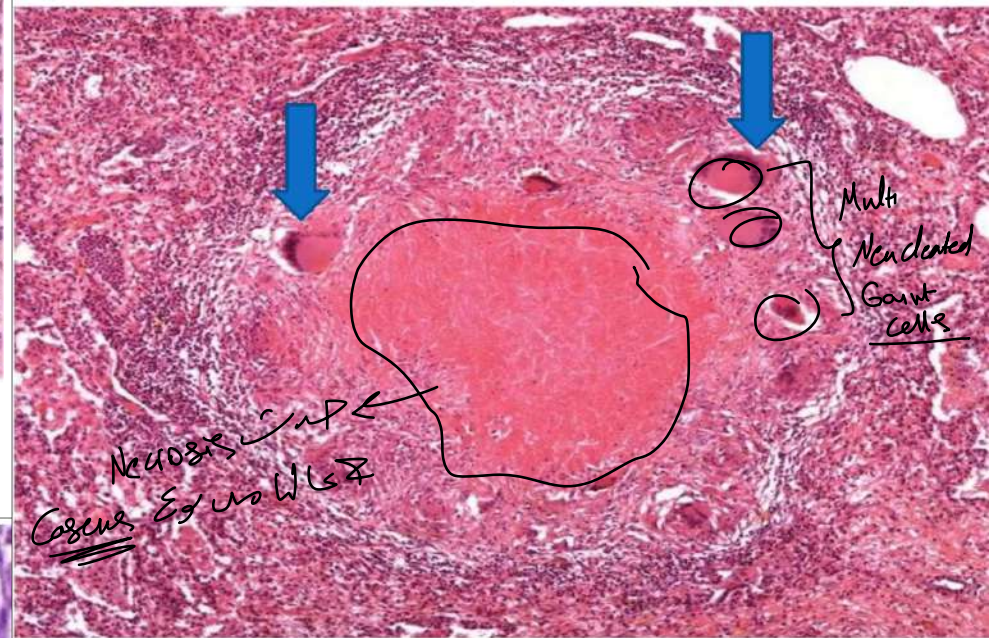
① Acid Fast stain

② Ziehl Nelsen stain



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Figure 48 : Microscopic view of granulomatous inflammation ,showing rounded aggregates of epithelioid cells ,giant cells (arrows) & surrounding lymphocytes with fibrosis .



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Figure 50 : Caseating tuberculous granuloma showing central caseous necrosis (pink) with peripheral epithelioid cells & Langhans giant cells (arrows), with lymphocytes & fibrosis .

