Lecture:

Chronic Inflammation.

Conditions for the development of chronic inflammation.

- Persistence damaging factor
- Immunological failure, and the development of secondary immunodeficiency due to humoral or cellular disorders.
- disorders of humoral immunity: concentration change IgA, IgG, IgM in blood, increasing their levels in the tissues;
- increasing the concentration of the CIC in the blood and tissues.
- disorders of cellular immunity: lymphocytopenia;
- reduction of the total population of T- lymphocytes;
- reduction of T- helpers and T- suppressors;
- change in the ratio of T-helper and T- suppressor;
- decrease in chemotactic activity of leukocytes;
- Also: During the process in a closed circle; violation of regeneration in the outbreak of chronic inflammation; difficulty in restoring homeostasis.

Morphological features of different types of productive inflammation:

LARGE SIGNS

- Lymphoid infiltration (lymphocytes , histiocytes / macrophages, plasma cells);
- Fibrosis / sclerosis;
- Angiogenesis and the formation of granulation tissue;

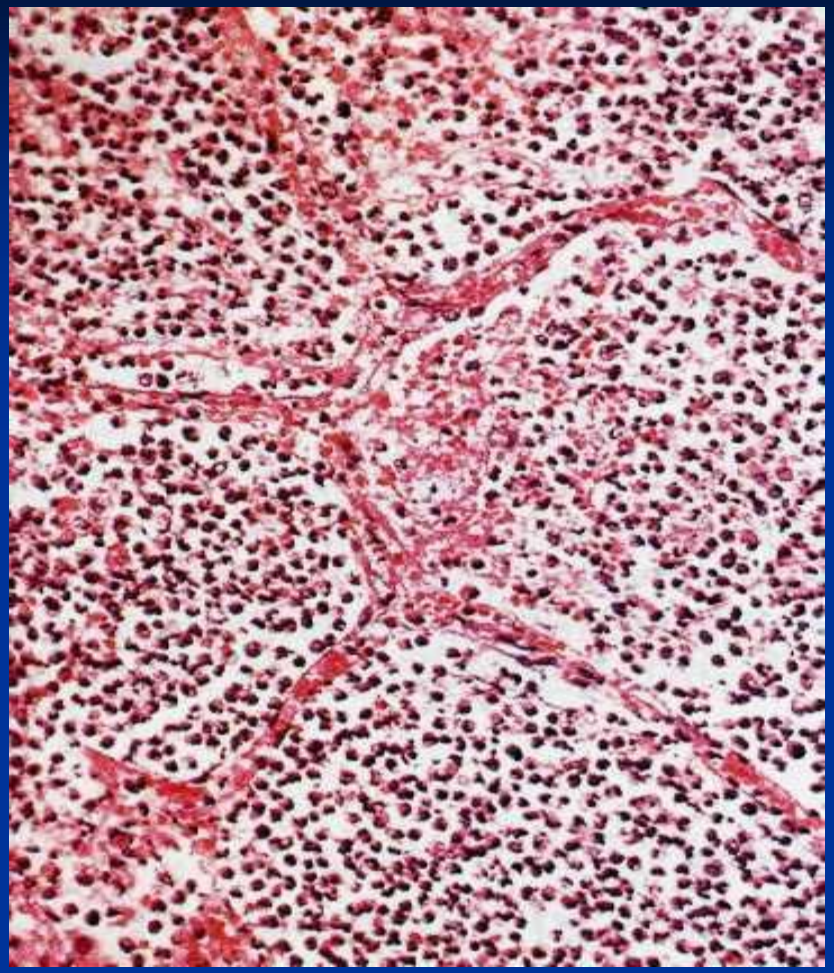
small signs

- necrosis;
- eosinophilic infiltration of (parasitic infections, allergies);
- tissue regeneration, including metaplasy

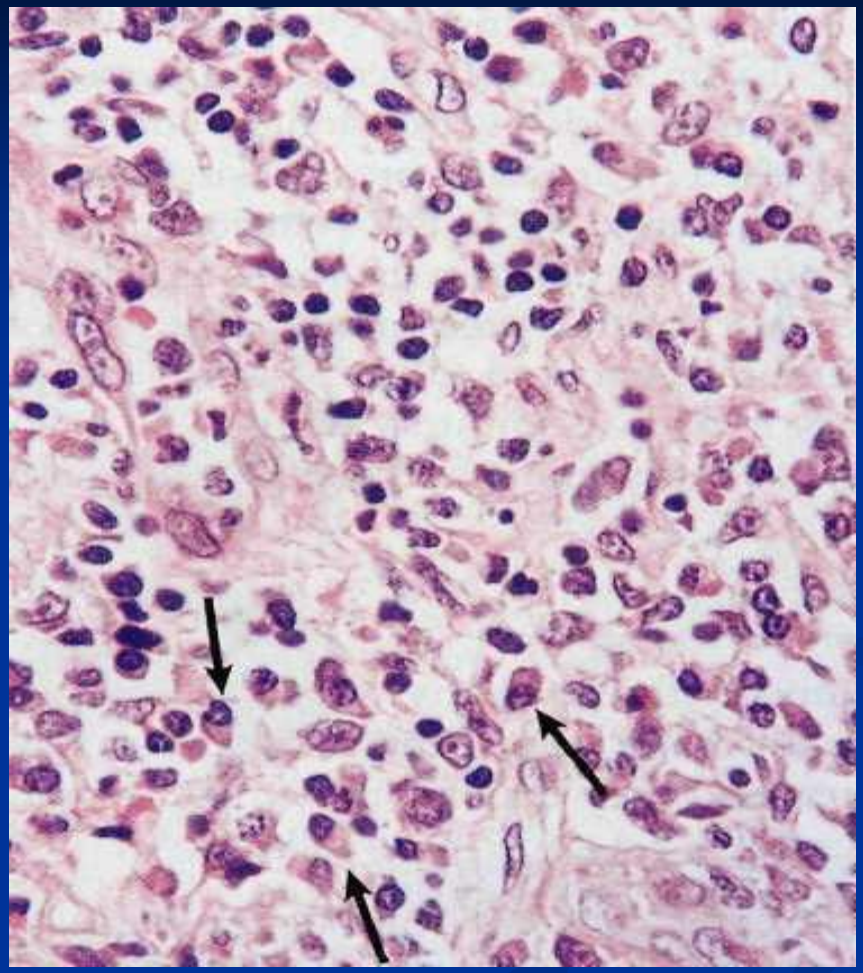
Features of chronic productive inflammation

- 1 Chronic undulating course.
- 2 Localization predominantly in connective tissues and in tissues whose cells retained the ability to proliferate - epithelium of skin, intestine.
- 3 In morphological terms the most prominent
  feature is the formation of granulation tissue.

Inflammation



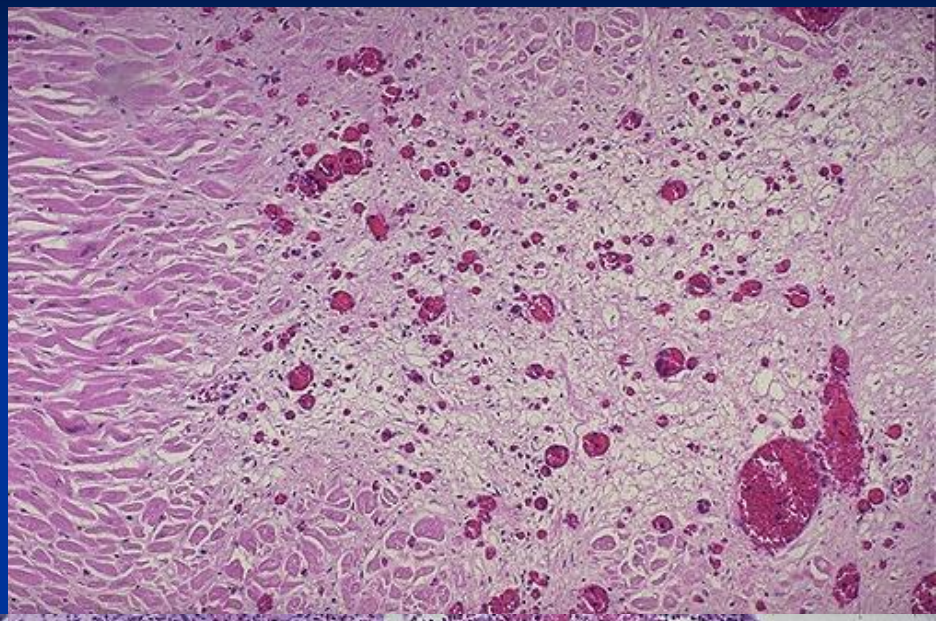
Acute inflammation. A photomicrograph shows densely packed PNL in the alveoli.

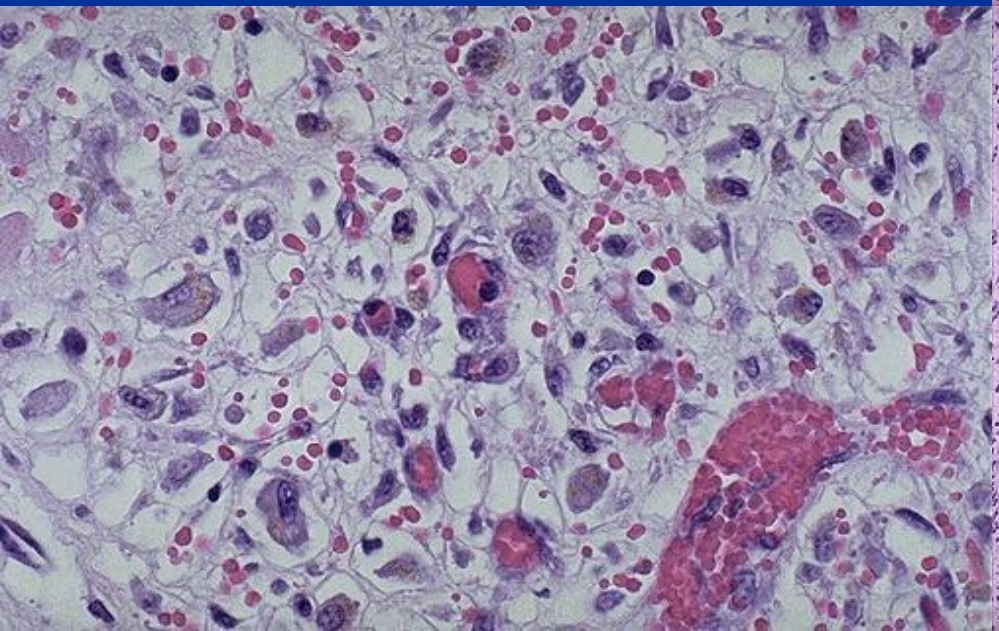


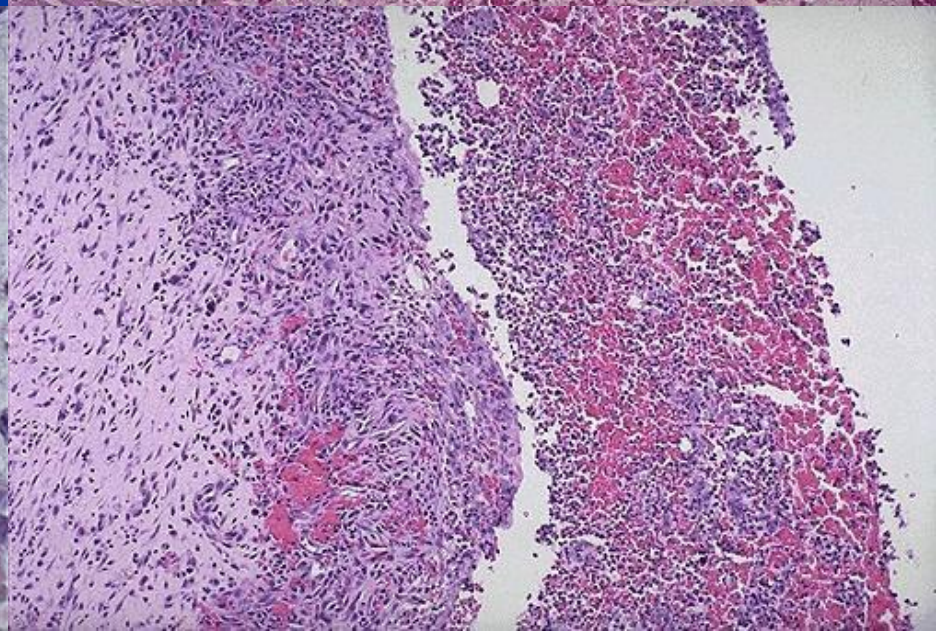
Chronic inflammation. Lymphocytes, plasma cells *(arrows),* and a few macrophages are present.

Chronic inflammation.

