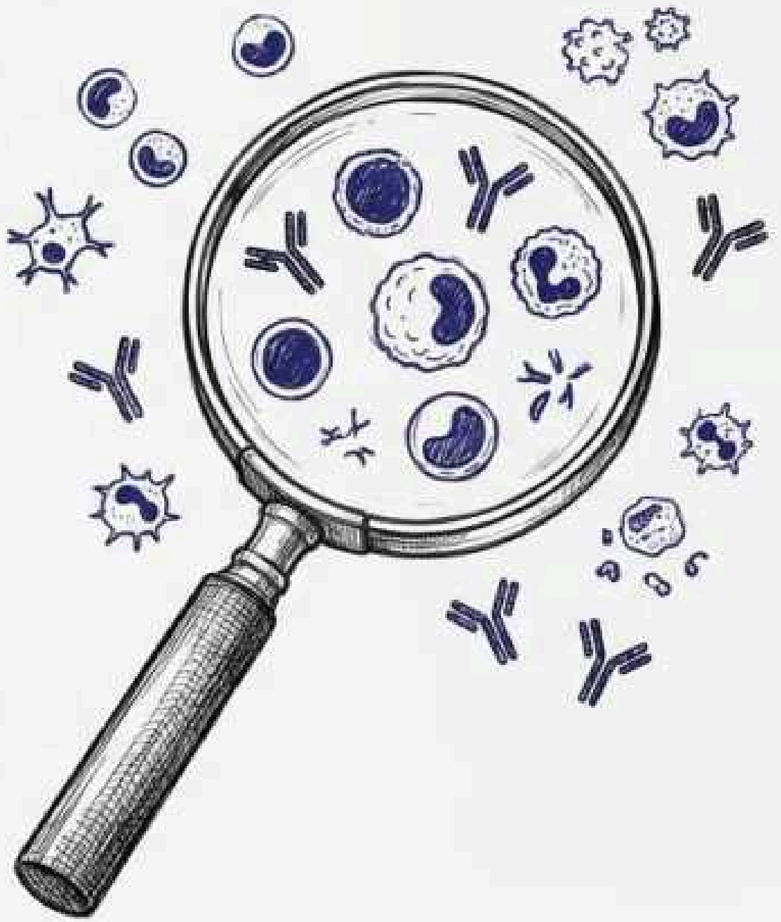
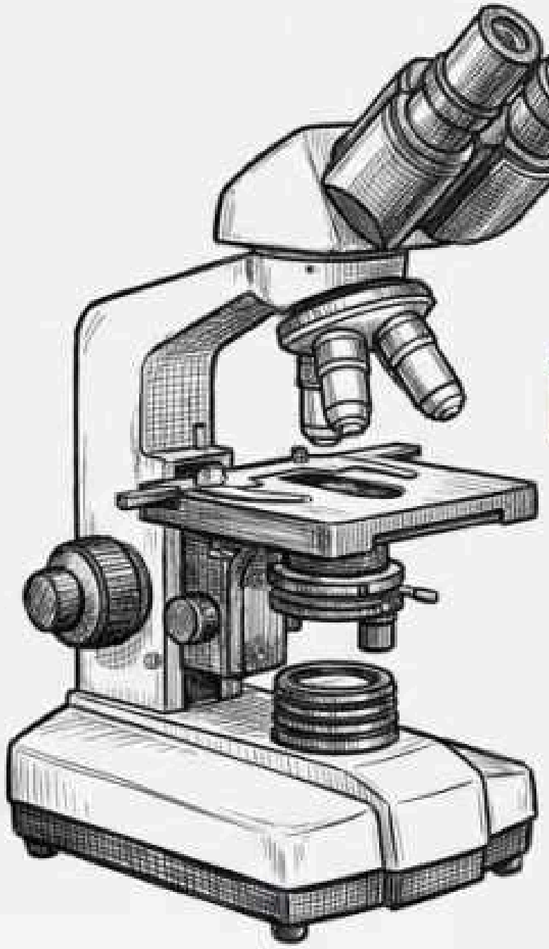
MED 504 B: Immune Response



Pathology: Tissue-Level Processes



- [1] Acute Inflammation
- [2] Chronic Inflammation

Differentiating these forms reveals the timeline and driver of a disease.

