

# INFLAMMATION



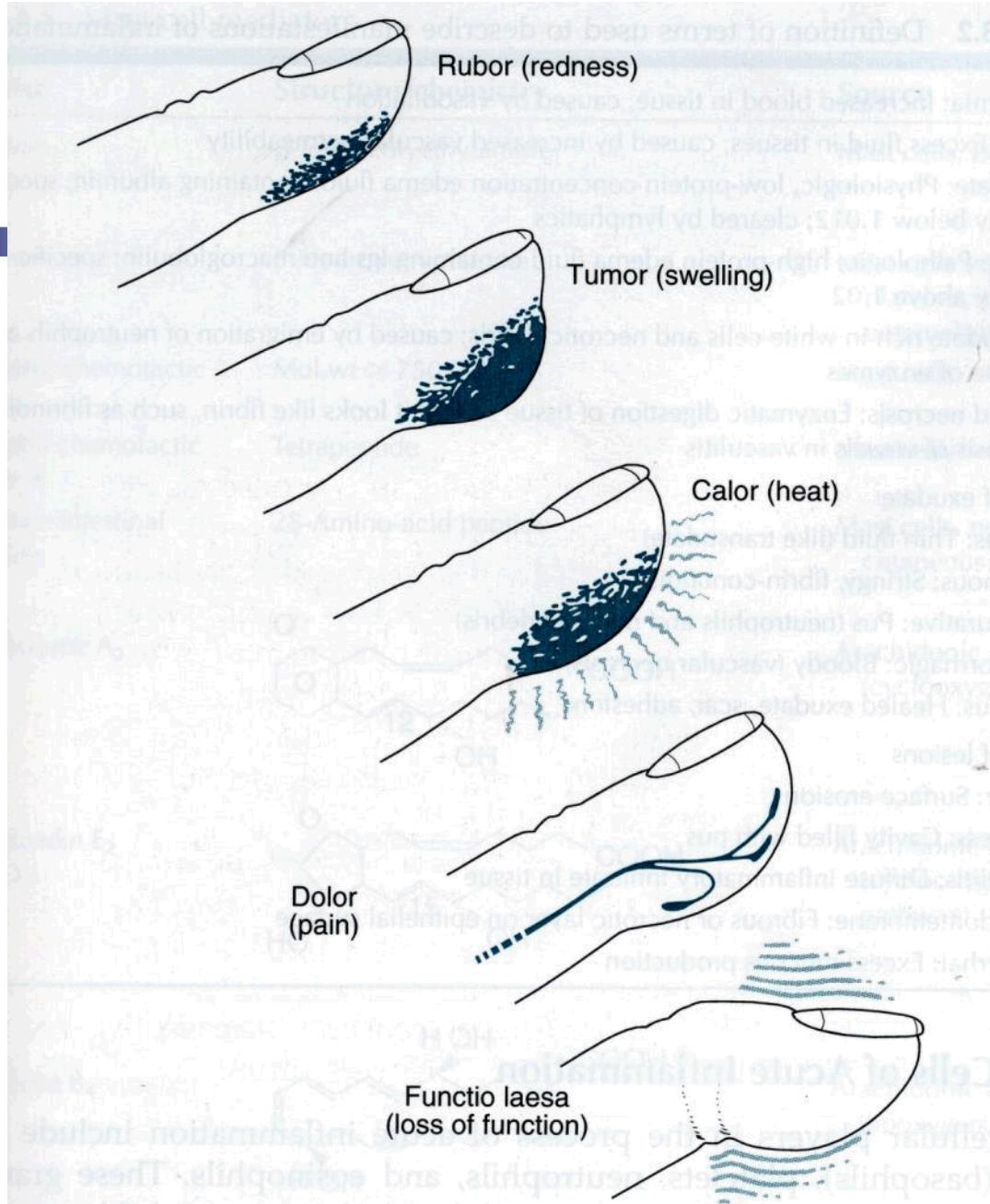
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# Inflammation





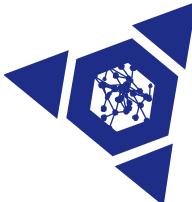


# Causes of inflammation

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- **Necrosis**
- **Microorganisms**
- **Physical and chemical agents**
- **Hypersensitivity**



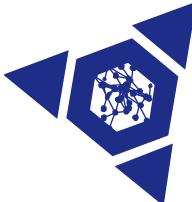


# Morphology of Inflammation

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- **Duration - acute, chronic**
- **Distribution- focal, diffuse**
- **Exudate- serous, purulent, fibrinous**
- **Tissue name - hepatitis, myocarditis**





# Time course of inflammation

**Peracute** → **acute** → **subacute** → **chronic**

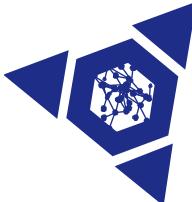
So fast you hardly know what hit you

One day to a few days

In between, a bit of a copout

Weeks to months





# What's the character of the inflammation?

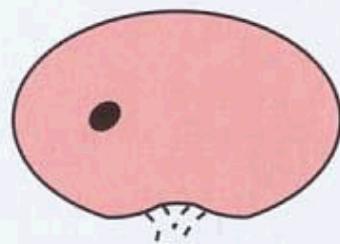
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- **Serous**
- **Catarrhal**
- **Fibrinous**
- **Hemorrhagic**
- **Purulent**
- **Necrotizing**
- **Granulomatous**

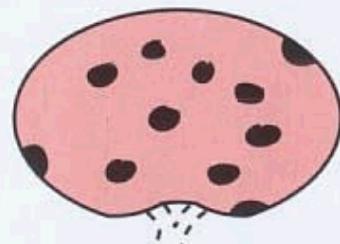




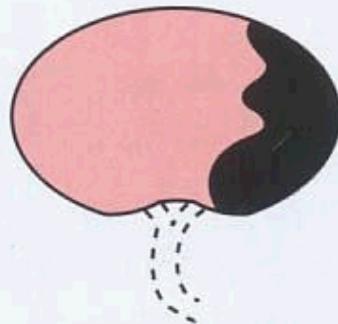
# What's the extent of the inflammation?