- granulation tissue

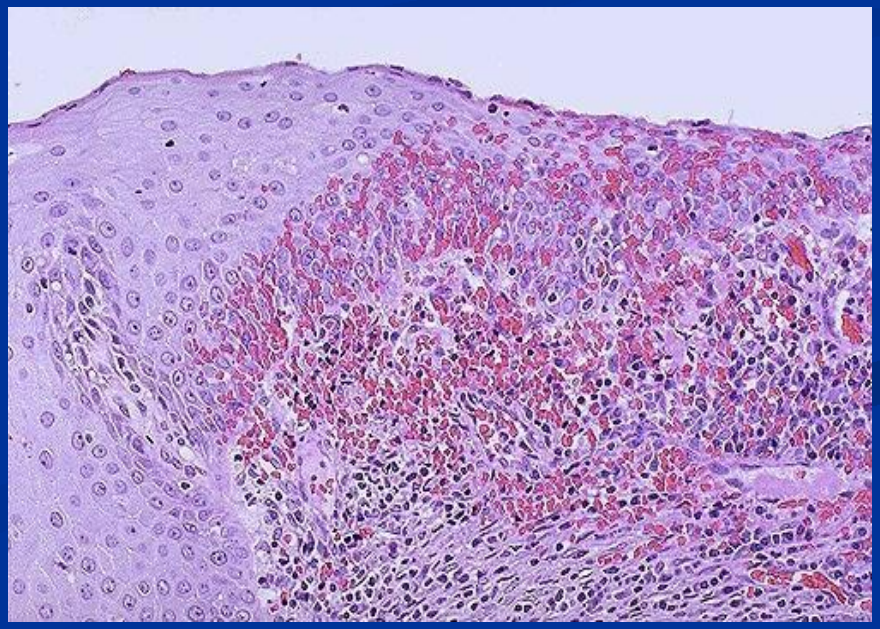






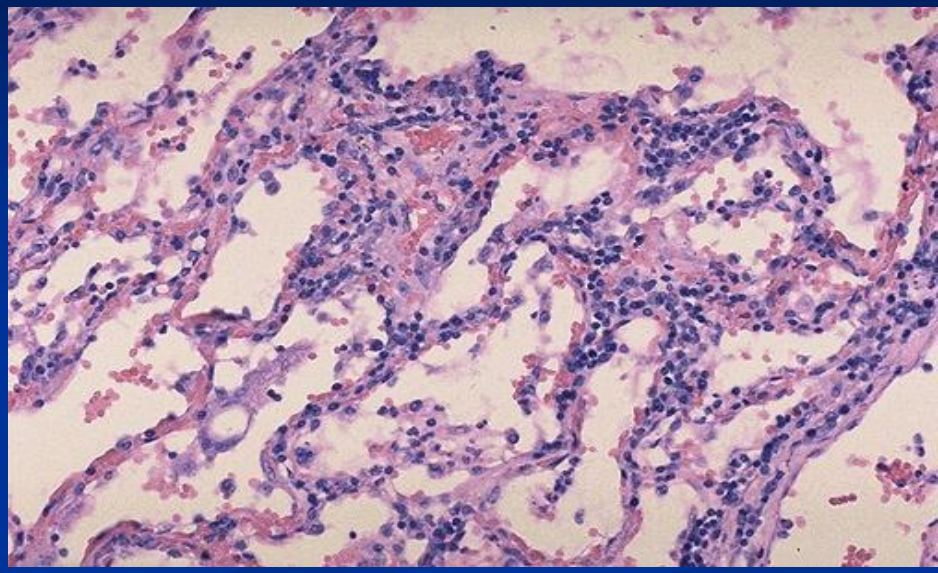
Classification of proliferative (chronic) inflammation.

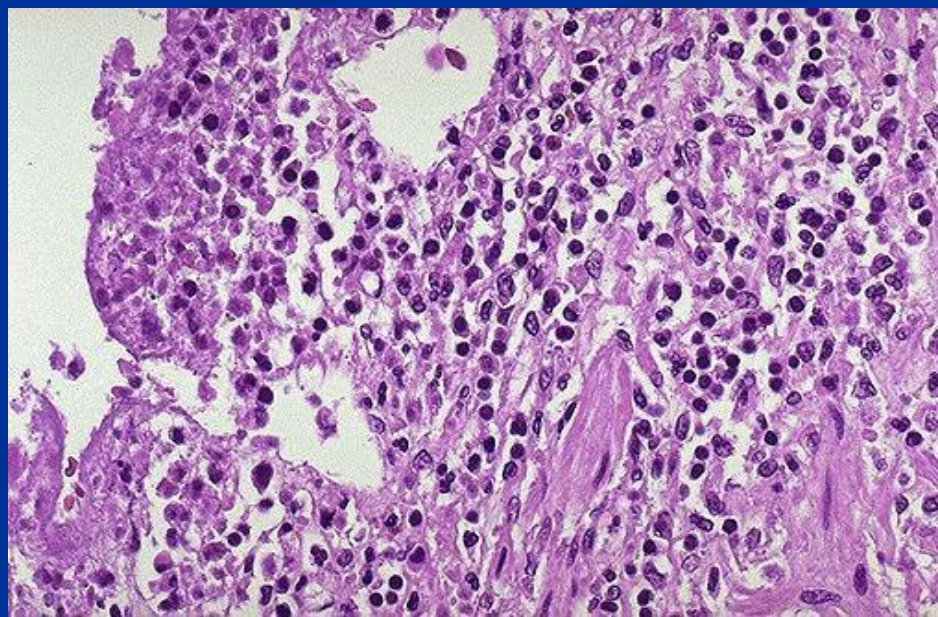
- 1. Interstitial inflammation .
- 2. Granulomatous inflammation .
- 3. Hypertrophic proliferative inflammation with formation of polyps & condylomas.
- 4. Proliferative inflammation around parasites.



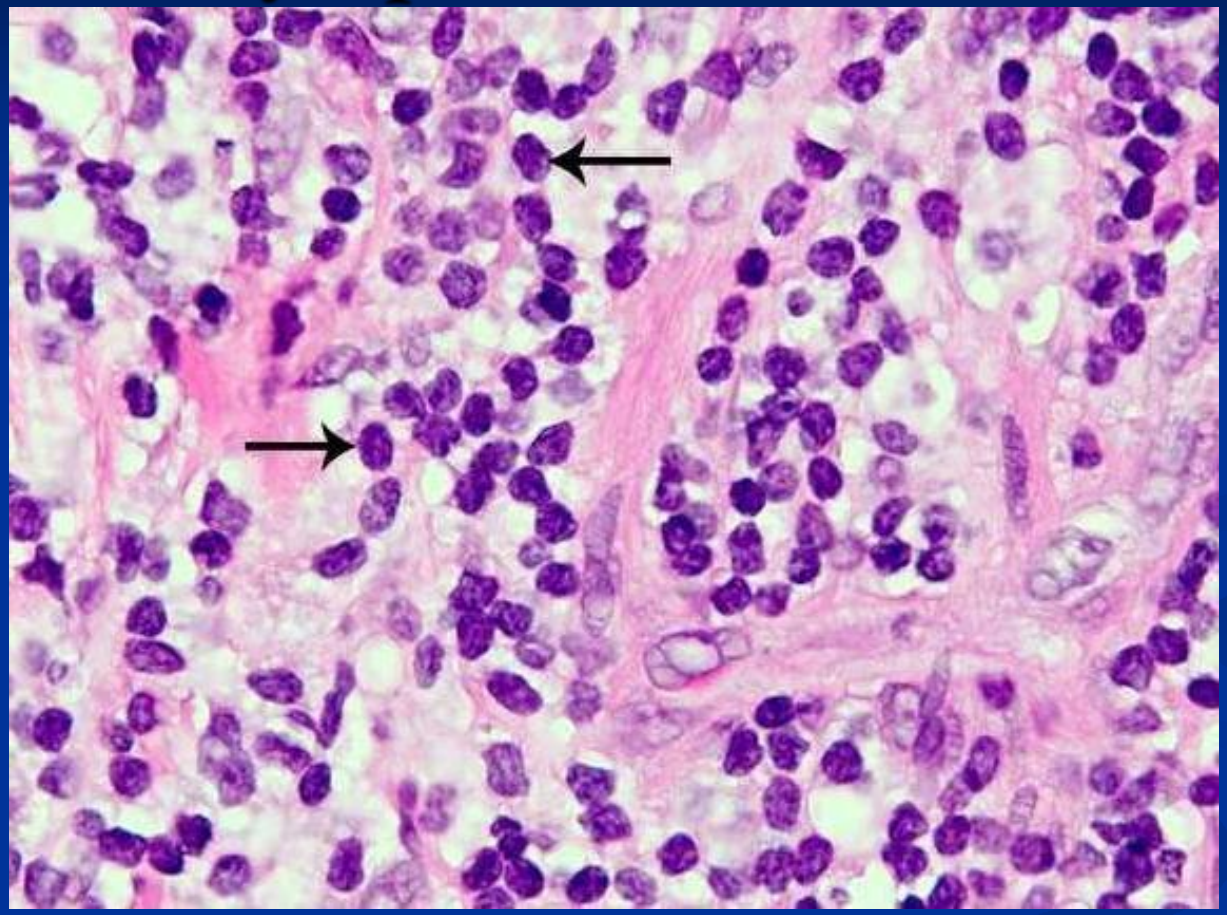
Interstitial inflammation

- Lymphoid infiltration in the stroma;
- Diffuse;
- Fibrosis and sclerosis.

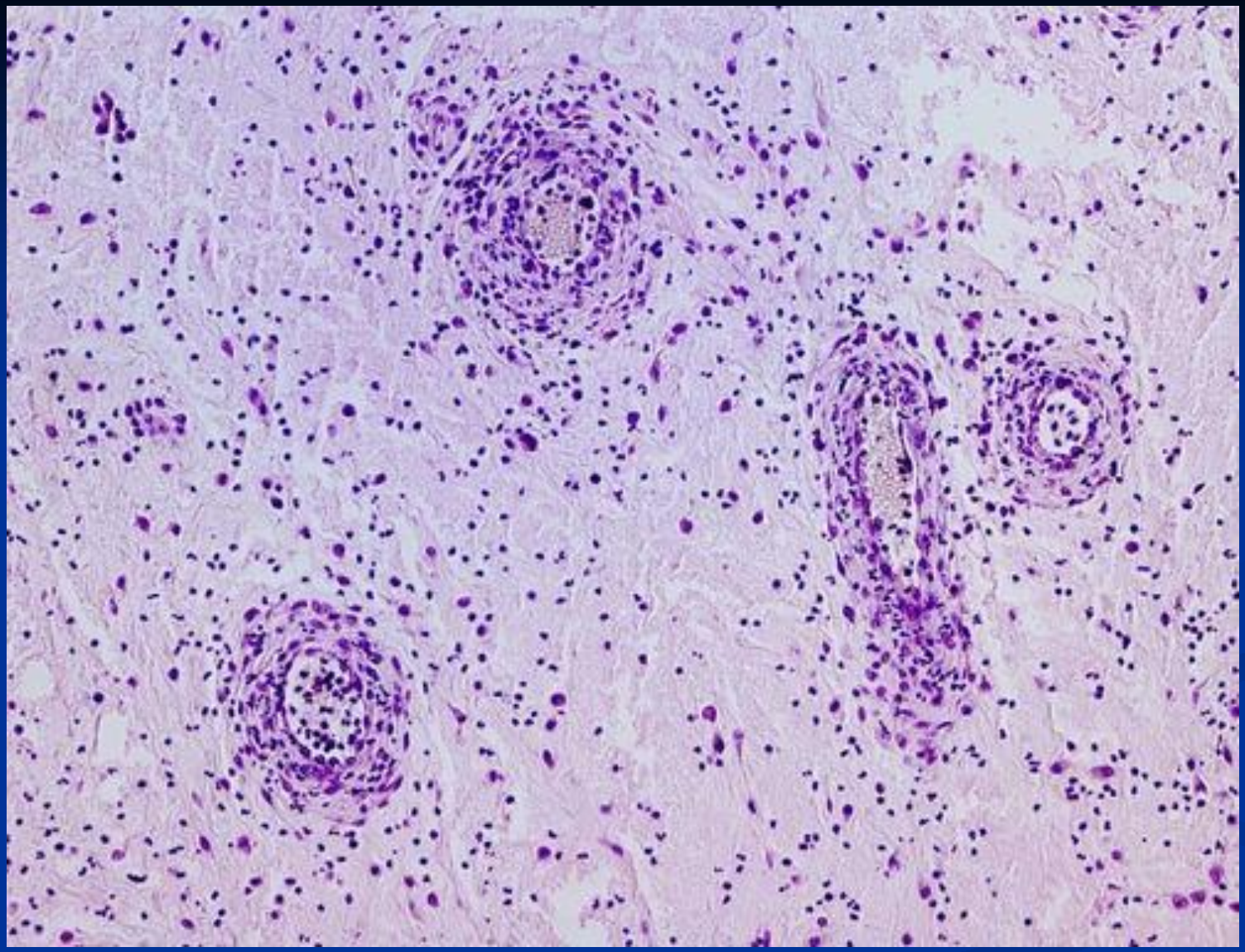




Interstitial inflammation. Lymphoid infiltration.



