

Immune System

Function: Fight infection through the production of cells that inactivate foreign substances or cells.

Antigen Presentation

1. A phagocyte "eats" a bacterium.
2. Parts of the bacteria (antigen) goes to the surface of the phagocyte.
3. The phagocyte presents the antigen to a helper T cell.
The helper T cell is activated.

activated helper T cell

helper T cell

DEXTER

Two Types of Immunity

Innate Response
= *Born with it*

- Nonspecific

(a)

Adaptive Response

- Specific
- Requires contact with the antigen

(b)

Source: <http://classes.mindandtech.com/canep/Courses/biol211/>

Innate Immune System

1. *Innate: Non-Specific*

Keep out

- 1st Line:
 - Skin (Armor)
 - Snot (quick sand)
 - Hair (Razor Wire)
 - Tears (Mote)

Doesn't Matter Who you are

Innate Immune System

2. *Innate: Non-Specific*

2nd Line: Don't care who you are I will kill you

Your in, but I'll kill you

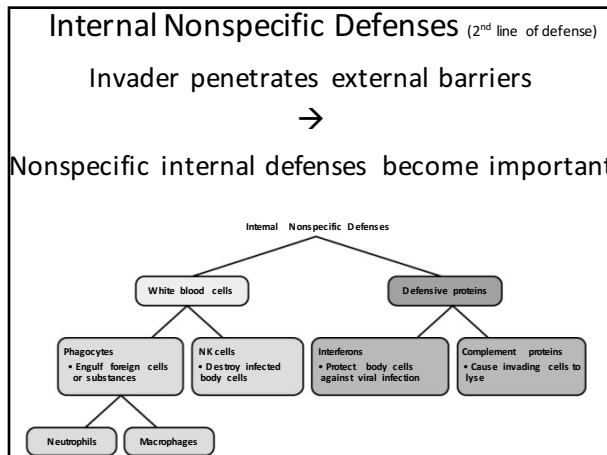
Doesn't Matter Who you are

MACROPHAGE hugs...

ANTIGEN

are often fatal

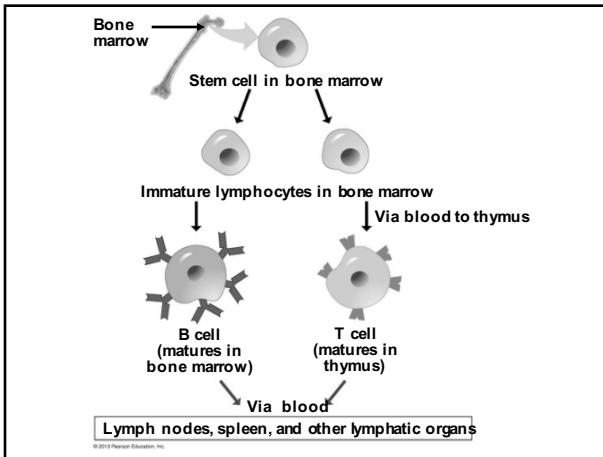
- Fever (*Boil it*)
- Inflammation (*increase blood flow and make puffy so nothing else can get in*)
- Interferon (*Prevent viral Reproduction*)
- Cells: Phagocytes (*eat bad guys*):
 - **Macrophage**: Capture and eat
 - **Neutrophils**: Bleach



Immune System Notes: Adaptive

3. 3rd line of defense: *Specific/Adaptive*

- **Cell Mediated Response**
 1. **B-Cells**: which mature in the bone marrow
 - Recognize pathogen, Make Antibody
 2. **T-Cells**: which mature in the thymus, a gland in the chest.
 - **Helper T**: Call for killer with chemicals
 - **Killer T**: Stab to death
 - **Suppressor T**: Shut down immune response



How do you get Adaptive Immunity?

