INFLAMMATION & TISSUE REPAIR

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The major local manifestations of acute inflammation, compared to normal

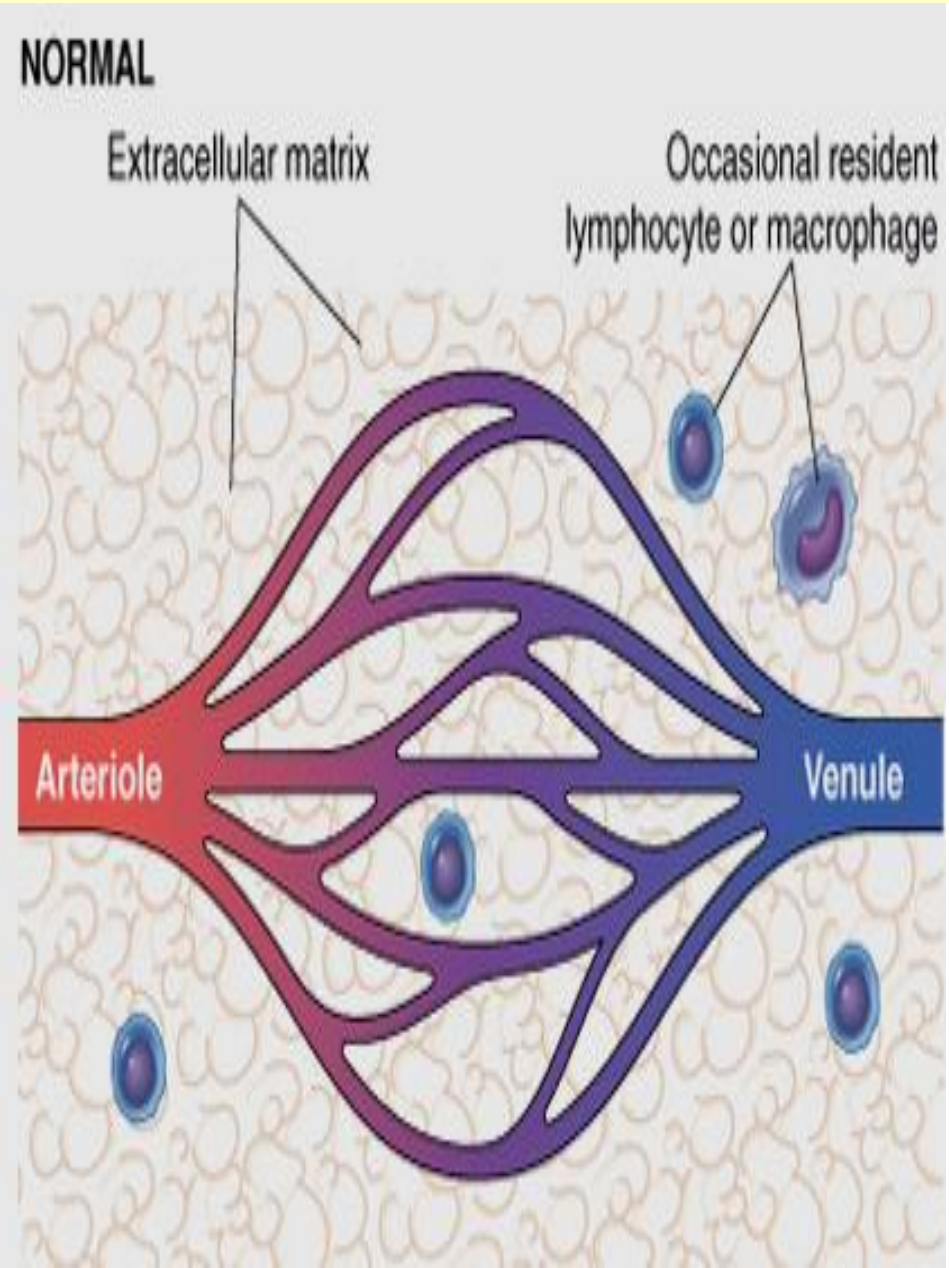
(1)Vascular dilation and increased blood flow (causing erythema and warmth).

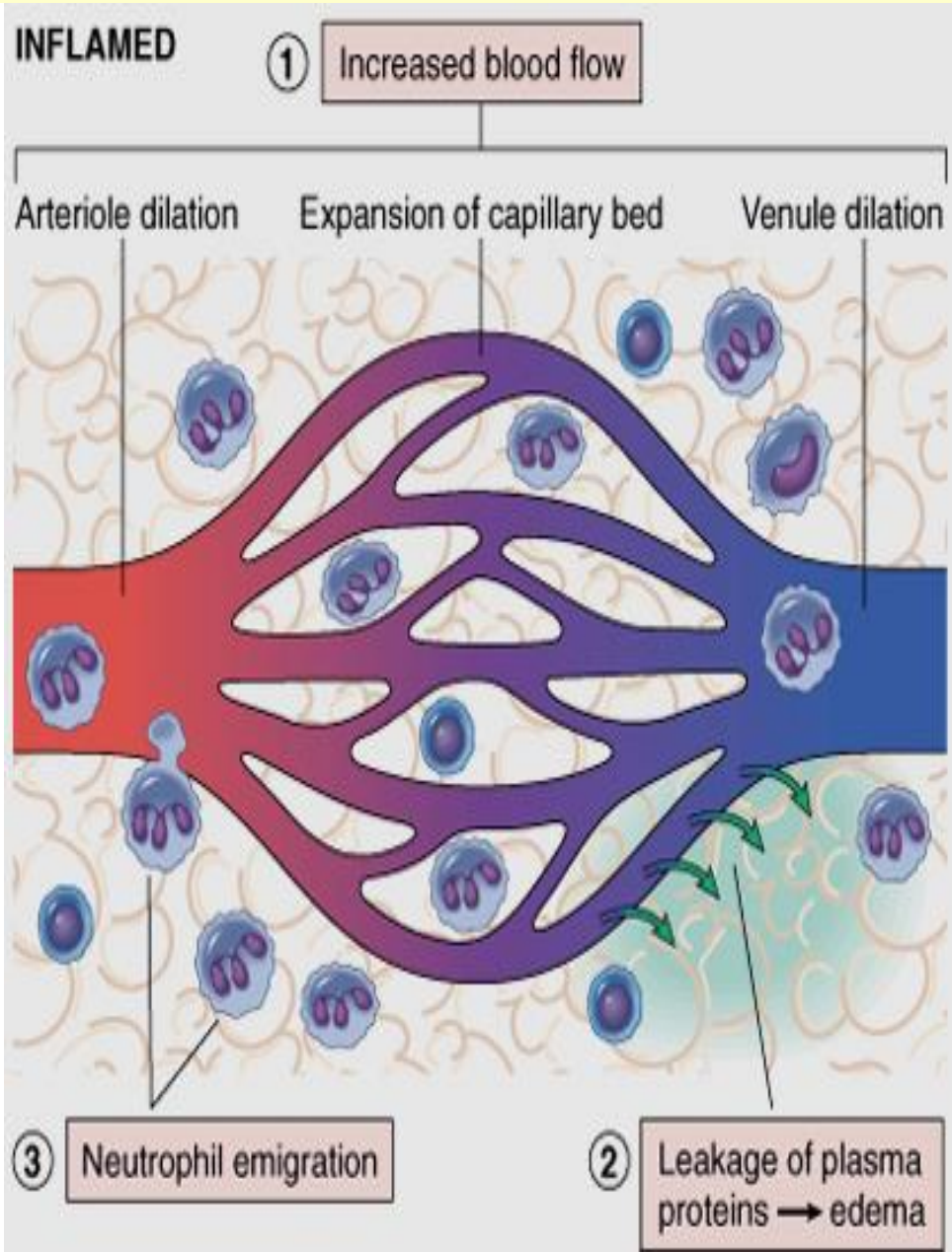
(2)extravasation and deposition of plasma fluid and proteins (edema), and

(3)leukocyte (mainly neutrophil) emigration and accumulation in the site of injury.

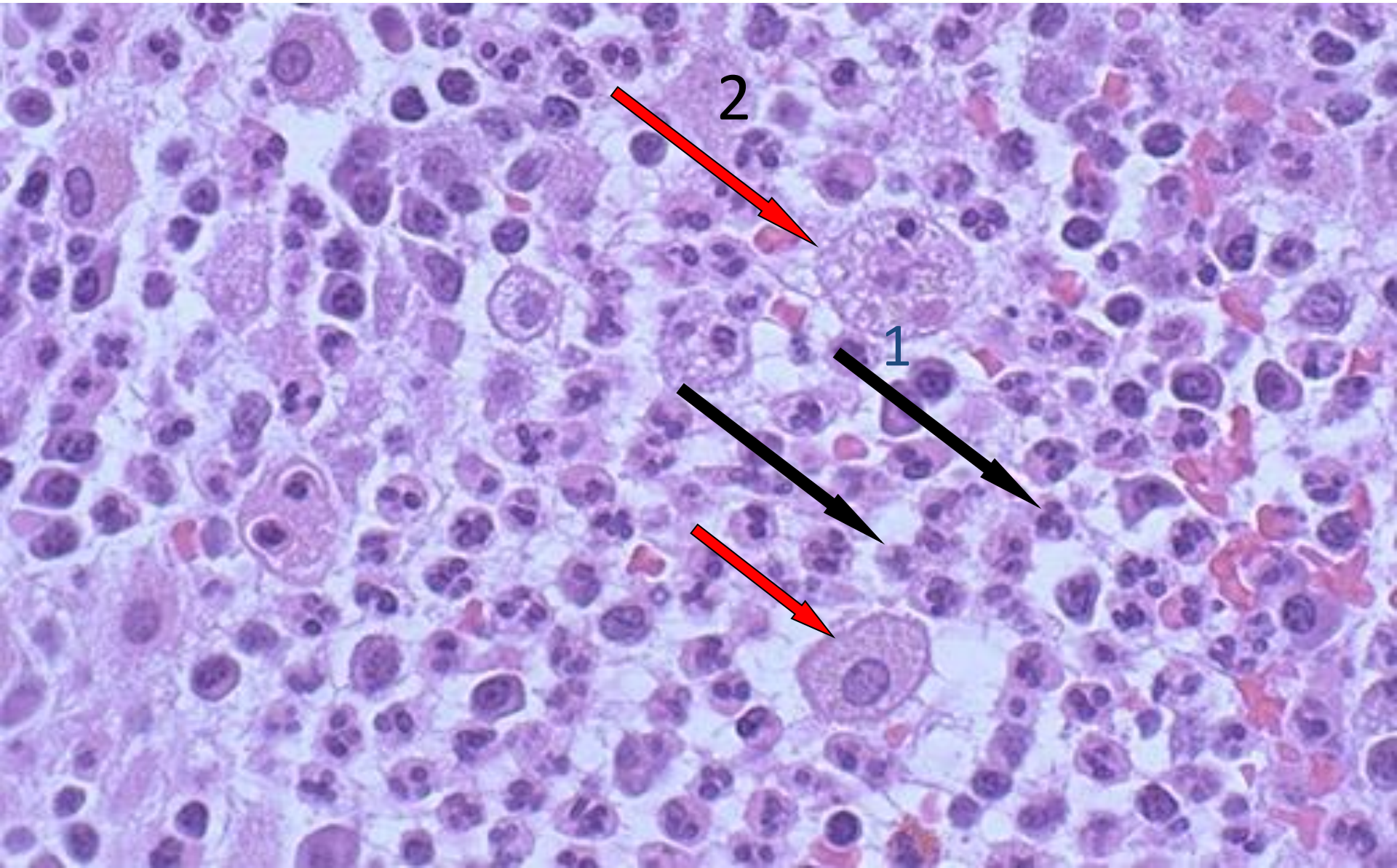
Signs of acute inflammation

The major local manifestations of acute inflammation, compared to normal





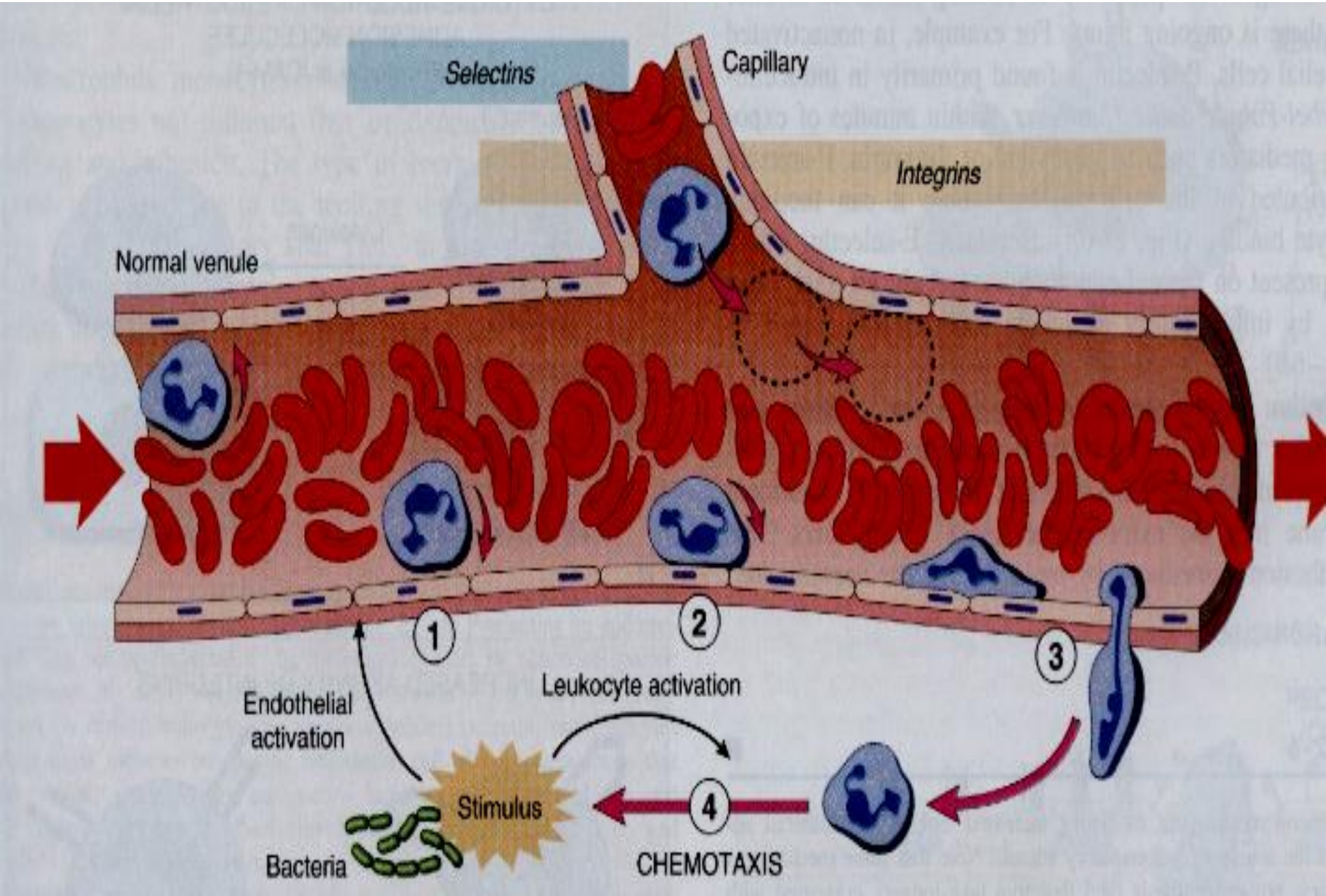
Types of acute inflammatory cells

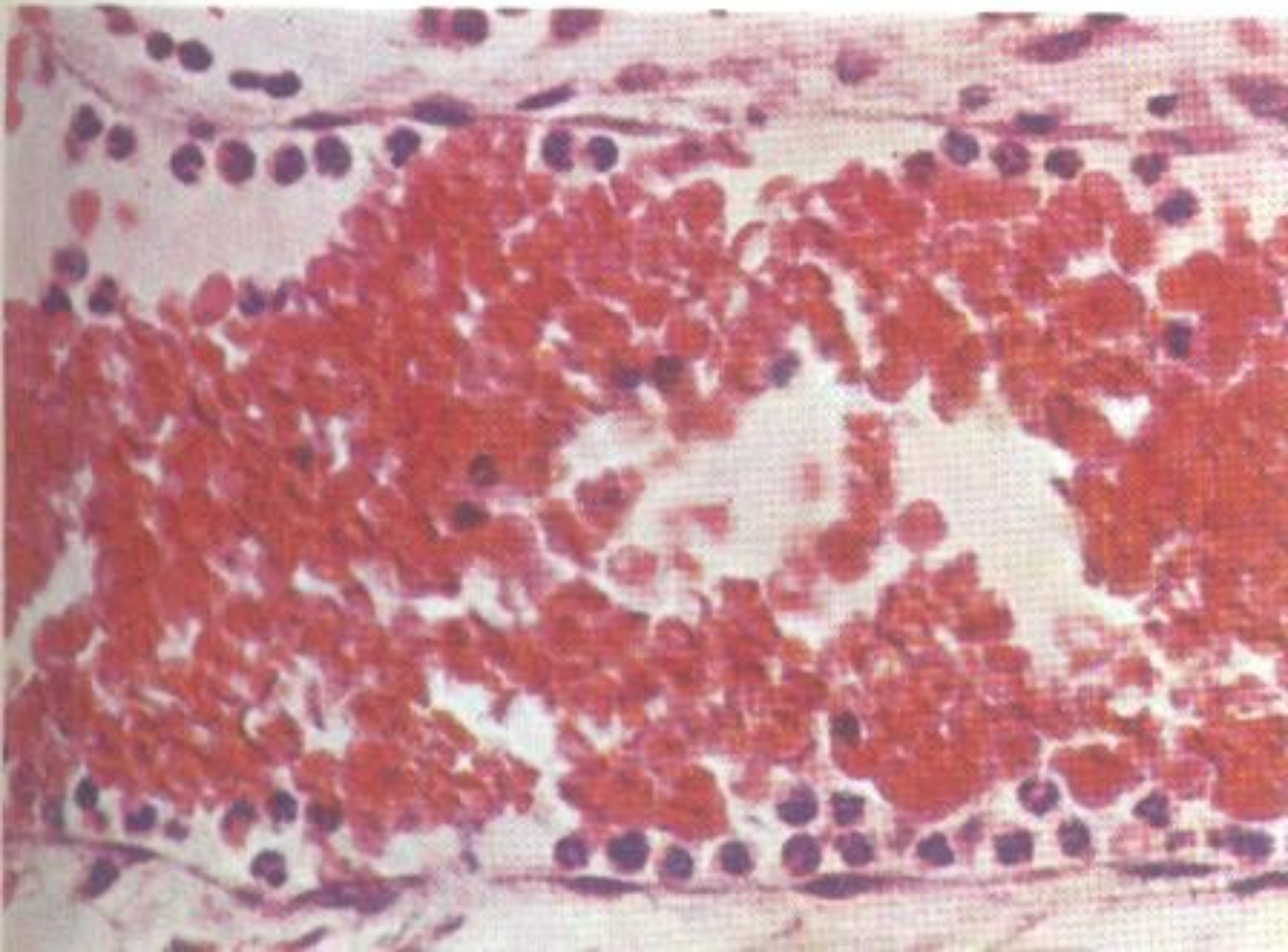


Sequence of events in leukocytes emigration in inflammation:

1. Margination.
2. Rolling.
3. Adhesion.
4. Transmigration and movement toward injurious agent (stimulus).

Emigration of neutrophils





Phagocytosis of a particle (e.g., a bacterium) involves:-

(1) attachment and binding of the particle to receptors on the leukocyte surface.