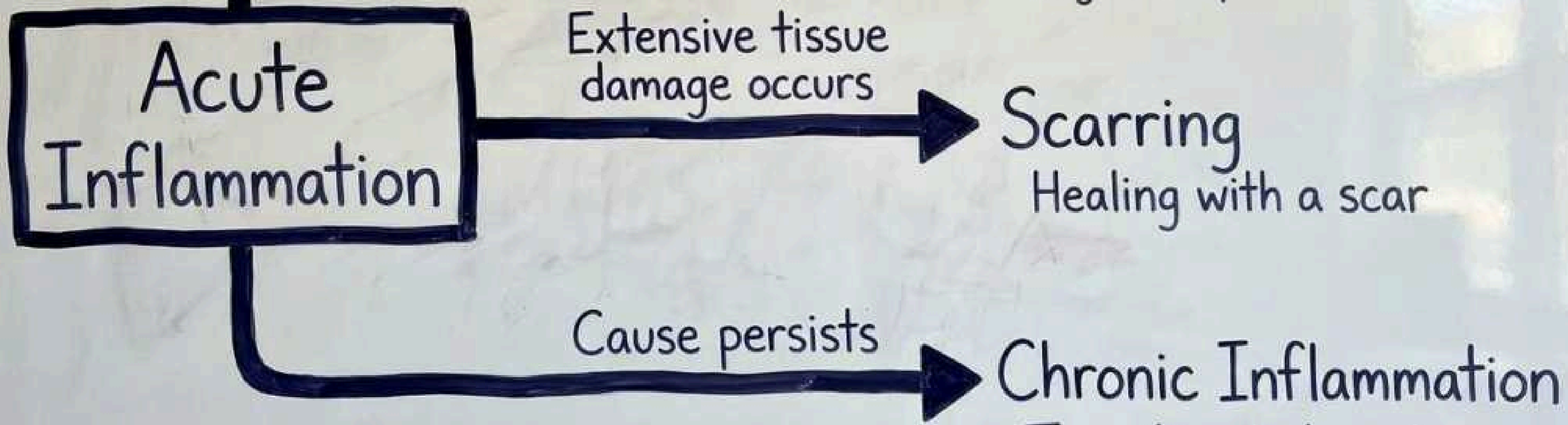
¶2.2

[Timeline: Minutes to Days]



Dead Neutrophils + Bacteria + Debris = Pus

(Pus walled off in tissue → Abscess)


Acute Inflammation
Cause is removed + fluid drains
Complete Resolution
Tissue returns to normal (e.g., mild pneumonia clears)
Extensive tissue damage occurs
Scarring
Healing with a scar
Cause persists
Chronic Inflammation
Transition to long-term inflammatory state