This example highlights a collection of small lymphocytes (two arrows) that show scant cytoplasm and round nuclei without prominent nucleoli. Most of the inflammatory lymphocytes are of T-cell type admixed with a smaller population of polyclonal B-cells.



- Wall thickening and narrowing of the blood vessels of granulation tissue .

Granulomatous inflammation

- is a distinctive morphologic pattern of inflammatory reaction encountered in relatively few diseases. Tuberculosis is the archetype of the granulomatous diseases, but also included are syphilis, sarcoidosis, cat-scratch fever, leprosy, brucellosis.

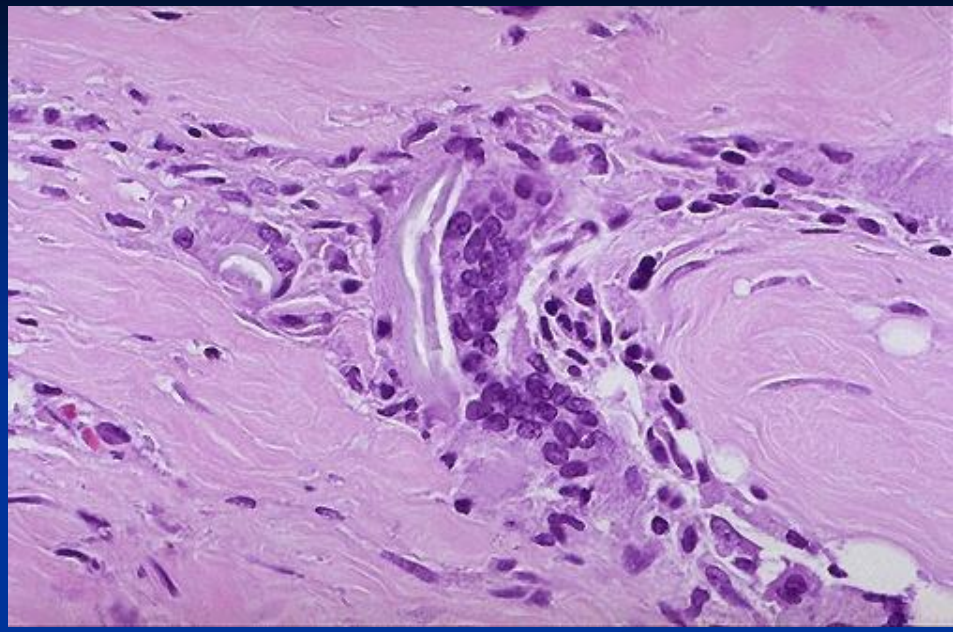
Granuloma

A granuloma consists of a microscopic aggregation of plump fibroblasts or histiocytes that have been transformed into epithelial-like cells, designated there for epithelioid cells, surrounded by a collar of mononuclear leukocytes, principally lymphocytes and Occasionally plasma cells. Frequently, but not invariably, large giant cells are found in the periphery or sometimes in the center of granulomas. These giant cells may achieve diameters of 40 to 50 microns.

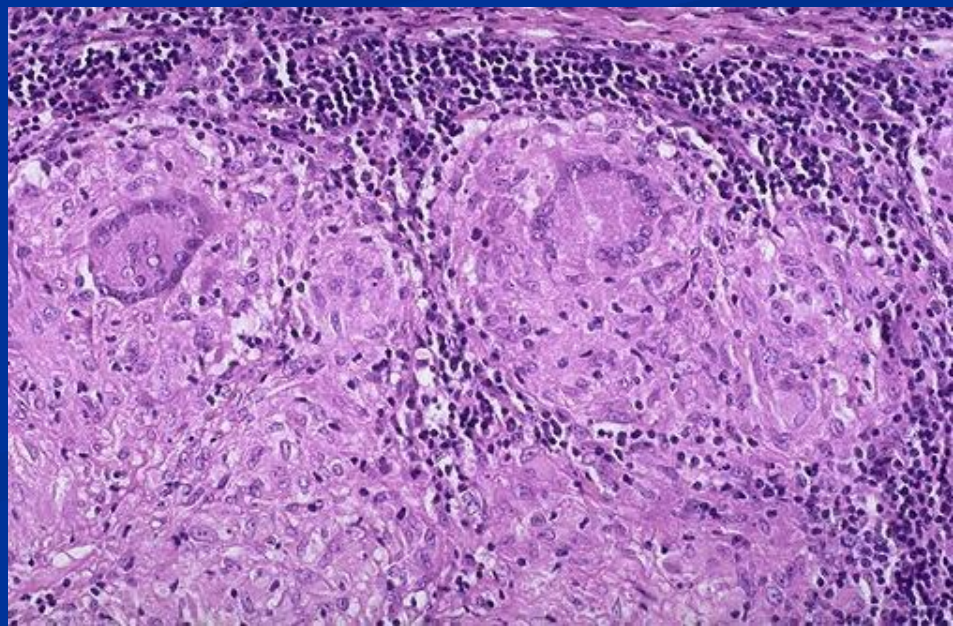
There are two types of granulomas :

- epithelioid cell granuloma, which arises as a result of an immune response, activated macrophages and lymphokines of T- cells;
- foreign body granuloma , in which the nonimmune phagocytosis of foreign antigenic material occurs by macrophages.