(2) engulfment and fusion of the phagocytic vacuole with granules (lysosomes), and

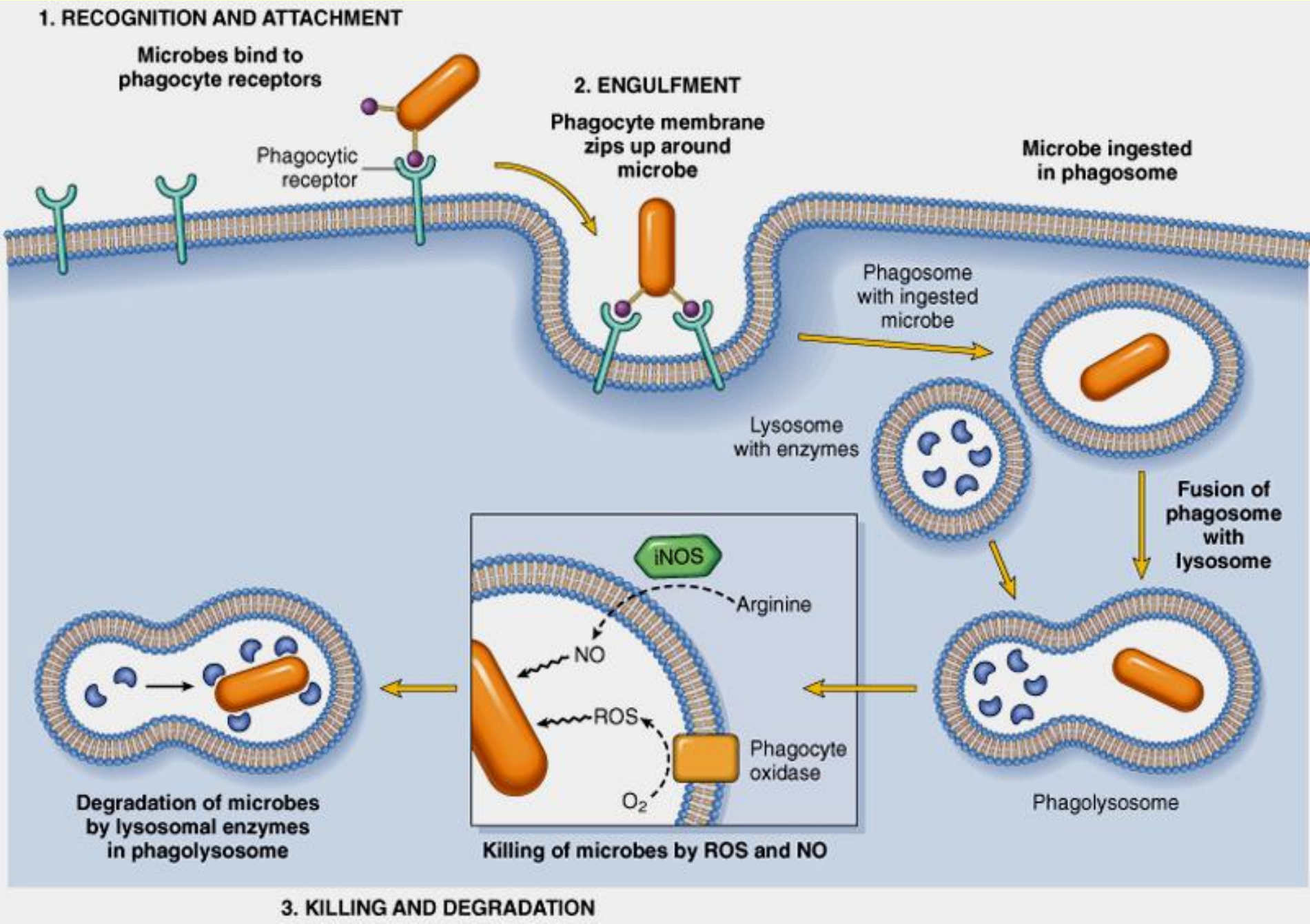
(3) destruction of the ingested particle.

iNOS, Inducible nitric oxide synthase;

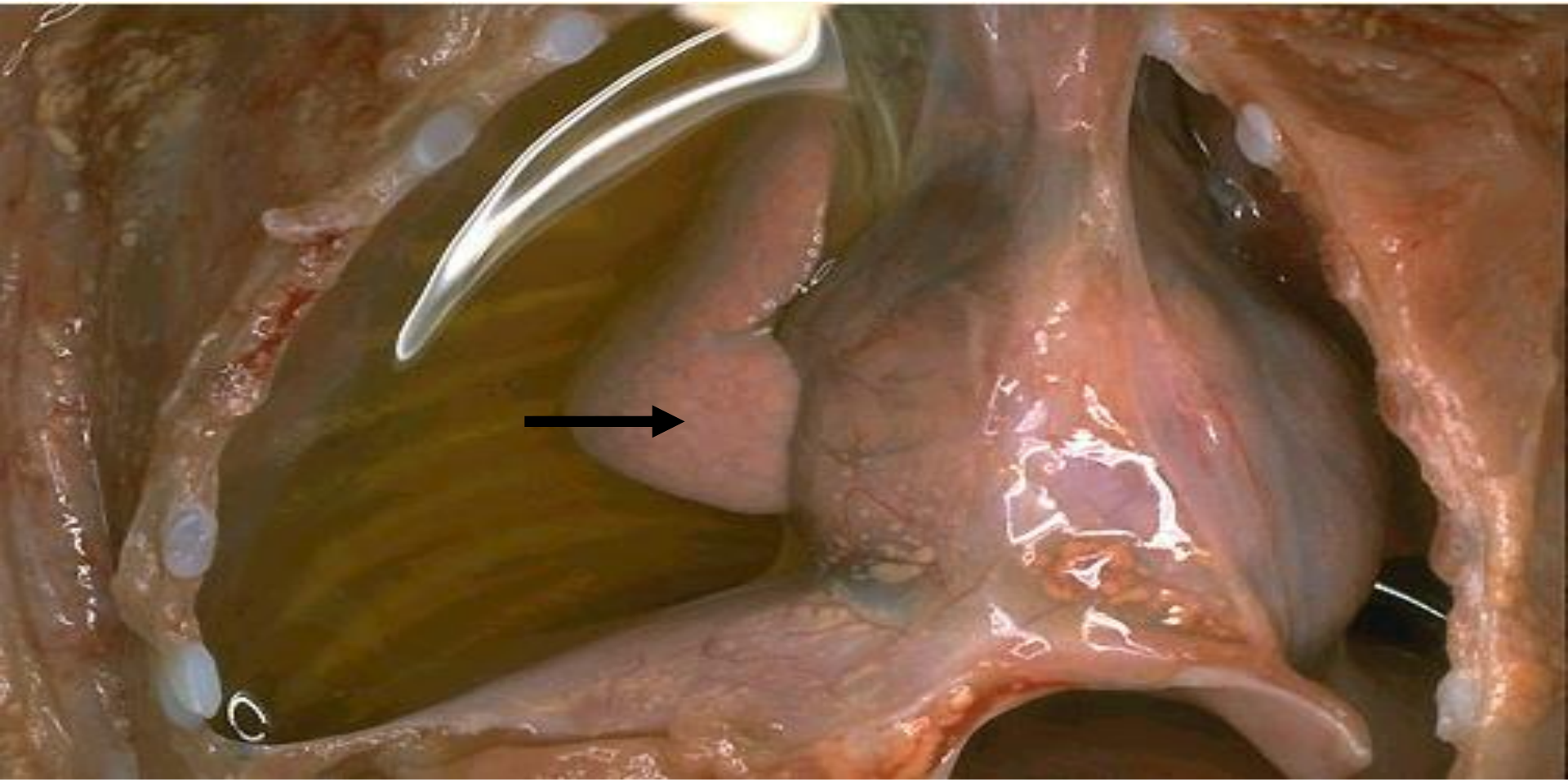
NO, nitric oxide;

ROS, reactive oxygen species.

Phagocytosis



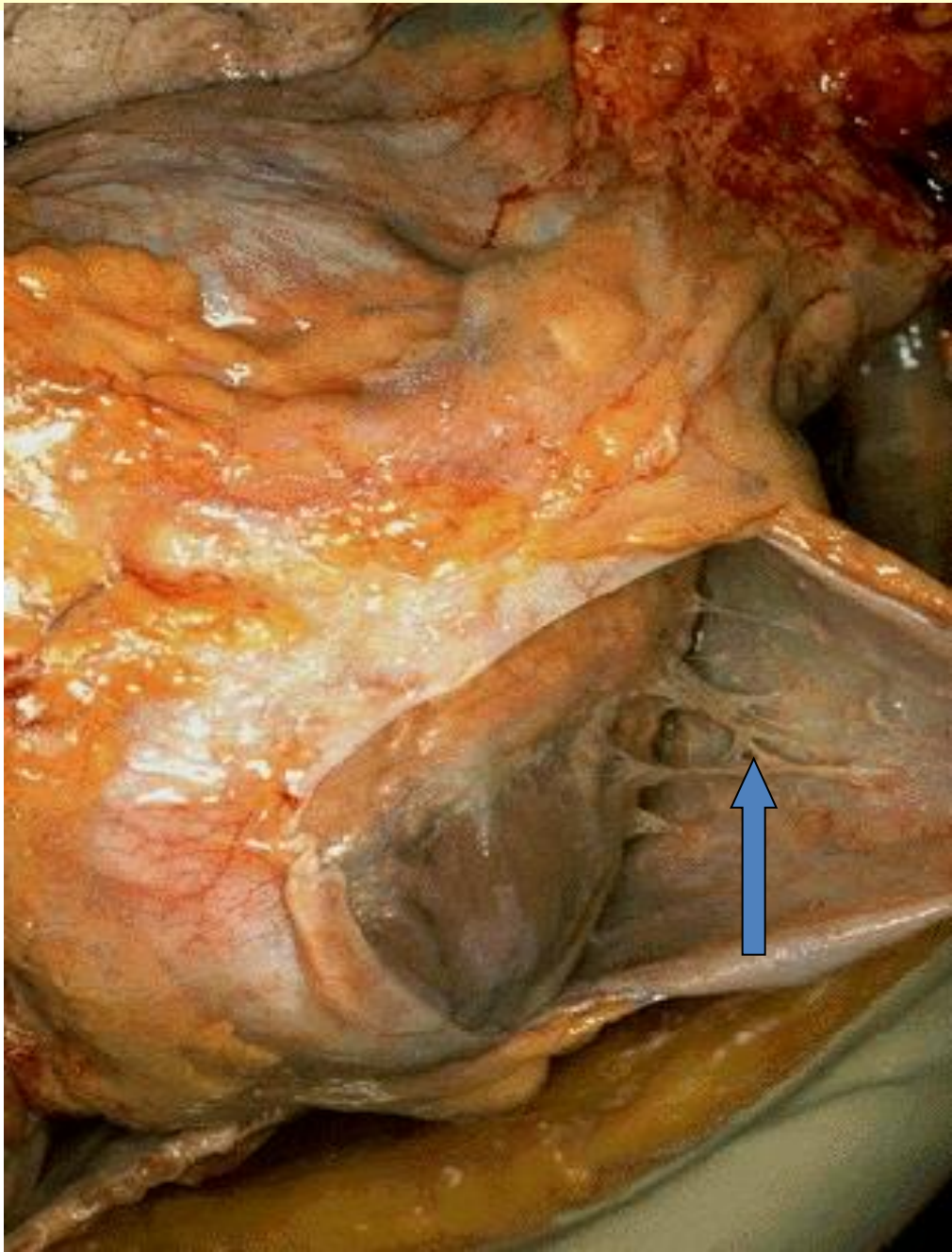
❑ Serous inflammation (serous pleural effusion)



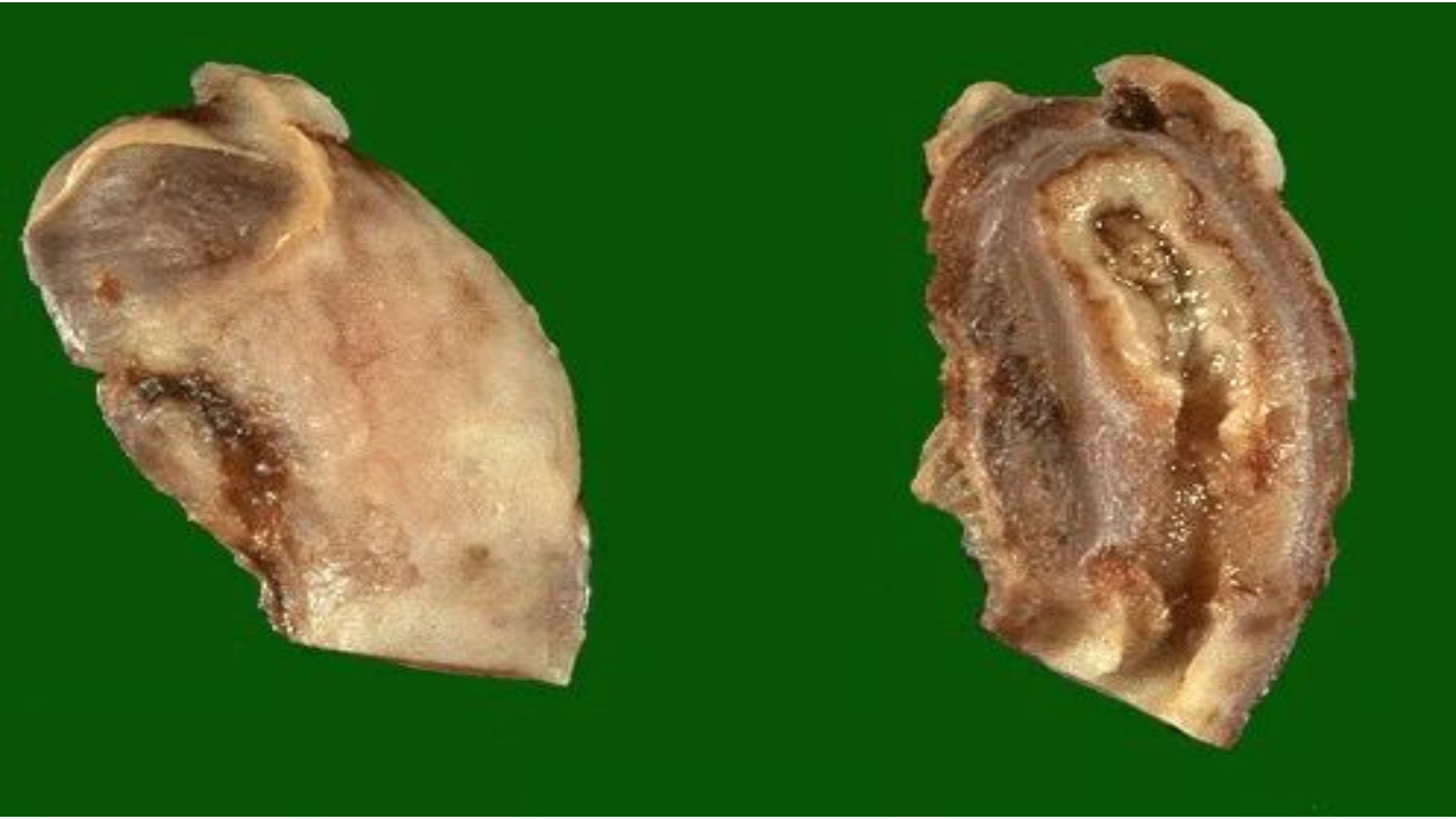
Excessive accumulation of clear, thin fluid within pleural cavity. It is transparent but note the reflection of light in the upper part of the photograph and lung collapse (arrow) due to pressure induced by the fluid.