¶ 2.4

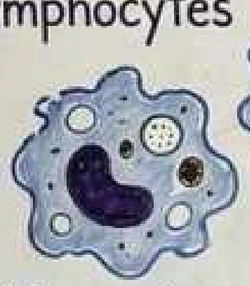


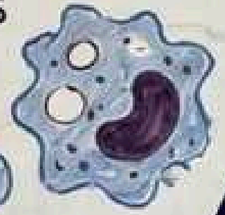
Lymphocytes



Plasma Cells

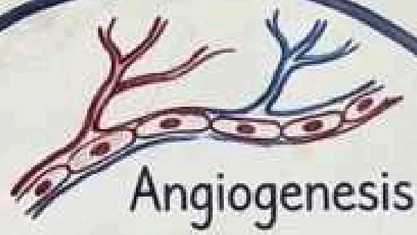






Macrophages

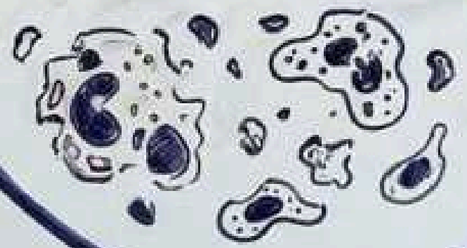
Weeks, Months, or Years

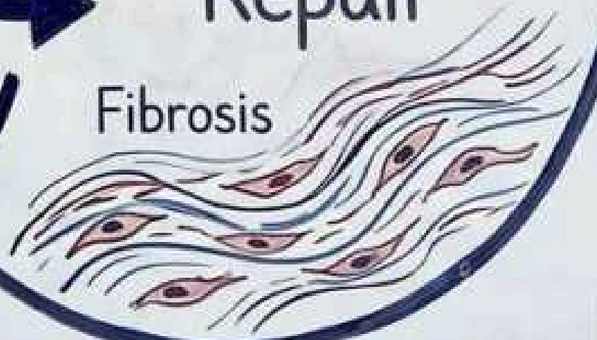


Angiogenesis

Tissue Destruction

Attempted Repair





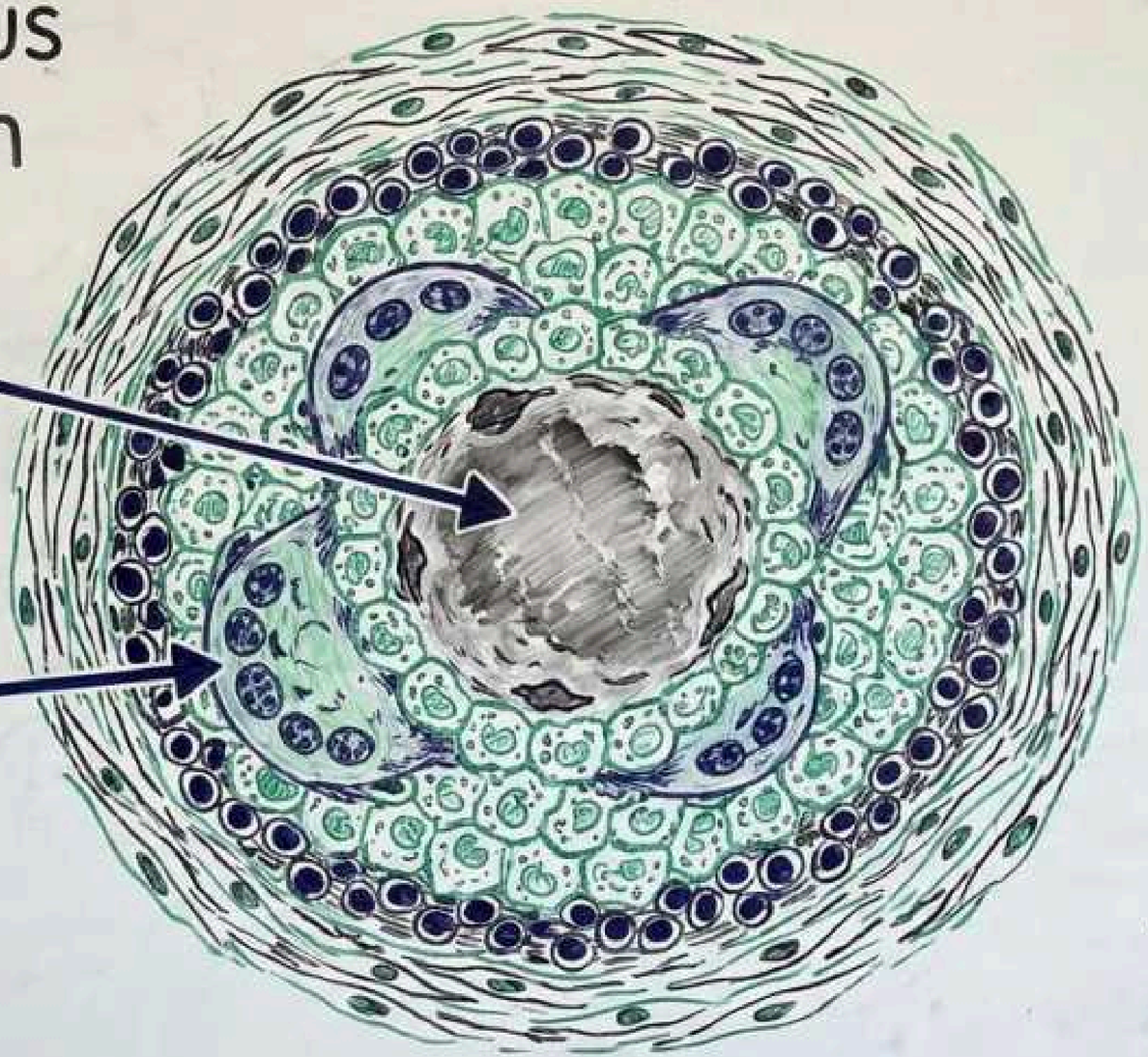
Fibrosis

Causes:

- Infections the body cannot clear
- Long exposure to irritants (silica dust, tobacco smoke)
- Autoimmune diseases (rheumatoid arthritis)

Granulomatous Inflammation

¶2.5



Caseous Necrosis

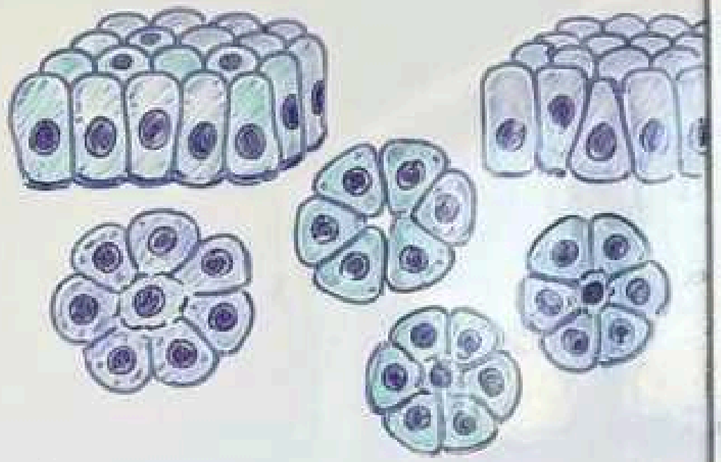
Giant Cells
(Fused Macrophages)

- Tuberculosis (classic cause)
- Fungi
- Foreign material
- Sarcoidosis (unknown cause)

The body's attempt to wall off something it cannot eliminate.

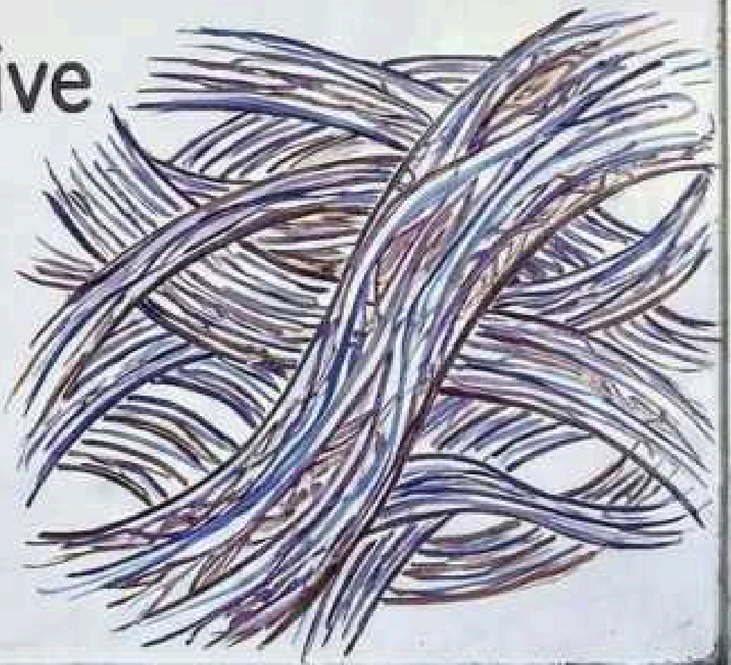
¶2.6

Damage → Regeneration = New Cells (Same Kind)



→ 100% Normal Tissue Function

Damage → Scarring = Fibrous Connective Tissue (Collagen)