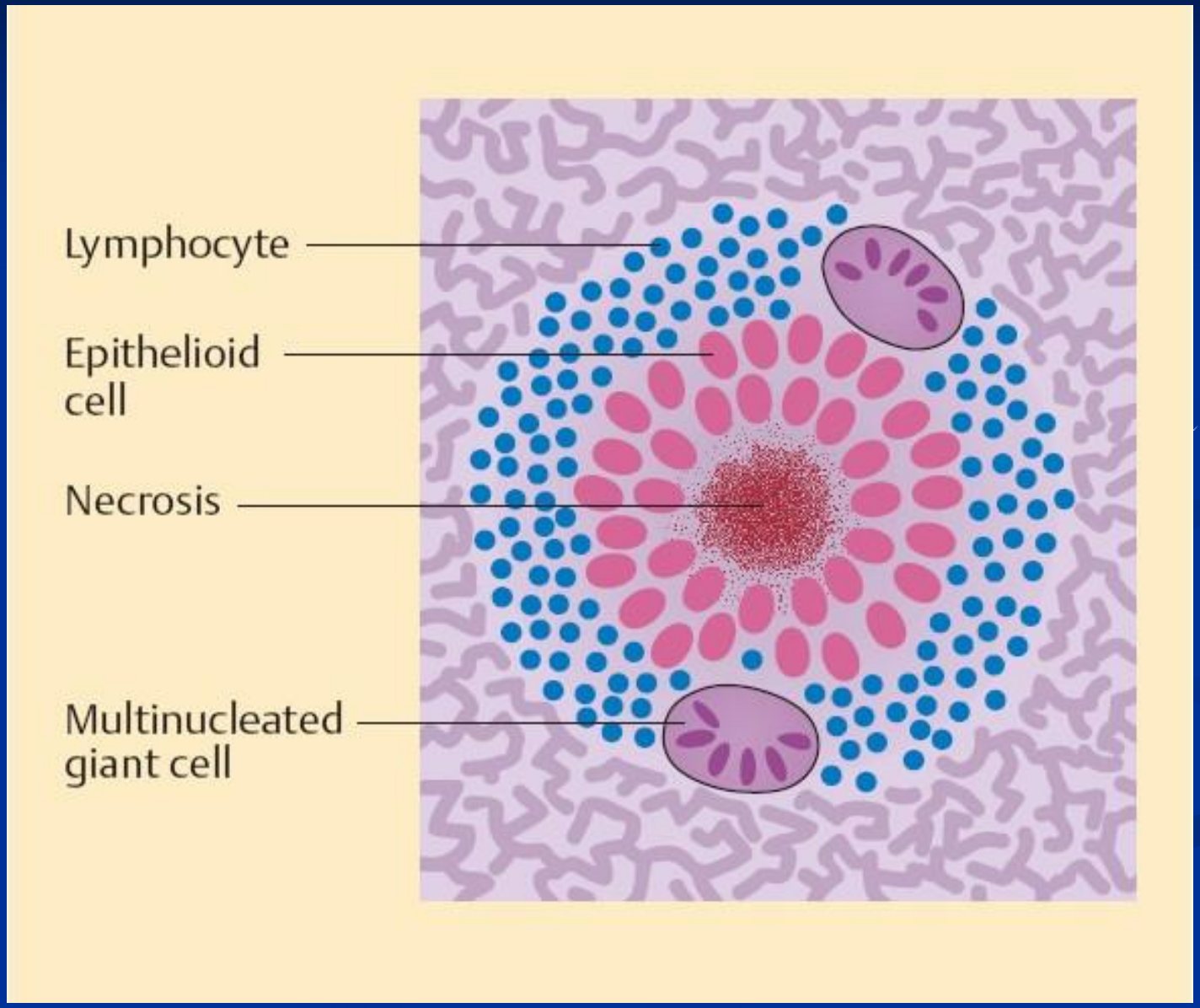
Giant multinucleated cells



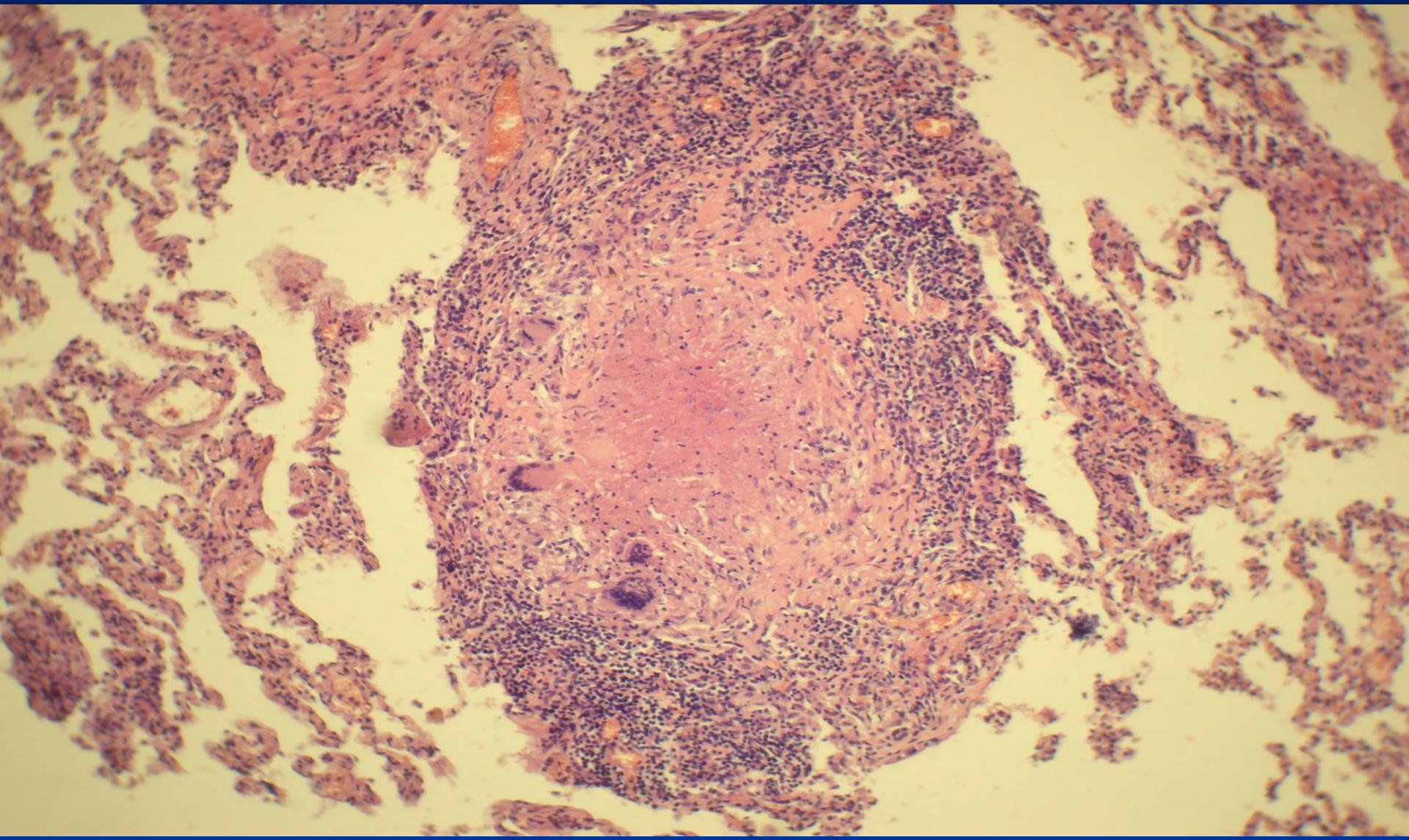
Pirogov-Langhans



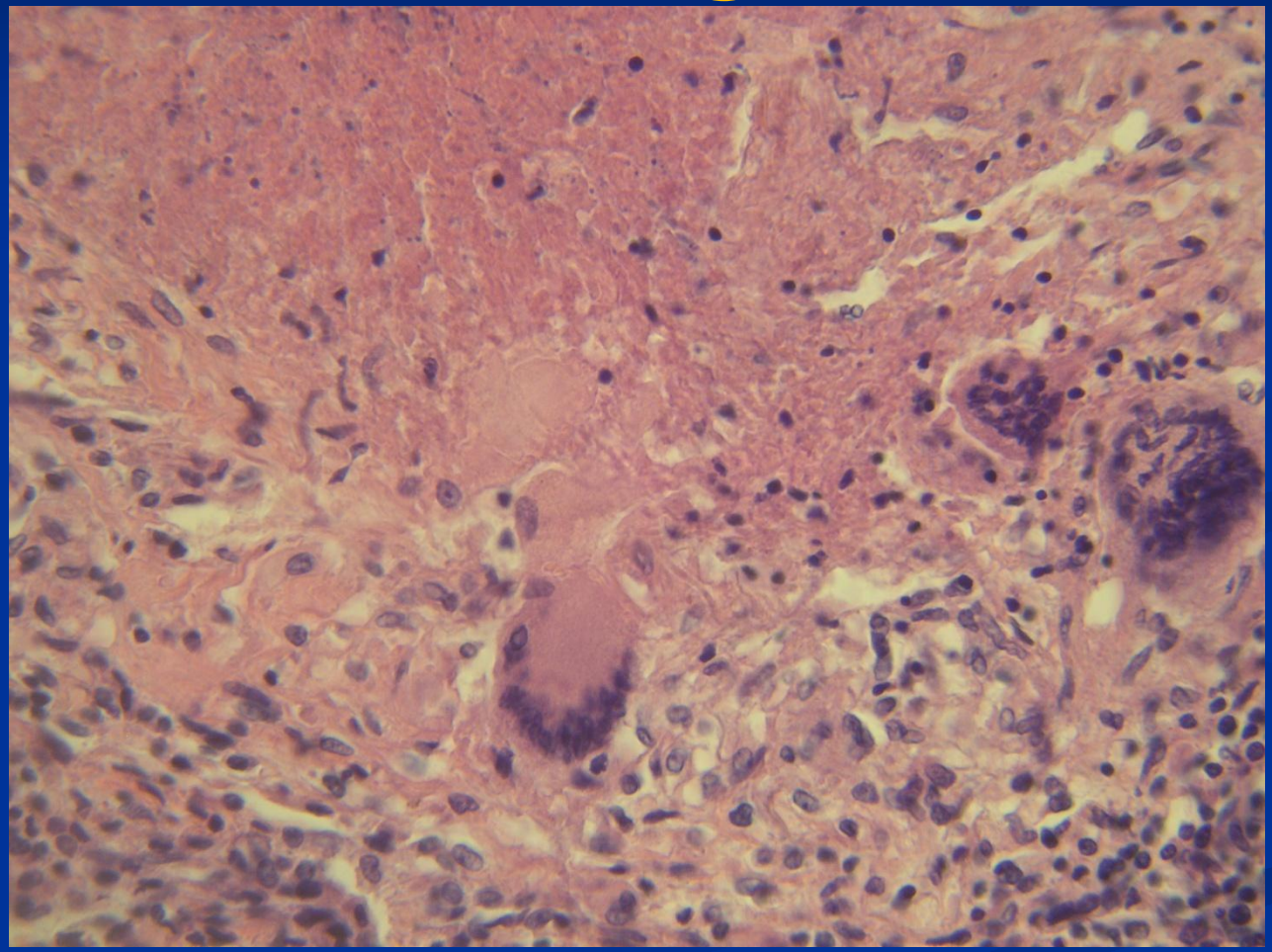
Tuberculous granuloma

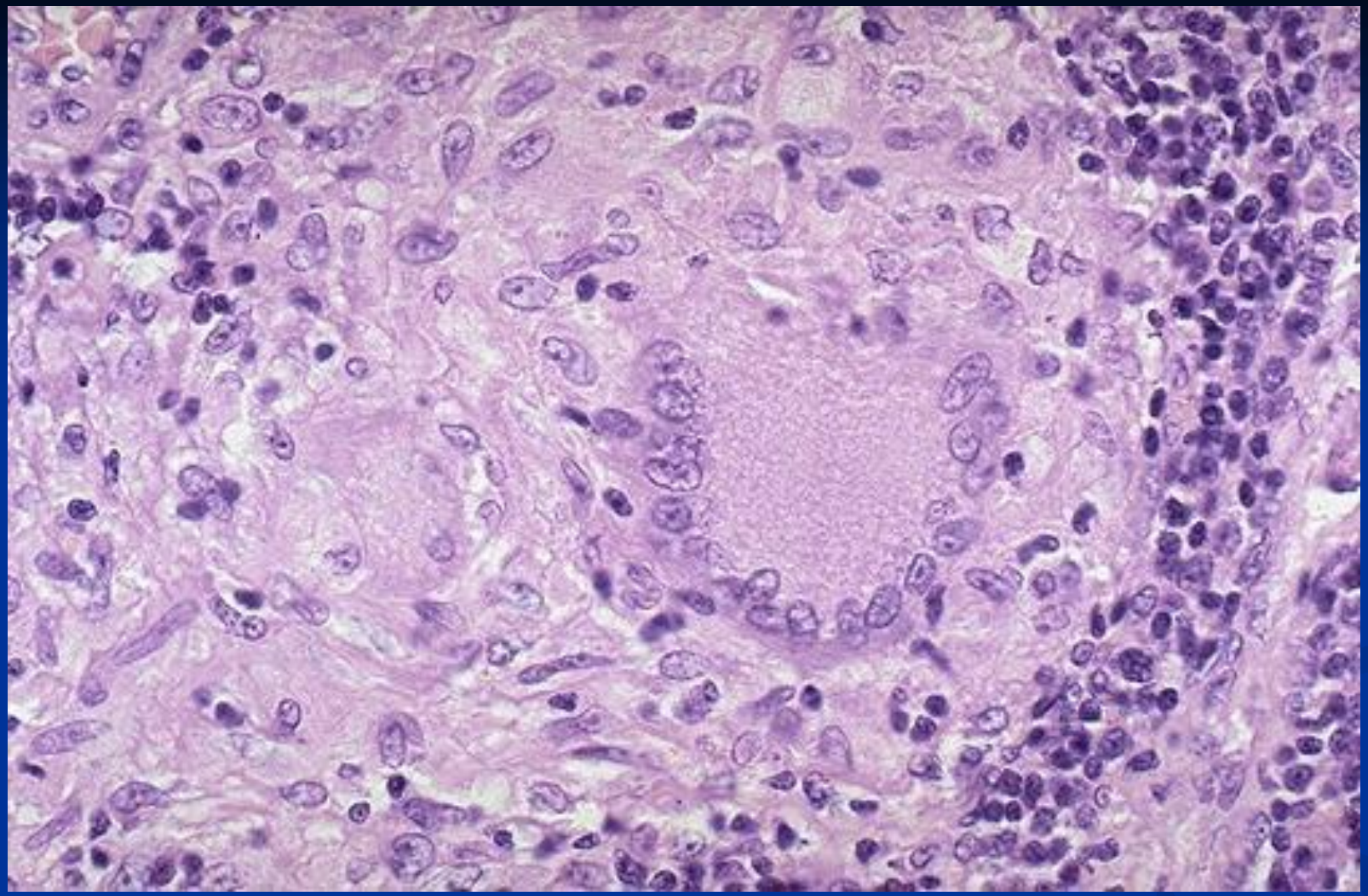


Tuberculous granuloma.



Granulomatous inflammation. Tuberculous granuloma.



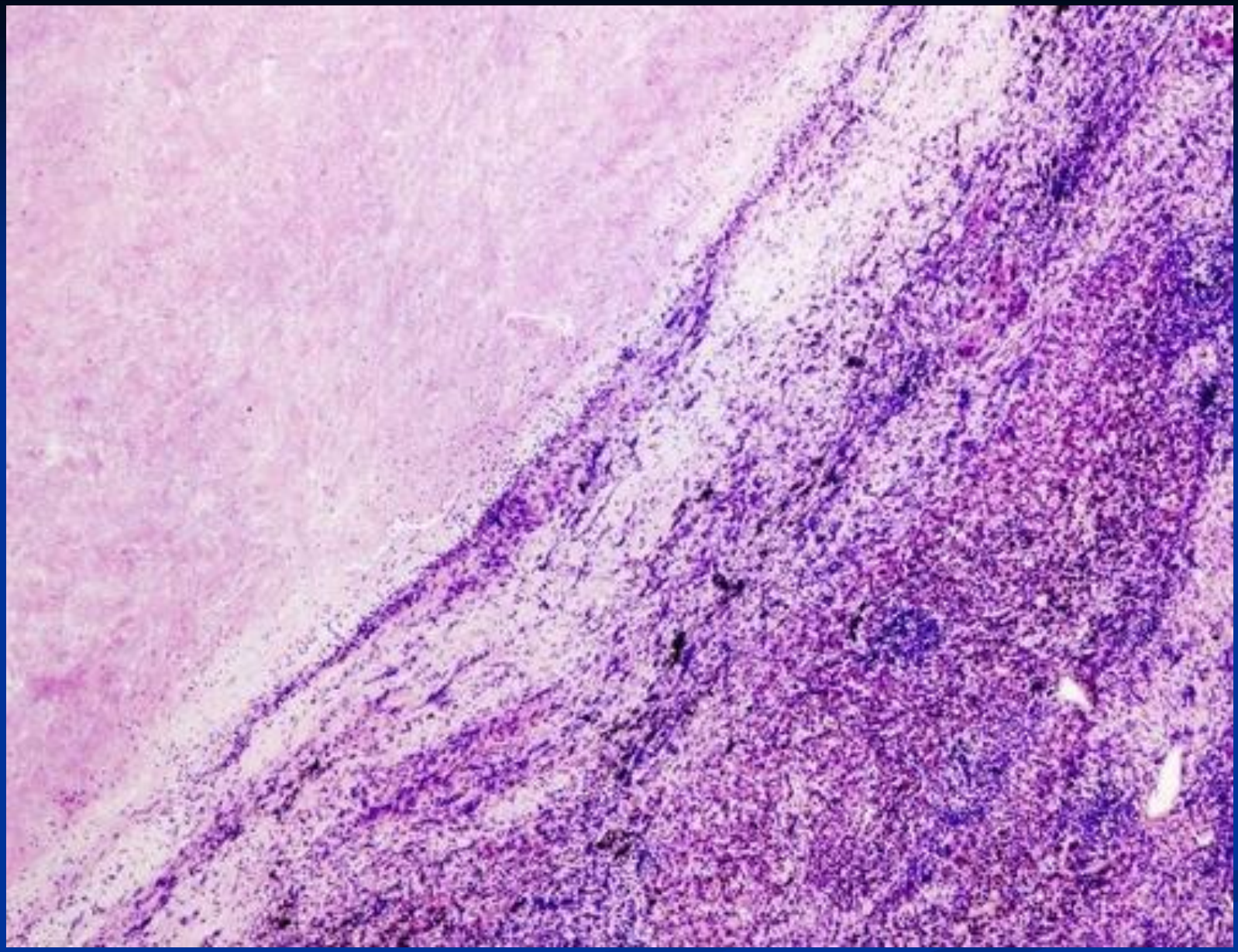


- At high magnification, the granuloma demonstrates that the epithelioid macrophages are elongated with long, pale nuclei and pink cytoplasm. The macrophages organize into committees called giant cells. The typical giant cell for infectious granulomas is called a Langhans giant cell and has the nuclei lined up along one edge of the cell. The process of granulomatous inflammation takes place over months to years.

- There is a small tan-yellow subpleural granuloma in the mid-lung field on the right. In the hilum is a small yellow tan granuloma in a hilar lymph node next to a bronchus. This is the "Ghon complex" that is the characteristic gross appearance with primary tuberculosis. In most persons, the granulomatous disease will not progress. Over time, the granulomas decrease in size and can calcify, leaving a focal calcified spot on a chest radiograph that suggests remote granulomatous disease.