Focal



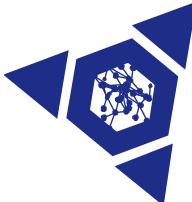
Multifocal



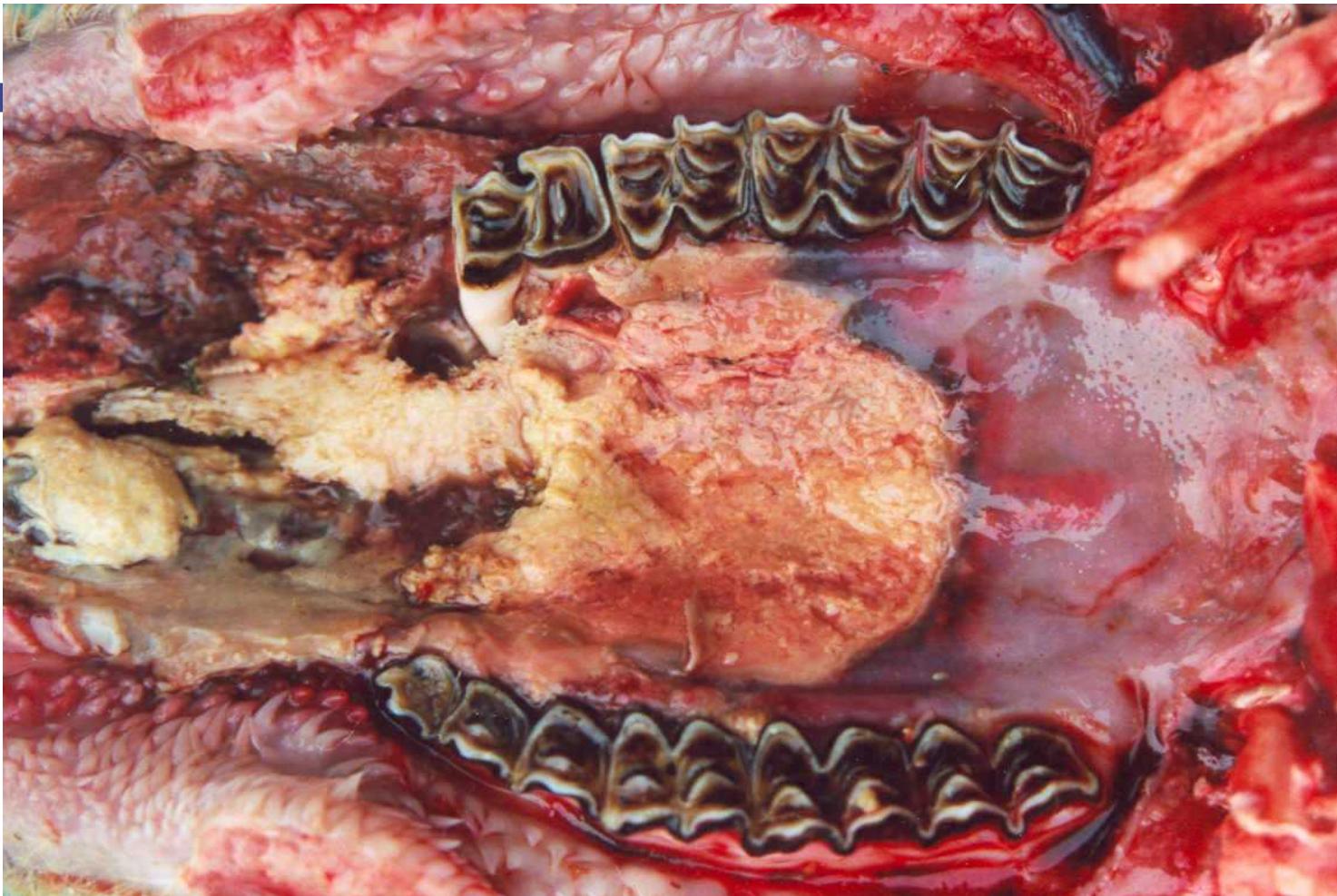
Locally extensive



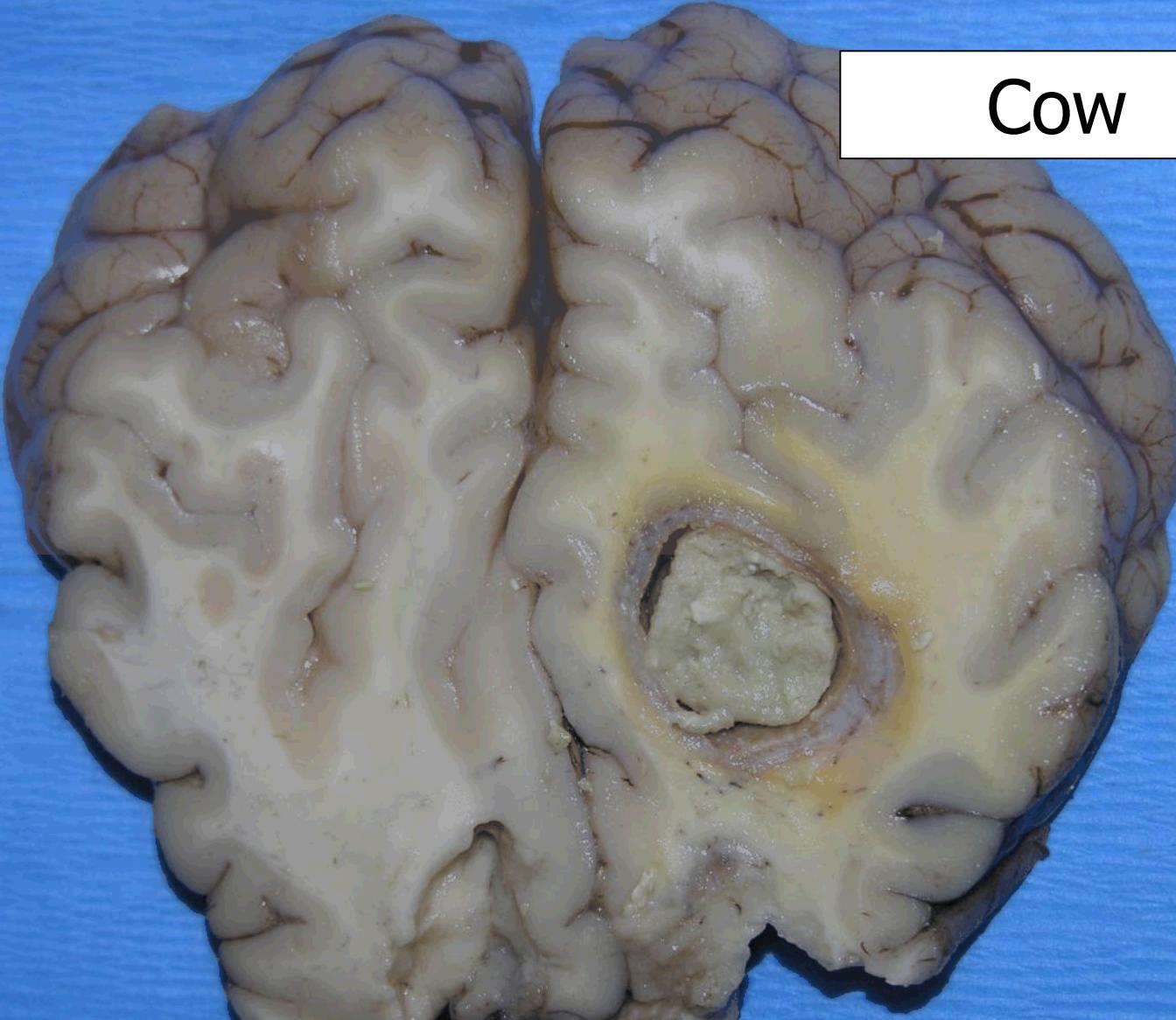
Diffuse



# Horse

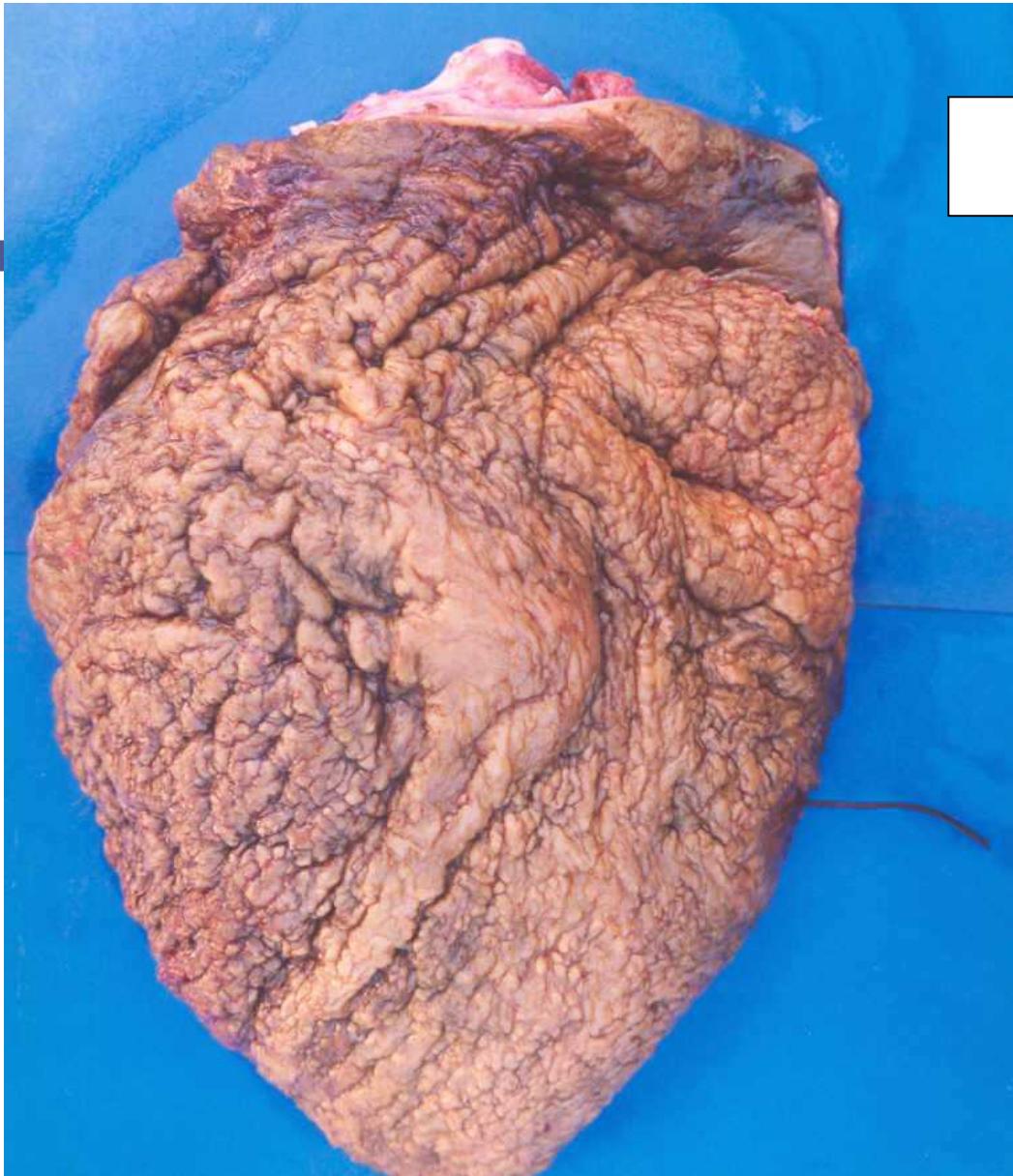


Acute focally extensive necrotizing stomatitis



Cow

Focal purulent encephalitis (also cerebral abscess)

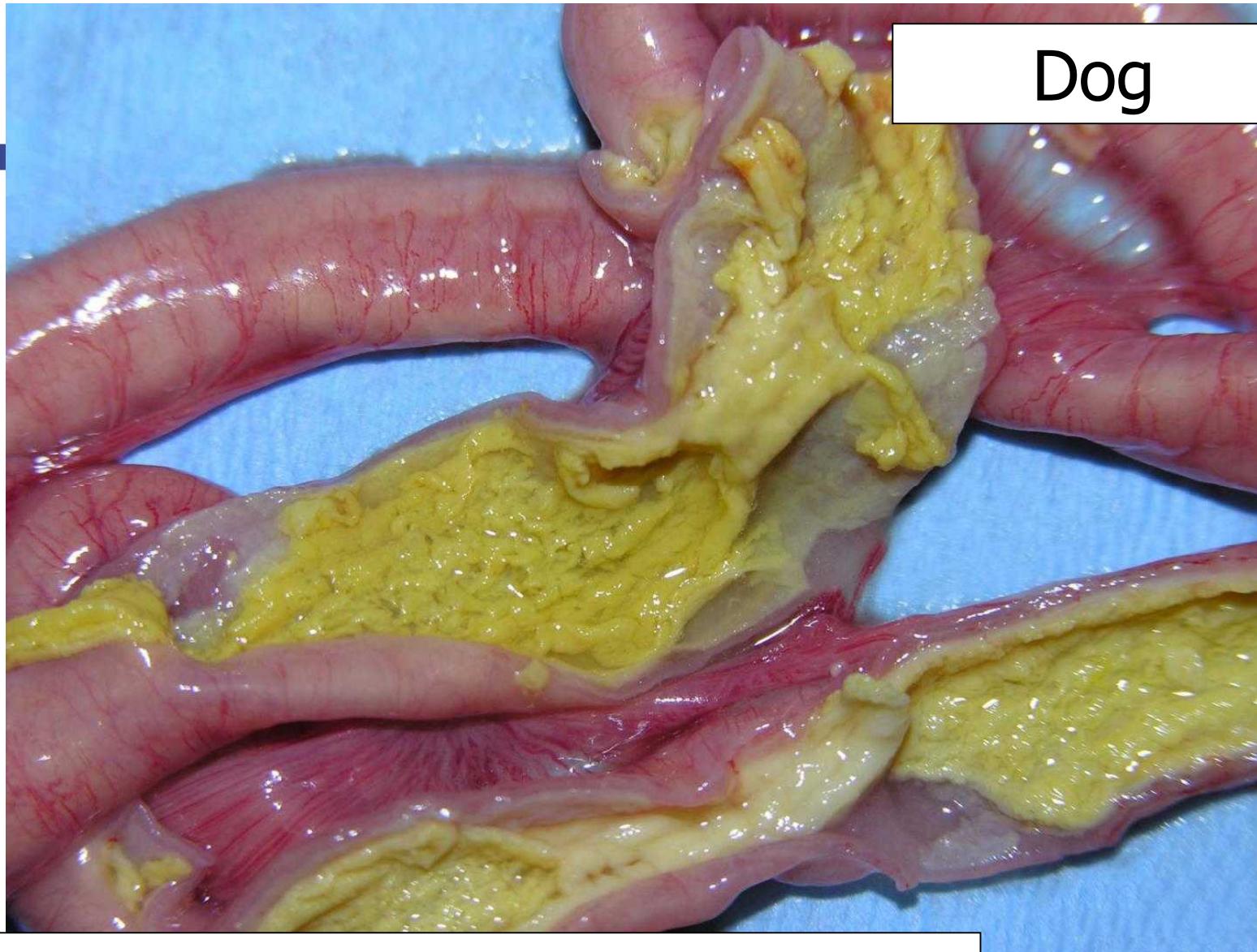


Cow

Chronic proliferative pericarditis

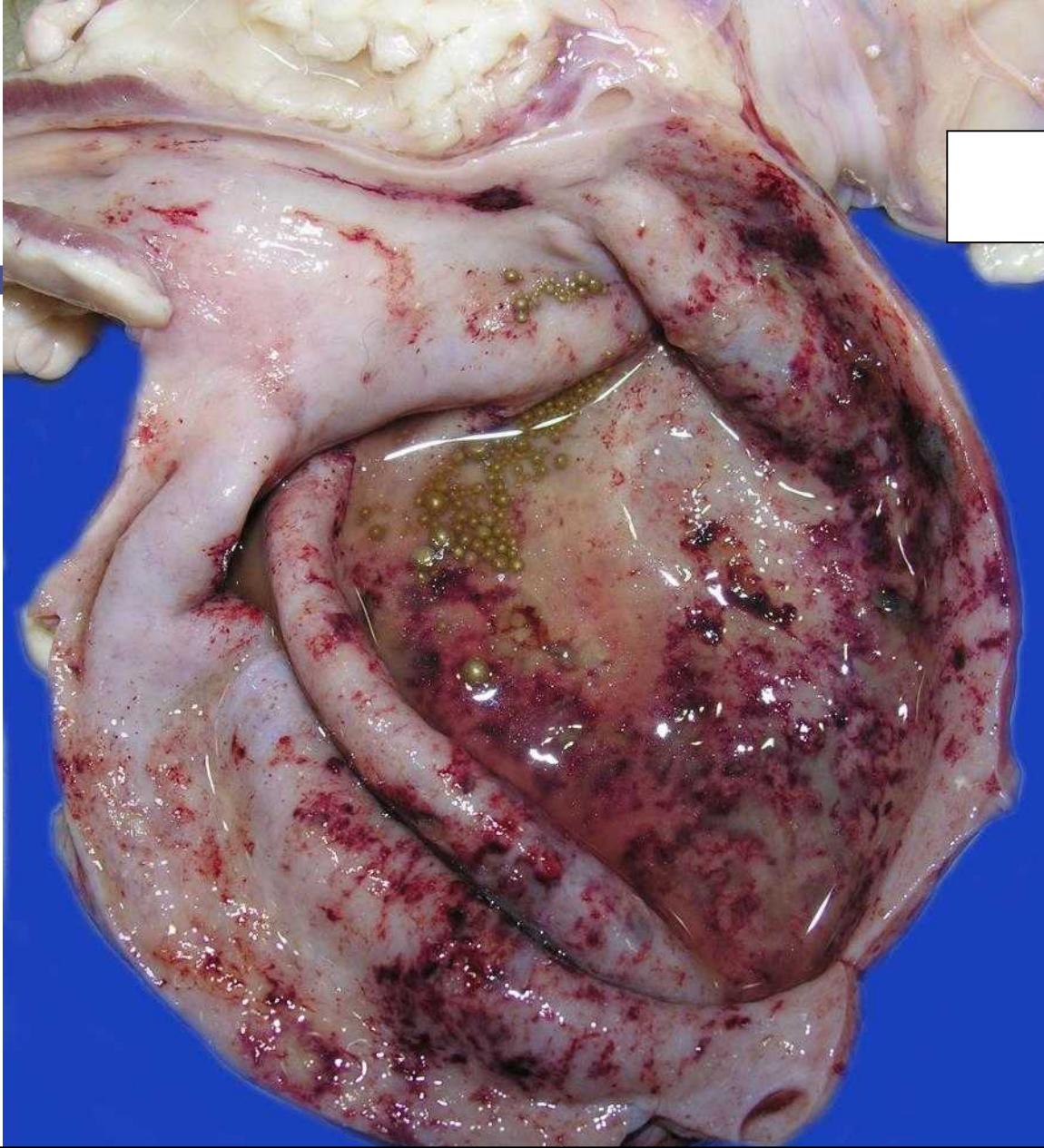


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Acute diffuse fibrinous enteritis