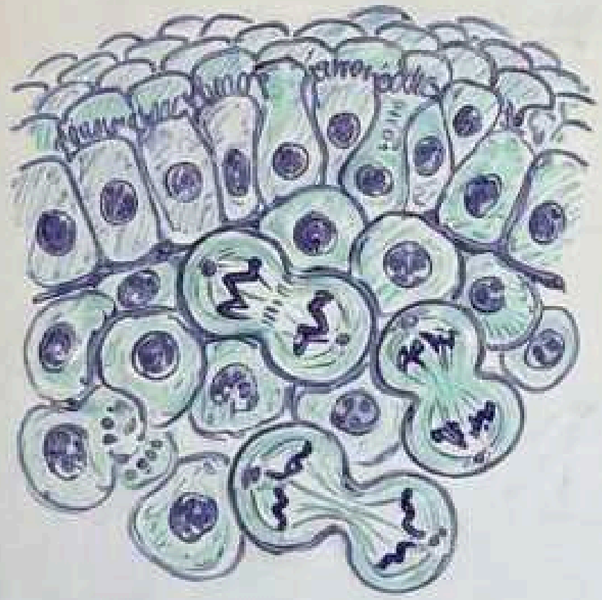


→ Strength Restored, Normal Function Lost

Outcome depends on tissue type and extent of damage.

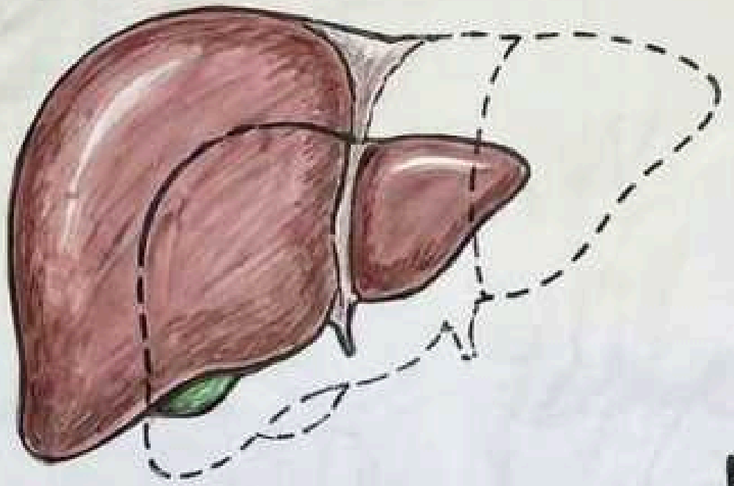
¶2.7

High Capacity
Gut lining, Skin

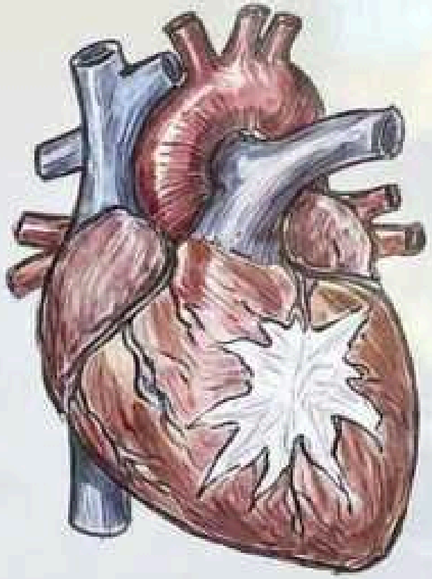


Divide constantly; regenerate well.

