

Immunity



Immunity

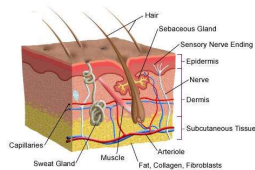
- The ability of the body to fight & resist pathogens
- **Nonspecific defense mechanisms** attack anything that is foreign to the body.
- **Specific defense mechanisms** attack a particular disease-causing agent.

Integumentary System

- Skin, hair, nails, some glands

Major Functions:

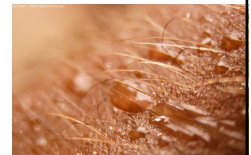
1. Infection Protection: barrier between you & pathogens
2. UV Protection



Integumentary System

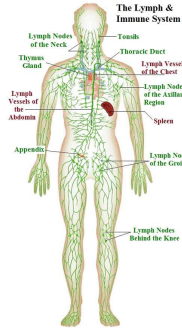
Major Functions:

3. Regulates Temperature: sweat & vasodilation; “goosebumps”
4. Waste Removal: water, electrolytes, & other chemicals in sweat



Lymphatic System

- **Lymph** = fluid that builds up in tissue throughout the body
- **Lymphatic Circulation:** collects & filters lymph



Lymphatic System

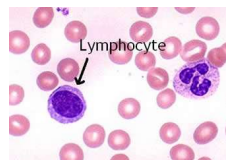
Major Functions:

1. Maintains fluid balance in cells (if not maintained, **edema**, or swelling occurs)
2. Filters & checks lymph for pathogens

Lymphatic System

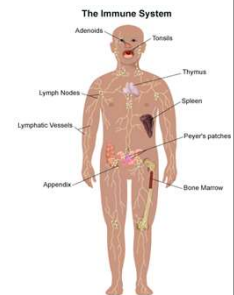
Major Functions:

3. Filters blood of dead/damaged RBCs
4. Produces lymphocytes (type of WBC)



Immune System

- The body's main defense against pathogens
- Responsible for destroying cellular debris, dead cells and abnormal cells in the body



Passive Immunity

- The body does not make the antigens, they are given to you
- Short term
- Given to babies through placenta & breast milk
- Some vaccines (rabies)

Active Immunity

- The body reacts to a pathogen, producing an immune response
- Long term – the antibodies remember
- Most vaccines initiate this response

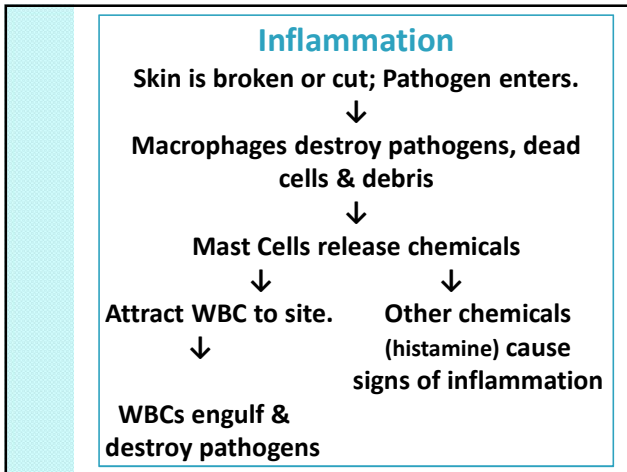
Innate Immunity

- **1st Line of Defense:** Nonspecific Barriers keep pathogens out

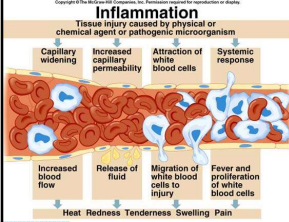
Mechanical Barriers	Chemical Barriers	Biological Barriers
<ul style="list-style-type: none">• Skin• Mucous• Coughing/ Sneezing• Movement of tears & urine	<ul style="list-style-type: none">• Enzymes in saliva & tears• Stomach acid & enzymes	<ul style="list-style-type: none">• Probiotics (“good bacteria”) in intestines, etc.

Innate Immunity

- **2nd Line of Defense:** Nonspecific Responses attack pathogens to prevent infection
- Can be triggered when tissue or cells are stressed, injured or damaged



Signs of Inflammation



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Inflammation
Tissue injury caused by physical or chemical agent or pathogenic microorganism

- Pain – chemical reactions stimulate nerve endings
- Heat & Redness – increased blood flow
- Swelling – fluid leaking out of cells

Adaptive Immunity

3rd Line of Defense: Specific Responses attack & remembers specific pathogens

- Most Pathogen Invasions → **Humoral Immunity**
- Abnormal cell or invasion inside cells (viruses, fungi, protists) → **Cell Mediated Immunity**

Humoral Immunity

B cells activated (in lymph nodes)

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Recognize Specific Antigens

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Make Specific Antibodies

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Antibodies bind to Antigen on pathogen, signal to destroy pathogen

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If re-infection: memory B cells quickly produce antibodies again (Secondary Immune Response)

Cell Mediated Immunity

Macrophages signal helper T cells



Release Cytokines



Activates cytotoxic T cells
to destroy infected cells



B cells activated to
enhance Humoral Immunity



Suppressor T cells
shut down the reaction

Allergies – Sensitizing Exposure

- B cells mount a humoral response against a mundane substance.
- Antibodies attach to mast cells & basophils.
- If the allergen enters again, the antibodies will take over.

Allergies – Allergic Reaction

- Next exposure releases chemicals
 - Histamine & prostaglandins cause vasodilation & ∴ swelling
 - Histamine also causes itching
 - Leukotrienes cause smooth muscle contraction.
 - increase production of mucous
 - constriction of the airways
 - diarrhea or vomiting

Vaccines

- A biological substance that induces active immunity against a particular pathogen without making you sick.
- If you are infected with the actual pathogen, your immune system will mount a secondary immune response against it before it causes diseases.

Questions? Comments?