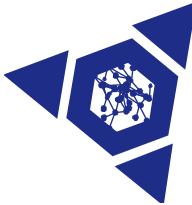


Goat

Diffuse hemorrhagic cystitis



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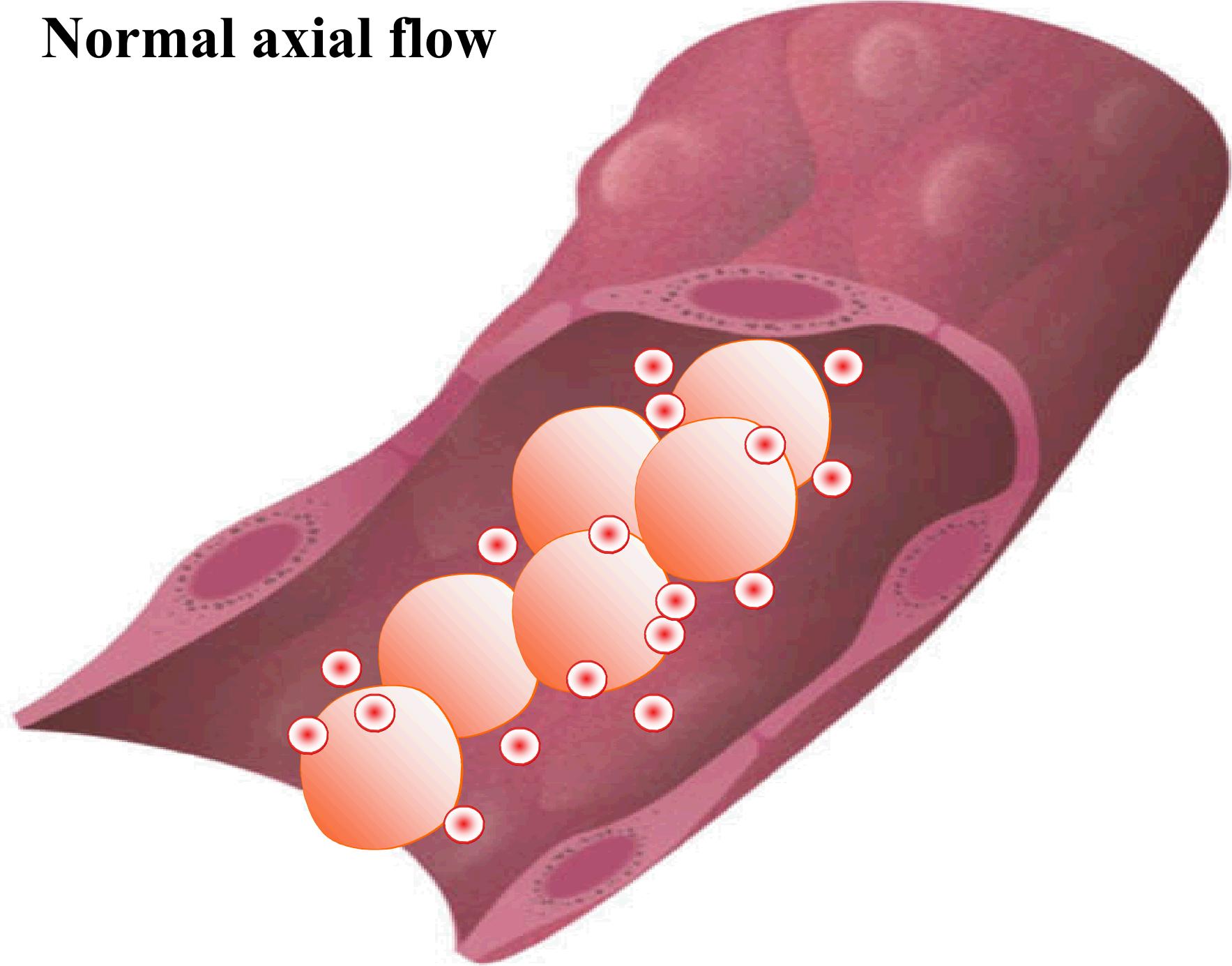
# Mechanics of acute inflammation

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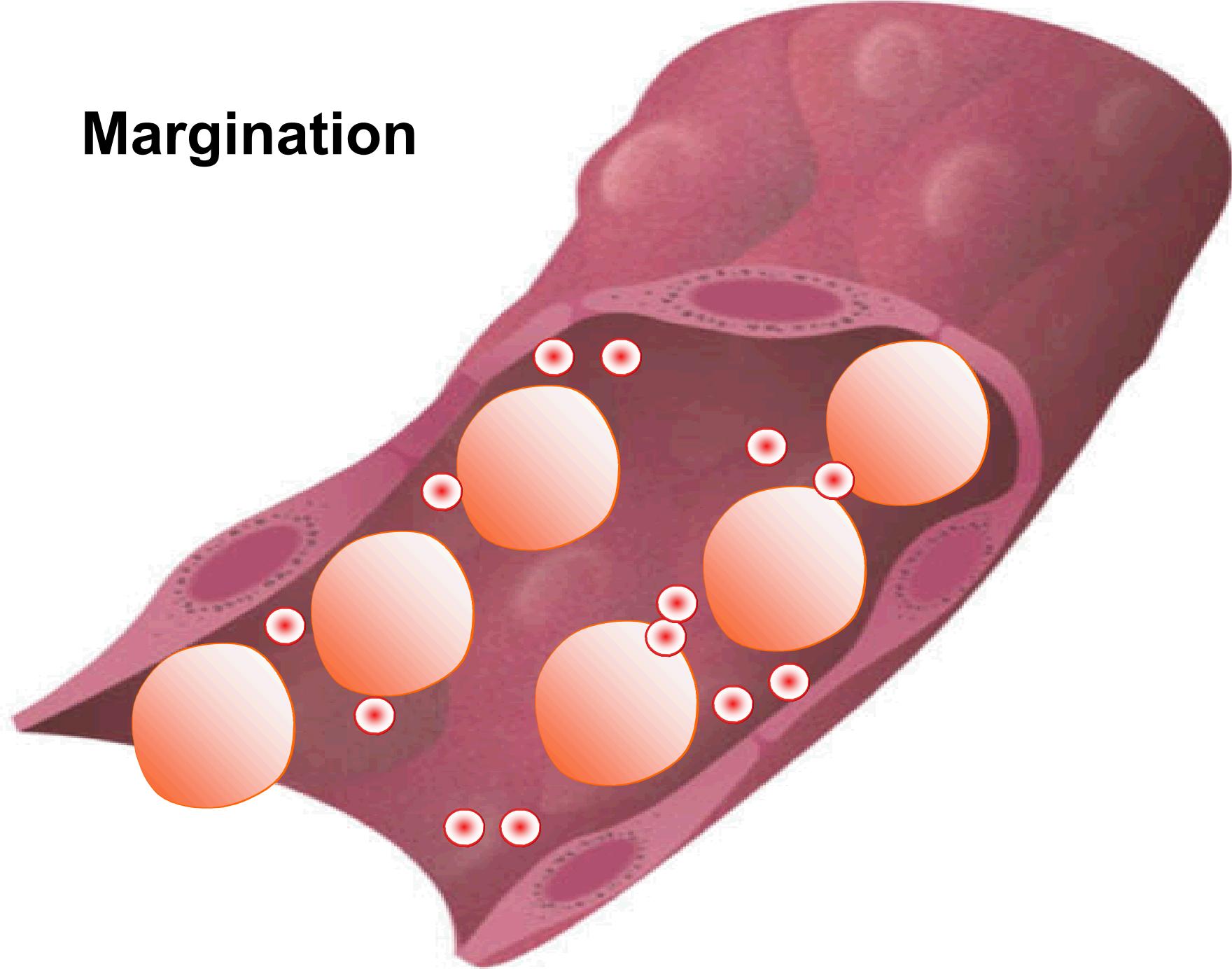
- **Vascular changes**
  - **Vessels dilate and become leaky**
- **Leukocytes and endothelium “talk” to each other**