Medium Capacity
Liver



Low/No Capacity
Heart muscle, most nerve cells

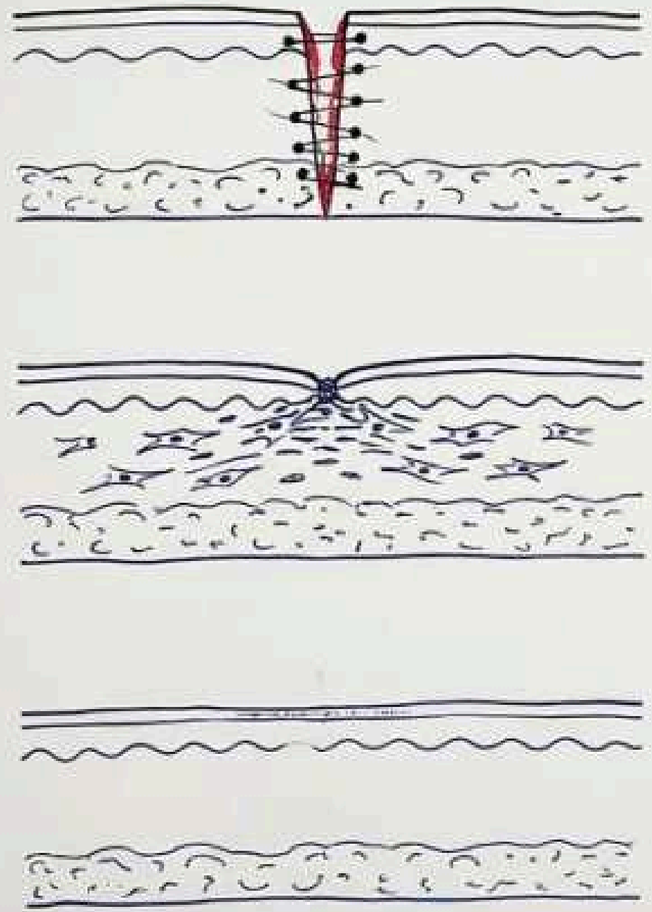


Heal mainly by scarring (e.g., heart attack leaves a permanent scar).