تحتوى الحويصلات على الحبيبات لانه الوجود طويلا

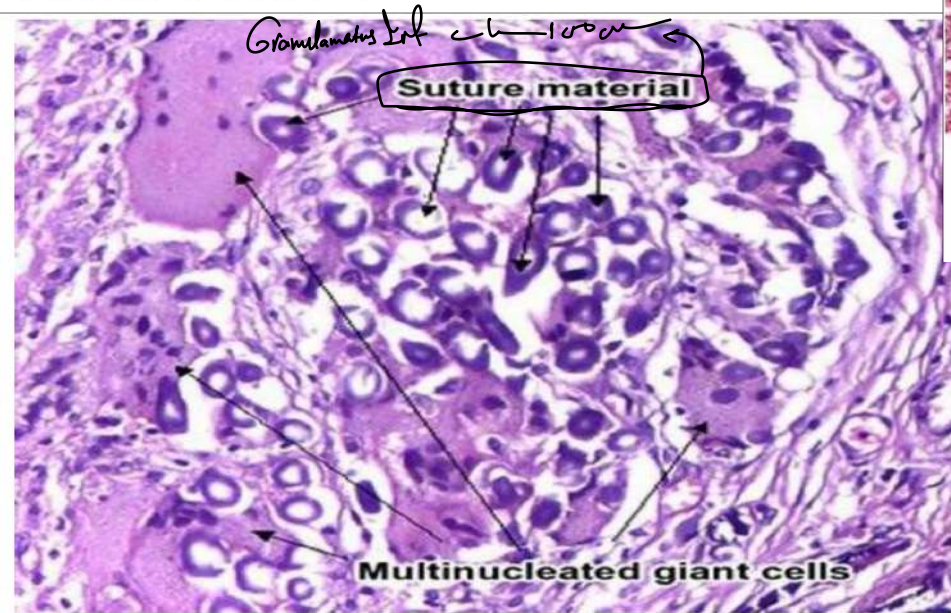


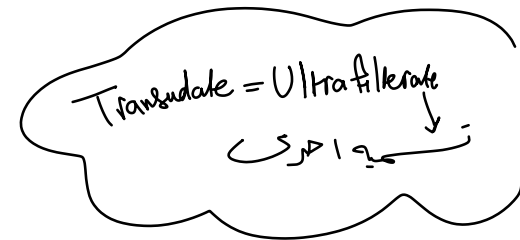
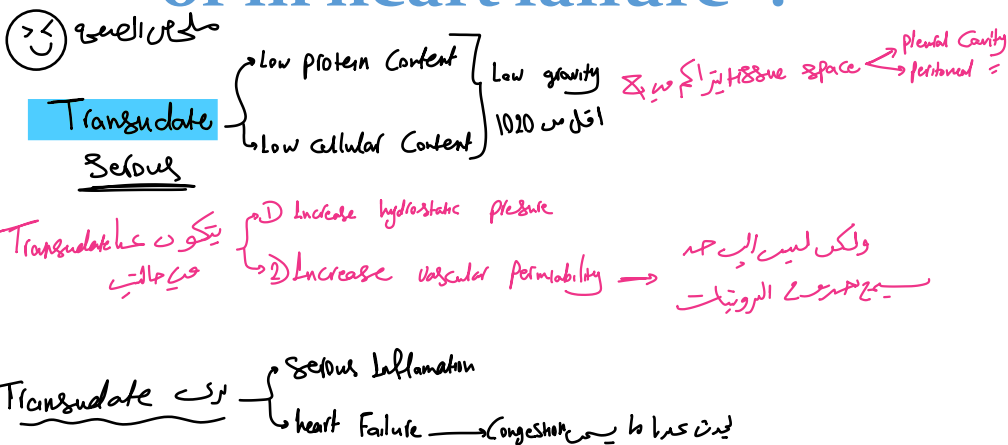
Figure 49 : Microscopic view of foreign-body giant cell granuloma ,surrounding particles of suture material .

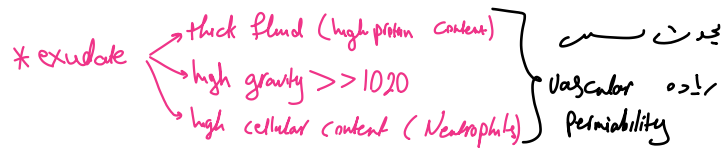
# Definitions :

## Transudate :

Is a **clear serous fluid** that has **low protein content** , **low specific gravity less than 1020** , and a **low cellular content**.

It accumulates in tissue spaces & in serous cavities , when increased intravascular fluid escapes from intravascular compartment due to increased hydrostatic pressure or increased vascular permeability as in **serous inflammation** or in **heart failure** .

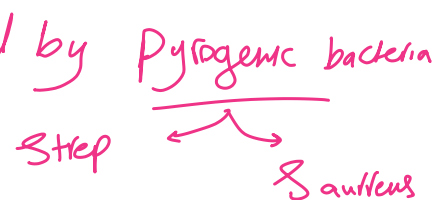




**Exudate** : A thick fluid of high protein content, high specific gravity more than 1020 , and high cellular content mainly neutrophils, accumulate in tissue spaces , seen in acute suppurative inflammation due to escape of plasma protein and leukocytes due to increased vascular permeability.

**Pus** : A thick creamy yellowish , greenish or blood – stained fluid consisting of neutrophils , necrotic debris , with high protein content and high specific gravity more than 1020.