❑ Fibrinous exudate-pericardium

- there is a lot of fibrin
- the visceral and parietal surfaces become stuck together (by fibrin).
- Separation of the two layers imparts rough irregular appearance (the so called bread and butter).

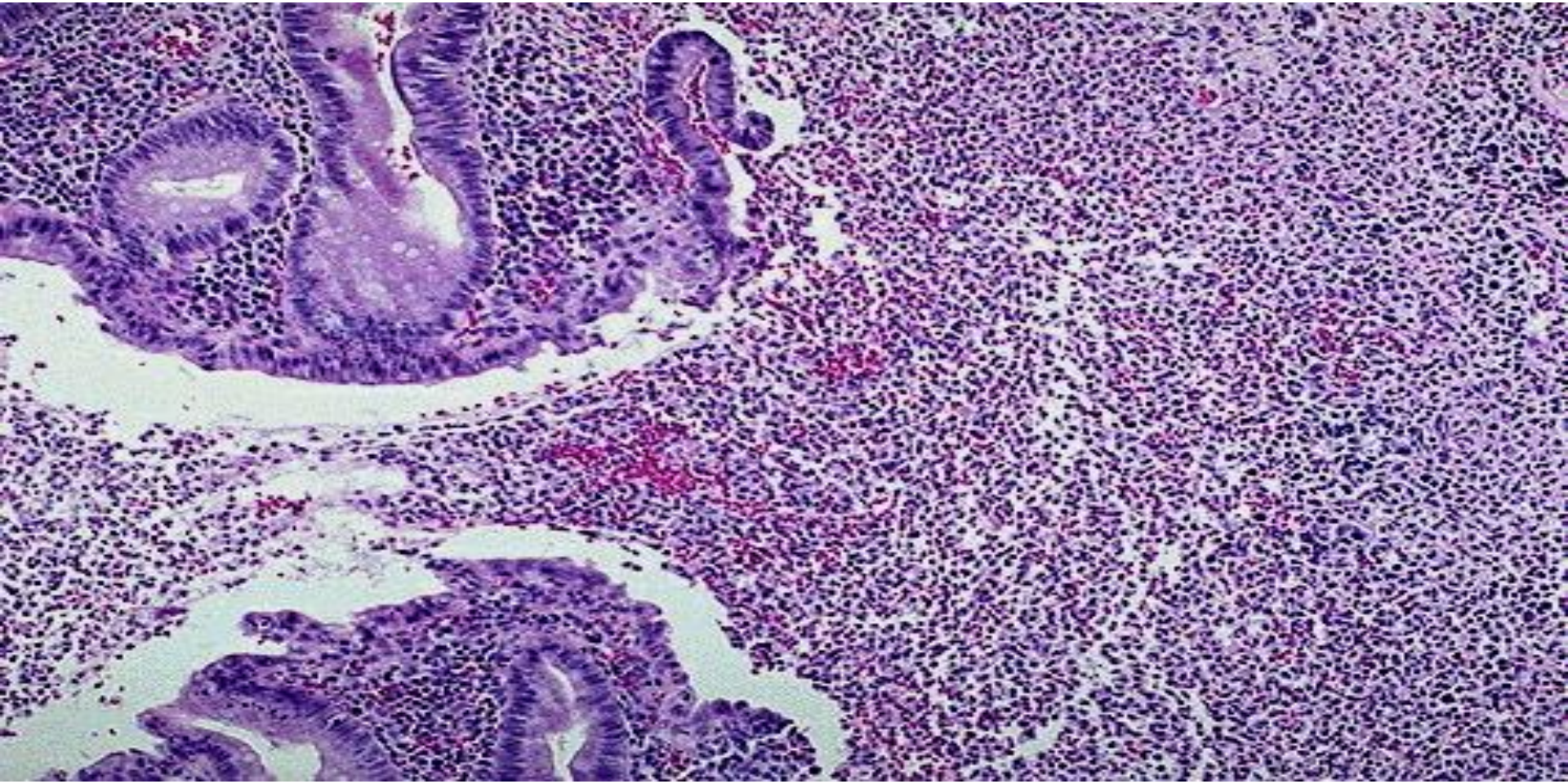


❑ Appendix: acute suppurative inflammation



Upper half of excised appendix. Lt: fibrino-purulent serosal exudate Rt: lumen filled with pus.

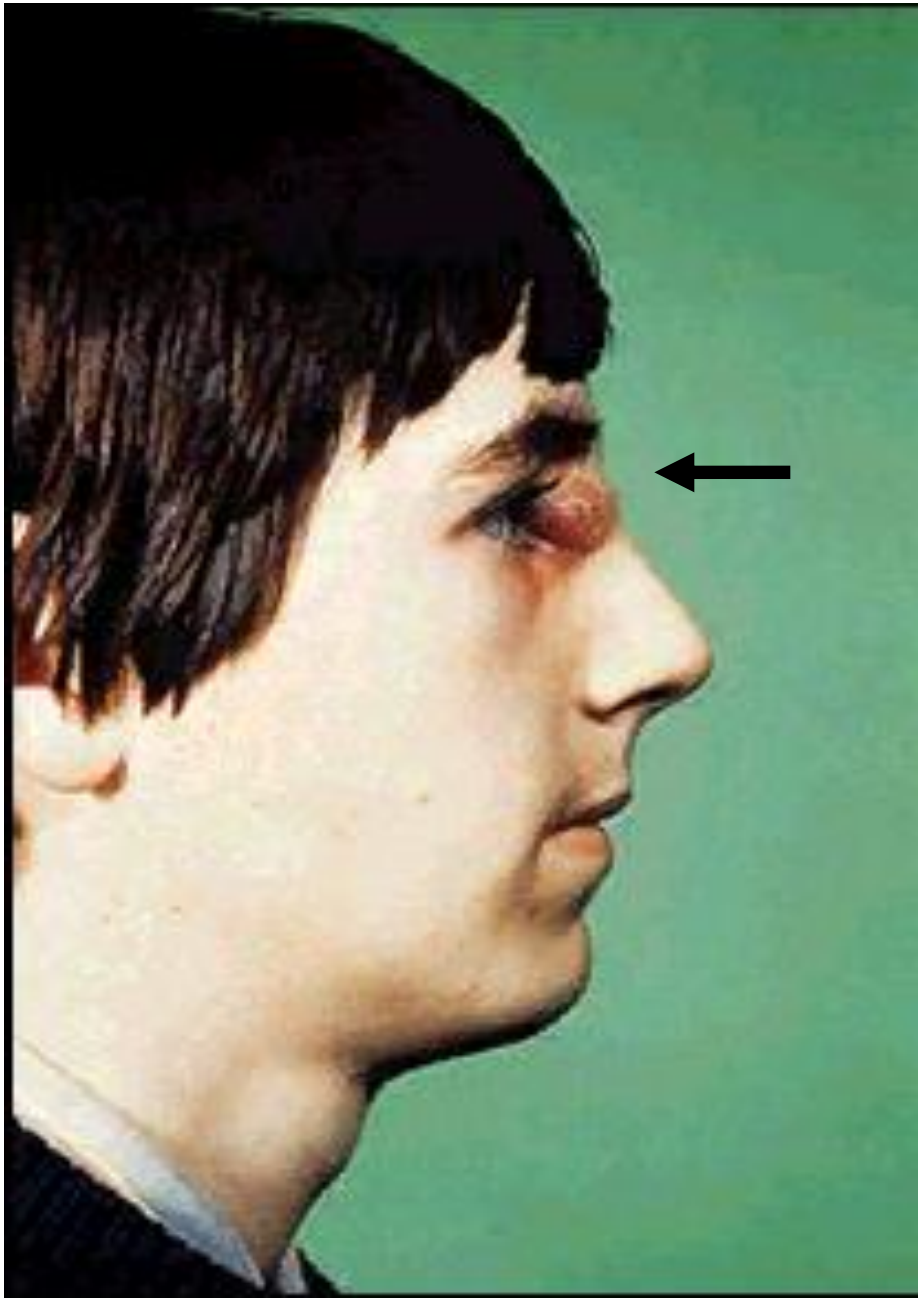
❑ Appendix: acute suppurative inflammation



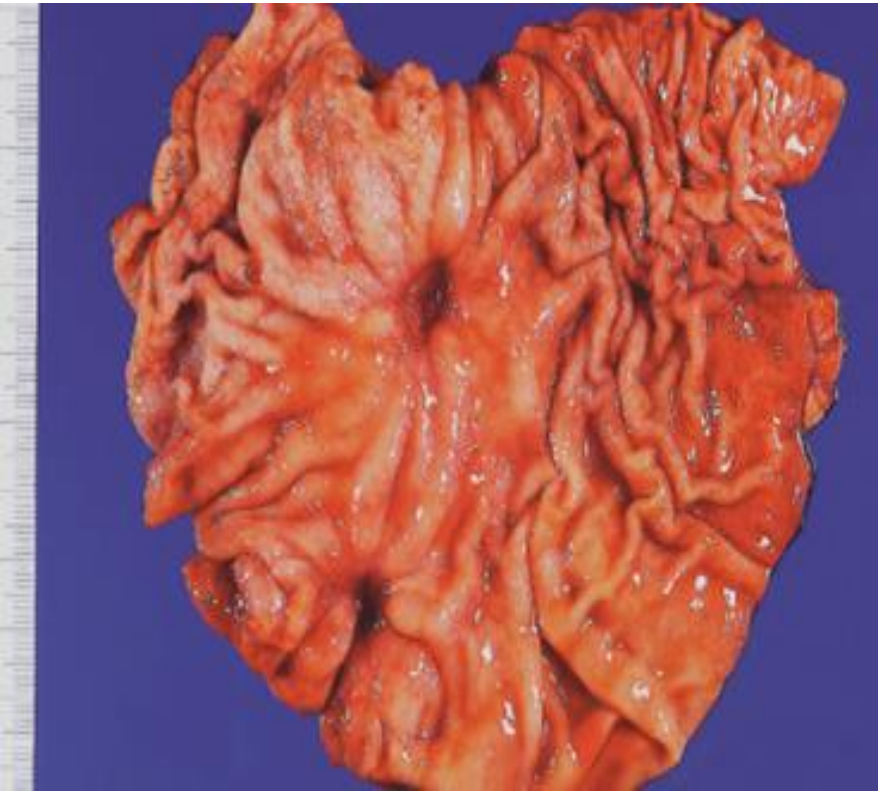
Mucosal ulceration and undermining by an extensive neutrophilic exudate

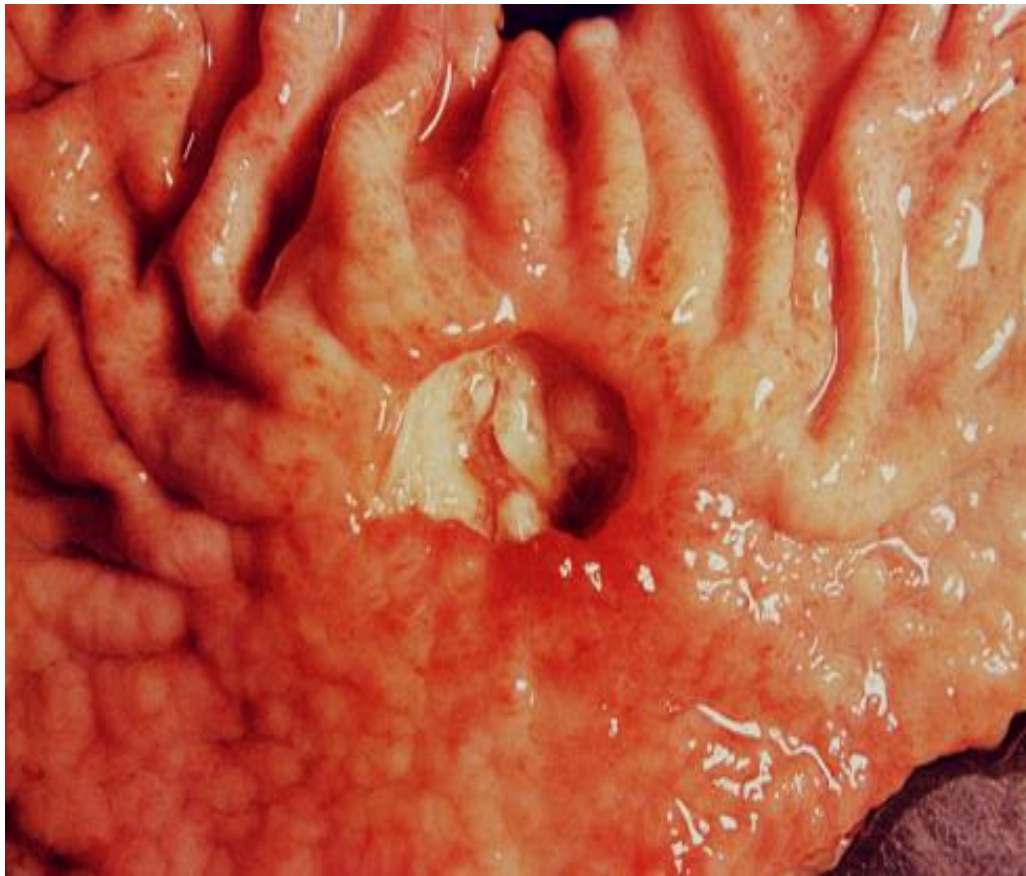
Abscess (Furuncle) (boil)

Abscess that involves the skin is called “Boil” or “furuncle”.