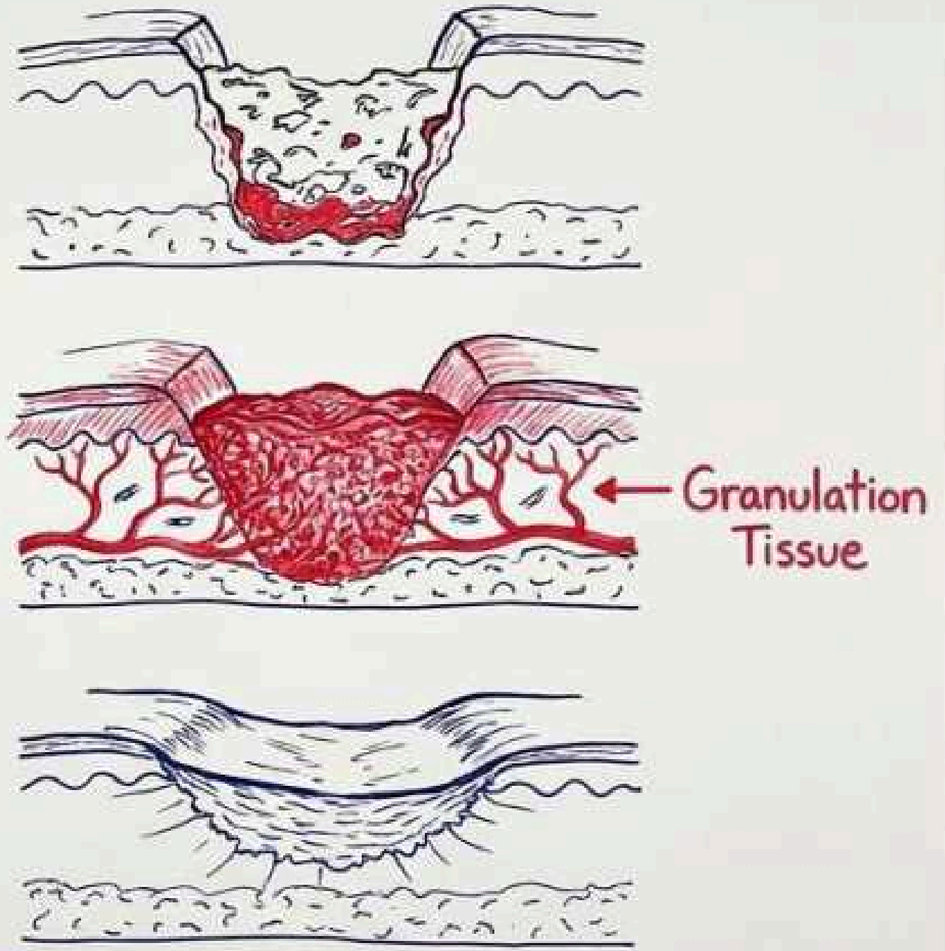
REGENERATION CAPACITY

¶2.8

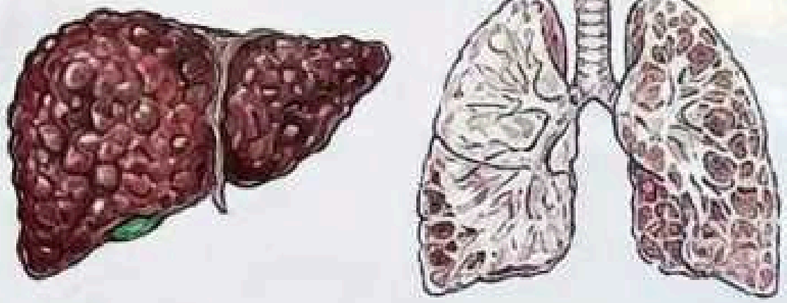
First Intention



Second Intention



Scar rarely regains the full strength of unwounded skin.

Deficient Repair	Non-healing wounds	Causes: poor blood supply, diabetes, malnutrition
Excessive Repair (Surface)	Raised scars (Keloids) or movement-limiting contractures	
Excessive Repair (Internal)	Fibrosis destroying organ function	 Cirrhosis & Lung Fibrosis

¶2.10

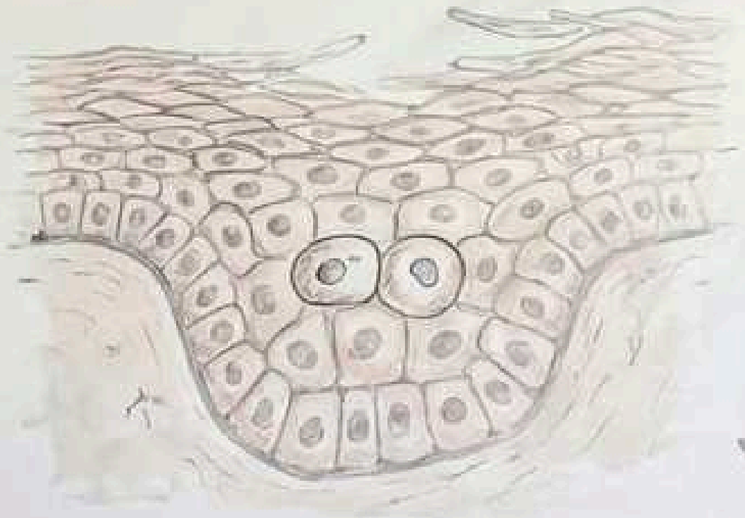
$$\int \left(\underset{\text{[clears cause/debris]}}{\text{Inflammation}} + \underset{\text{[restores tissue]}}{\text{Repair}} \right) dt \rightarrow \text{Healing}$$

$$\underset{\text{persistent}}{\text{Limit}} \left(\text{Inflammation} \right) \cup \underset{\text{overshoot}}{\text{Limit}} \left(\text{Repair} \right) \rightarrow \text{Disease}$$

Inflammation and repair are two halves of one response. When both work well, the body heals. When the response persists or overshoots, it becomes the cause of disease.

