

Unit 3

Maintaining Dynamic Equilibrium

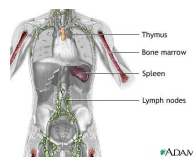
- Immune system
- 1st, 2nd and 3rd line of defense
- Immune disorders

Oct 11-3:27 PM

Immune System p.382-386

Immune system - A complex system involving several organs and tissues (e.g. skin, lungs, blood).

Function: Protect body from invaders (pathogens).



Pathogen – Anything that can cause a disease.



There are three lines of defense:

- 1st: Physical and chemical barriers (Non-Specific)
- 2nd: Inflammatory Response (also Non-Specific)
- 3rd: Immune system Response (Specific)
 - B & T lymphocytes (white blood cells - wbc)

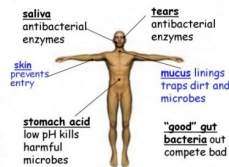
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Immune System

1st Line of defense

- This defense is **non-specific**,
i.e. it reacts **the same** for all invaders.
- Parts include the skin and mucus membranes

First Lines of Defence



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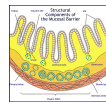
1st Line of defense

The Skin:

- The skin covers the body and **prevents** pathogens from entering.
- Skin is mildly **acidic** and produces secretions of sweat and oil which inhibit (slow or stops) pathogen growth.
- Non-harmful bacteria live on the skin and compete with pathogens to prevent their growth.



Mucus Membrane:



- Mucus membranes line the **digestive tract** and **respiratory system**.
- Mucus **traps** pathogens.
- Mucus membranes produce an **enzyme** which destroys bacterial cell walls.

** Remember: All to maintain Homeostasis, equilibrium in the body**

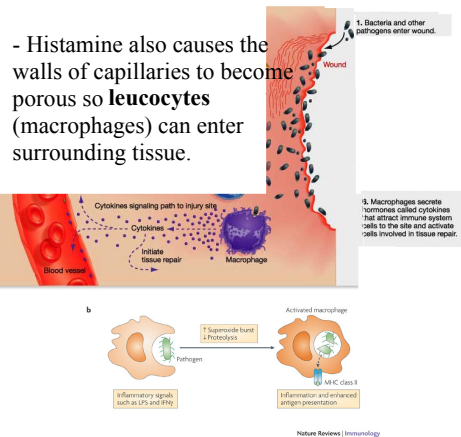
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Immune System



2nd Line of defense

- The **inflammatory response**.
- This defense is also **non-specific**, i.e. it reacts the same for all invaders.
- A complex system involving several organs and tissues (e.g. Skin, lungs, blood).
- Injured cells release the chemical **histamine** which causes capillaries to dilate, increasing blood flow.



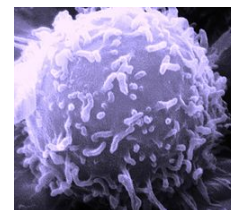
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Immune System

3rd Line of defense

The actual immune system.

This type of defense is **specific**, i.e. it attacks each invader uniquely.



Involves **B & T lymphocytes** (wbc).

These cells are produced in bone marrow and mature in the bone or thymus.

They are stored in the spleen, lymph nodes, tonsils.

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Immune System Response

1) When macrophages digest pathogens they display part of the pathogens on their exterior.

- These pieces are called **antigens**.

- **Antigens** : A chemical that is capable of causing a response from the immune system.

2) **Helper T** cells (white blood cell) have receptors for these antigens and bind to them on the outside of the macrophages.

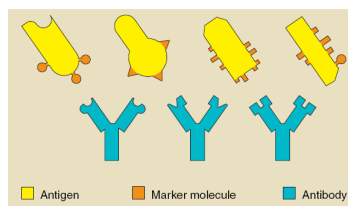
3) This signals **Killer T** cells (wbc) which bind & destroy the invaders and **B cells** (wbc) which bind & produce antibodies and **memory cells** (wbc) .

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Immune System

Antibodies : A large molecule which binds to a specific antigen and helps destroy an invader.