— 3rd line of defense

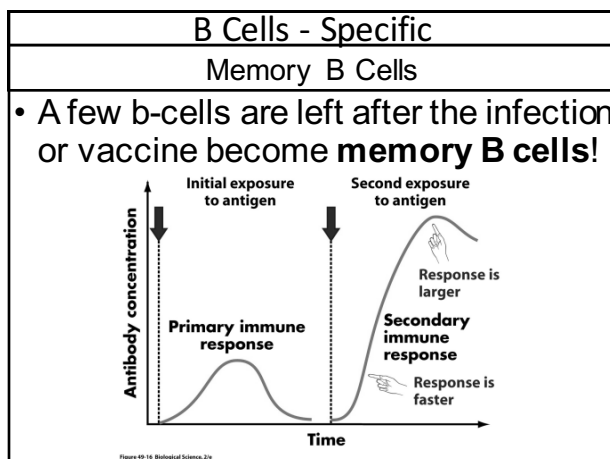
- 1) Active: Get sick or vaccine
- 2) Passive: Given Antibodies

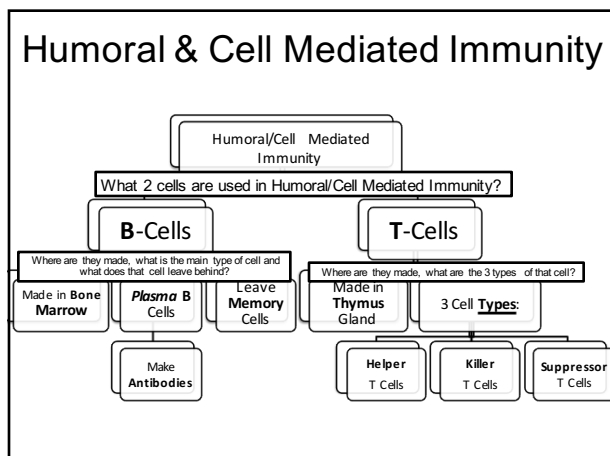
www.dreamstime.com

Immune System Notes: Adaptive

Active Immunity: Get sick

- Immunity after first exposure
- What cells are left over? Memory B Cells
- We can get it 2 WAYS:
 1. Get Sick: Have Memory B Cells left over to fight faster next time
 2. Vaccine: Injecting a weakened form of the pathogen to “train” your immune system.





Flu Vaccine: Keeping Up With The Virus

<http://www.youtube.com/watch?v=mOVvyQQRiGU>

Questions:

- What type of immunity does a vaccine cause?
- Why do you need a vaccine every year?
- What changes about viruses?

B Cells

Made in Bone Marrow

Produce Antibodies
(Flag that something is bad)

-Used to recognize antigens on invaders by a fitting together like puzzle pieces

- Antibodies link viruses together in a large mass.
- Macrophages “eat” antibody-tagged invaders

Figure 24.7a

Antigen

Antigen-binding site

Antigen-binding sites

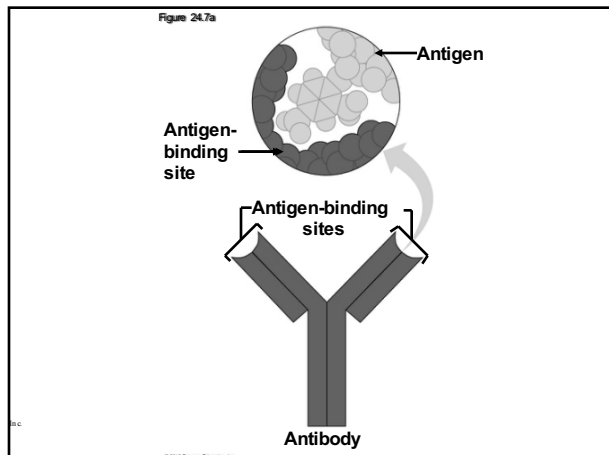
Antibody

Antibodies

Antigen binding site

Neutralized viruses

Macrophage (will phagocytose)



Types of B Cells

a. Plasma Cells: Make antibodies which are proteins that bind antigens

b. Memory Cells: Stick around so next time they can respond faster

- Why vaccines work

Resting B cell

membrane-bound Ig

B cell

Encounter with antigen

bacterium

B cell

Stimulated B cell gives rise to antibody-secreting plasma cells

plasma cells

secreted antibody

course1 | umnora.edu

Figure 41. The Immune System, and © Garland Science 2009