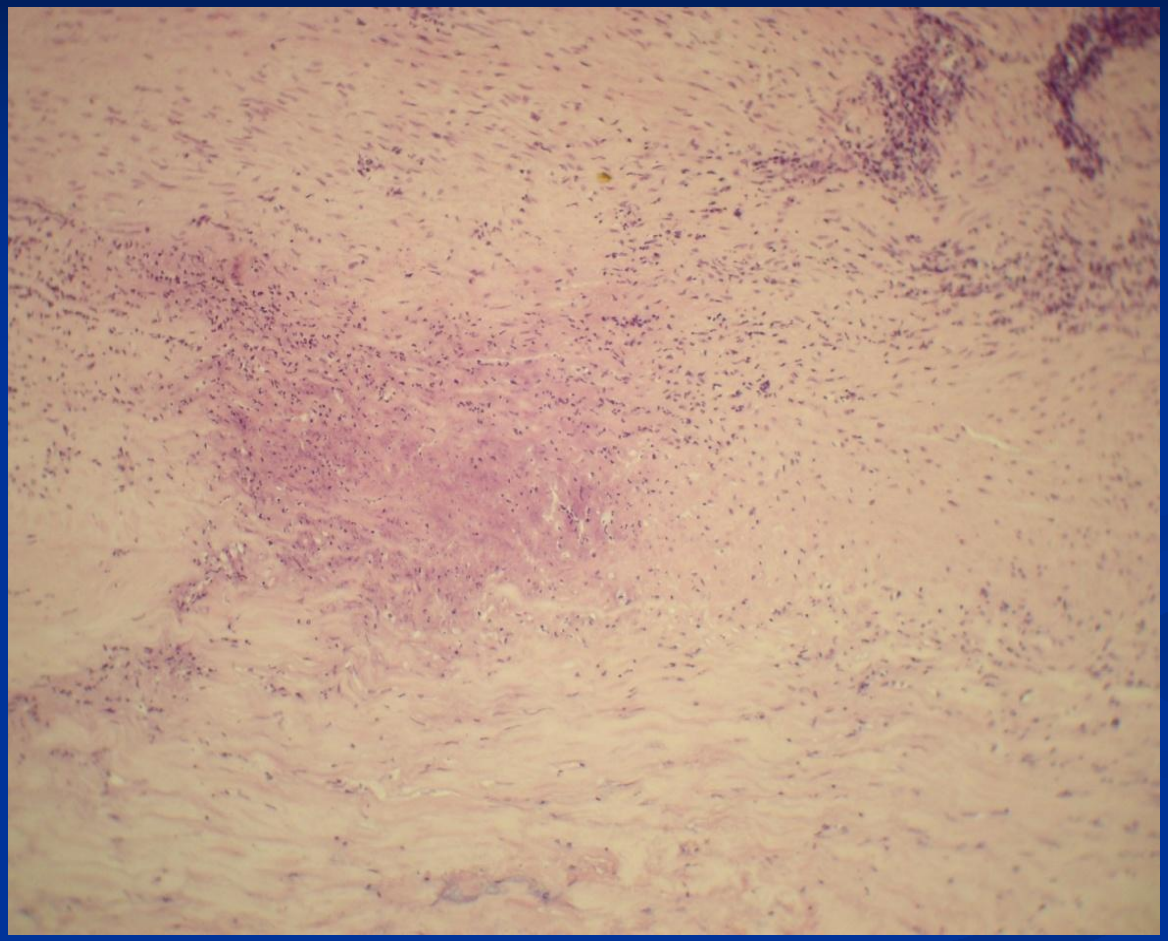
Syphilitic granuloma

- Syphilitic granuloma (Gunma) contains a zone of coagulation necrosis. Zone of necrosis surrounded by lymphocytes, plasma cells , polymorphonuclear leukocytes , fibroblasts, as well as single epithelioid cells, macrophages and giant Pirogov- Langhans cells. Granulomas around intensively connective tissue, forming a capsule. Around the capsule in the inflammatory infiltrate many small vessels with signs of productive endovasculitis . The reason for this - incubation Treponema pallidum preferably in vessels consequently microorganisms are primarily on the intima . Around gummas - diffuse infiltrate of lymphocytes, fibroblasts and leukocytes



- Syphiloma in the liver.

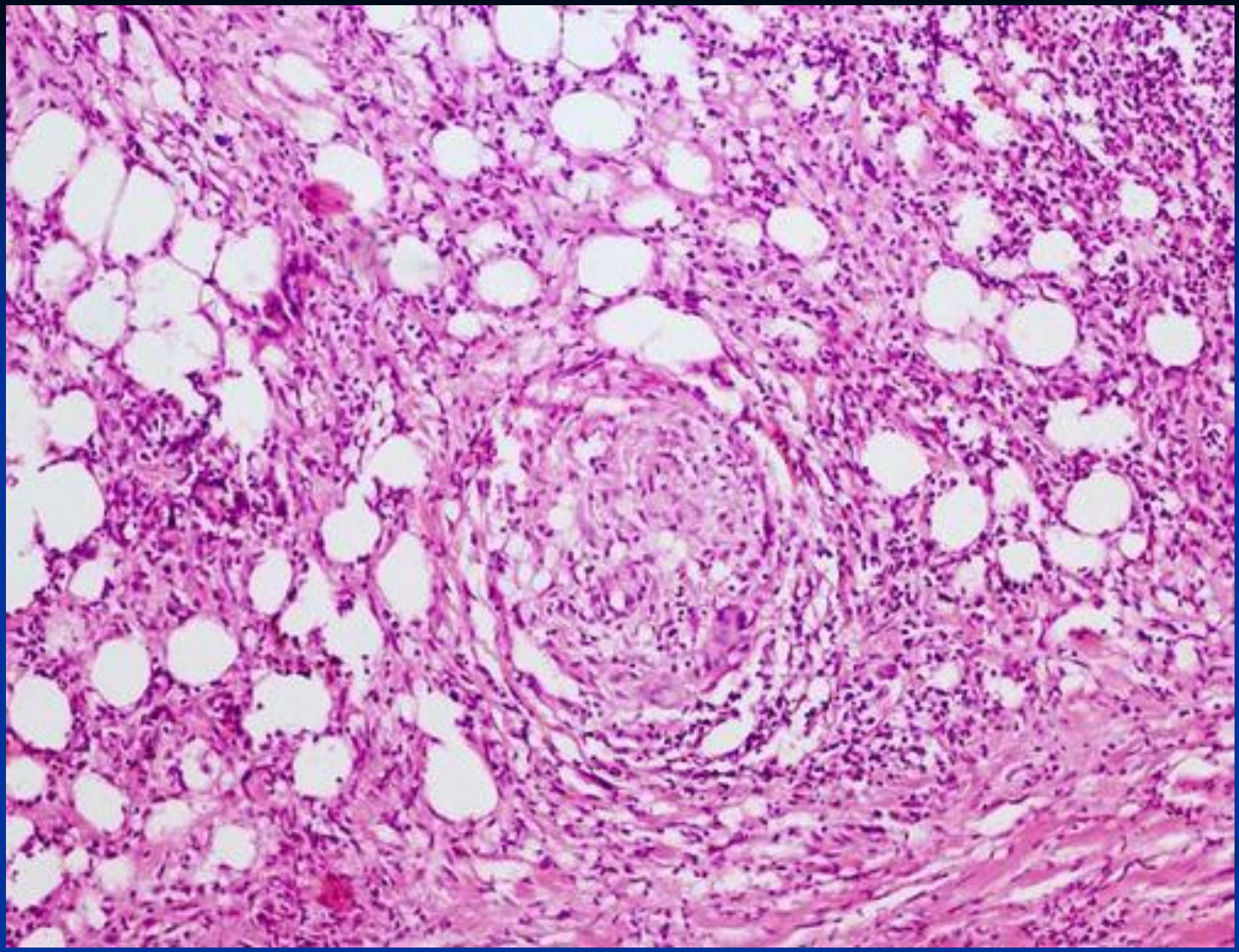
Syphilitic mesaortitis



Syphilis produces gummatous necrosis in the center of its granuloma. Gummatous necrosis tends to have a rubbery consistency, firmer than the soft cheesy texture of the tuberculous reaction.

Leprosum granuloma

- Leprosum granuloma (leproma) has the same cellular composition of the infiltrate that other specific granuloma: macrophages, epithelioid cells, lymphocytes, plasma cells, fibroblasts. Some macrophages are seen as large cells with large fat inclusions (leprosy balls) , after the destruction of these cells content is phagocytosed by giant cells. Macrophages contain Mycobacterium leprae , located in the form of cigarettes in a pack. Such giant cells are called leprosy Virchow cells.



- Leprosum granuloma . Giant leprosy Virchow cells are seen.

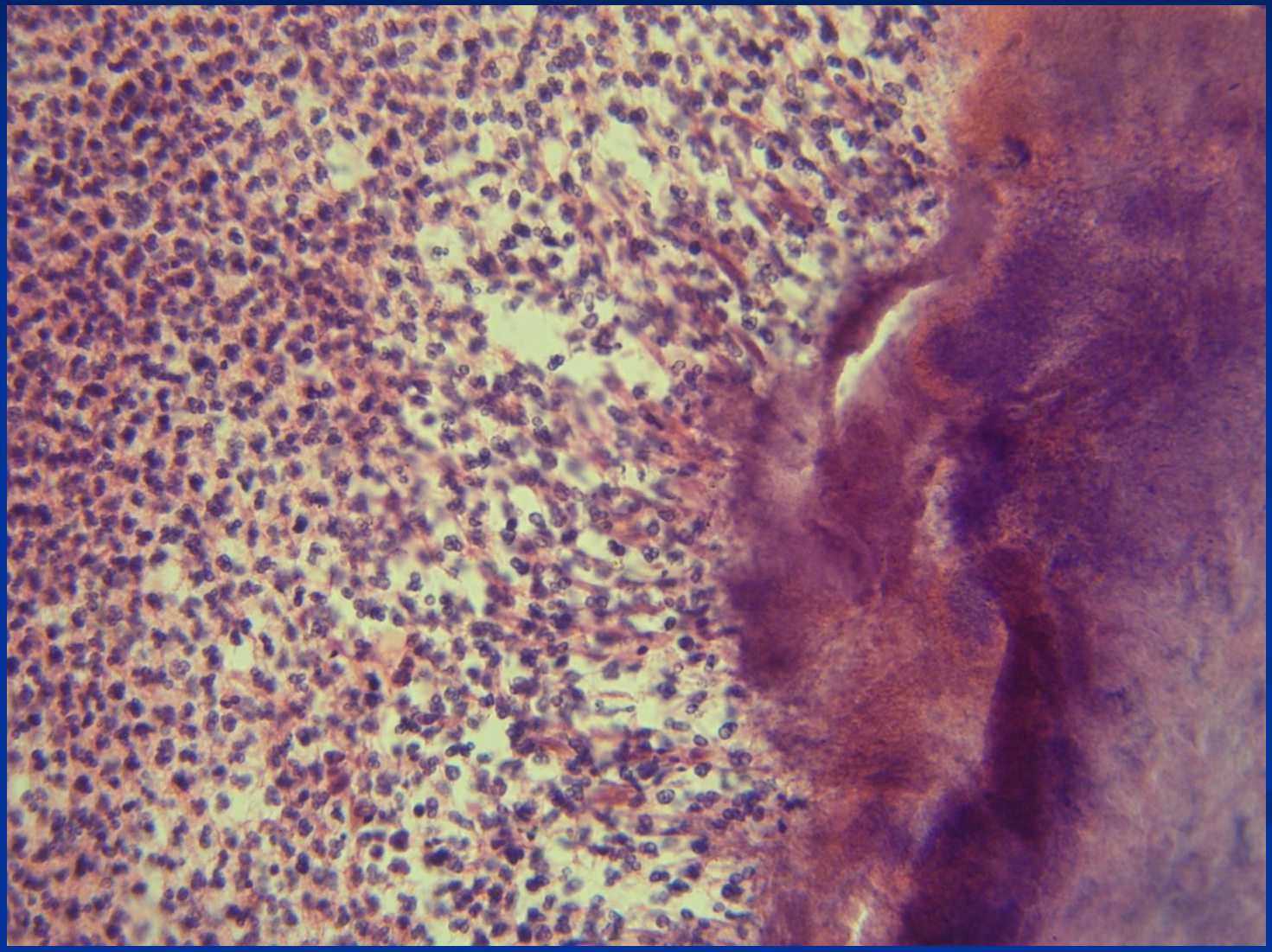
Actinomycosis

- - an infection caused by Actinomyces spp., Gram- positive rods , which is usually found in most facial and cervical areas can be found in any other parts of the body . Actinomycetes are found as part of the normal flora in the oropharynx , gastrointestinal tract , vagina. With the introduction of the pathogen in tissues migration of white blood cells occurs, followed by tissue necrosis the formation of the abscess cavity containing pus and bacteria occurs.