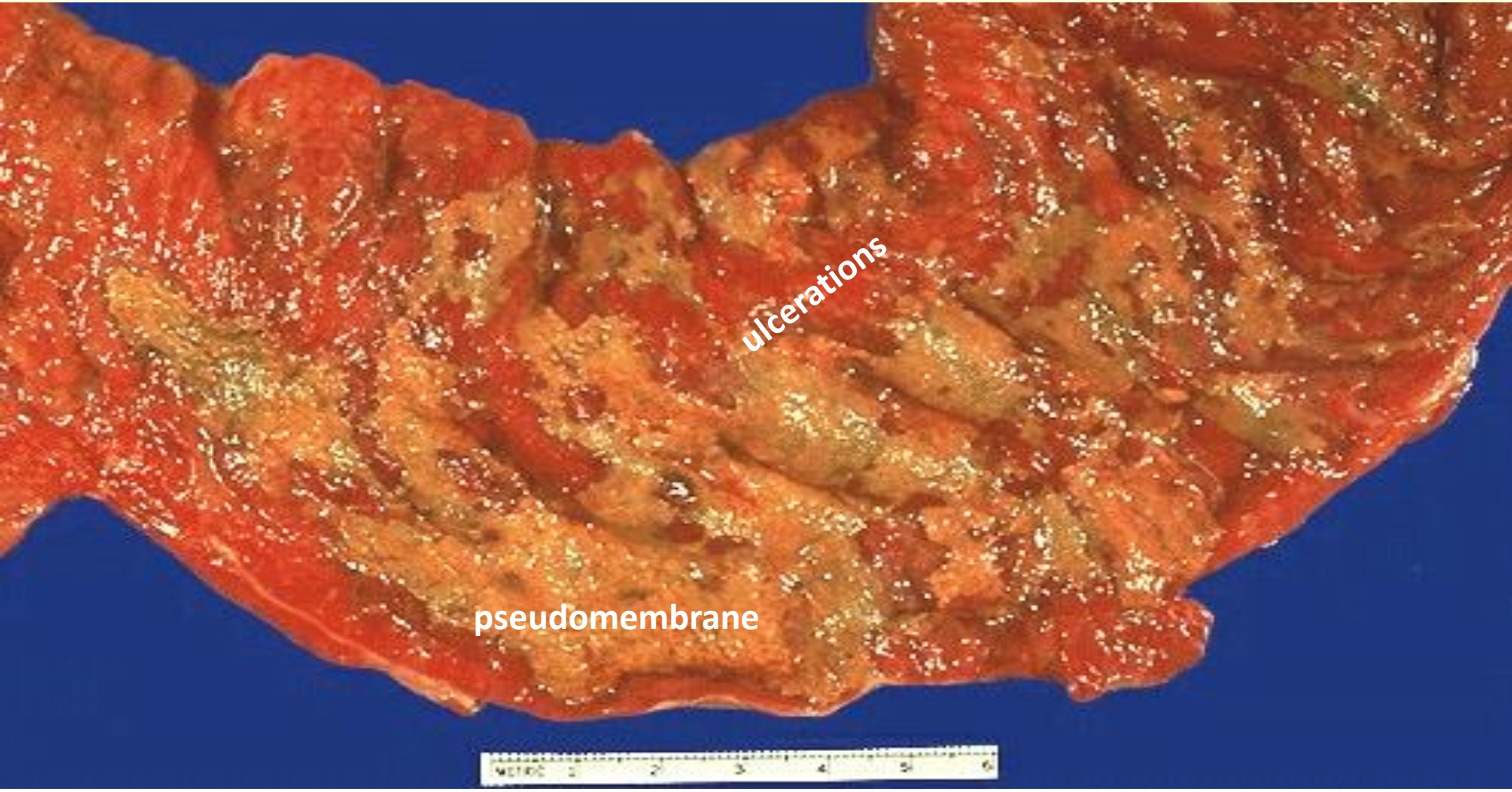
Chronic peptic ulcer stomach





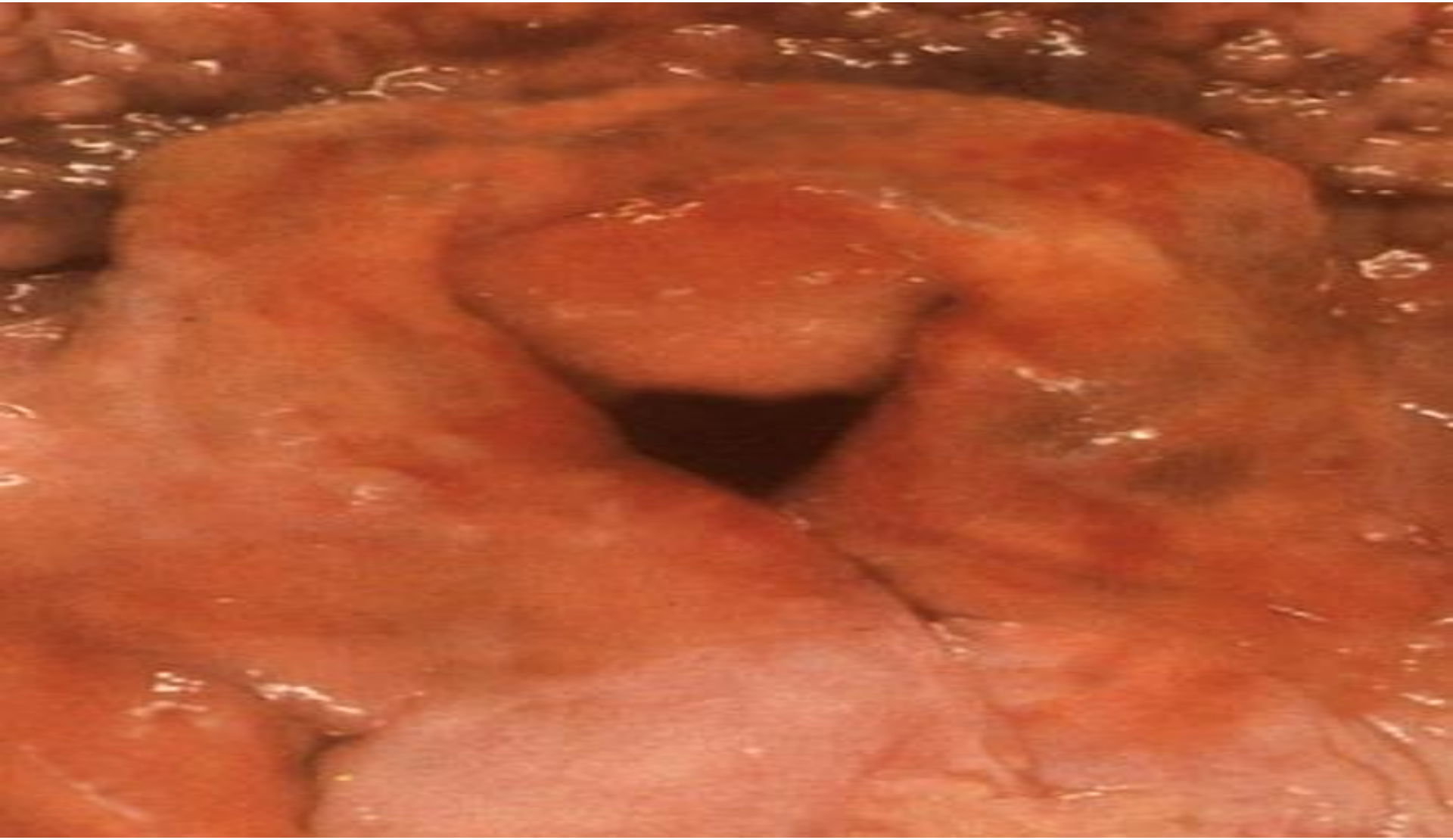
Sharply delimited chronic peptic ulcer with converging folds of mucosa in the upper half

Pseudomembranous entercolitis



This yellow-green exudate on the surface of an inflamed, hyperemic (erythematous) bowel mucosa consists of many neutrophils along with fibrin and amorphous debris from dying cells.

Laryngeal edema due to acute epiglottitis



Note congestion and the marked narrowing of laryngeal orifice

Outcome of acute inflammation

- ✓ ***Resolution.***
- ✓ ***Fibrosis.***
- ✓ ***Suppuration.***
- ✓ ***Progress to chronic inflammation.***

Chronic inflammatory cells

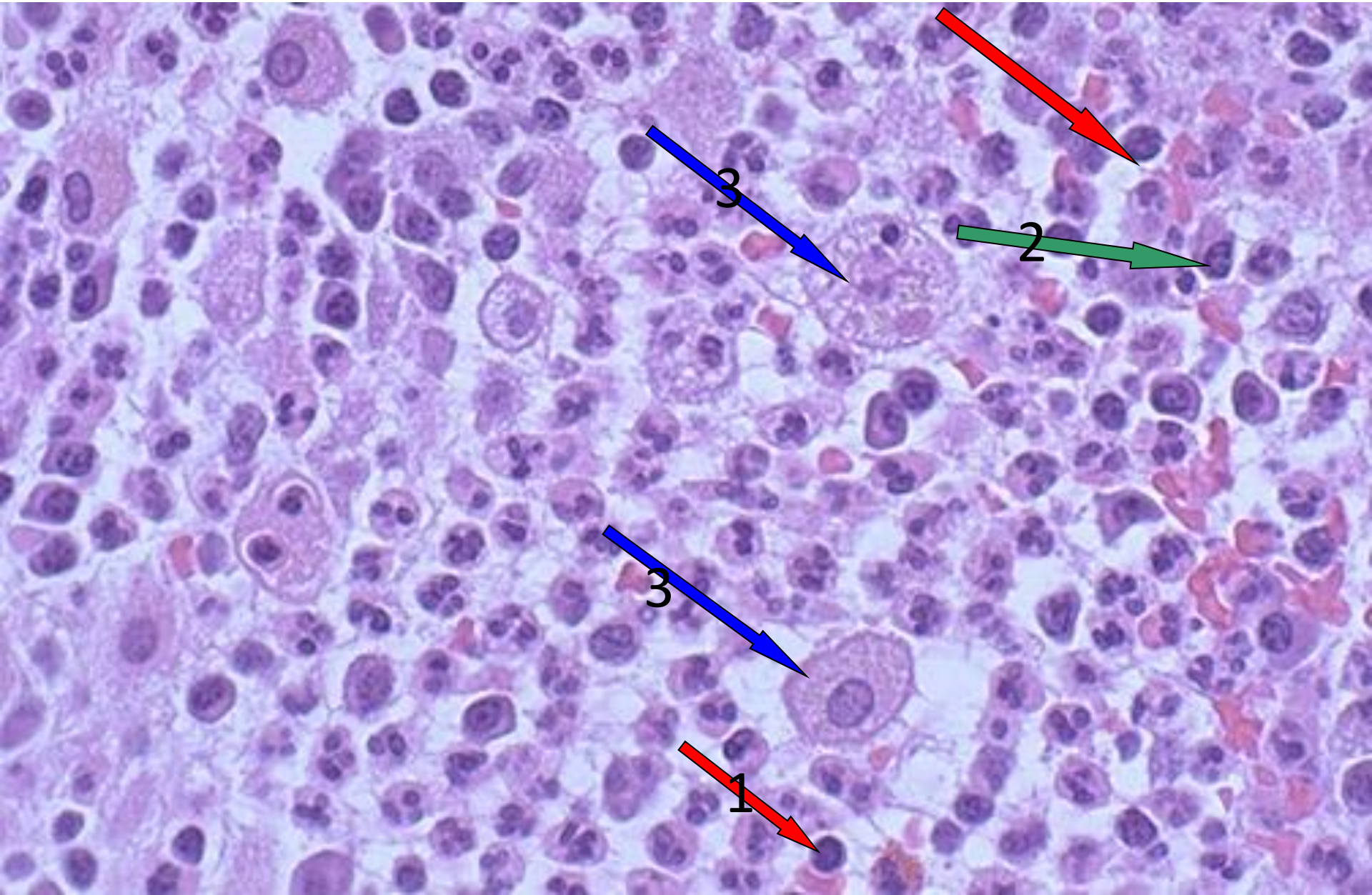
1- lymphocytes.

2-plasma cells.

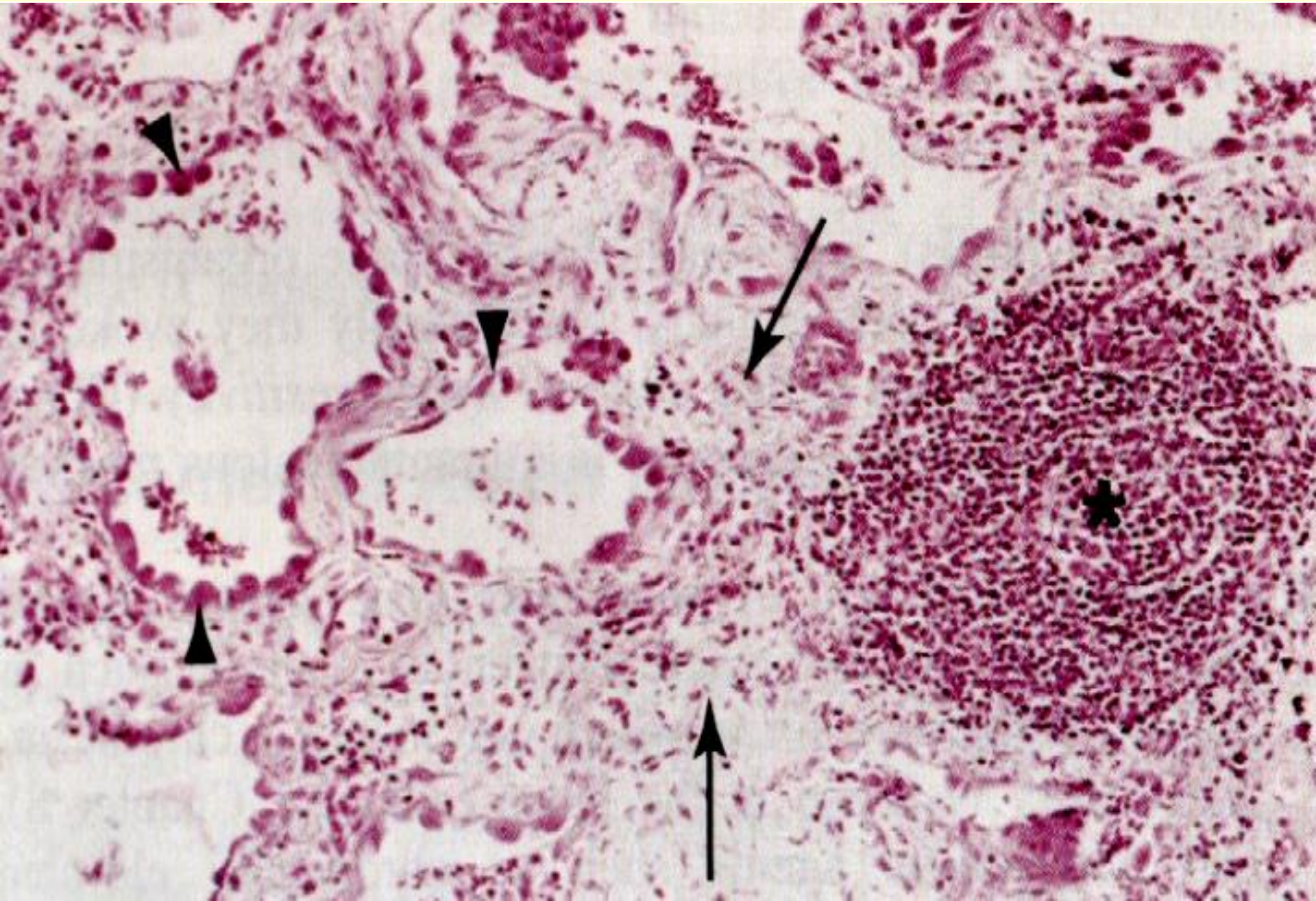
3- macrophage.

4- fibroblast.

Types of chronic inflammatory cells



Features of chronic inflammation (LUNG)



The three characteristic features of chronic inflammation (in the lung):-

1. Chronic inflammatory cells infiltration*
2. Destruction of the normal tissue

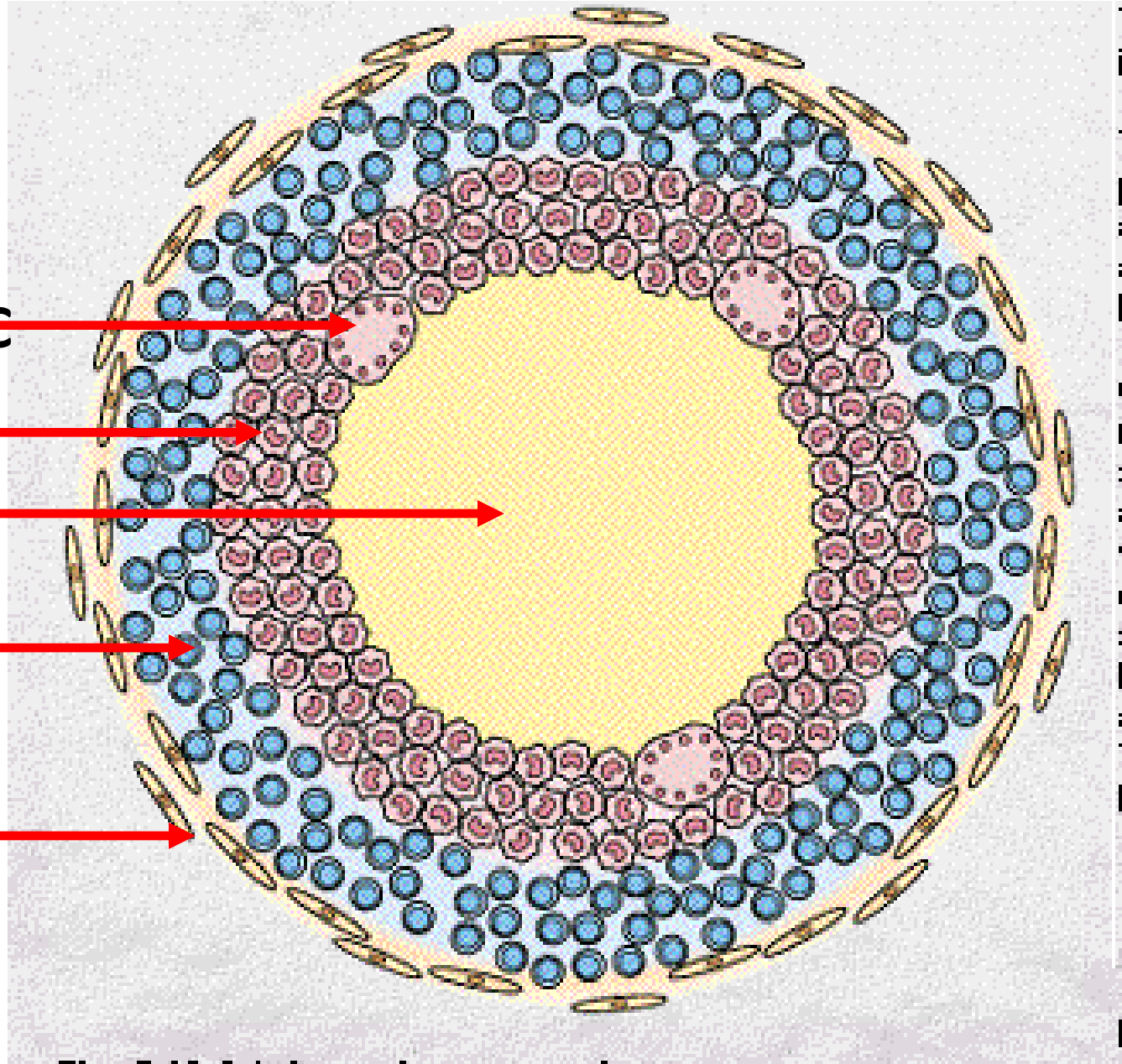
(normal alveoli are replaced by spaces lined by cuboidal cells (arrow heads).