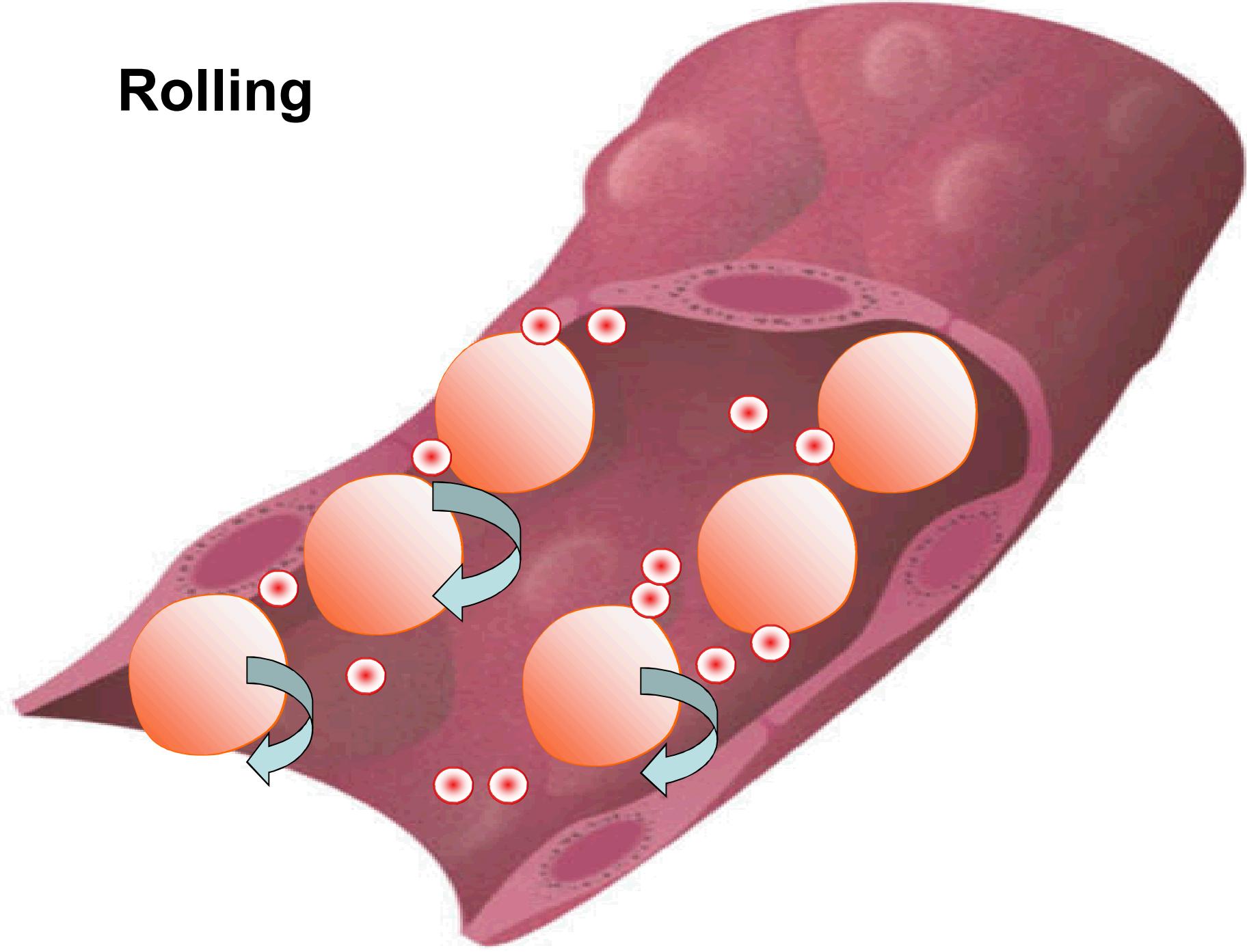
# Normal axial flow



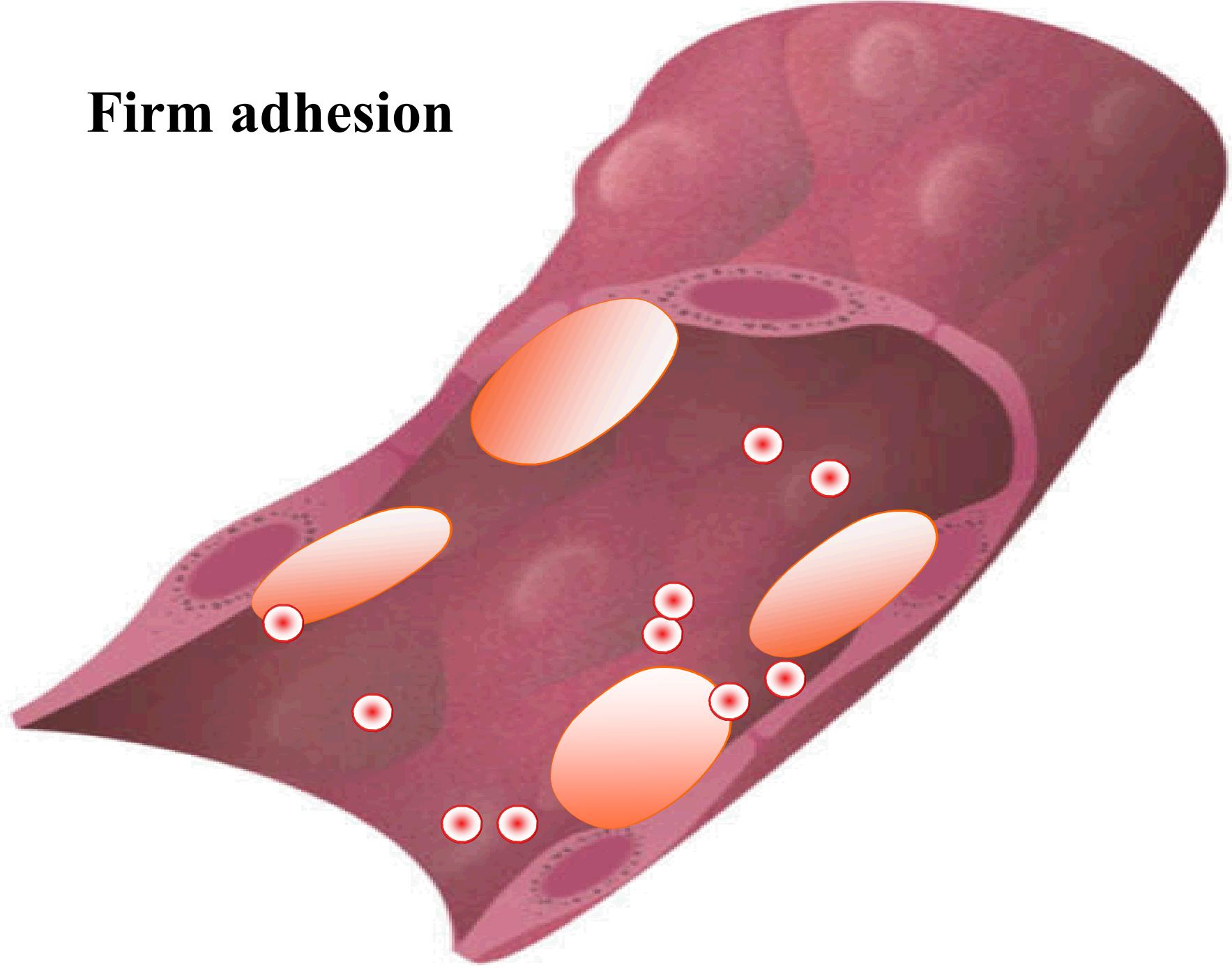
# Margination



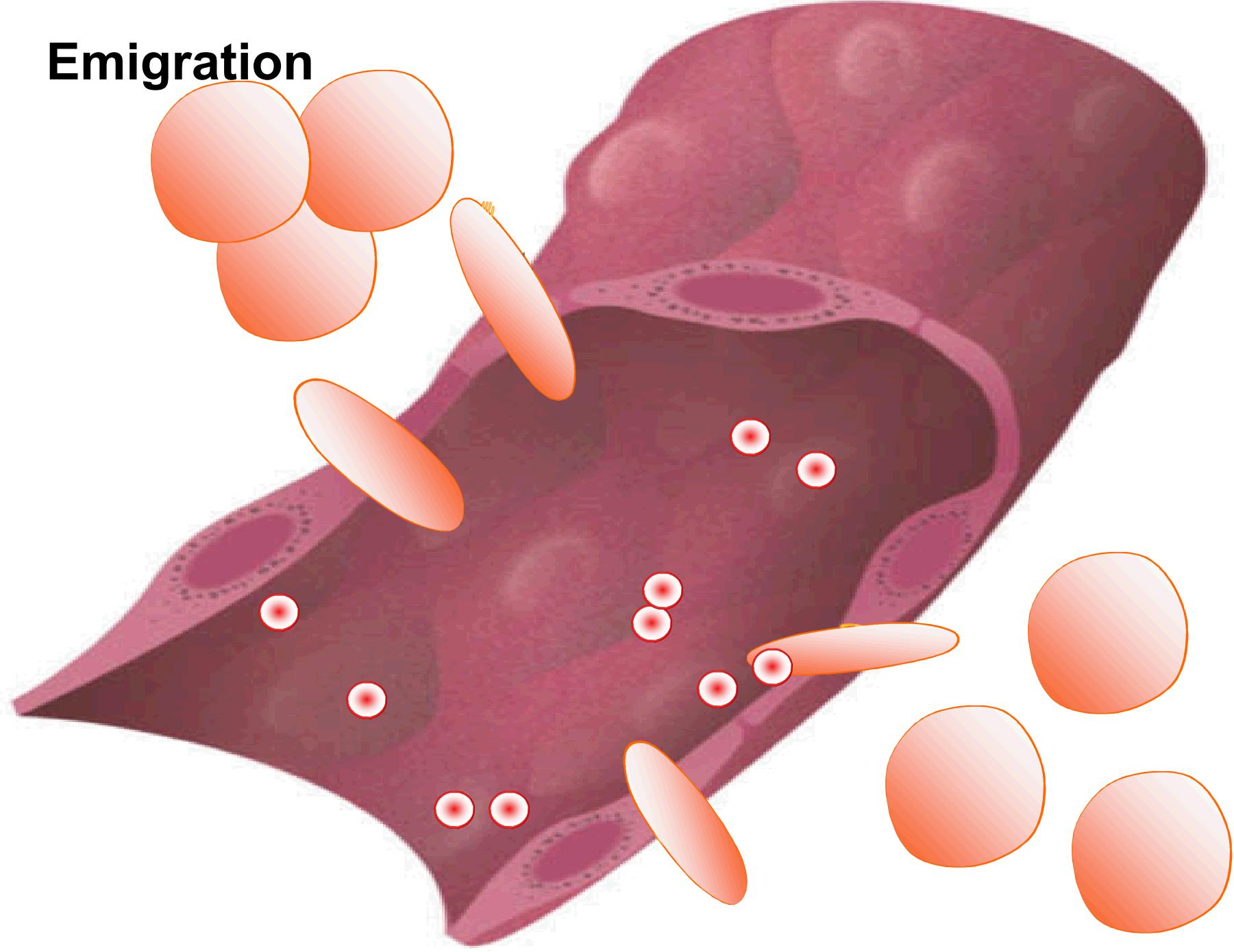
# Rolling



# Firm adhesion



# Emigration





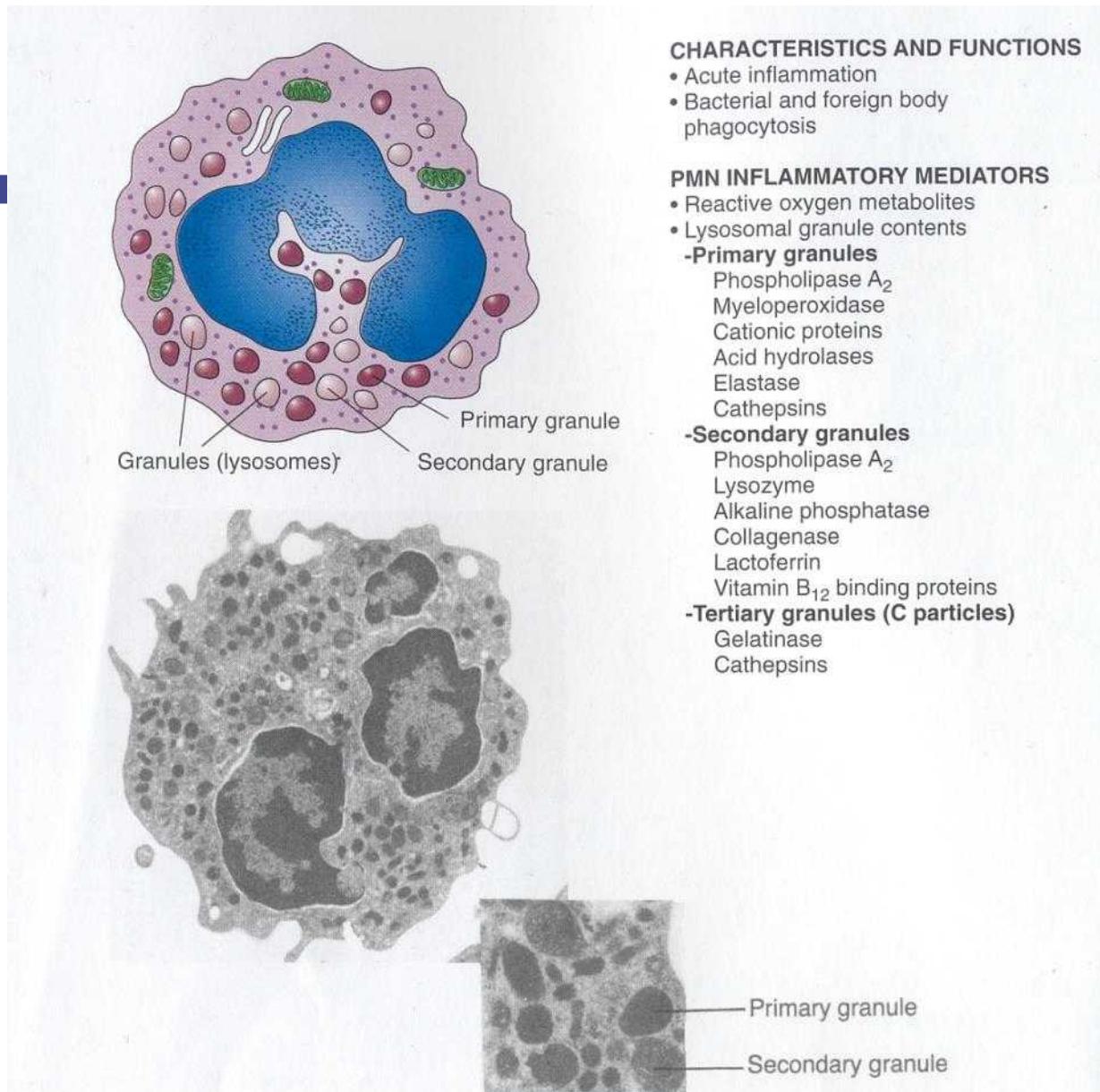
# Inflammatory cells

**NEUTROPHILS**

**Eosinophils**

**Macrophages**





#### CHARACTERISTICS AND FUNCTIONS

- Acute inflammation
- Bacterial and foreign body phagocytosis

#### PMN INFLAMMATORY MEDIATORS

- Reactive oxygen metabolites