Actinomycosis of the neck

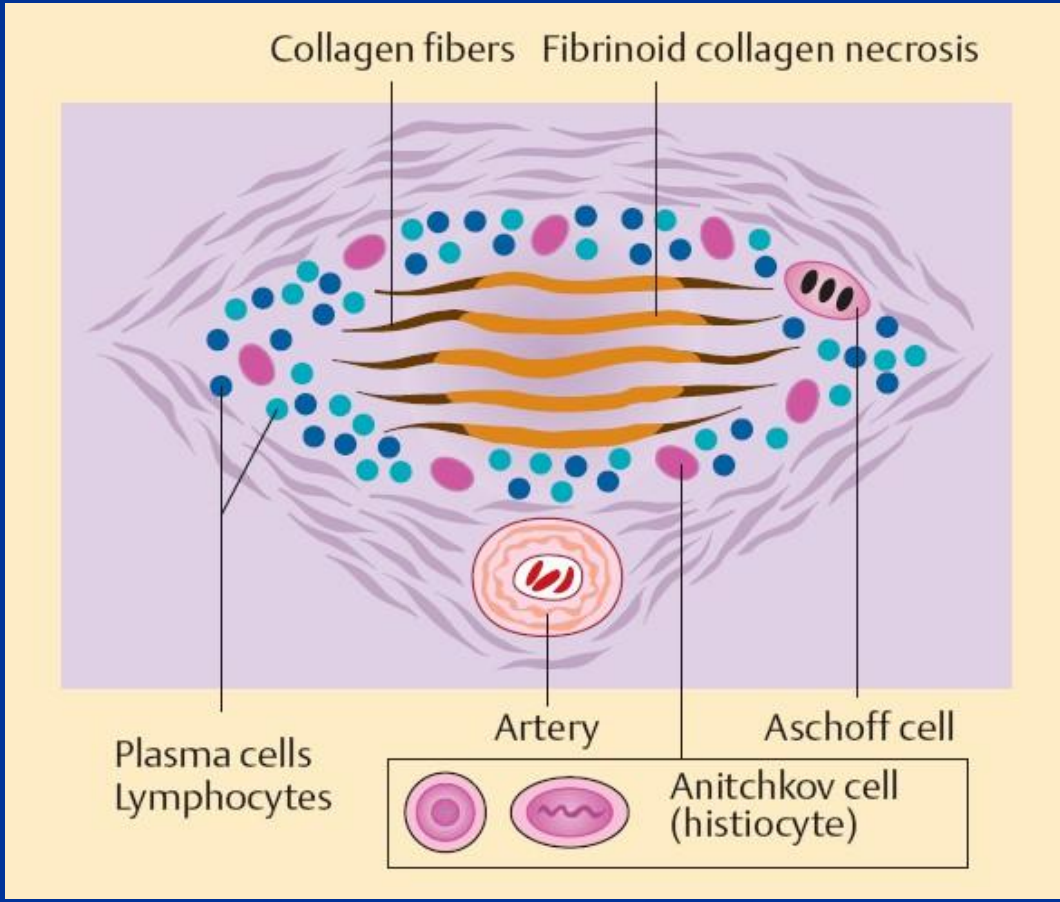
- The inflammation becomes chronic nature , formed granuloma , having a form of multiple small abscesses containing pus in addition to small whitish granules. Microscopic granules , which are colonies of bacteria are located in the central regions of the granuloma , surrounded by polymorphonuclear leukocytes , granulation tissue containing fibroblasts and lymphocytes. The formation of new granulomas and their fusion with the formation of extensive tissue lesions.

Actinomycosis

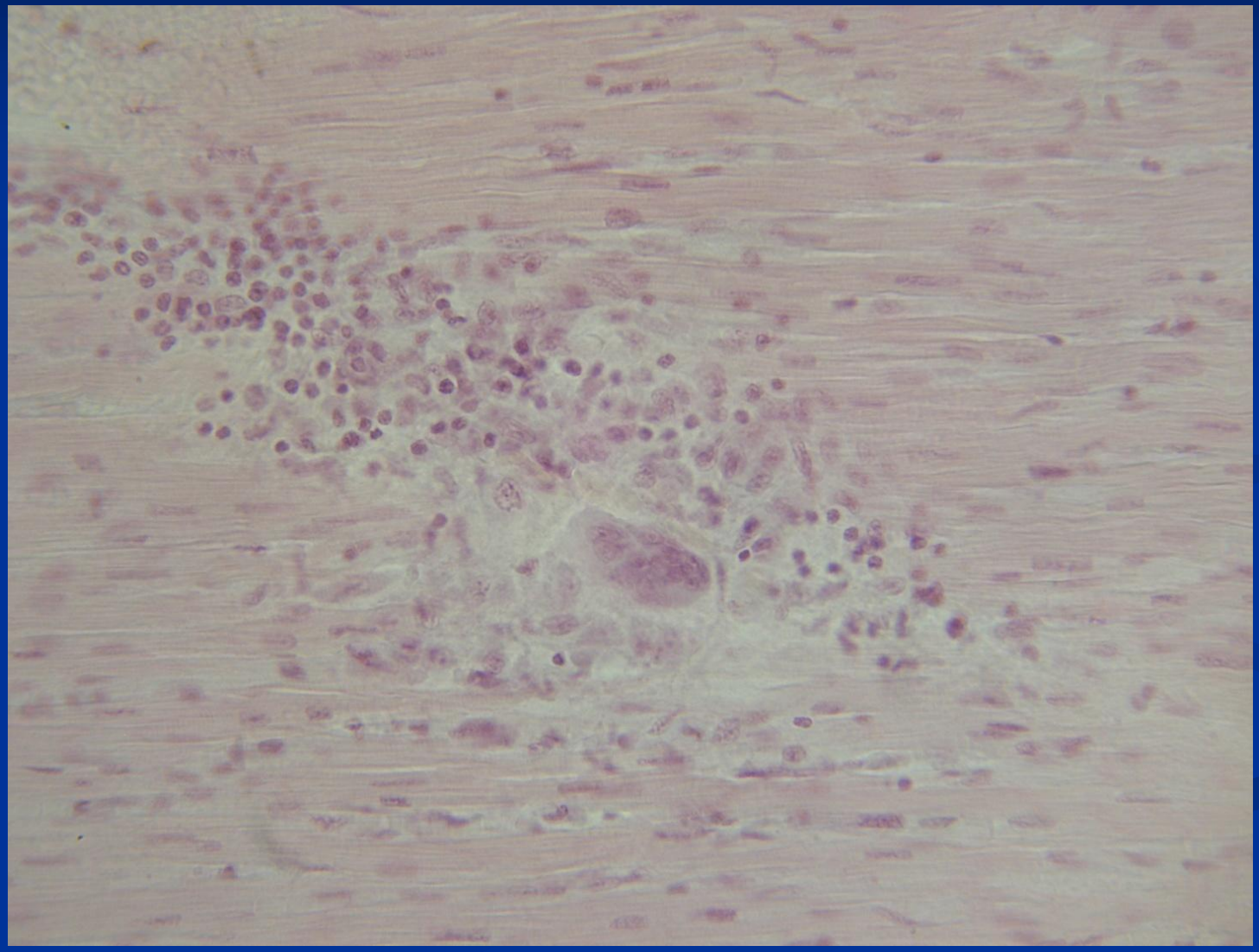


Rheumatic granuloma.

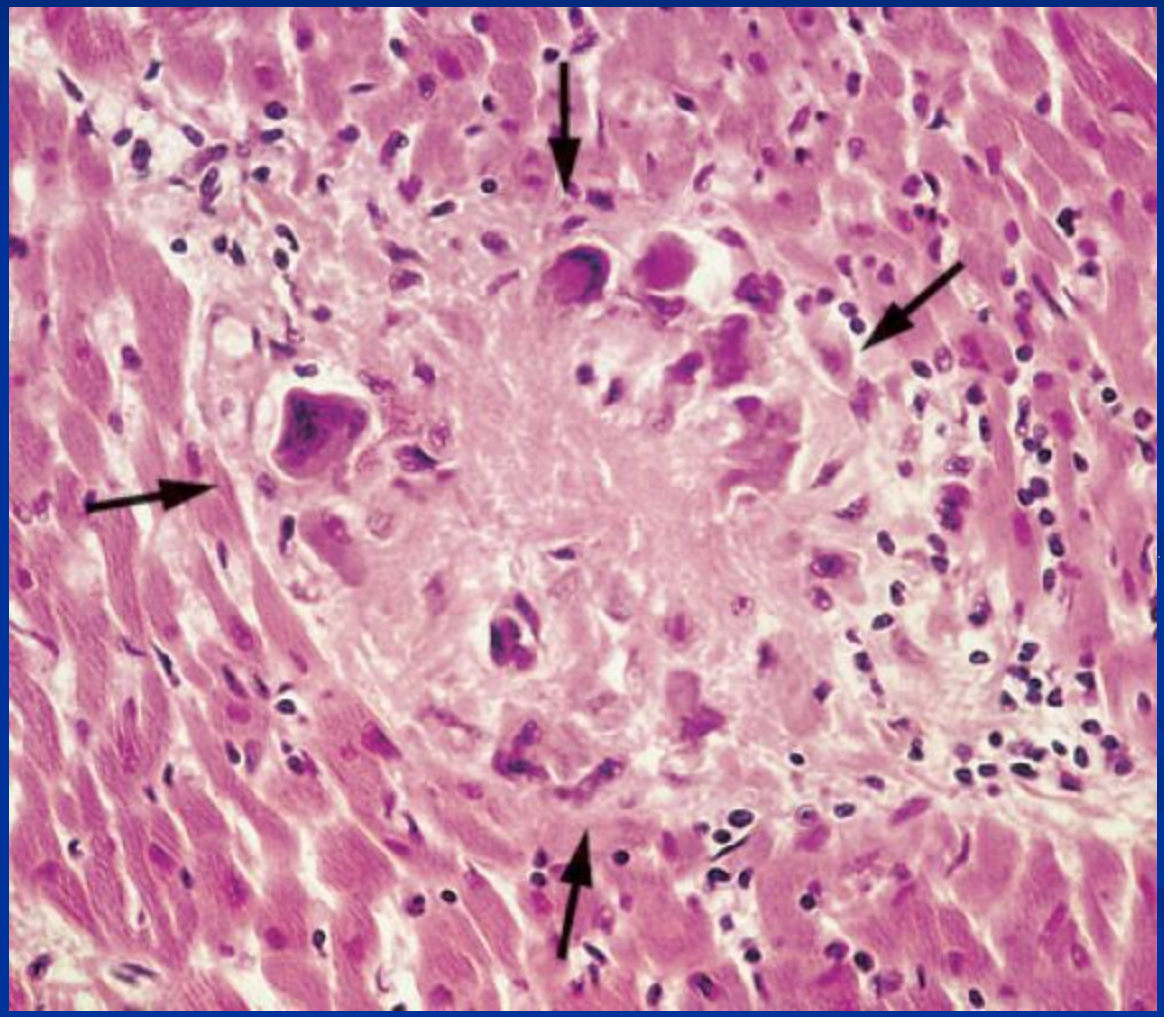
- Definition: Histiocytic granuloma around a core of fibrinoid collagen necrosis, occurring primarily in the myocardium and only with rheumatic fever (acute articular rheumatism).