1. Replacement by fibrosis (arrows).

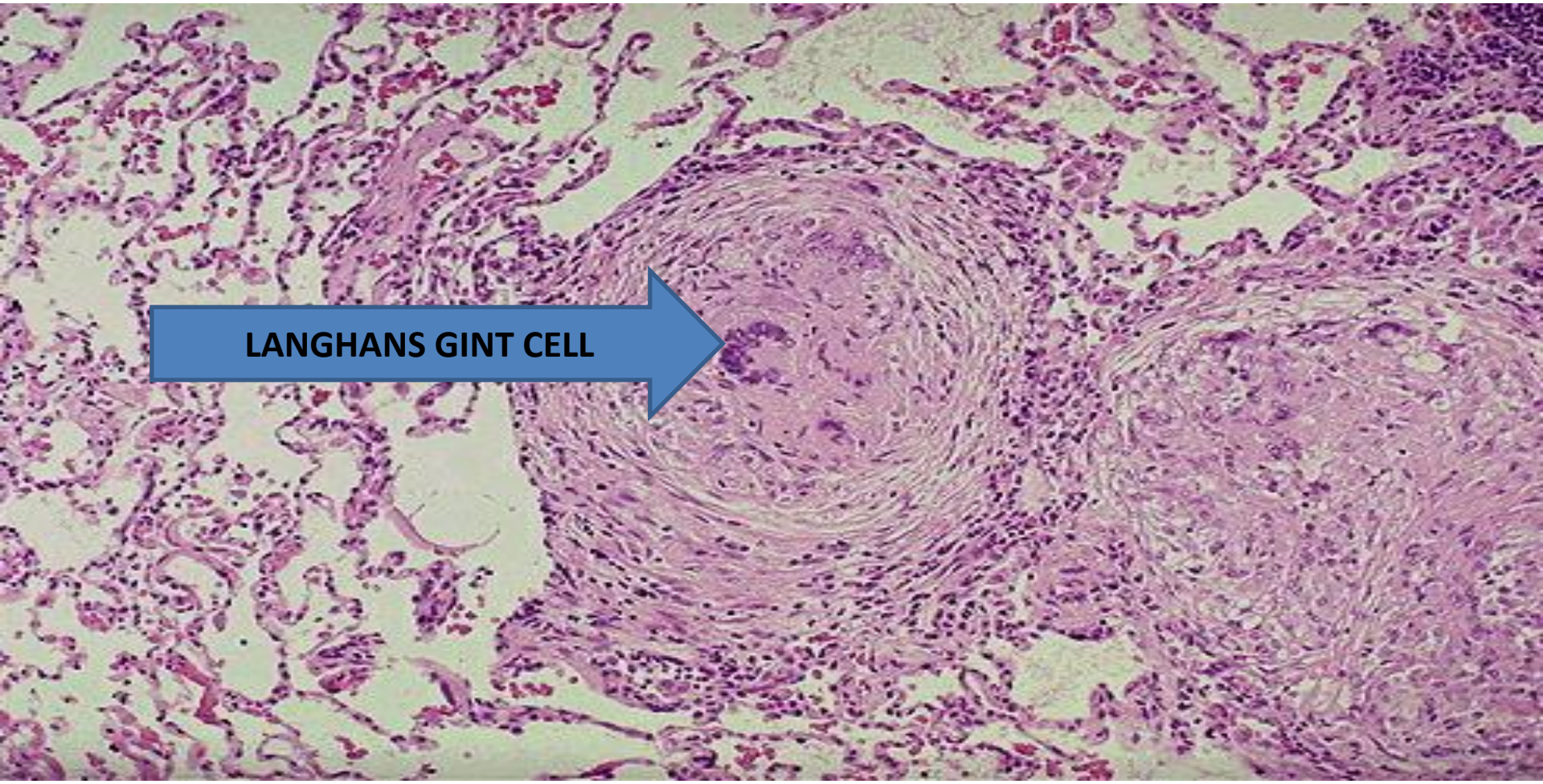
Chronic cholecystitis with cholelithiasis

Note thickening of the wall due to fibrosis

Diagram of typical TB granuloma

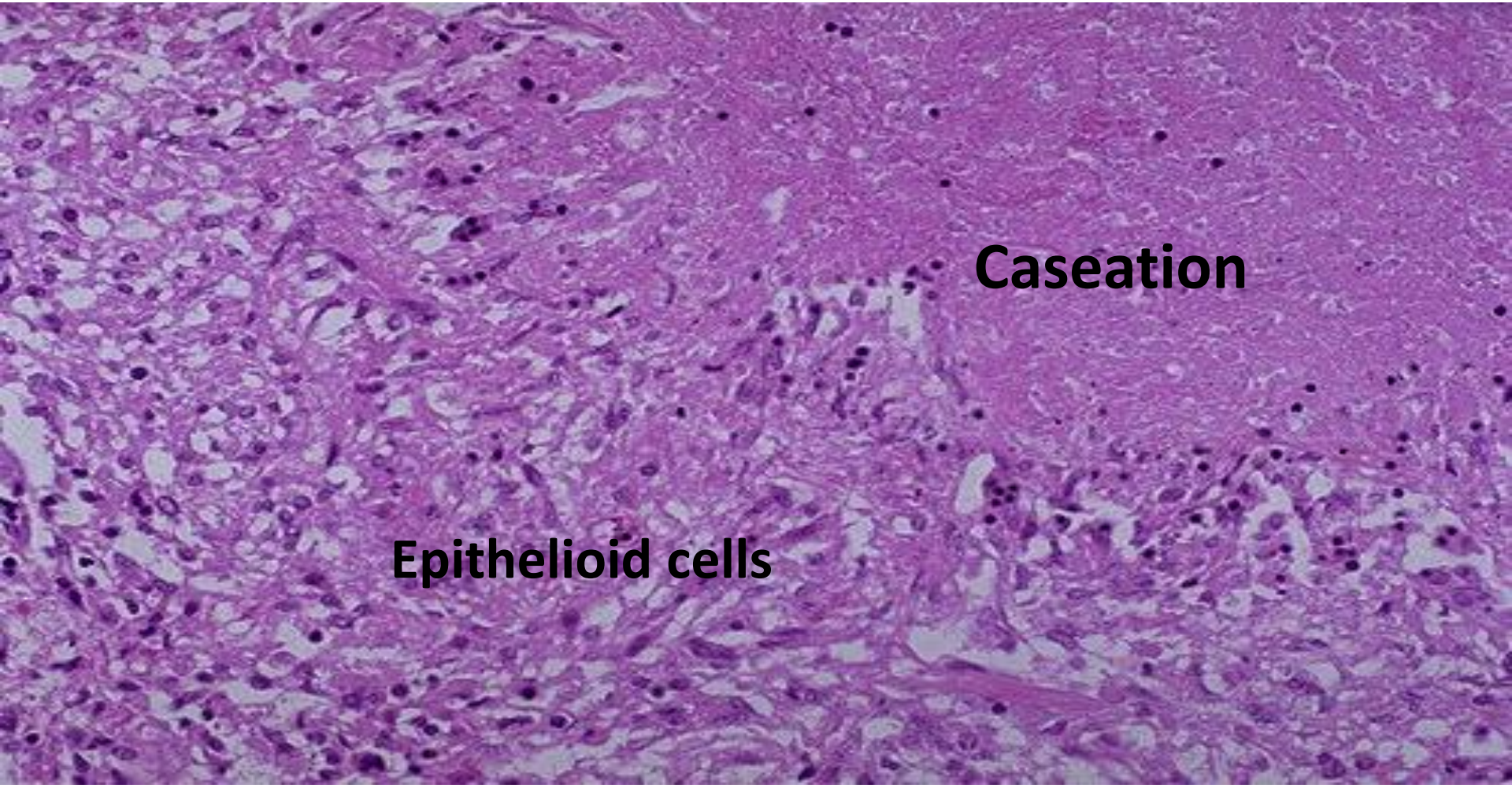


TB granulomas lung



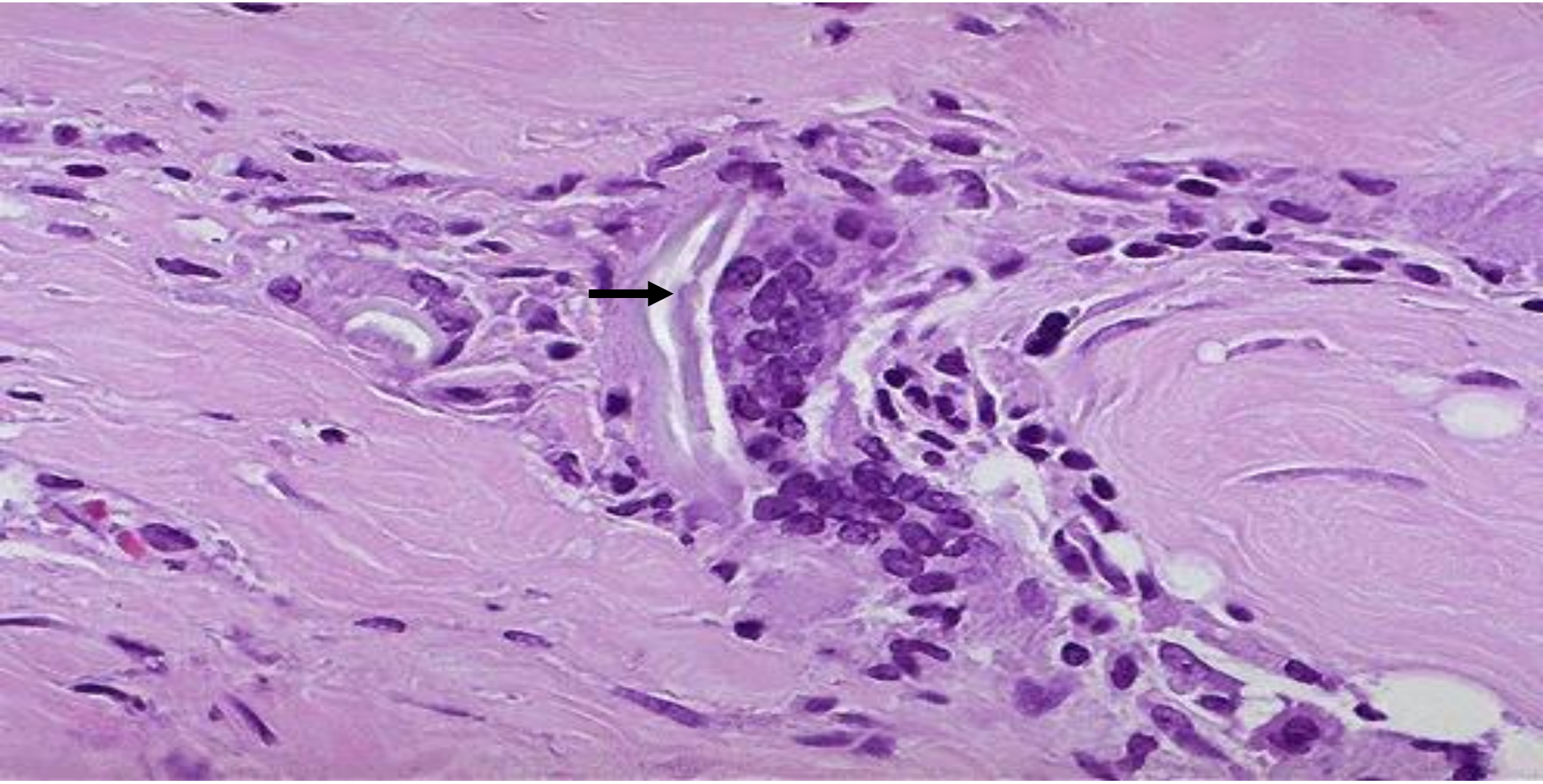
This is a low power view showing two, adjacent, well-defined, rounded granulomas . From this power the presence of multinucleated giant cells is obvious (arrow).

TB granulomas



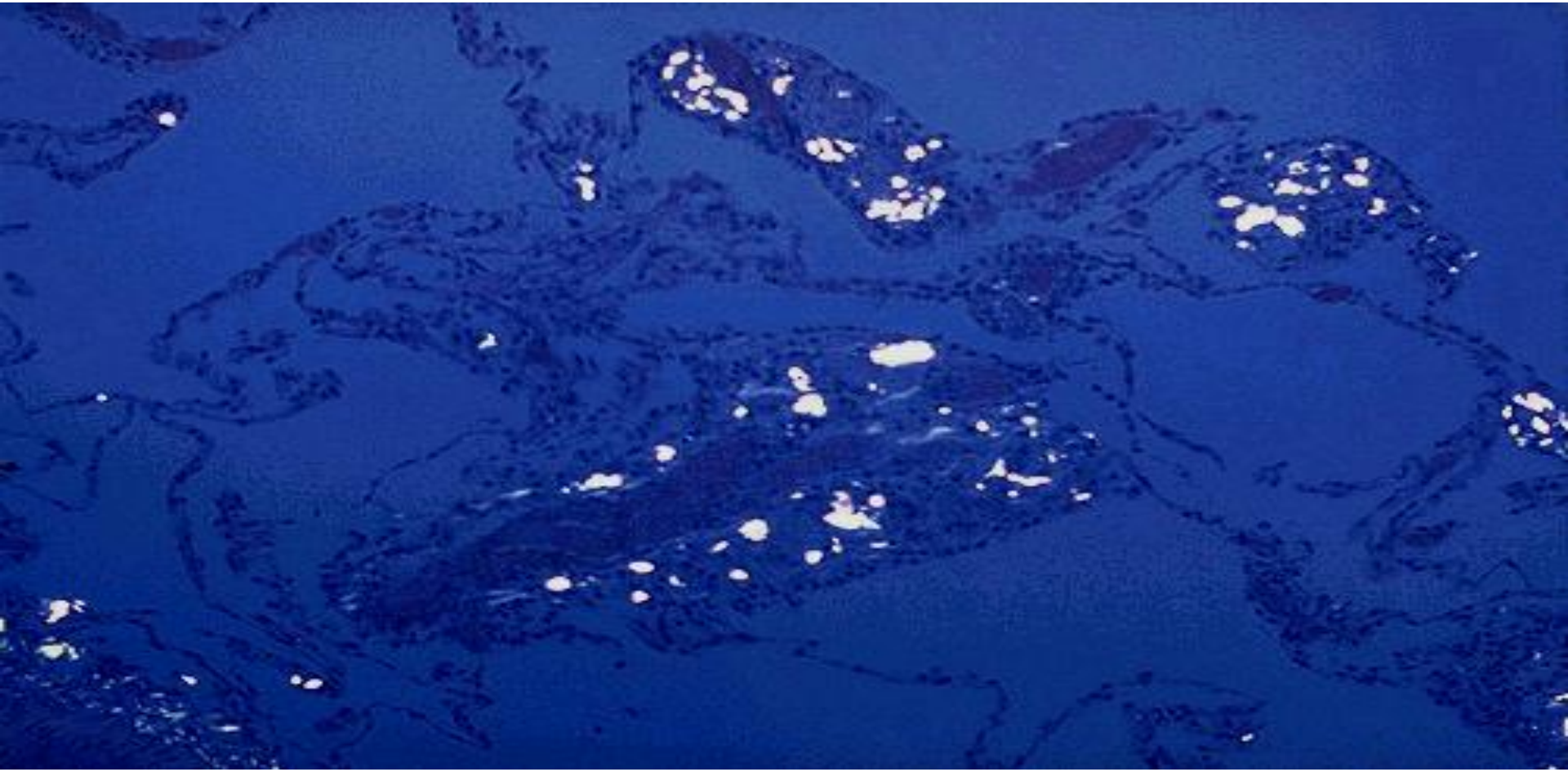
This is a high power view showing a portion of typical TB granuloma. Note the amorphous, pinkish central caseation, which is surrounded by a rim of epithelioid cells.

Foreign body giant cells in suture granuloma



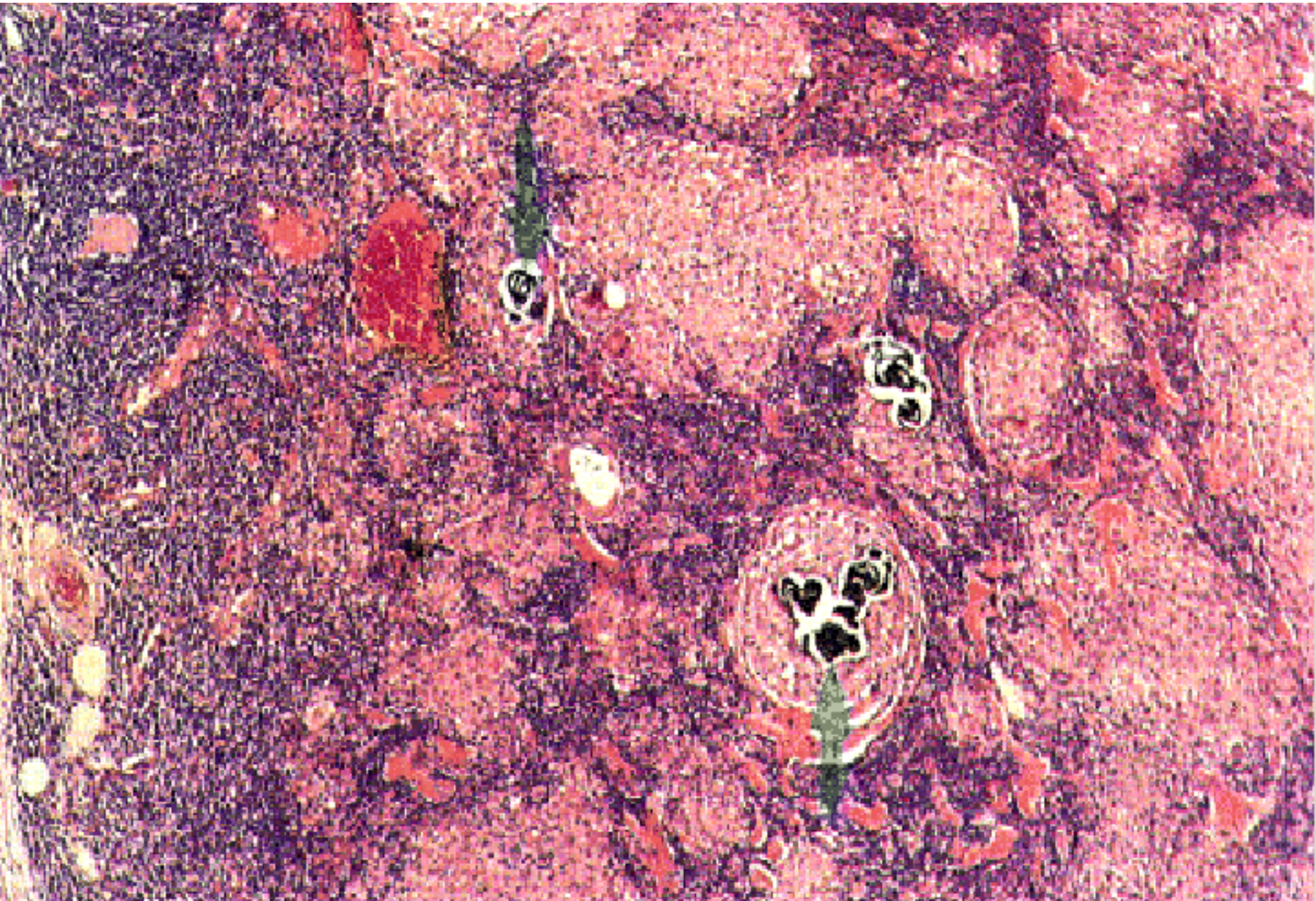
Two foreign body giant cells are seen, where there is a bluish strand of suture material (arrow) from a previous operation

Talc granulomas, pulmonary, polarized light



Seen under polarized light are numerous bright white crystals of talc in a patient who was an intravenous drug user. The injected drug was diluted with the talc. Such foreign material can produce a granulomatous reaction.