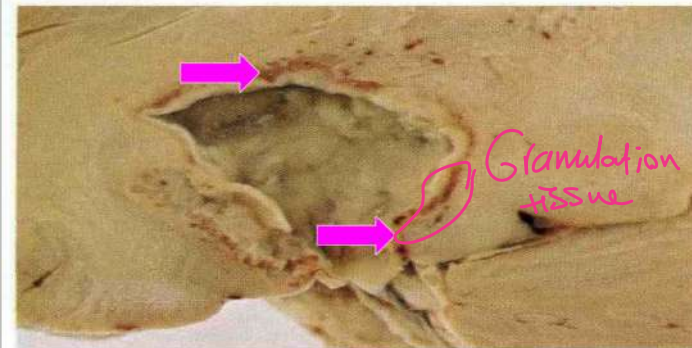
It accumulates in severe suppurative inflammation.



# Abscess : قناه تخرجه + bus → healed by Fibrosis

- A localized collection of pus caused by suppurative inflammation.
- The central part of the abscess consists of a mass of acidophilic (pinkish) amorphous semi fluid debris composed of dead tissue cells ,and dead leukocytes.
- This in turn is surrounded by a zone of viable neutrophils, which is surrounded by a highly vascularized connective tissue called *granulation tissue* and *fibrosis* which act as a barrier for further spread of the inflammatory process to the surrounding tissues.

Figure 51 : Chronic brain abscess, its inner wall of is covered with grayish-green pus. The abscess is enclosed by a fibrous capsule , the brownish rim is a granulation tissue (arrows) .



9.11 Chronic abscess : brain



Ulcer : → *تحدث عن طبقة epithelial surface*

Is a **local defect or excavation of the surface of the skin** , or the **lining of a viscous organ** (gastro-intestinal , respiratory or genitor-urinary tracts).

It is produced by **sloughing** of inflammatory necrotic tissue. *تفتت الخلايا المبروزة بسبب موتها*

In other words it is a **localized loss of the continuity of an epithelial surface.**

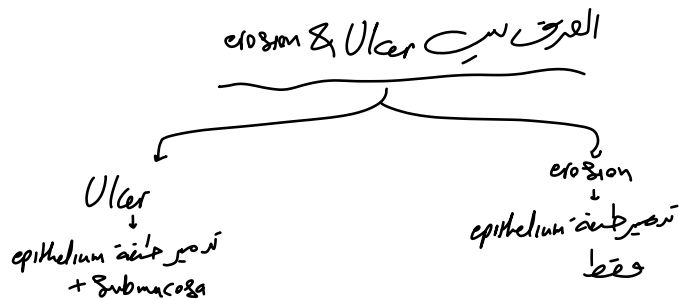




Figure 52 : Gross appearance of an aphthous ulcers in the tongue , caused by viral infections.

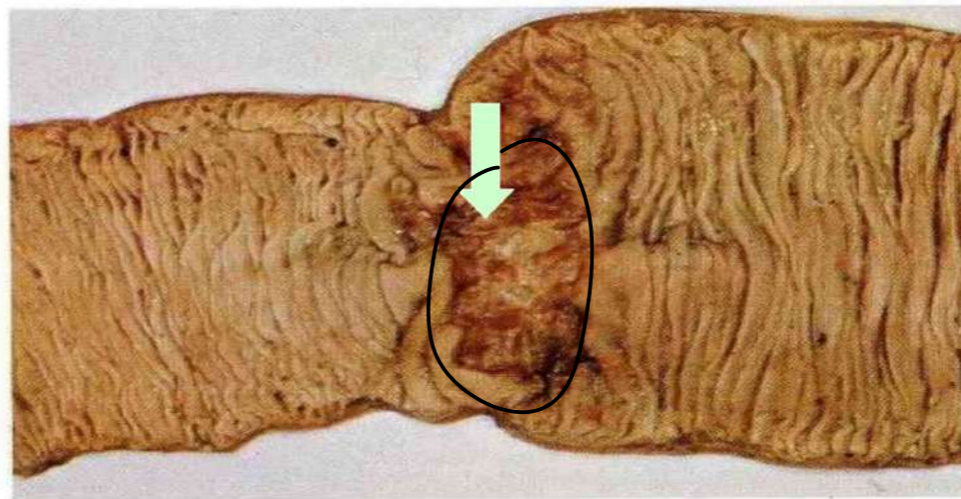
Figure 53 : Gummatous ulcer (syphilis) .Skin. A large ,deep ulcer of the abdominal wall. The ulcer base is covered by a necrotic slough.