- Lysosomal granule contents

##### -Primary granules

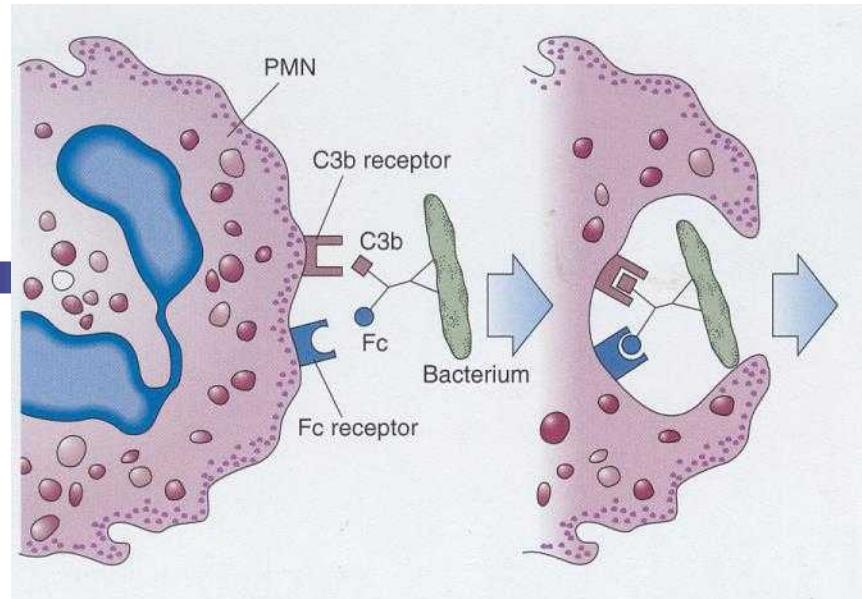
Phospholipase A<sub>2</sub>  
Myeloperoxidase  
Cationic proteins  
Acid hydrolases  
Elastase  
Cathepsins

##### -Secondary granules

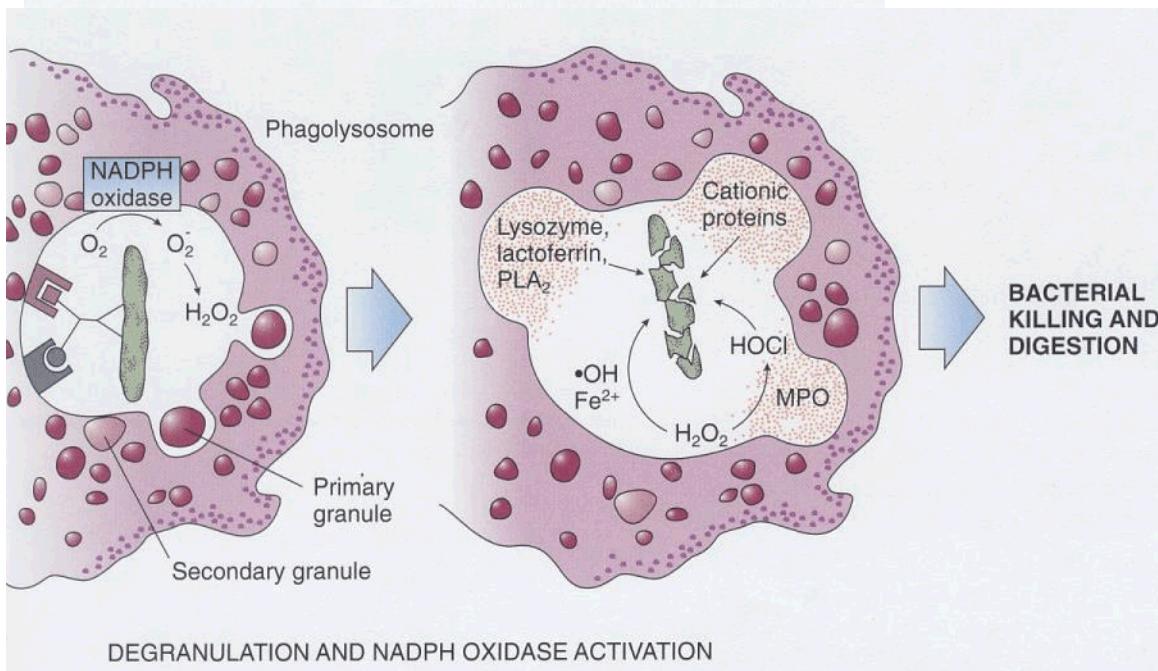
Phospholipase A<sub>2</sub>  
Lysozyme  
Alkaline phosphatase  
Collagenase  
Lactoferrin  
Vitamin B<sub>12</sub> binding proteins

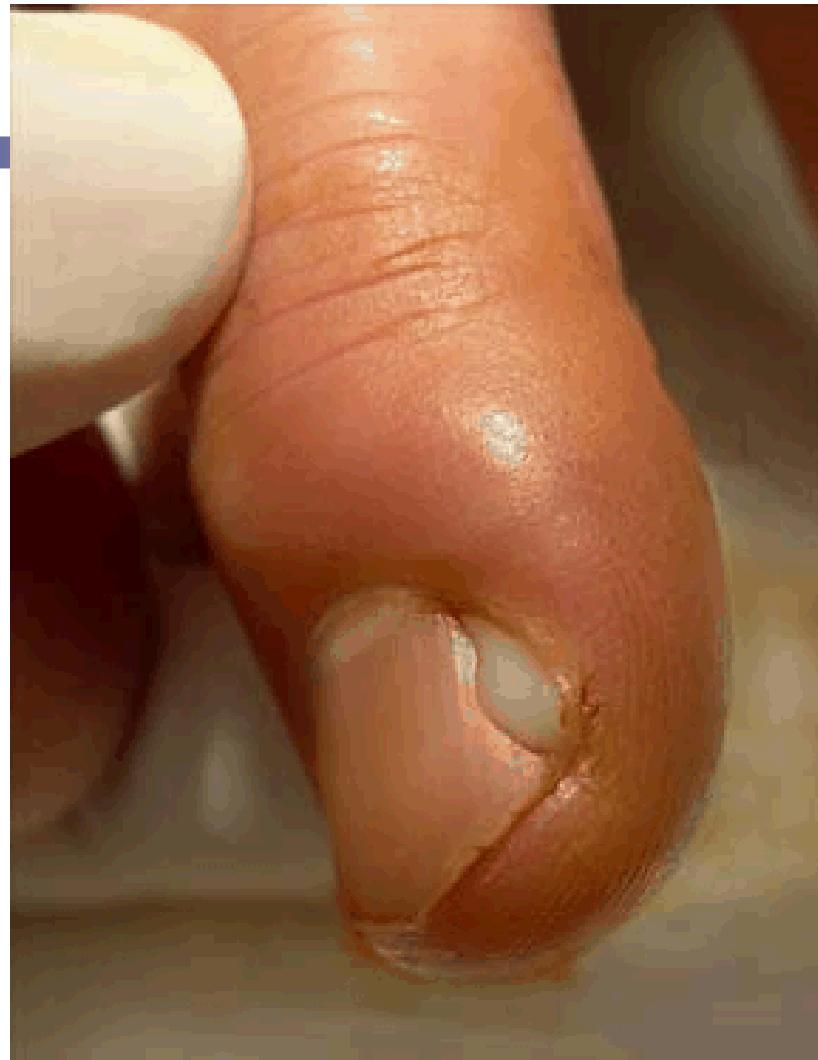
##### -Tertiary granules (C particles)