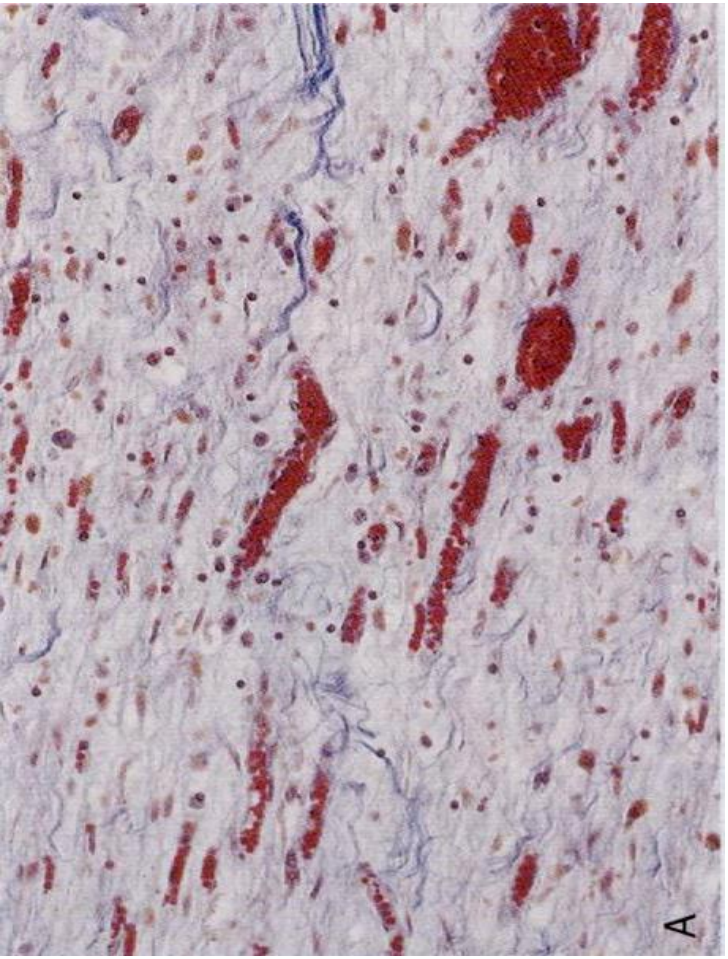
Sarcoidosis lymph node

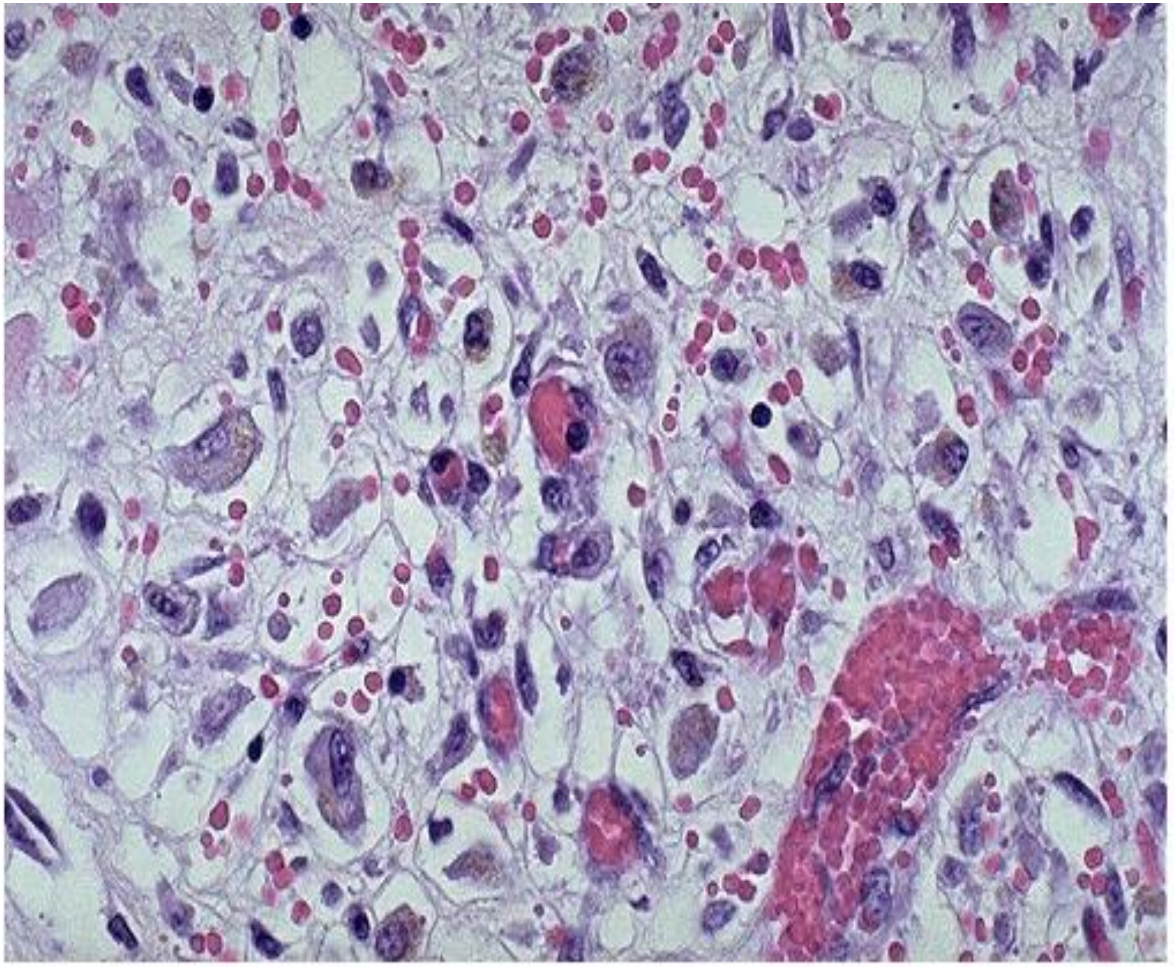


Sarcoidosis is a granulomatous inflammatory disease which affects many tissues, including lymphoid tissue. The capsule of the node is on the left. The normal architecture of the node has been largely destroyed, with some blue-staining lymphoid tissue surviving beneath the capsule and between the round sarcoid granulomas. The latter vary widely in size, from a few cells to very large collections (right) several mm in diameter. They consist of epithelioid histiocytes. There is no caseation, but some contain calcified laminated Schaumann bodies (arrows).

Granulation tissue

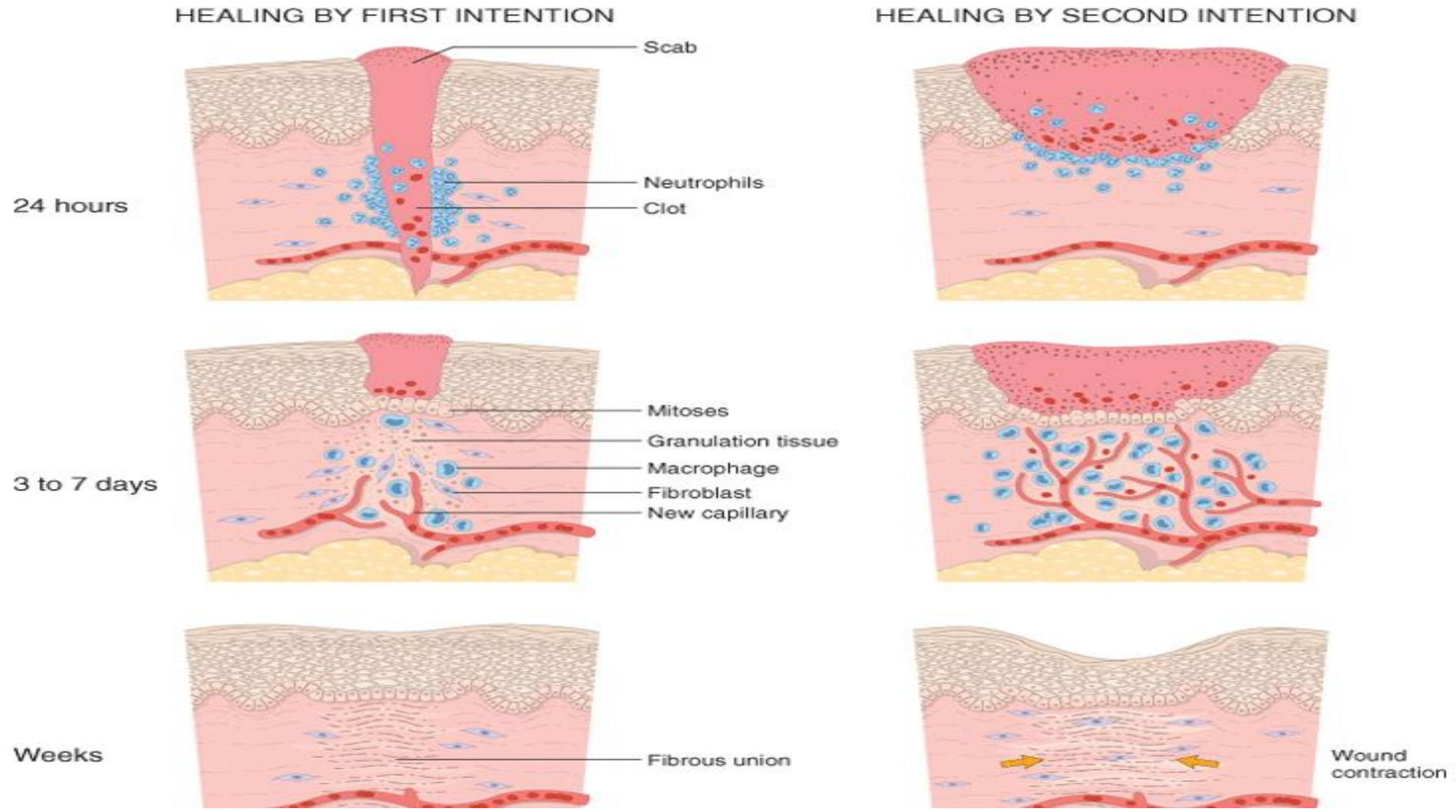
Granulation tissue formation in wound healing





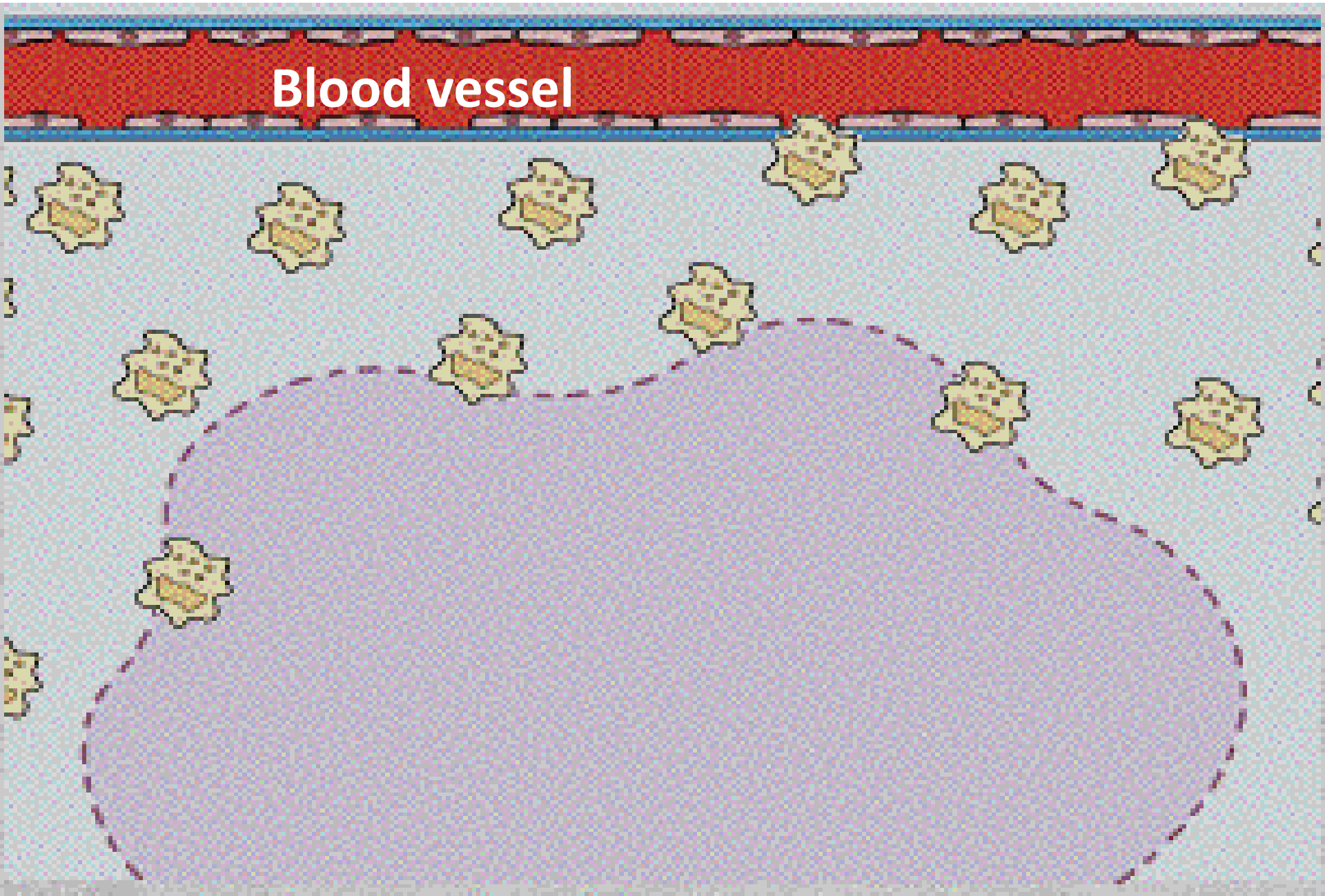
- Rt. There are numerous blood vessels, edema, and a loose extracellular matrix containing occasional inflammatory cells.
- Lt. at high magnification, granulation tissue has capillaries, fibroblasts, and a variable amount of inflammatory cells.