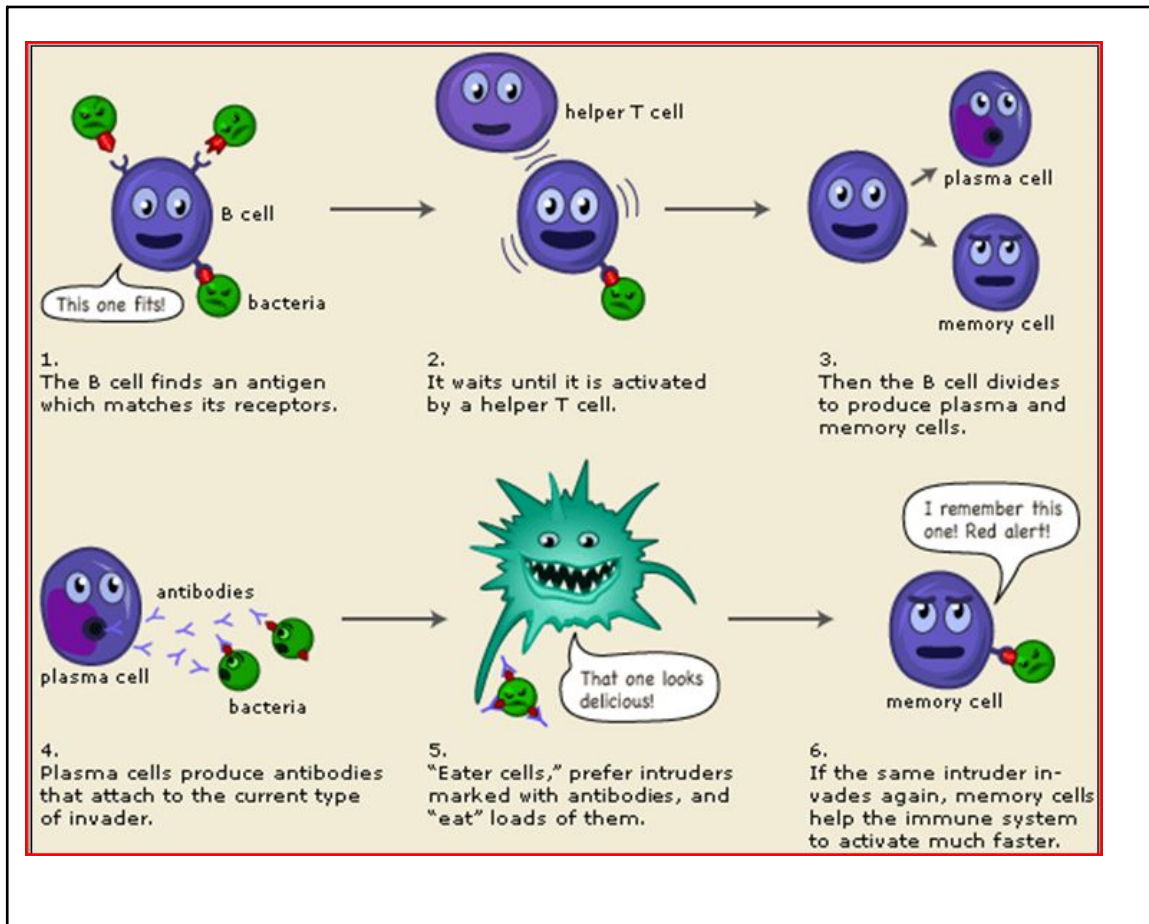
Antibodies Video



4) **Suppressor T** cells (wbc) limit the activities of B & T cells once the invasion is under control.

5) After the invasion is over, memory cells and T cells remain to fight off the next infection (secondary immune response).

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Apr 8-10:28 AM

Immune System

Important terms:

1. **Immunity** : The ability to resist a particular disease.
2. **Active immunity** : Immunity acquired through activation of our own immune system.
3. **Passive immunity** : Immunity acquired by an infant from the mother (while in womb & in breast milk).

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Body Sentinels Part 1



Body Sentinels Part 2



Body Sentinels Part 3



Mar 18-5:14 PM

Hodgkin's Disease STSE

Lymphatic system

Humans have two circulatory systems, one involving blood, the other lymph.

It is composed of tubes, nodes (sacks), and the liquid (lymph).

Lymph is circulated by body muscle movements.

Lymph is a yellowish transparent liquid that contains white blood cells.

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Hodgkin's Disease STSE

Lymphatic system is connected to the blood circulatory system at several points

White blood cells leave the lymphatic system and enter surrounding tissue to fight pathogens

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Hodgkin's Disease STSE

Hodgkin's Disease

- cancer that starts in lymphatic tissue
- can spread to other organs
- 810 new cases in 2001
- 63% survival rate after 15 years (but always improving)
- Treatments include radiation and chemotherapy,

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Allergic Reaction p. 386

An antigen is sometimes called an allergen

The presence of an allergen results in the release of histamine which can cause the symptoms associated with an allergy (swelling, runny nose, sneezing, coughing).

Sometimes an allergic reaction can be so severe that it causes anaphylaxis and can be fatal (eg. Peanuts, bee stings).

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Autoimmune Disorders p. 386

When your immune system (antibodies) attacks your body.

Example : Rheumatoid arthritis

Inflammation of the joints as a result of an autoimmune disorder.

Antibodies attack the cartilage and bone.

Causes pain, stiffness, swelling

Treatment includes aspirin, and anti-inflammatory drugs

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