Gelatinase  
Cathepsins



PHAGOSOME FORMATION





purulent paronychia



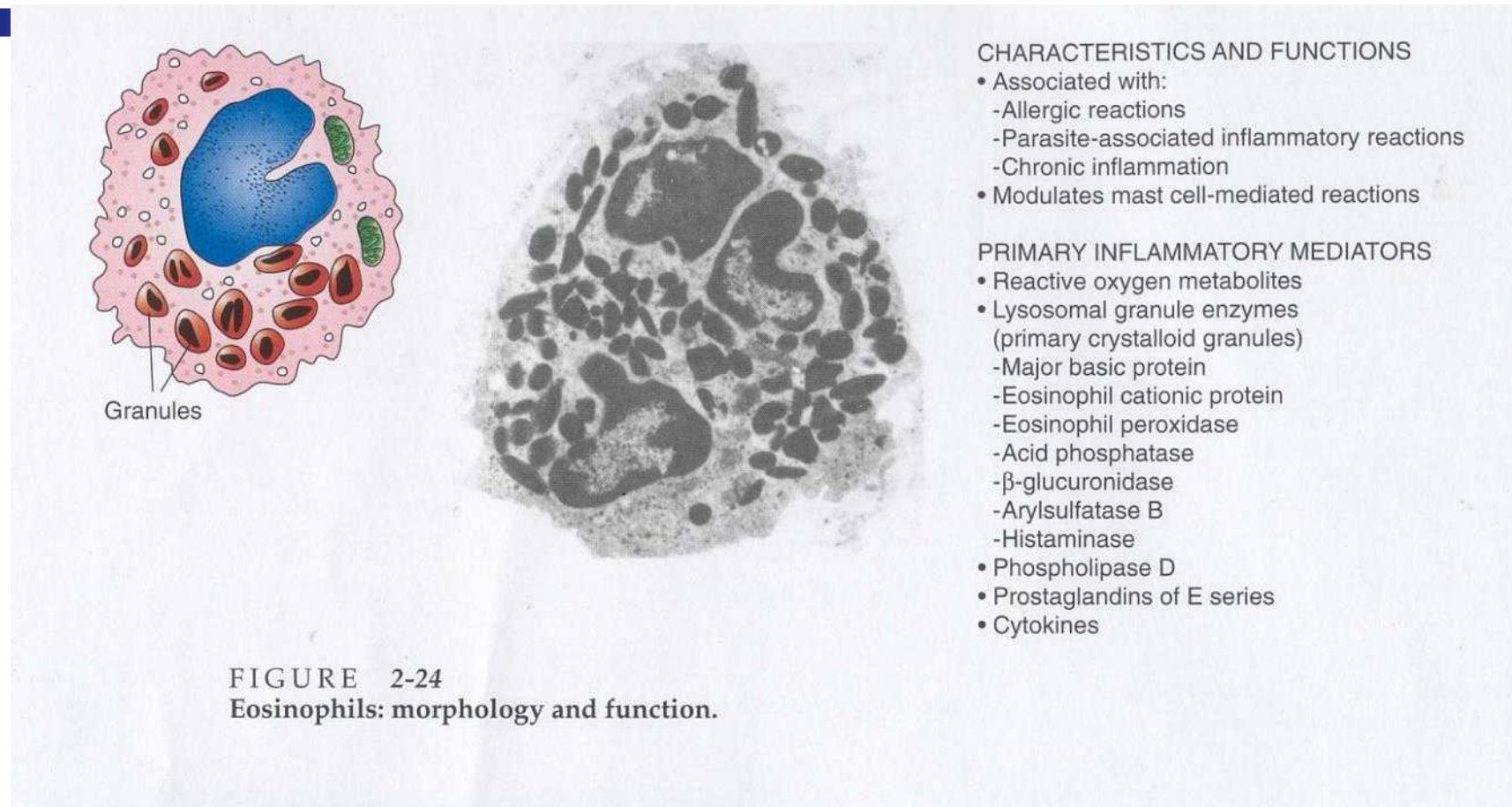


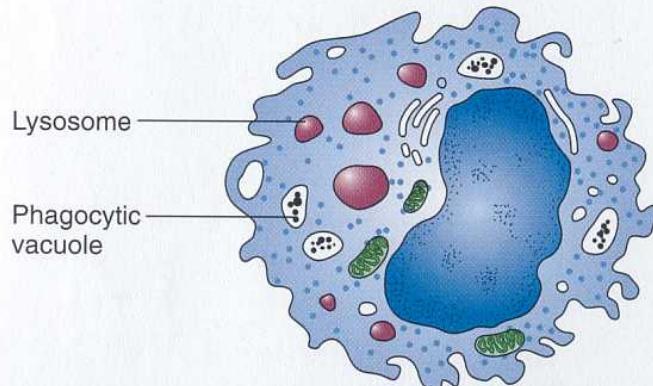
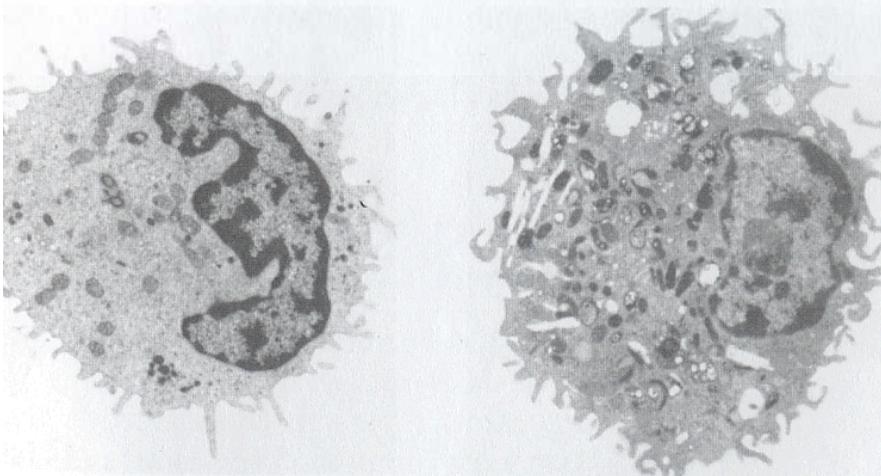
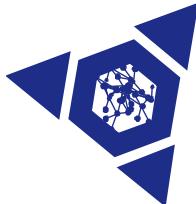
FIGURE 2-24  
Eosinophils: morphology and function.

#### CHARACTERISTICS AND FUNCTIONS

- Associated with:
  - Allergic reactions
  - Parasite-associated inflammatory reactions
  - Chronic inflammation
- Modulates mast cell-mediated reactions

#### PRIMARY INFLAMMATORY MEDIATORS

- Reactive oxygen metabolites
- Lysosomal granule enzymes (primary crystalloid granules)
  - Major basic protein
  - Eosinophil cationic protein
  - Eosinophil peroxidase
  - Acid phosphatase
  - $\beta$ -glucuronidase
  - Arylsulfatase B
  - Histaminase
- Phospholipase D
- Prostaglandins of E series
- Cytokines



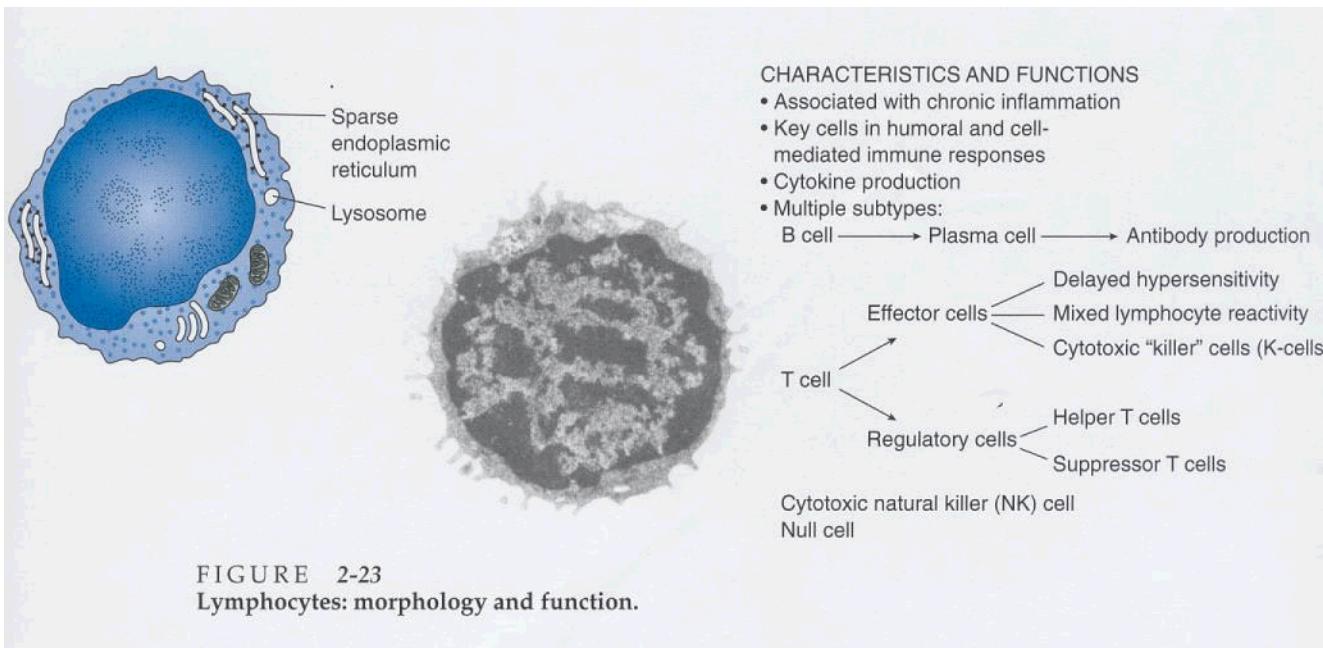
#### CHARACTERISTICS AND FUNCTIONS

- Regulates inflammatory response
- Regulates coagulation/fibrinolytic pathway
- Regulates immune response (see Chapter 4)

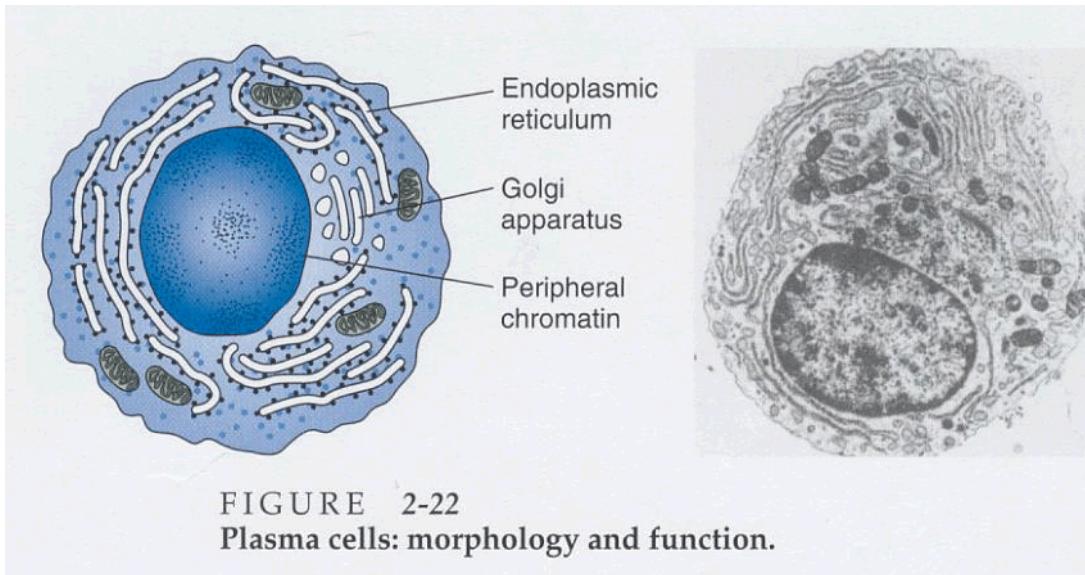
#### PRIMARY INFLAMMATORY MEDIATORS

- cytokines
  - IL-1
  - TNF- $\alpha$
  - IL-6
  - Chemokines (e.g. IL-8, MCP-1)
- lysosomal enzymes
  - acid hydrolases
  - serine proteases
  - metalloproteases (e.g. collagenase)
- cationic proteins
- prostaglandins/leukotrienes
- plasminogen activator
- procoagulant activity
- oxygen metabolite formation

FIGURE 2-20  
Monocytes/macrophages: morphology and function.



**FIGURE 2-23**  
Lymphocytes: morphology and function.



**FIGURE 2-22**  
Plasma cells: morphology and function.

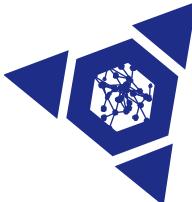


# Morphology of Inflammation

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- **Distribution- focal, diffuse**
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- **Tissue name - hepatitis, myocarditis**





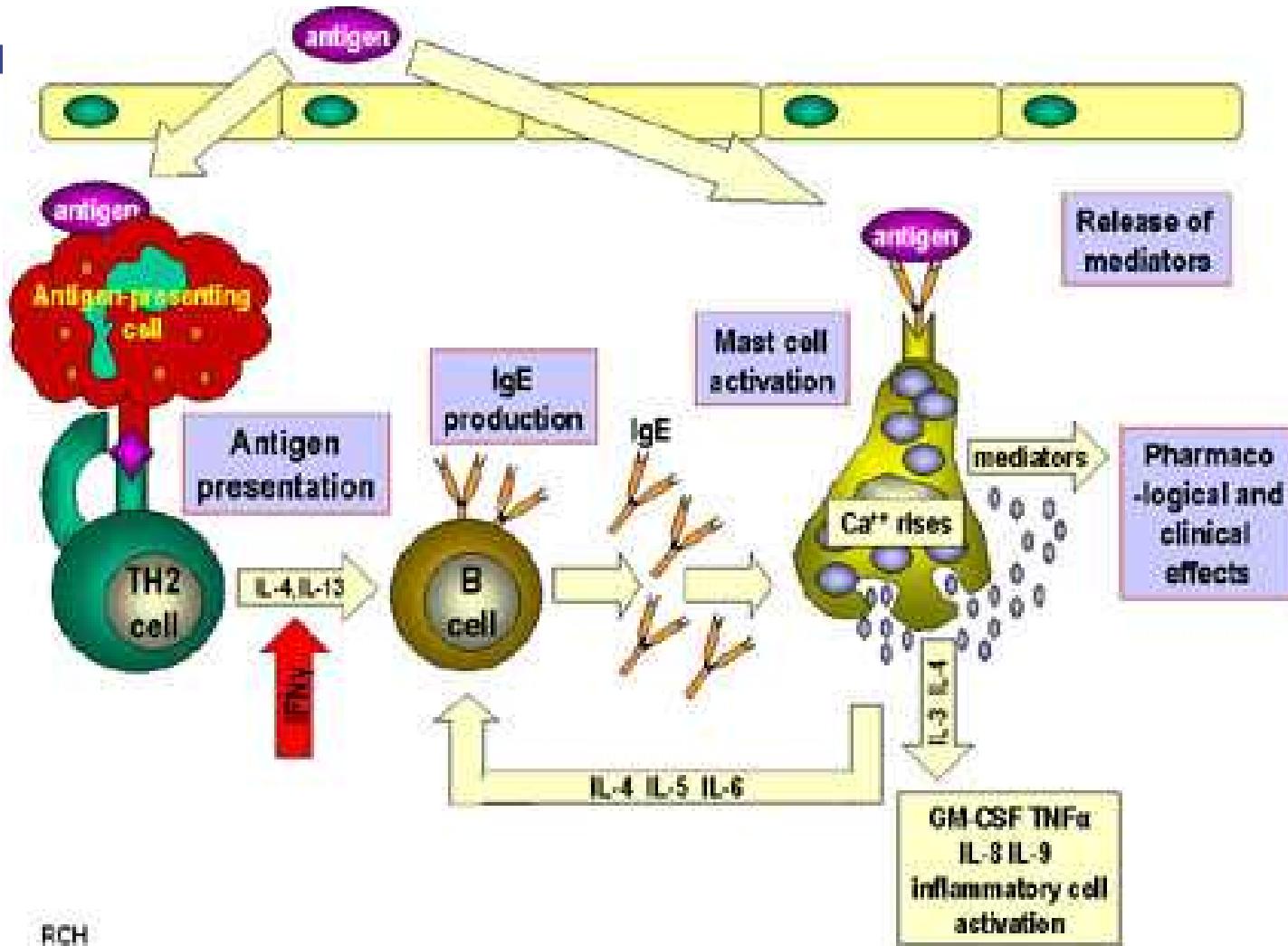
# Immune-mediated inflammation (= hypersensitivity)