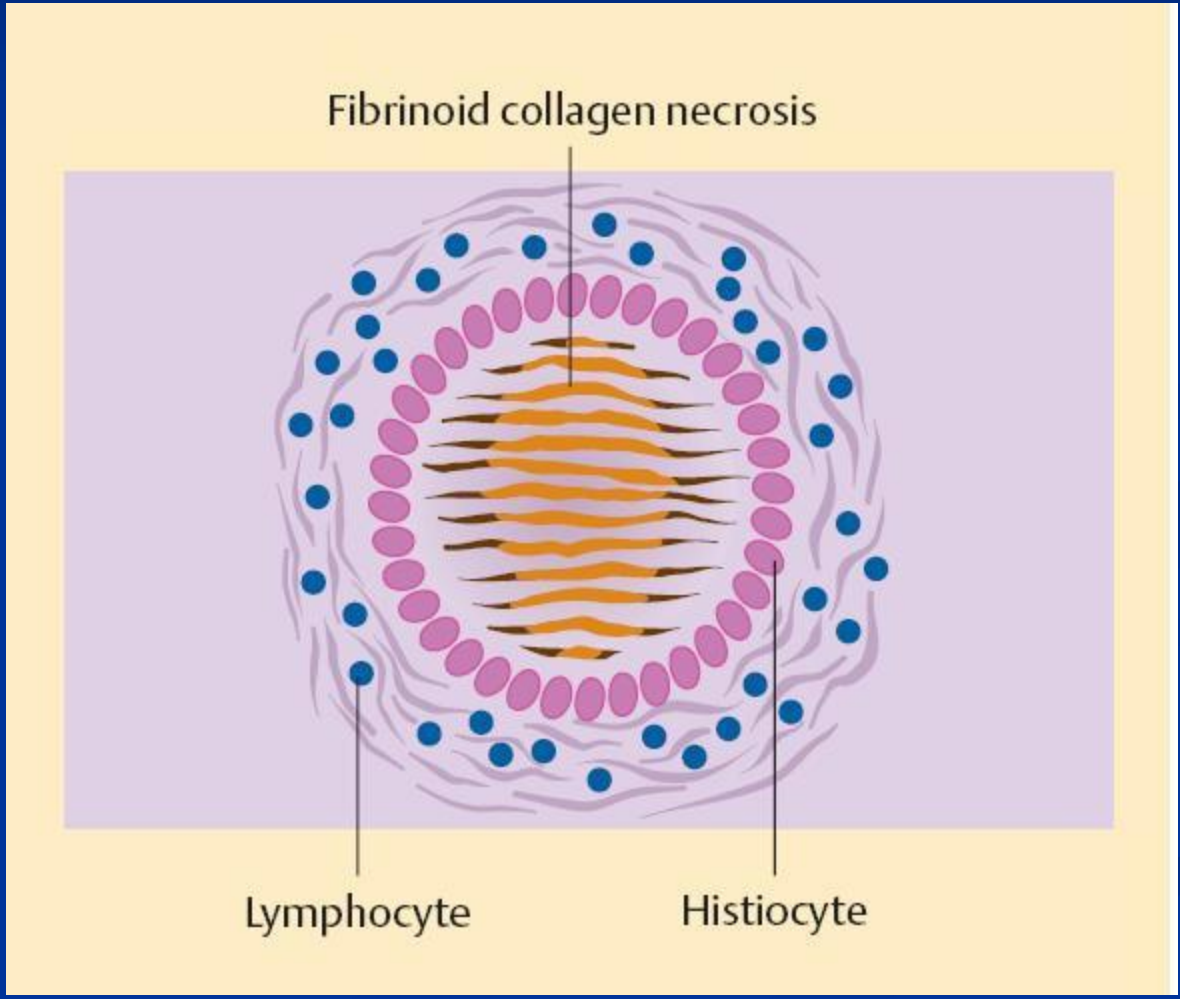
Granulomatous inflammation. Rheumatic fever. Rheumatic granuloma.



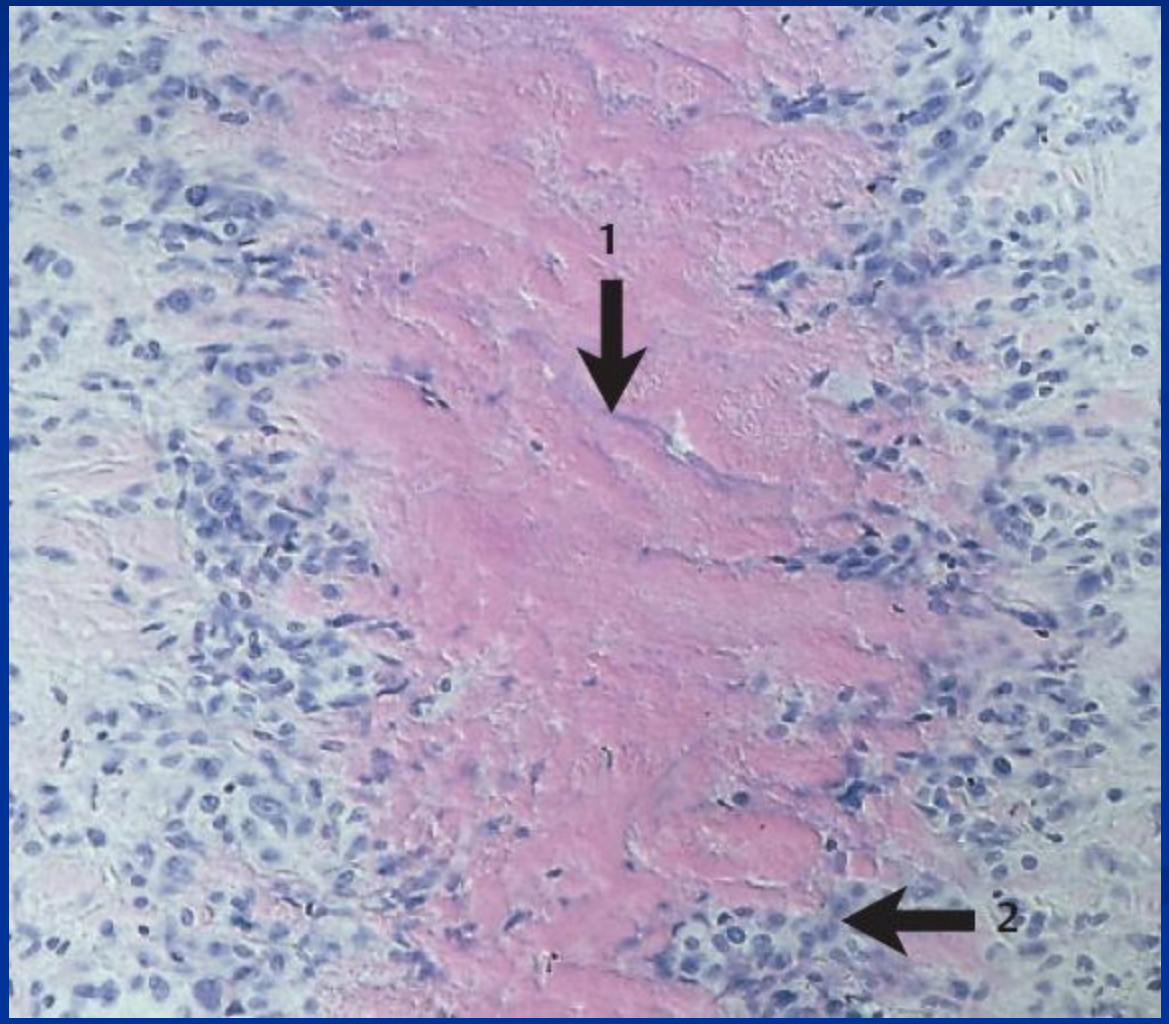
Granulomatous inflammation. Rheumatic fever. Rheumatic granuloma.



Granulomatous inflammation. Rheumatoid granuloma.



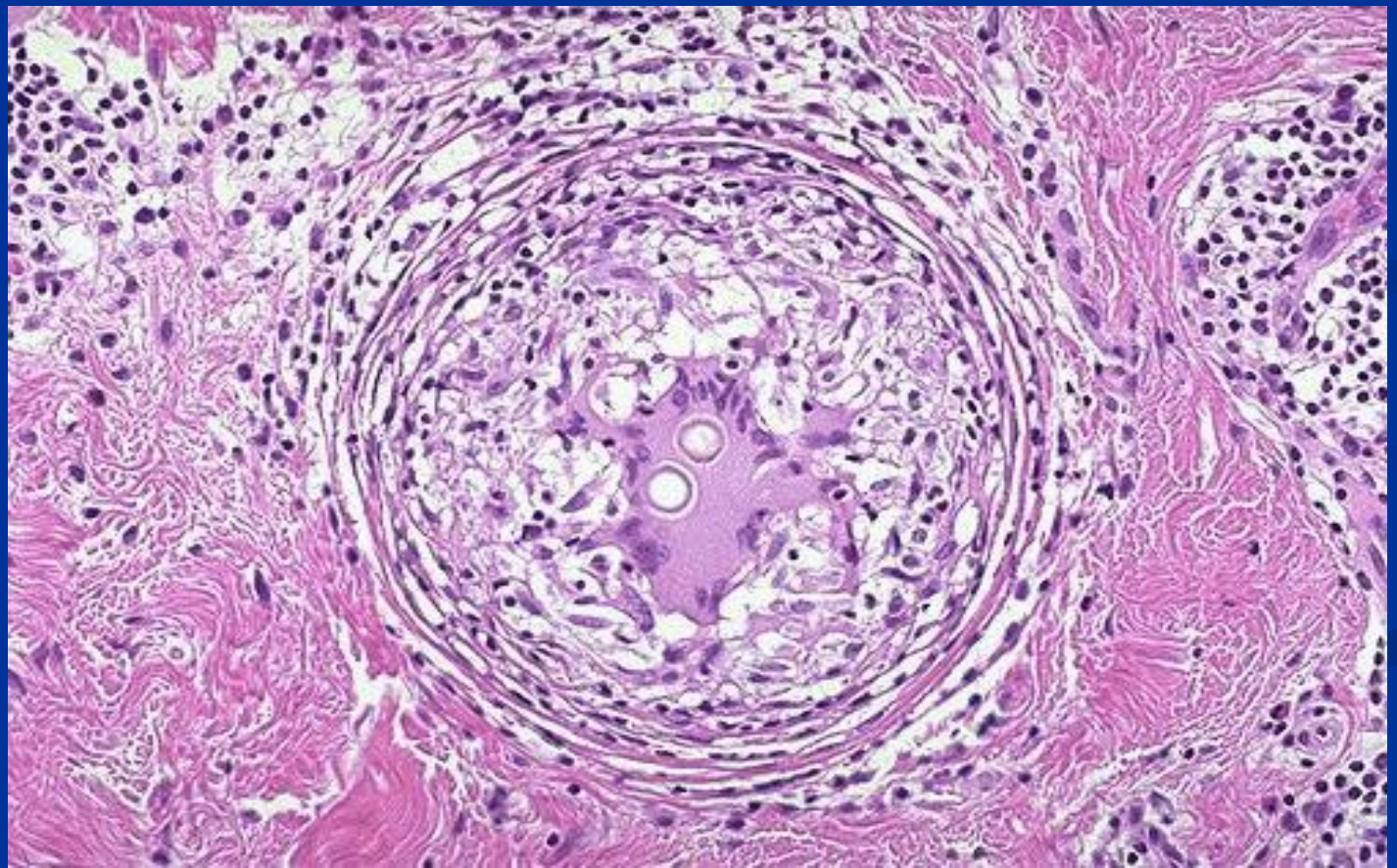
Granulomatous inflammation. Rheumatoid granuloma.

