

# IMMUNE SYSTEM



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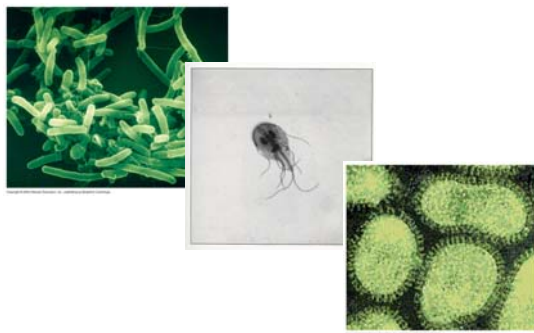
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# FUNCTIONS



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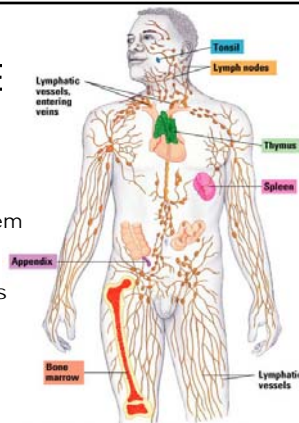
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# STRUCTURE

- Integumentary System
- Blood
- Lymph nodes/vessels



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## TWO TYPES OF DEFENSES

Nonspecific defenses		Specific defenses (immune system)
First line of defense	Second line of defense	Third line of defense
<ul style="list-style-type: none"> <li>• Skin</li> <li>• Mucous membranes</li> <li>• Secretions of skin and mucous membranes</li> </ul>	<ul style="list-style-type: none"> <li>• Phagocytic white blood cells</li> <li>• Defensive proteins</li> <li>• The inflammatory response</li> </ul>	<ul style="list-style-type: none"> <li>• Lymphocytes</li> <li>• Antibodies</li> </ul>
• The lymphatic system		

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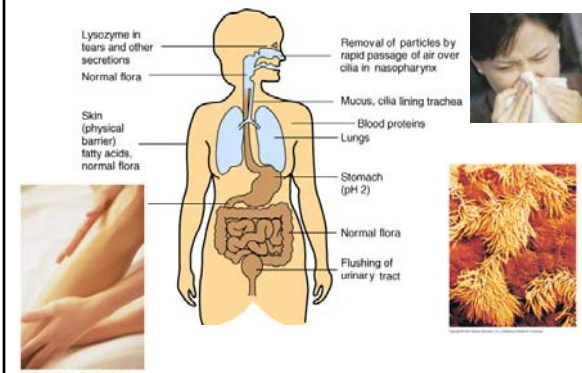
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## FIRST LINE DEFENSES




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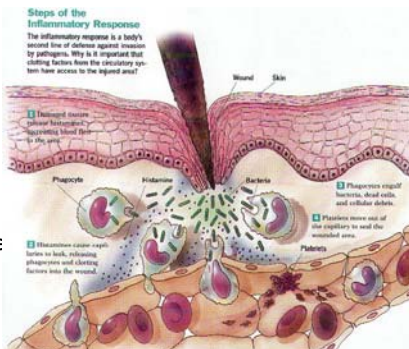
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## SECOND LINE DEFENSES: Inflammation

Rubor-redness  
Calor-heat  
Dolor-pain  
Tumor-swelling  
functio laesa-(loss of function)

Mast cells  
↓  
Histamine  
↓  
Neutrophil




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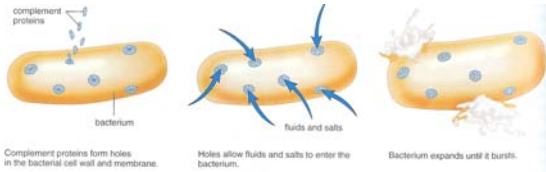
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## SECOND LINE DEFENSES: Complement

- Histamine release
- Opsonization
- "MAC" (membrane attack complex)



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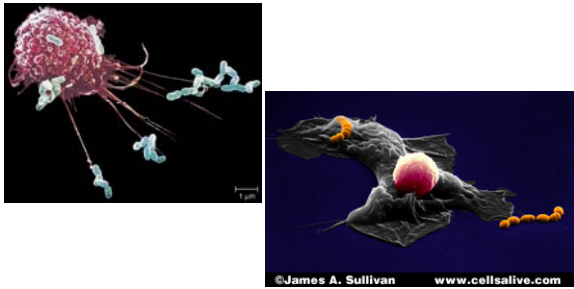
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## SECOND LINE DEFENSES: Macrophages



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## SECOND LINE DEFENSES: Fever

**defined as abnormal increase in body temperature**  
**normal variation is 1.0 - 1.5C**  
**hypothalamus resets body thermostat**  
**caused by pyogenic microorganisms**  
**accelerates phagocytic and antibody responses**