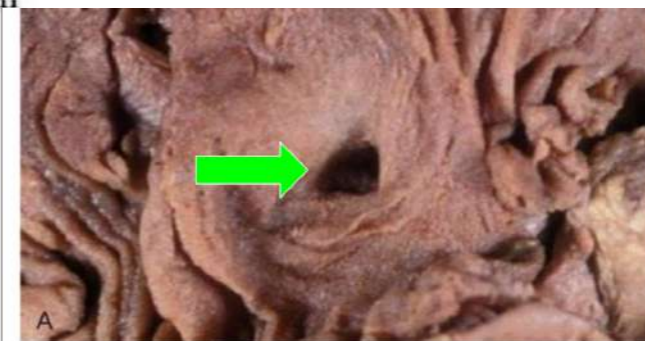
1.16 Gummatous ulcer: skin

فحص صرعان الرقود

Figure 54 : TB ulcer: ileum : A circumferential ulcer . Contraction of the ulcer scar tissue may produce a localized stricture, with intestina obstruction, and dilatation of the proximal segment (right of the figure).



4.35 Tuberculous ulcers and stricture: ileum



F 55 : Morphology of an ulcer . A, gross appearance of chronic duodenal ulcer.



B, Low power view of the ulcer crater (pit) with an acute inflammatory exudate in the base.

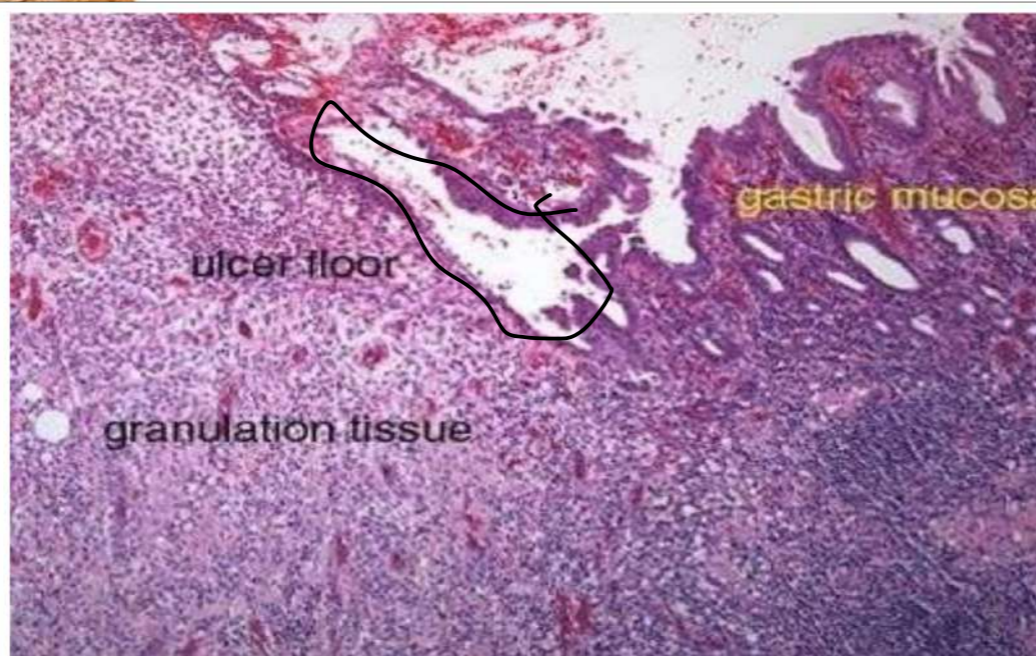


Figure 56 : Microscopic view of Chronic gastric ulcer ,showing loss of epithelial lining with acute inflammation & vascular granulation tissue at the ulcer floor .