Wound healing

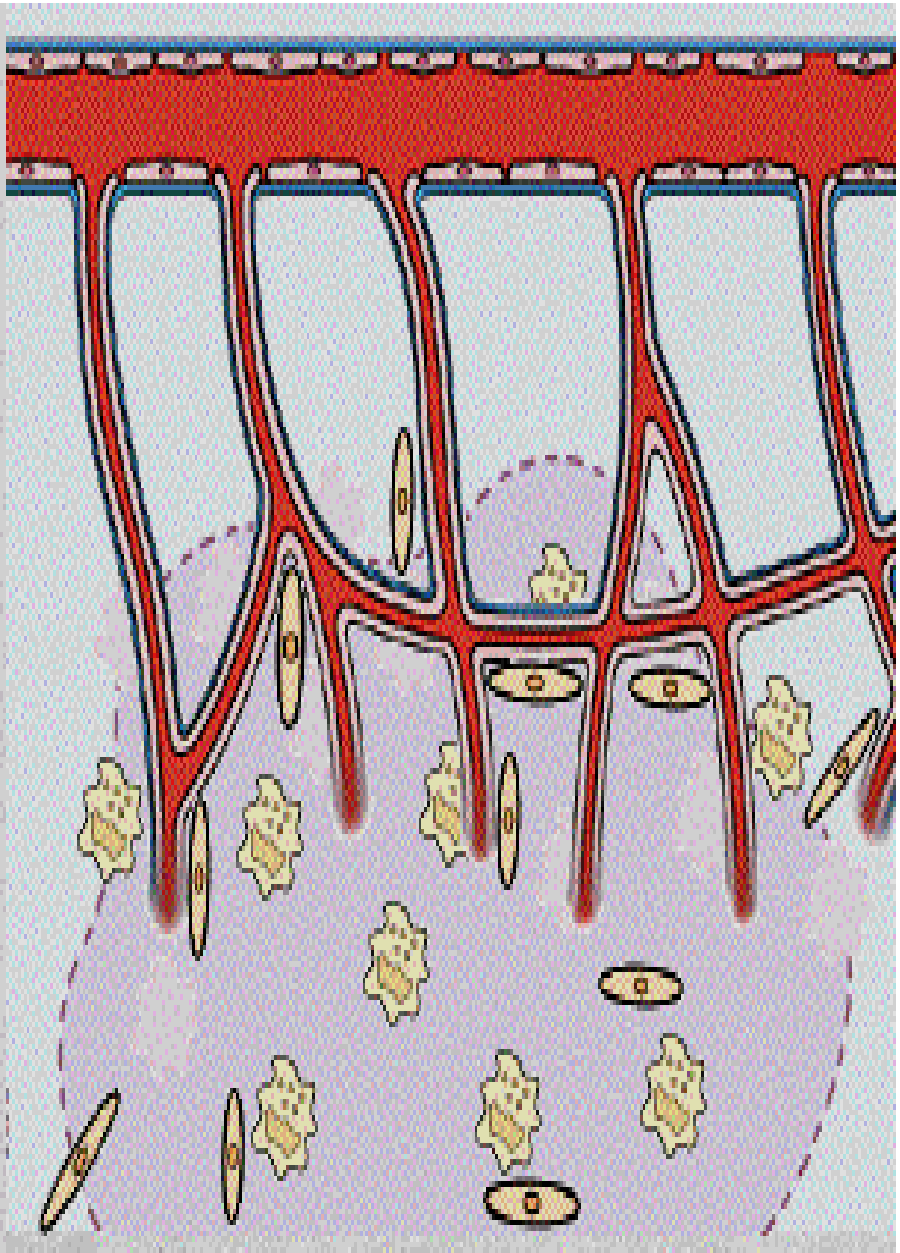


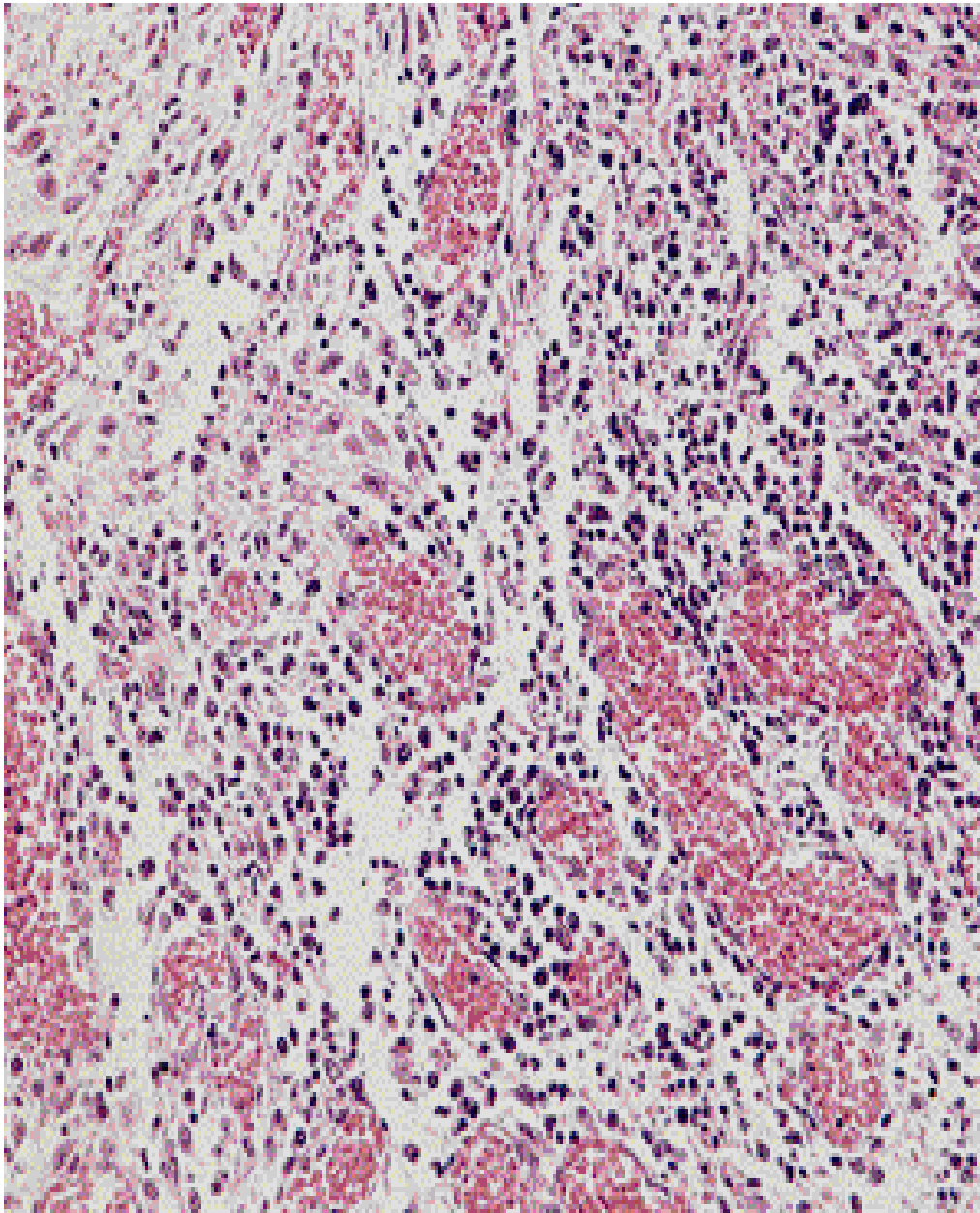
Steps in wound healing by first intention (left) and second intention (right). In the latter, note the large amount of granulation tissue and wound contraction.