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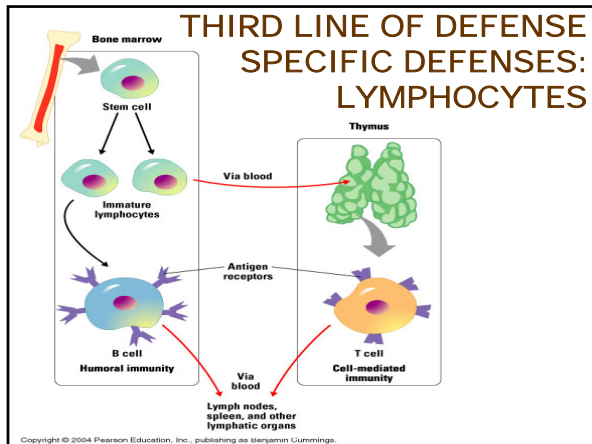
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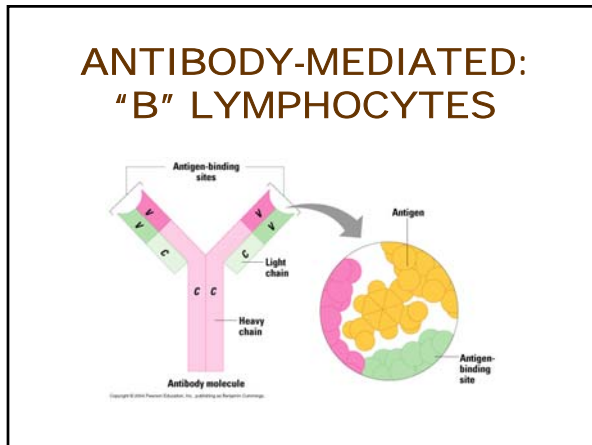
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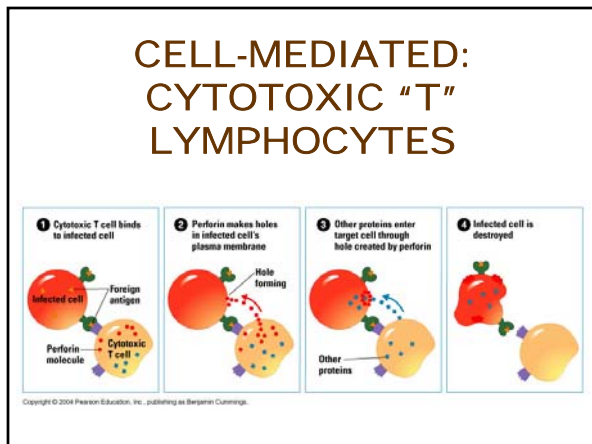
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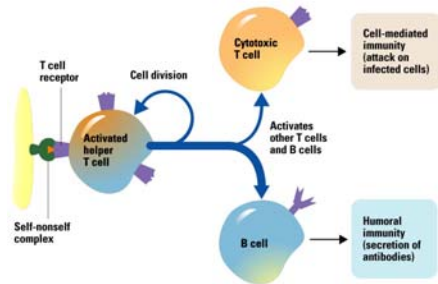
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## CELL-MEDIATED: HELPER "T" LYMPHOCYTES



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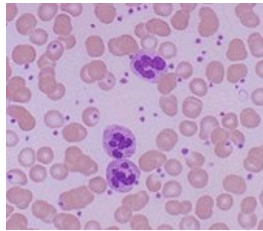
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## Neutrophil

- Aka PMN's
- Lobed nuclei
- Fast, non-specific
- First to the scene
- Phagocytosis
- Purple stained



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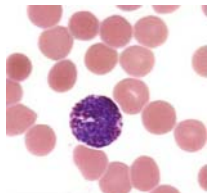
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## Basophil

- Dark Blue stained
- Migrate to damaged tissue and release
  - Histamine
  - Heparin



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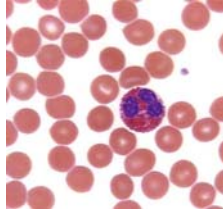
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## Eosinophil

- Wright's stain--red
- Bilobed
- Parasitic worms
- Allergic reactions



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## Monocyte

- Largest leukocyte
- Kidney-shaped nucleus
- Become macrophages



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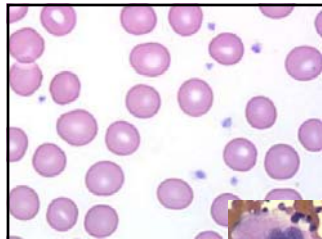
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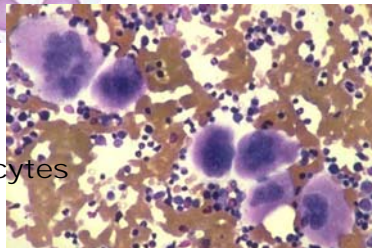
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## Platelets

- Blood clotting
- Scabbing



- Megakaryocytes



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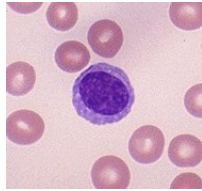
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# Lymphocytes

- T cells attack cells
  - Tumor cells
  - Microorganisms
  - Transplant cells



- B cells produce antibodies

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# INDUCED IMMUNITY



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# Rheumatoid ARTHRITIS



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