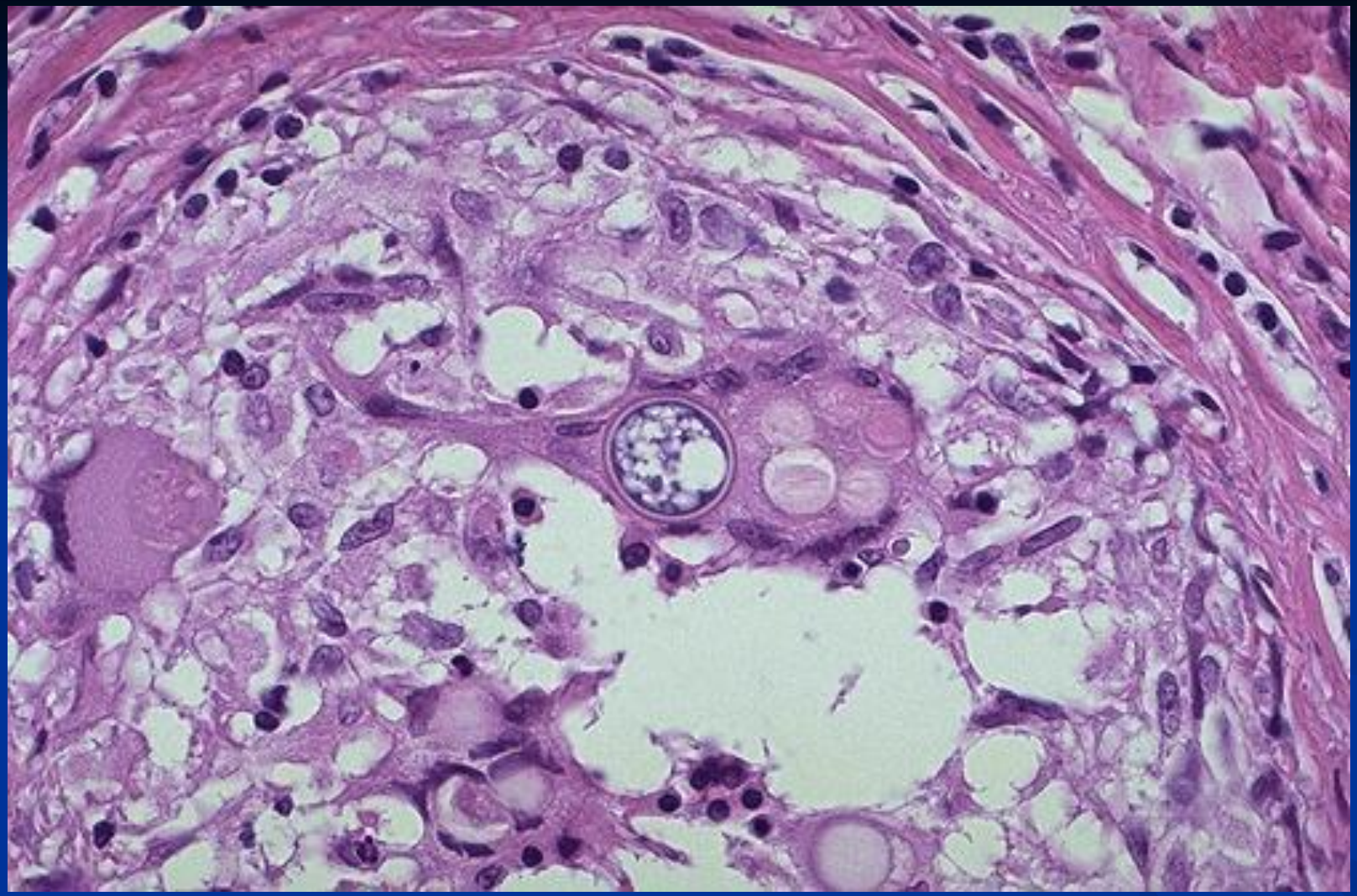


Fungal Infections

Coccidioidomycosis

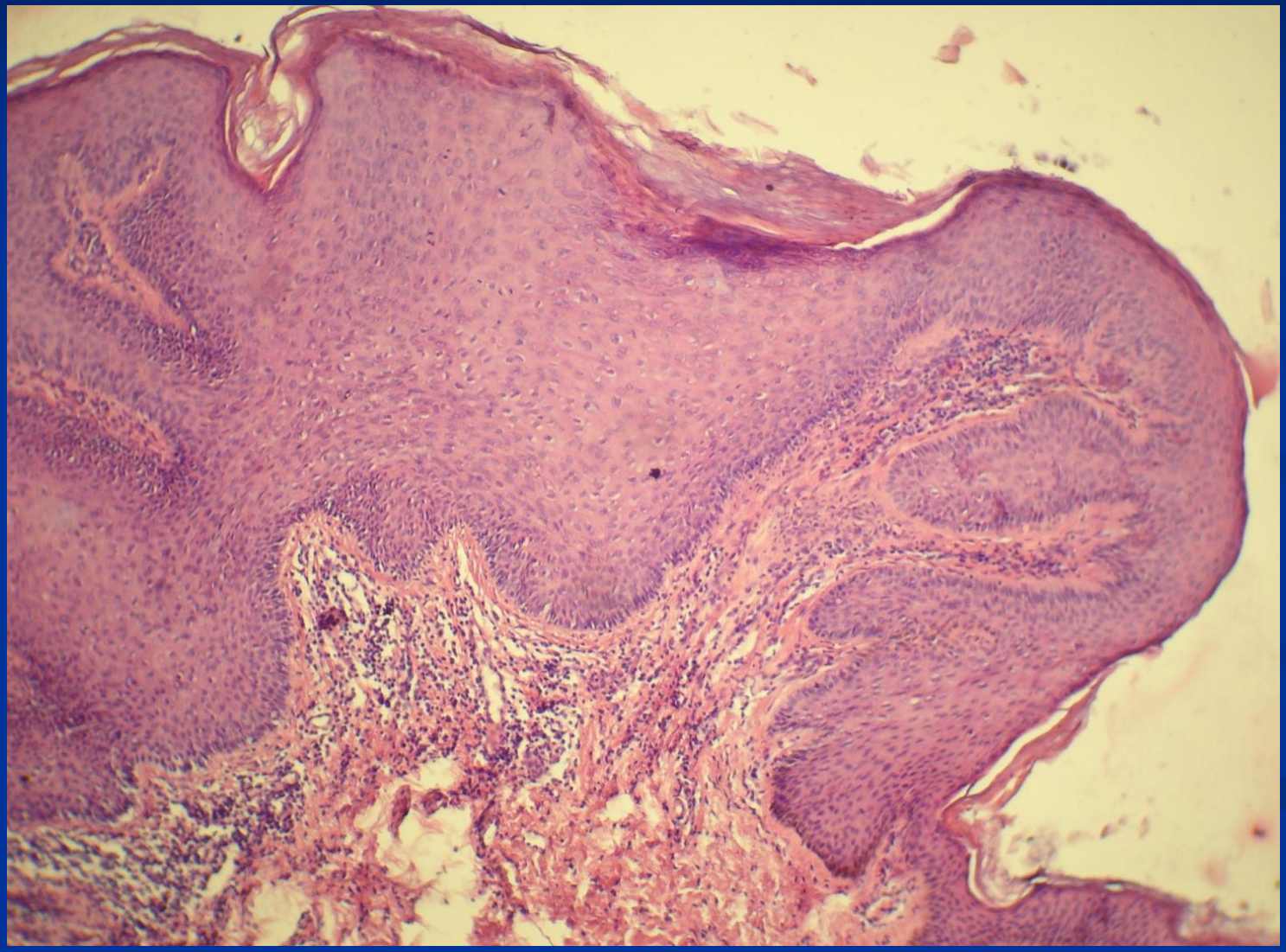
is caused by inhalation of the spores of Coccidioides immitis, sharing many of the clinical and pathologic features of histoplasmosis and tuberculosis.





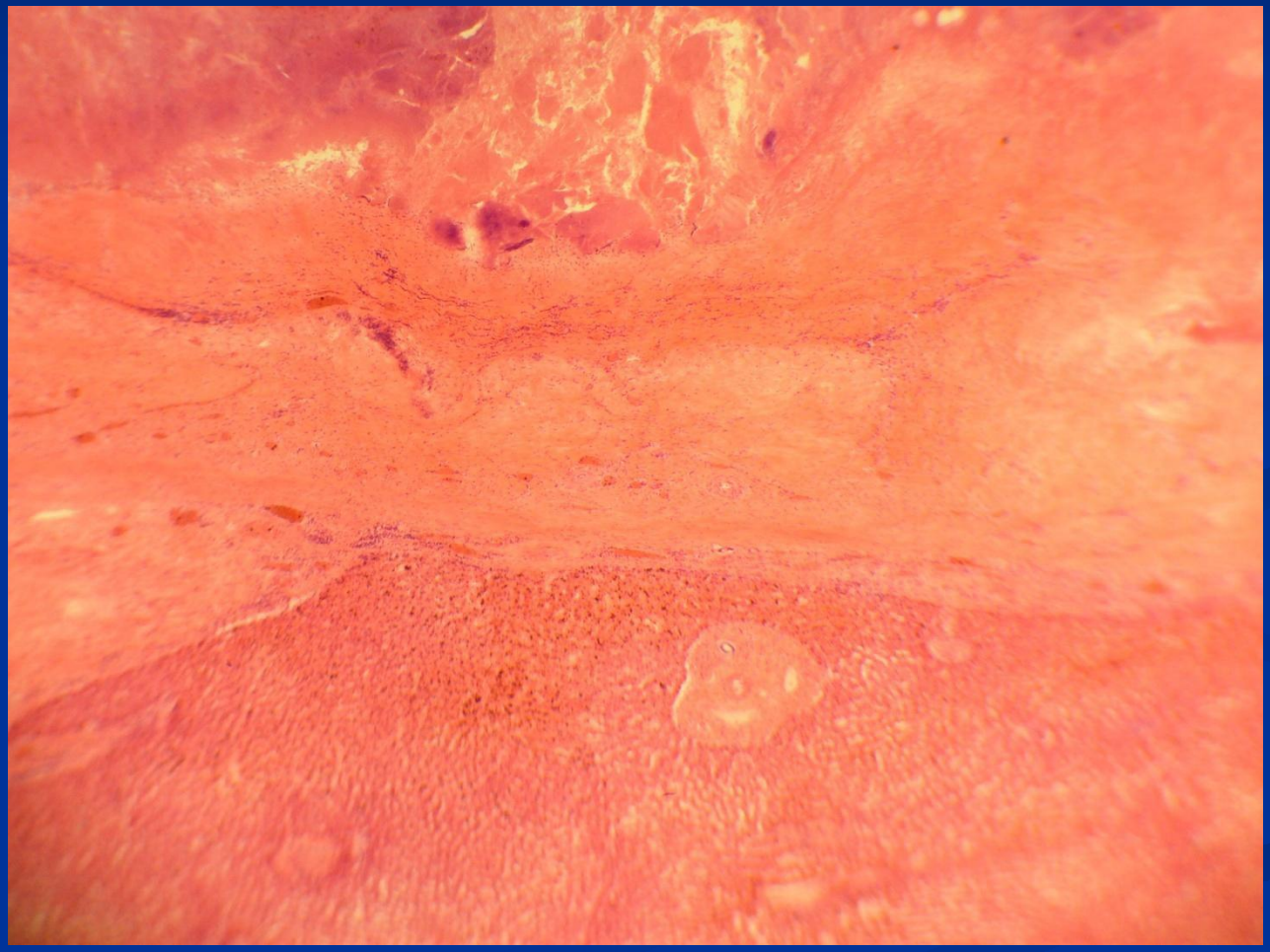
- At higher magnification, the thick wall of the C. immitis spherule is seen in a giant cell in the center of the photomicrograph. The spherule contains endospores. In the United States, C. immitis is endemic to the southwest.

Condyloma

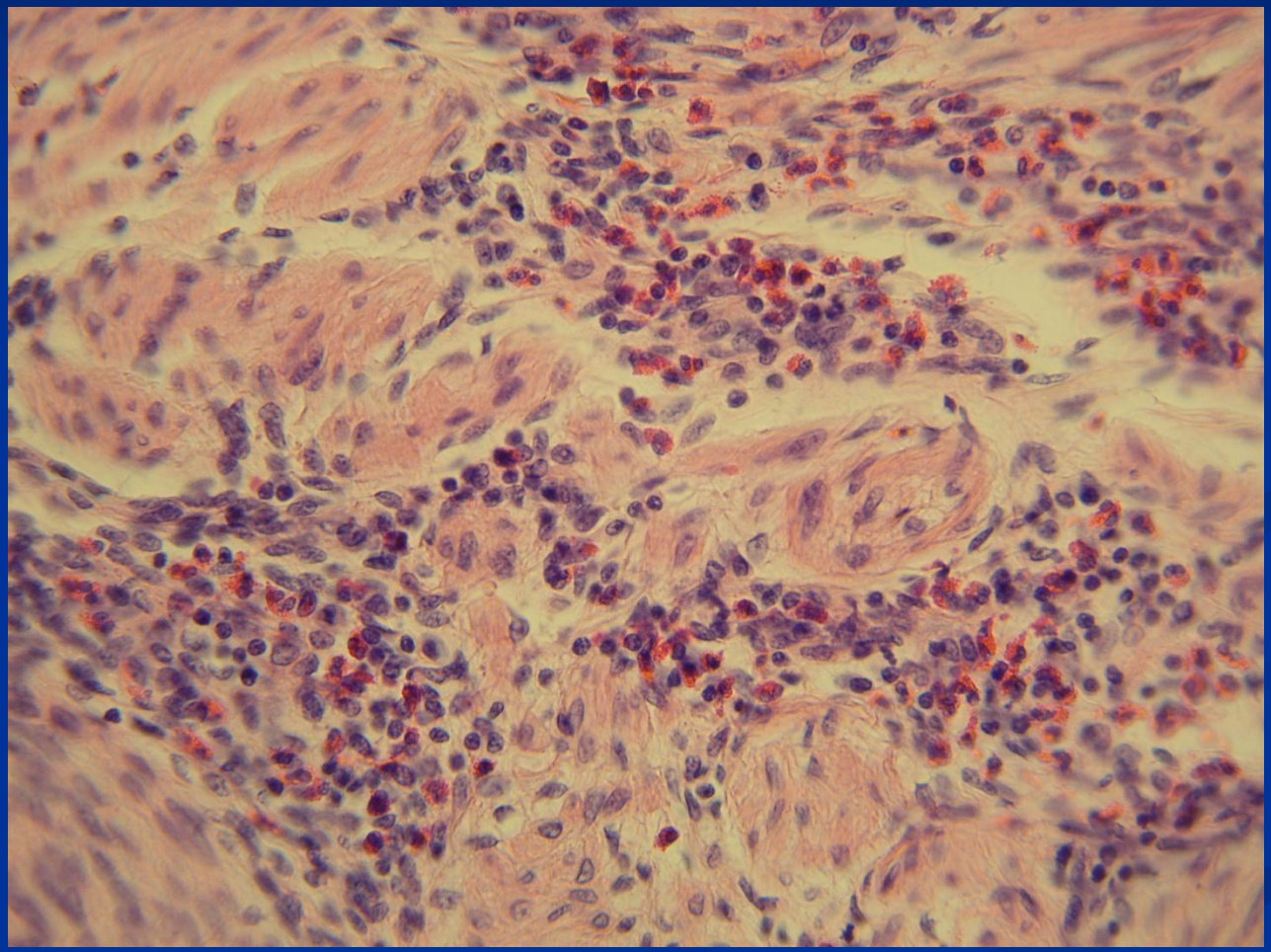


Echinococcosis of the liver

Proliferative inflammation around parasites. Echinococcosis of liver.



Eosinophilic leukocytes in the infiltrate.



Thank You...