- **Type I**
- **Type II**
- **Type III**
- **Type IV**



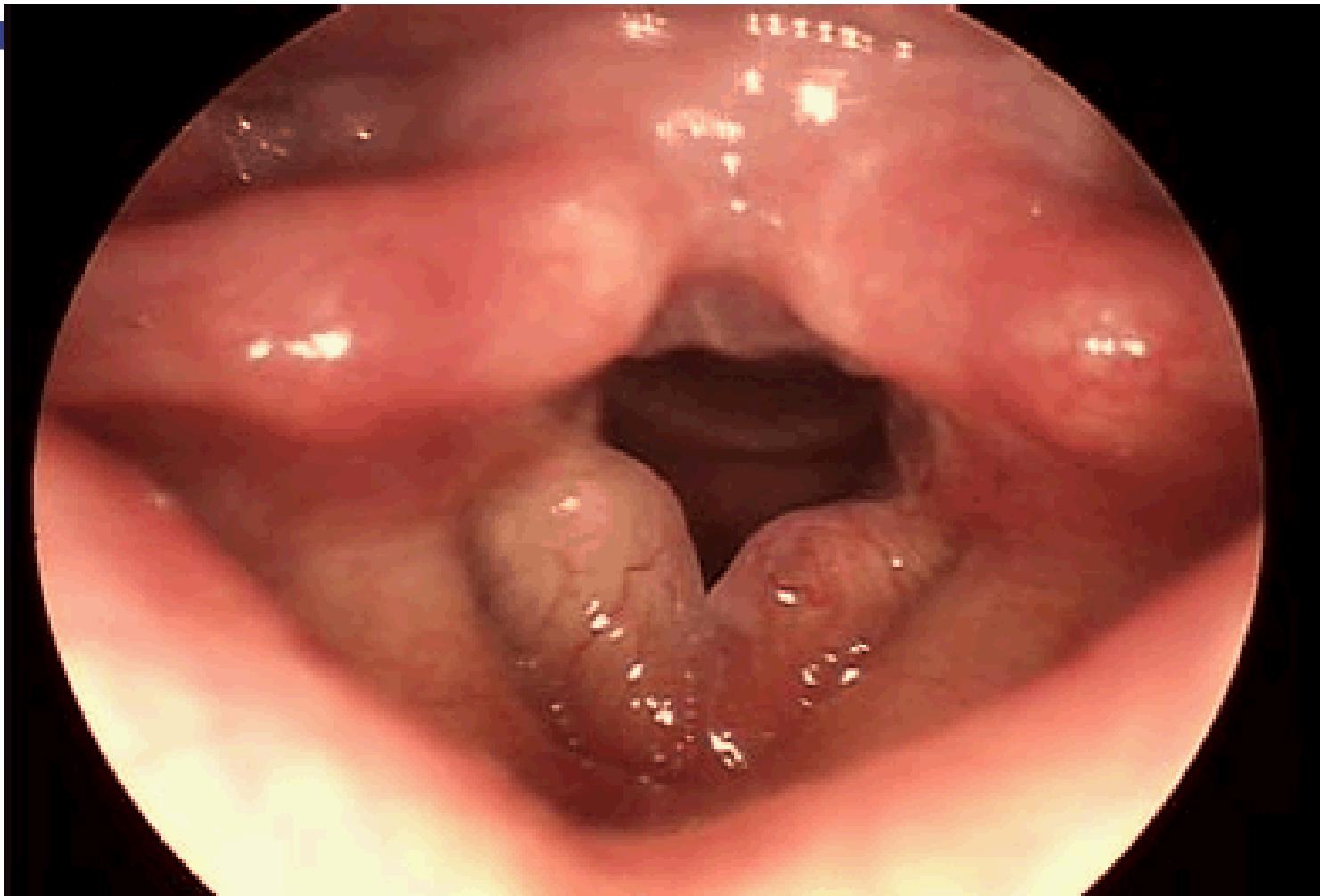


# Type I



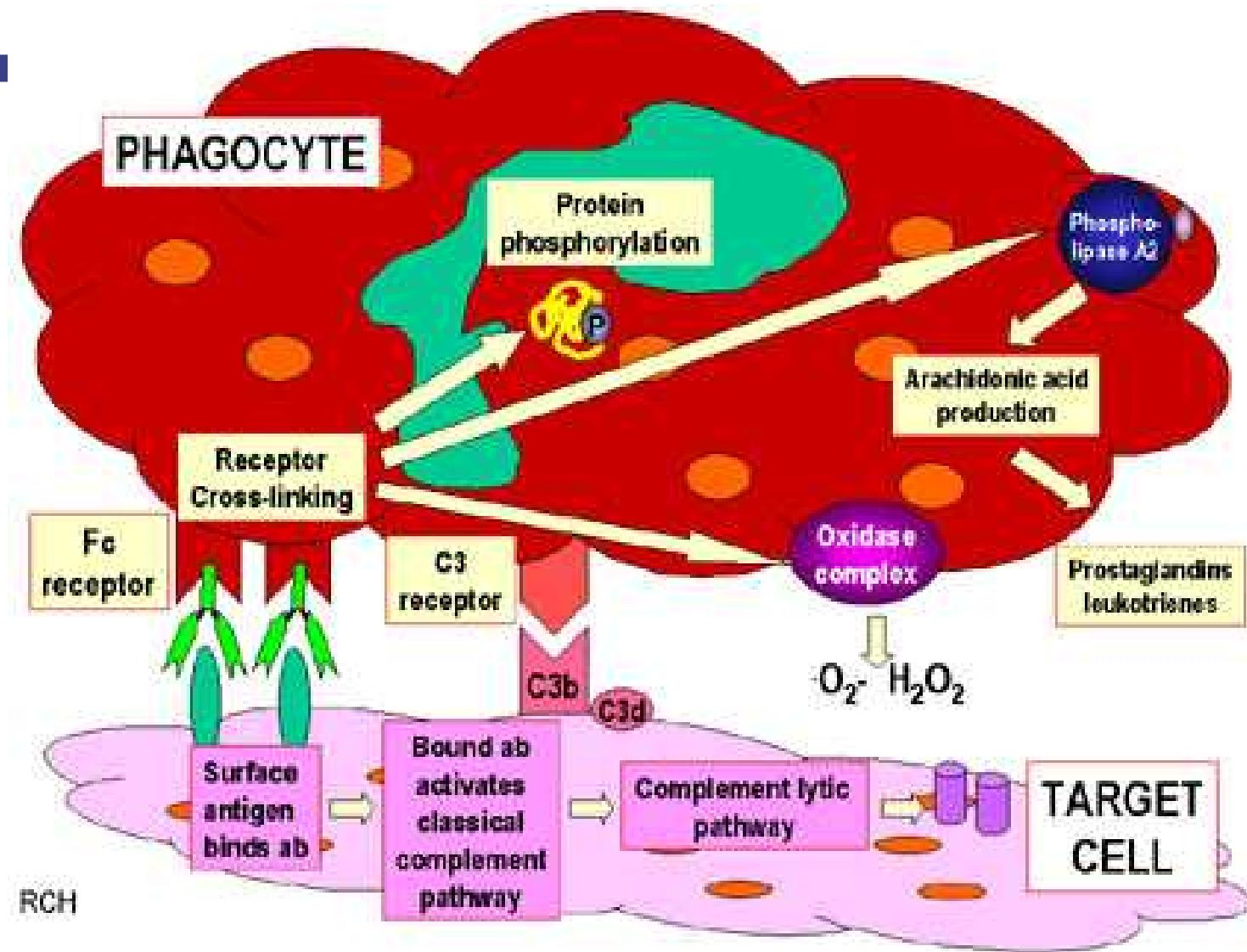
RCH





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# Type II



RCH



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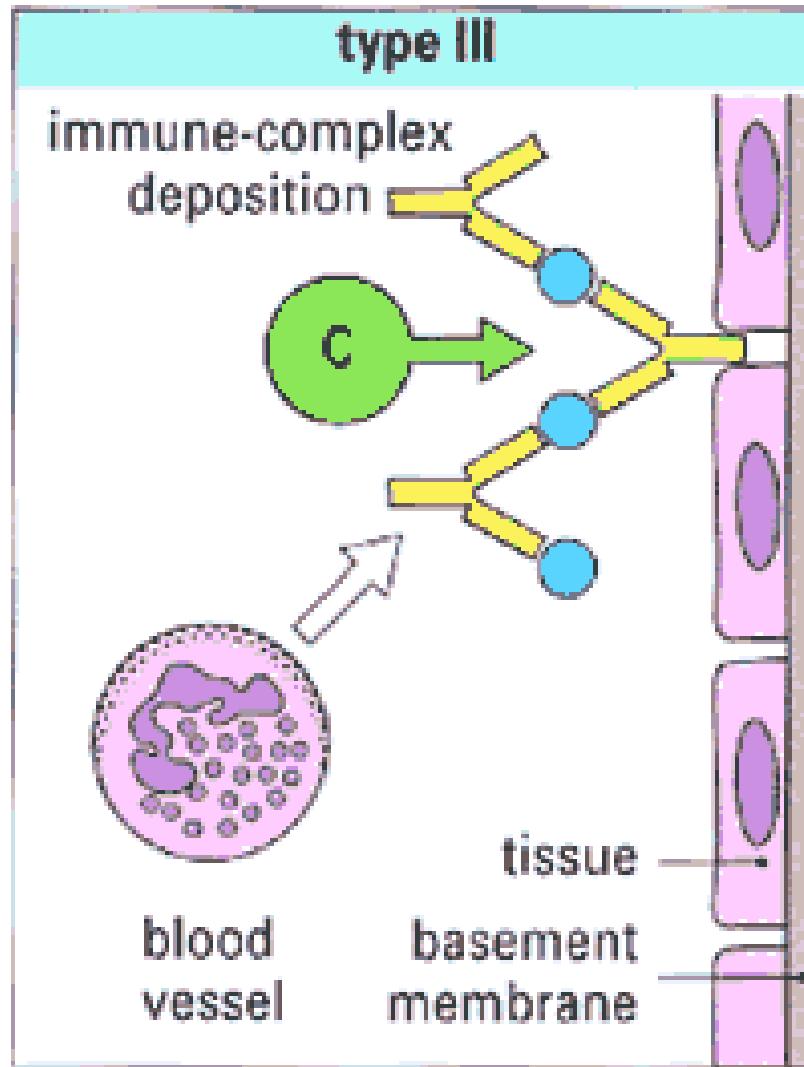
icterus