Removal of debris by macrophages

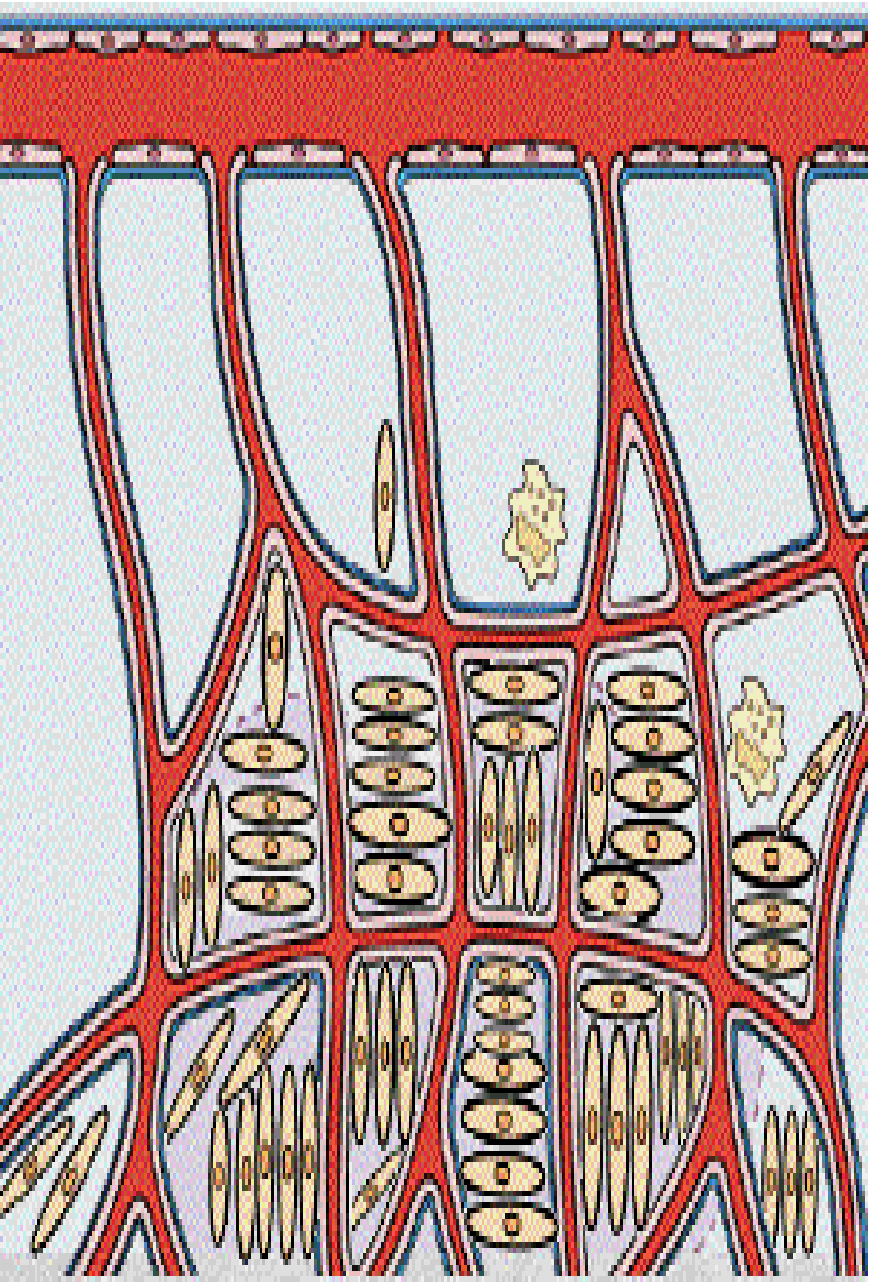


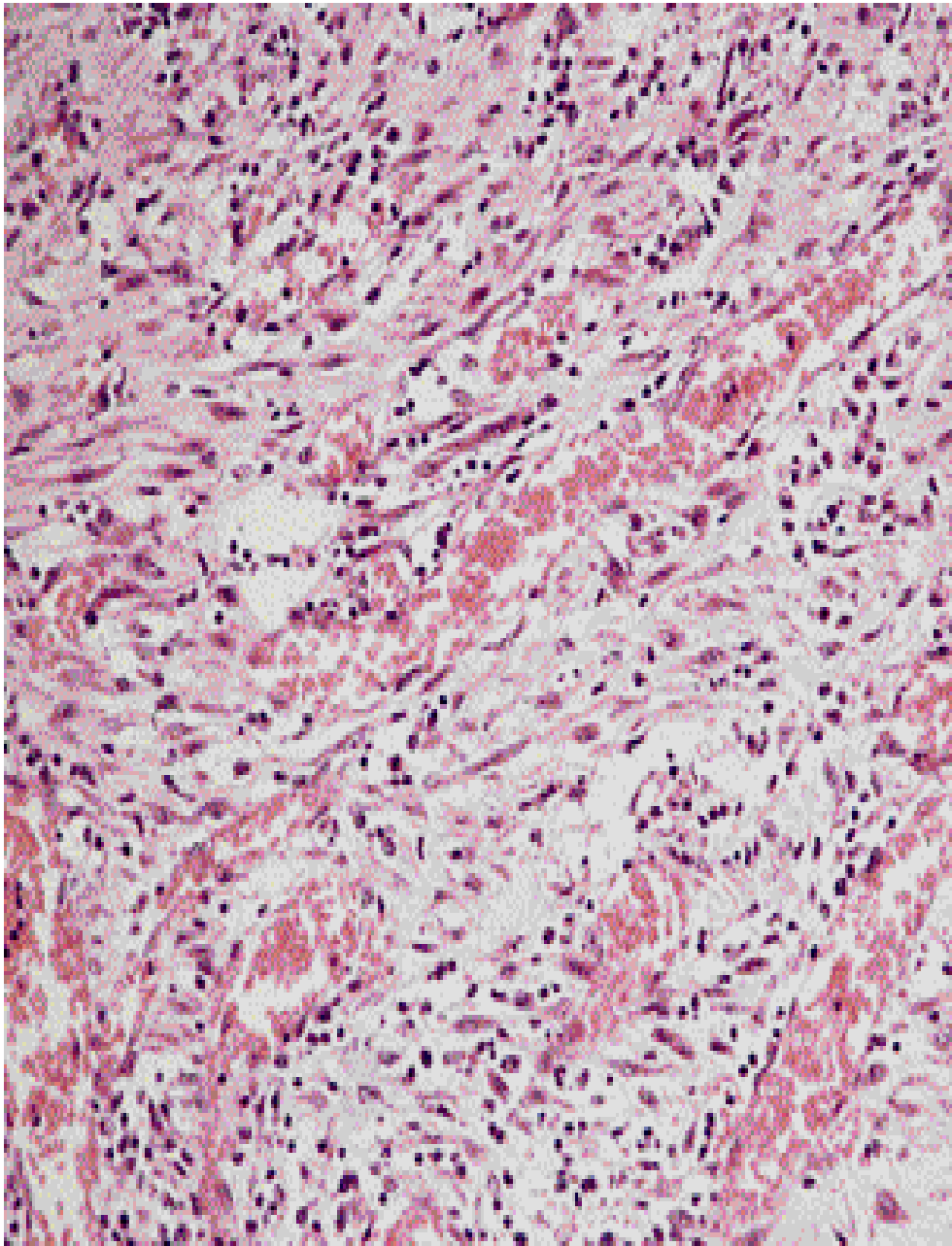
Vascular granulation tissue



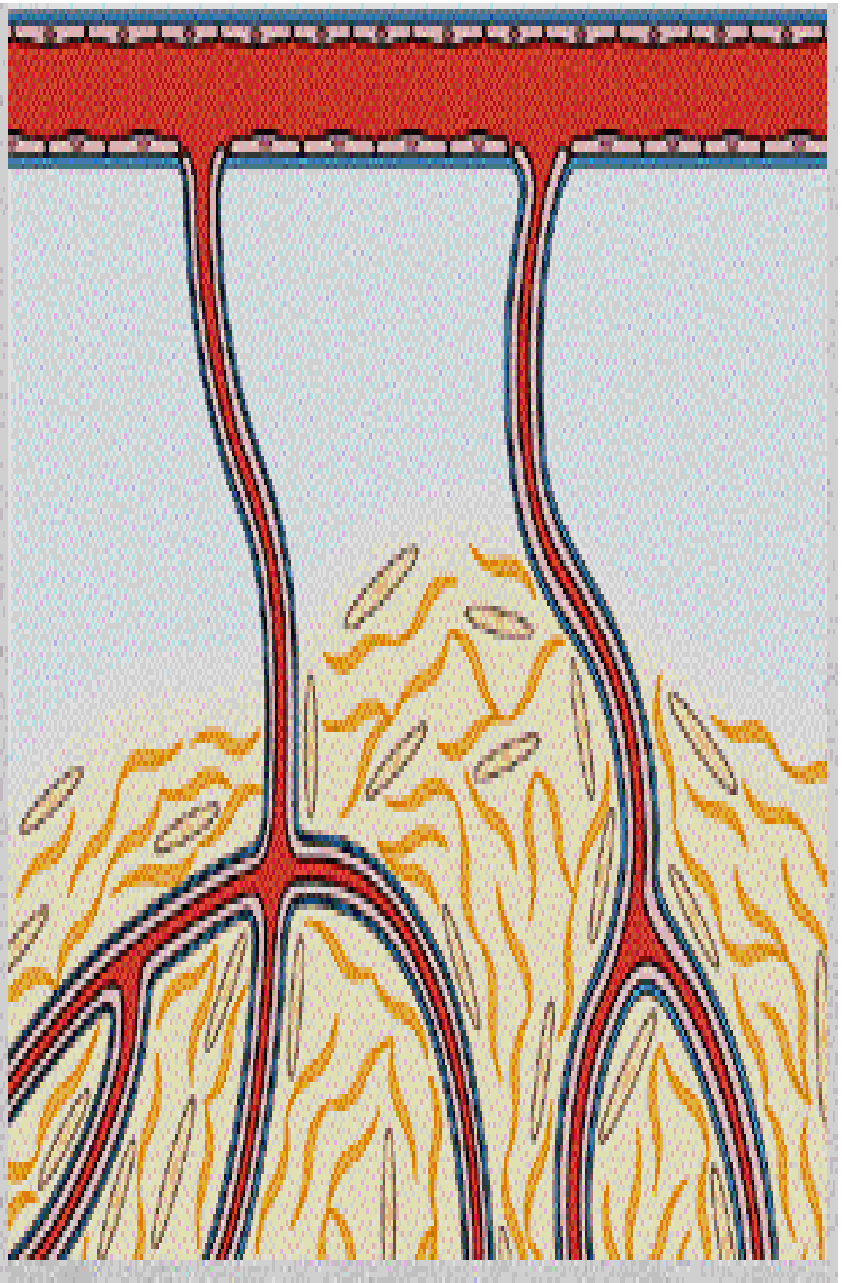


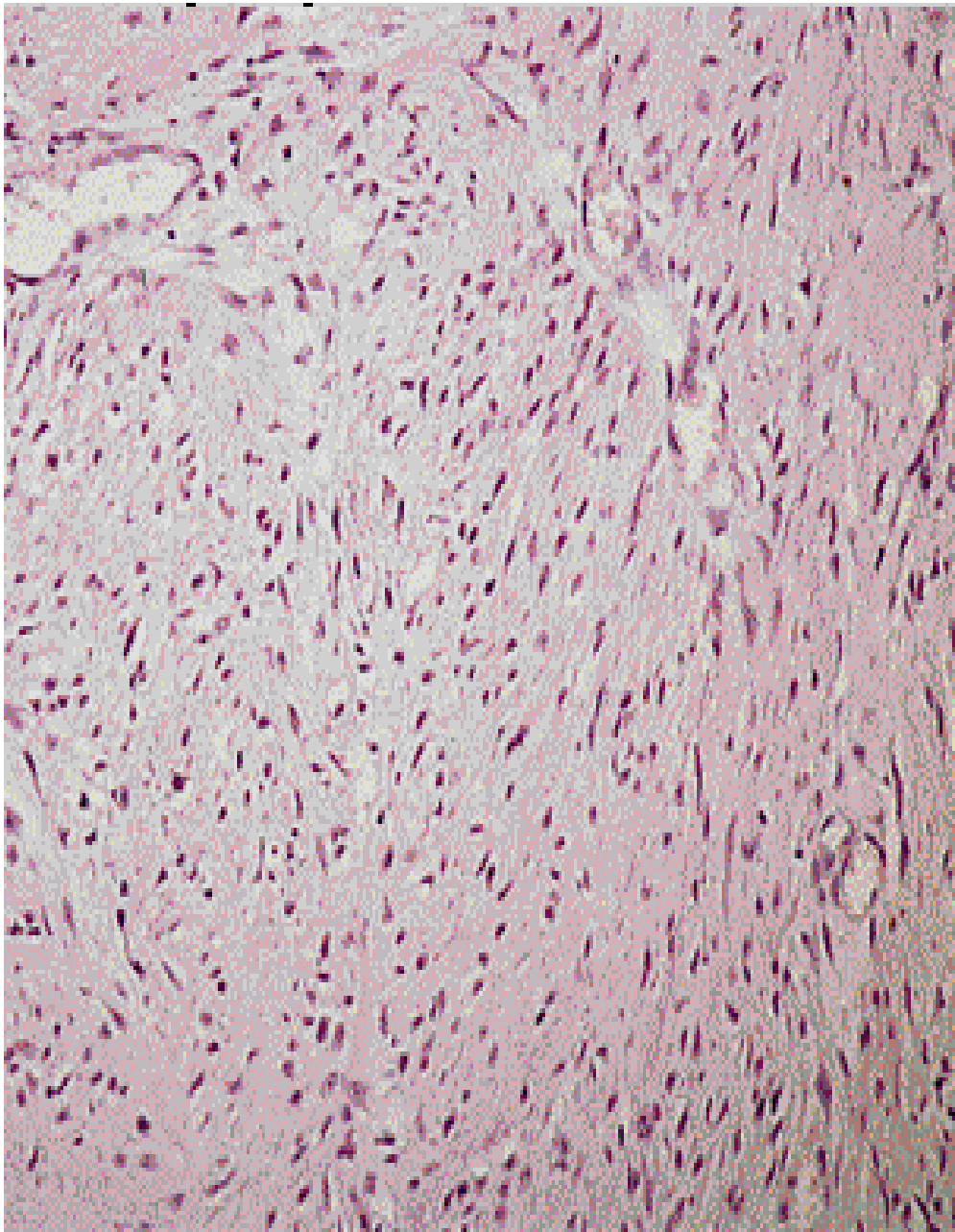
Fibro-vascular granulation tissue





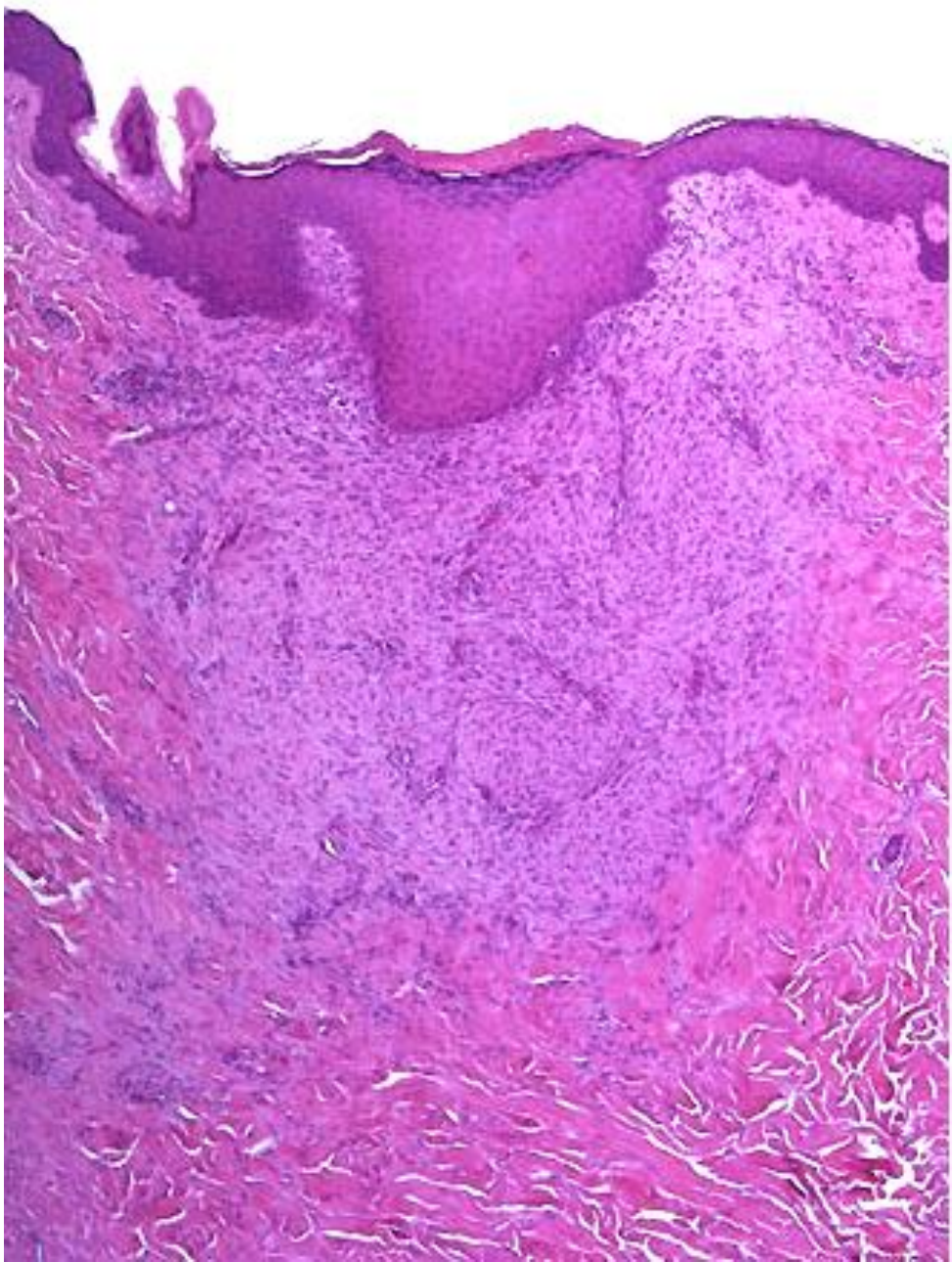
Collagenous scar formation



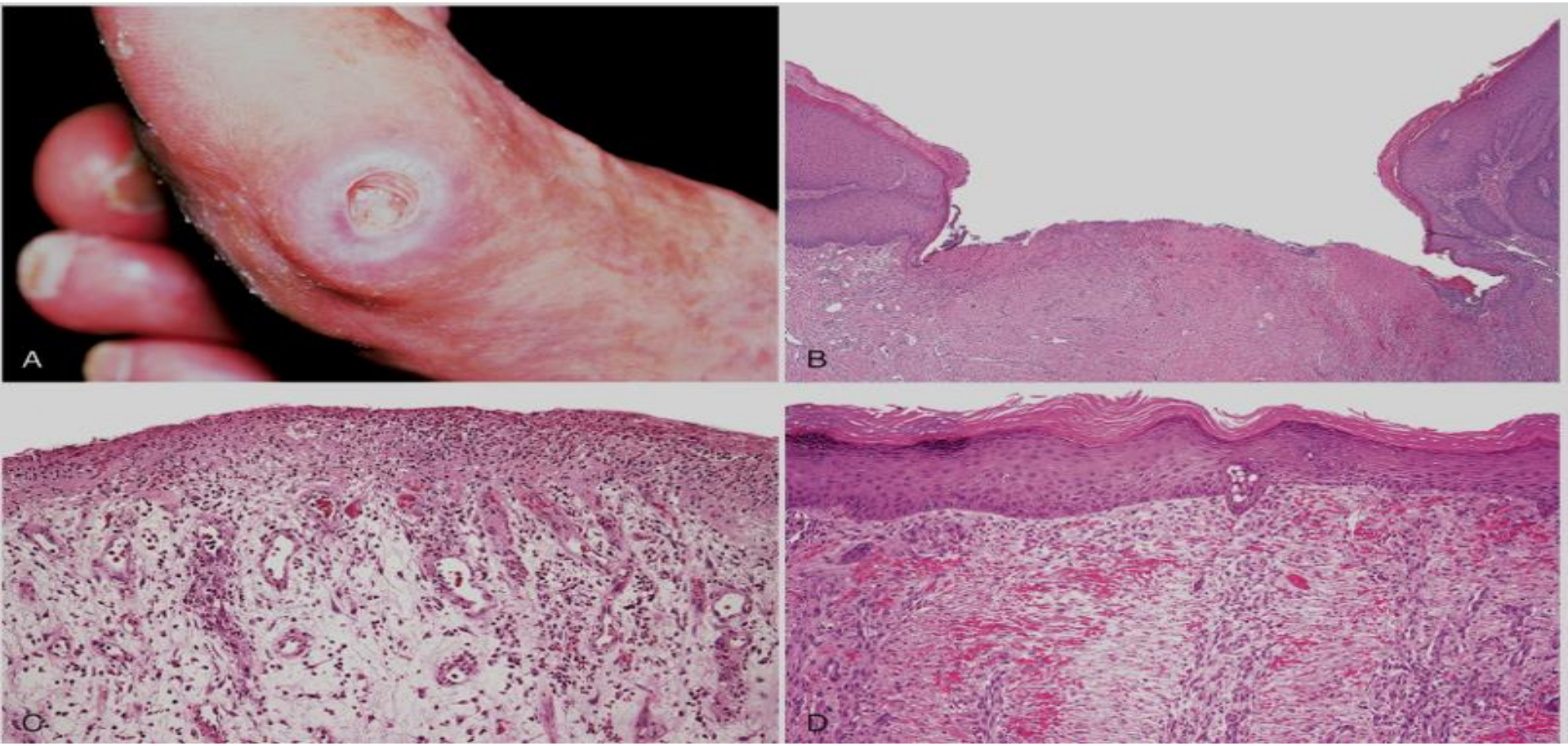


Healing scar, skin

This is a healing biopsy site on the skin seen a week following the excision, The skin surface has re-epithelialized, and below this is granulation tissue with small capillaries and fibroblasts forming collagen. After a month, just a small collagenous scar will remain.



Healing of skin ulcers

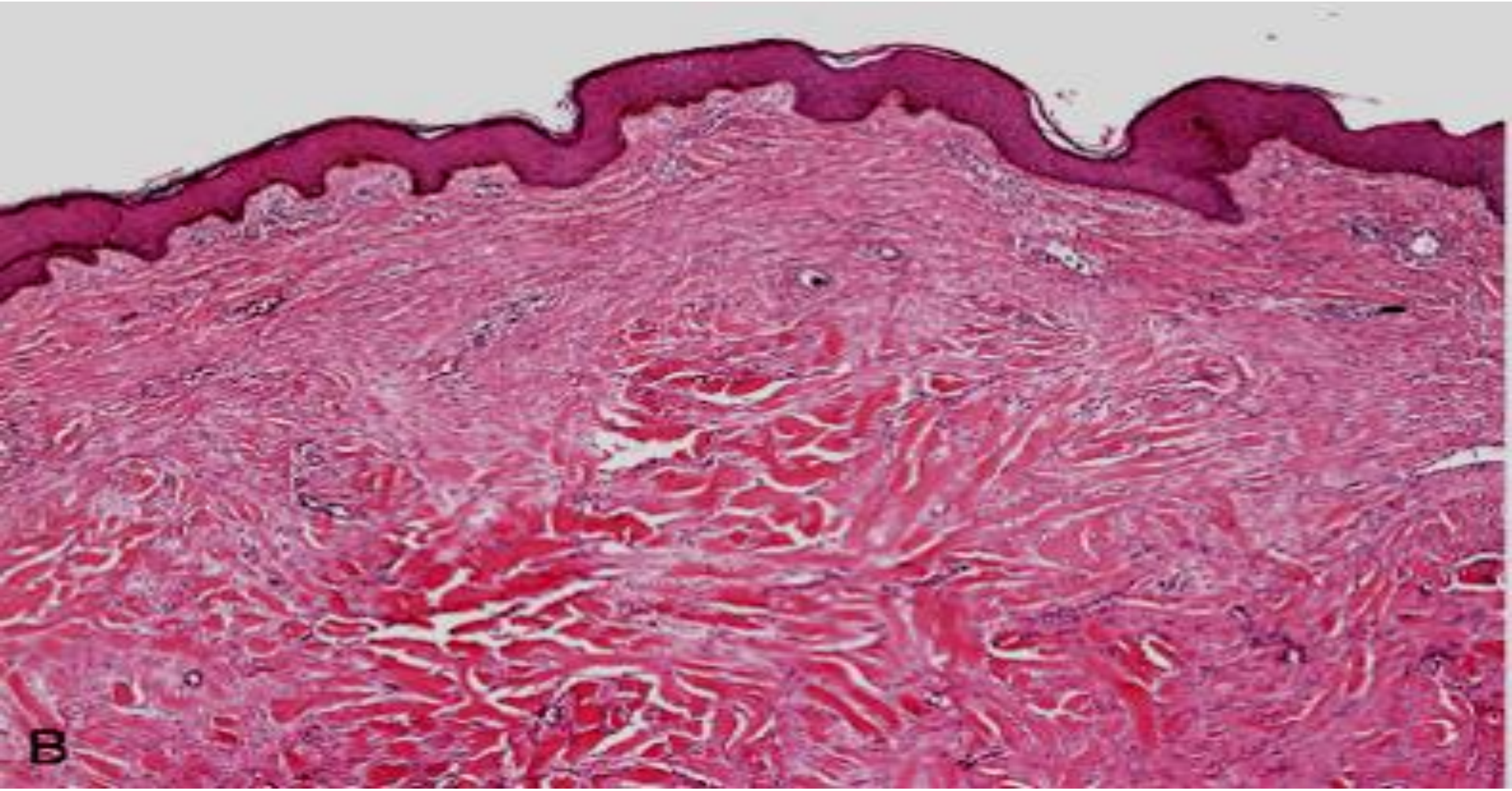


A) Pressure ulcer of the skin, commonly found in diabetic patients. B) A skin ulcer with a large gap between the edges of the lesion. C) A thin layer of epidermal re-epithelialization, and extensive granulation tissue formation in the dermis. D) Continuing re-epithelialization of the epidermis and wound contraction.

Keloid

A, Excess collagen deposition in the skin forming a raised scar known as a. keloid

Keloid

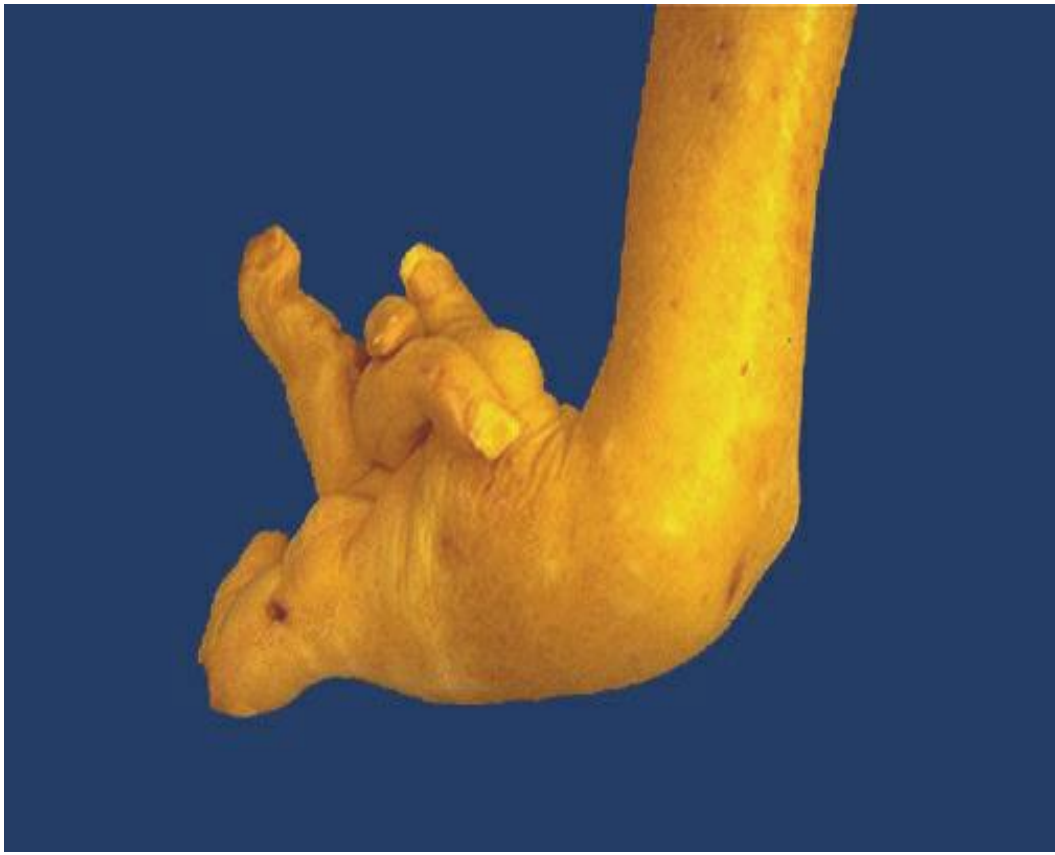


B, Thick connective tissue deposition in the dermis

Keloid

This large nodular mass is a keloid excised from the ear in a young male who had previously incurred trauma with laceration. Ear piercing in women may promote keloid formation. A keloid is an overgrowth of dermal scar tissue that forms over months following the injury.

Rheumatoid arthritis



This deformity of the hand is due to rheumatoid arthritis (RA). This autoimmune disease leads to synovial proliferation and joint destruction, typically in a symmetrical pattern involving small joints of hands and feet, followed by wrists, ankles, elbows, and knees. Rheumatoid factor can be identified serologically in most, but not all, RA patients.

THANK YOU