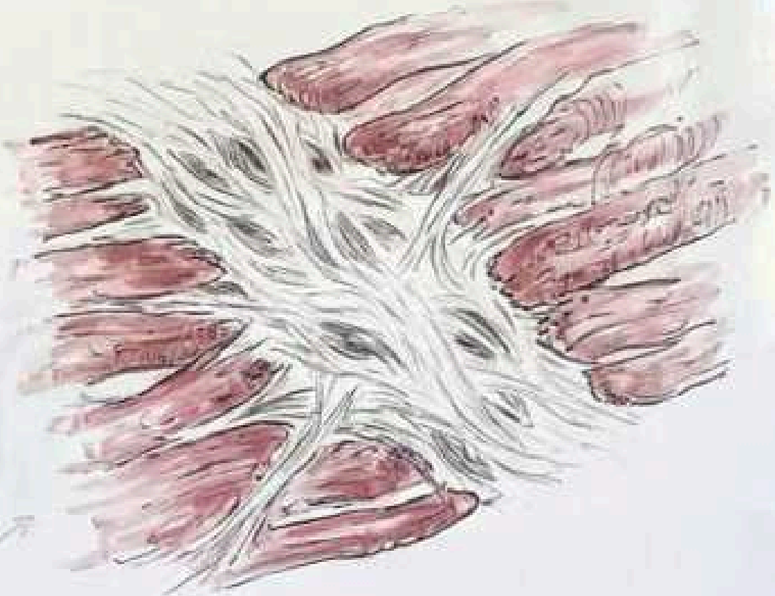
¶2.11

Why does a deep cut in the skin heal well, while a heart attack leaves permanent damage?



Regeneration

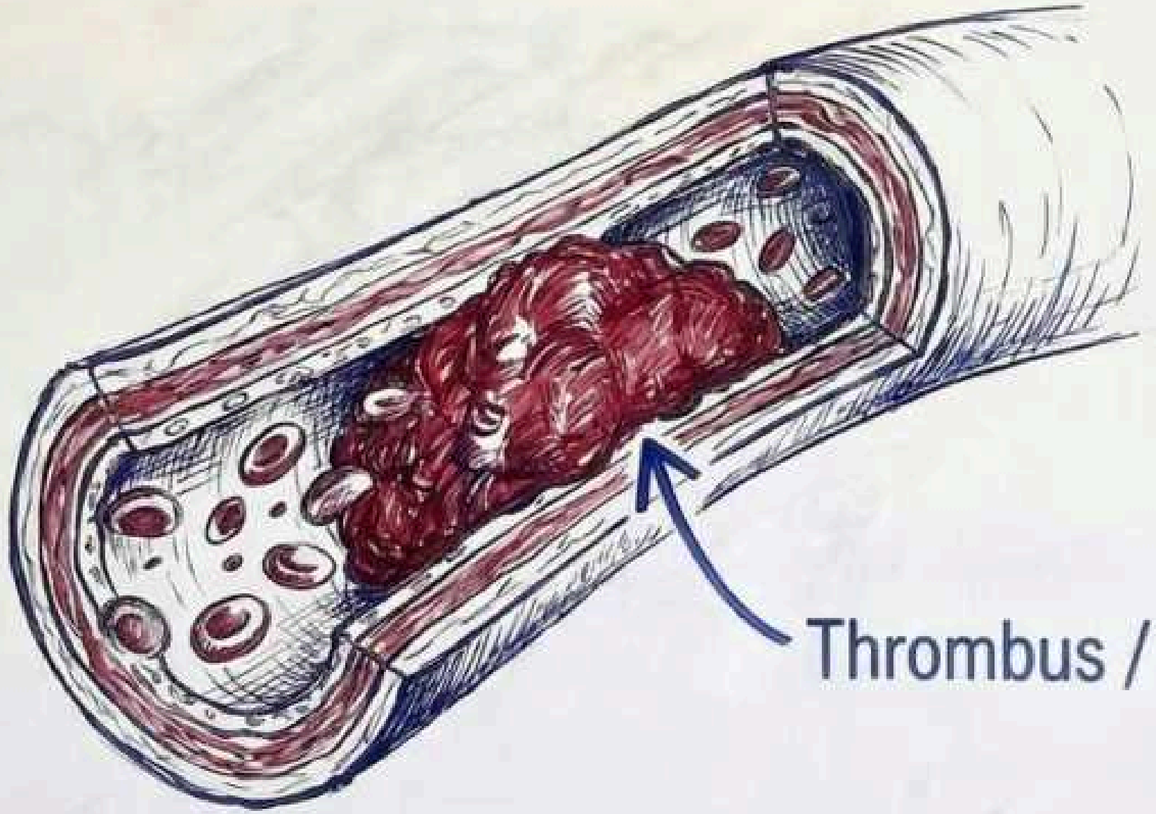
Use the difference between regeneration and scarring to answer.



Scarring

¶ 2.12

Lecture 3 Preview: Disorders of Blood Flow



Up Next

- Clots
- Blockages
- Shock

Anderson Academy · MED 505 B · garyanderson@mail.grokbot.com