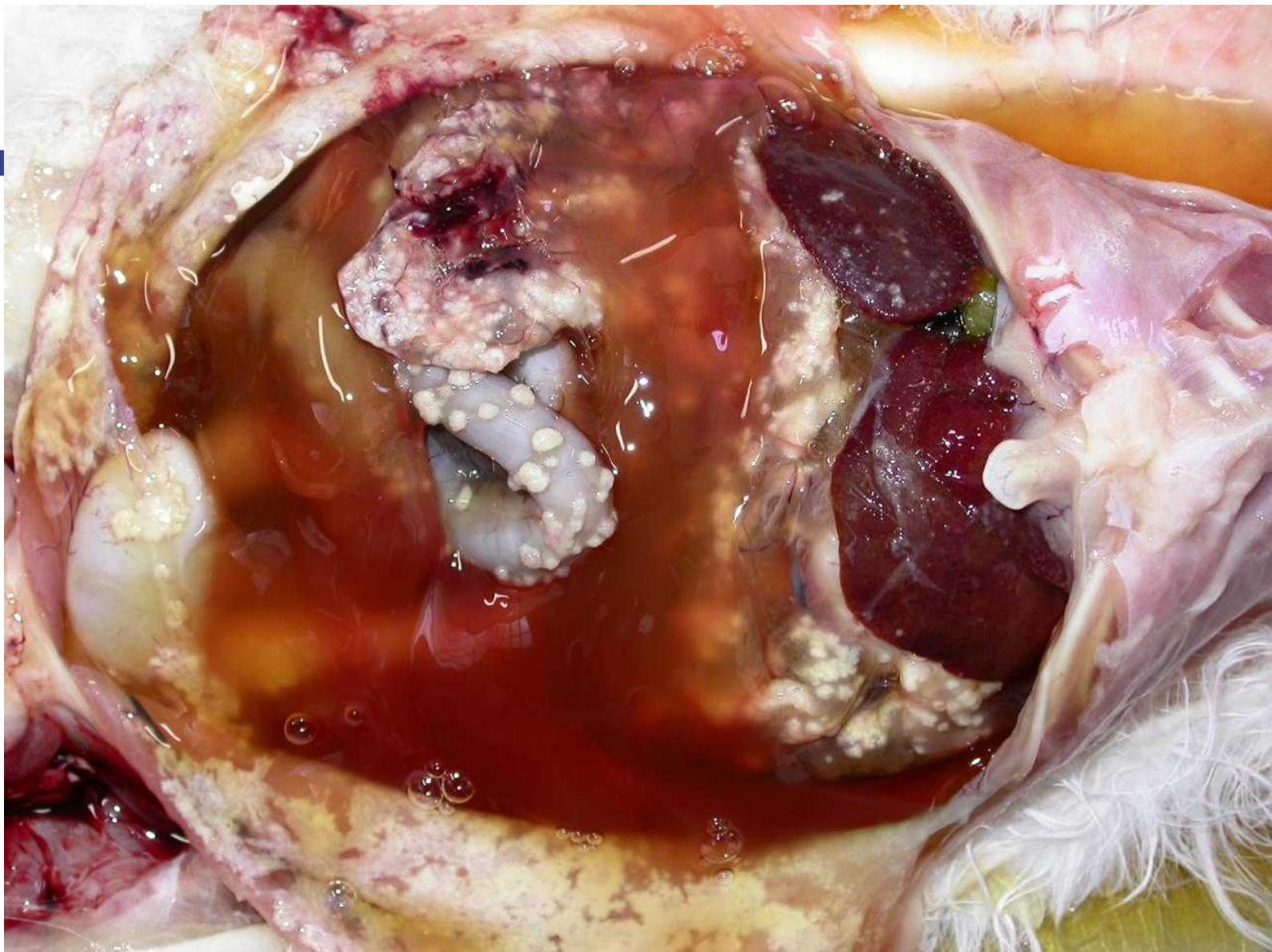


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# Type III hypersensitivity





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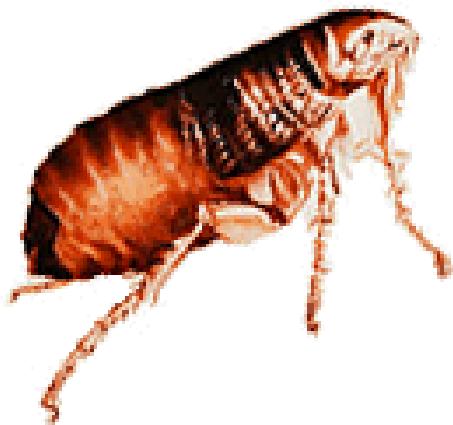


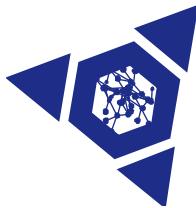
## Type IV hypersensitivity





# Type IV hypersensitivity



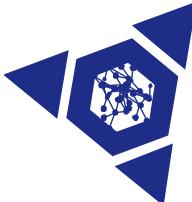


# Type IV hypersensitivity



Vesicular dermatitis





# Chronic Inflammation

- **Vascular components much less pronounced**
- **Hallmark is MACROPHAGES**
- **Usually some fibrous tissue**





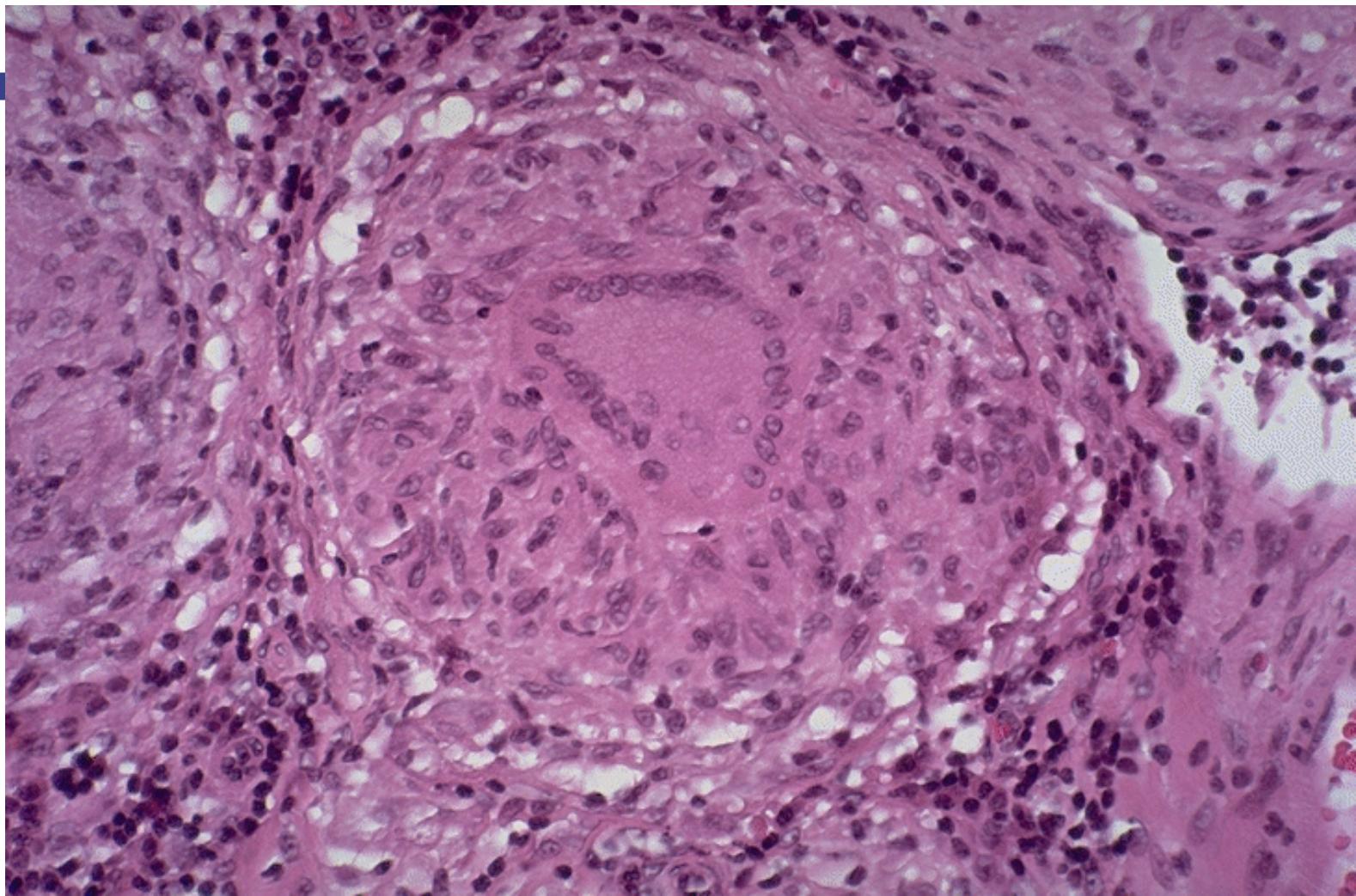
# What's a granuloma?



Chronic ulcerative dermatitis

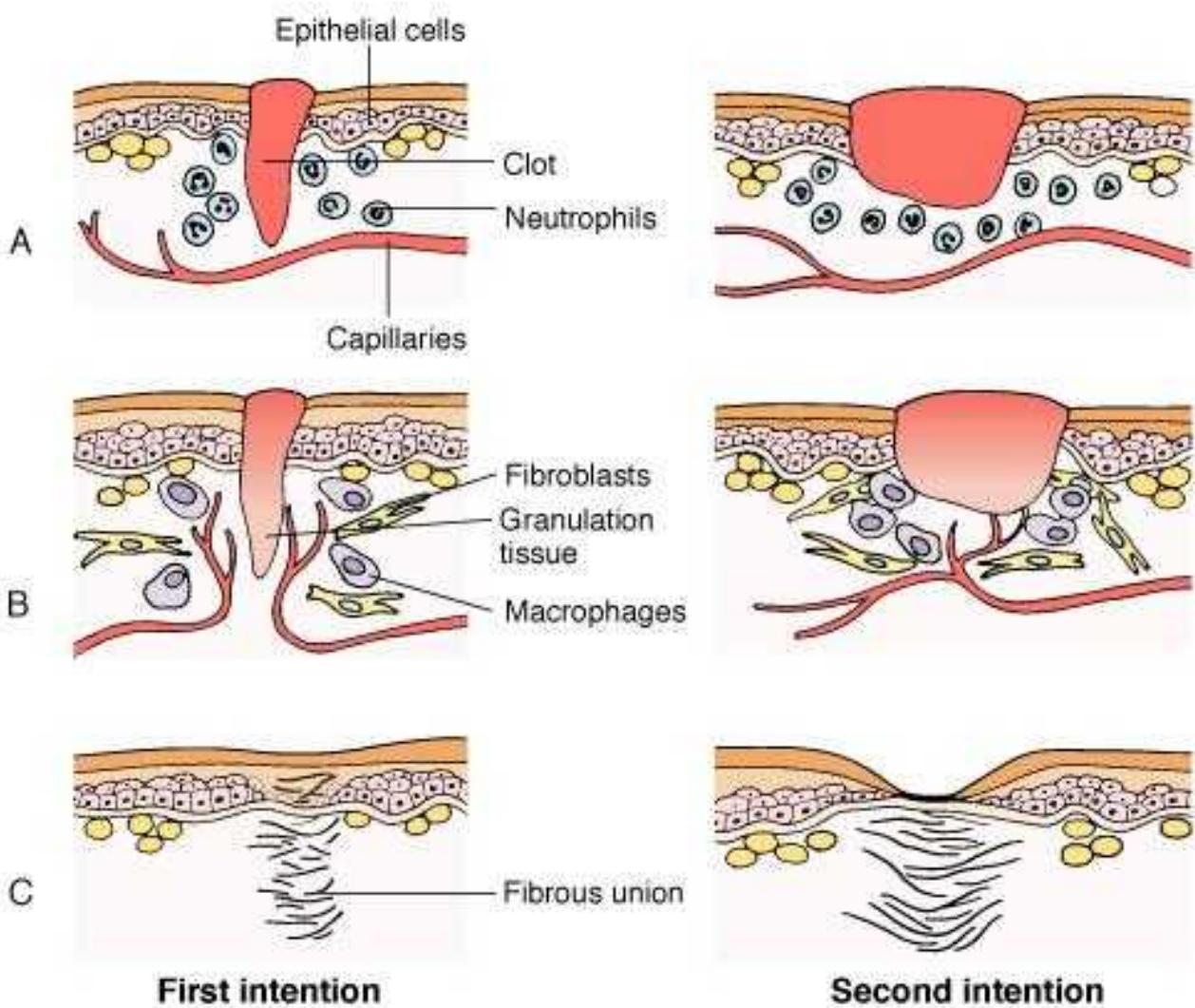


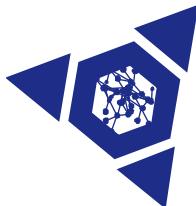
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# Healing and Repair





## Special Cases in Healing

- **Bone – a system all its own**
- **Heart, Brain – doesn't happen!**

