

Protecting the Body (The Immune System) (3.6)

How does the human body protect itself from pathogens?

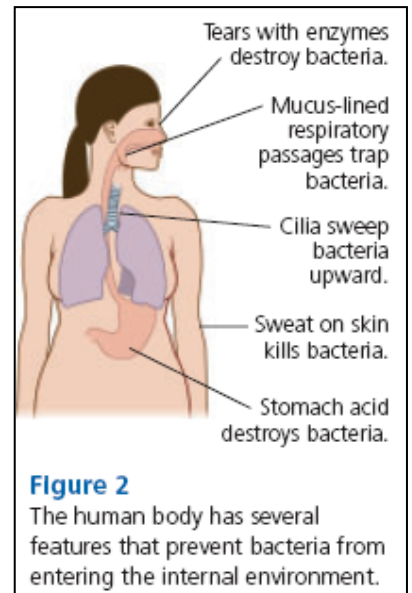
NON-SPECIFIC DEFENSES: protect against ALL pathogens all the time.

First Line of Defense ("Primary")

Consists of _____ that work by keeping pathogens _____ the body.

Physical barriers and how they protect the body:

- Skin:
- Nostril Hair:
- Ear Wax:
- Tears:
- Mucus & Cilia:
- Stomach Acid:



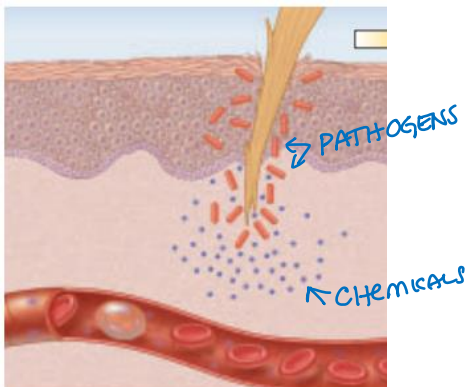
If pathogens get past the first line of defense and inside the body, a second line of defense is ready!

Second Line of Defense ("Secondary")

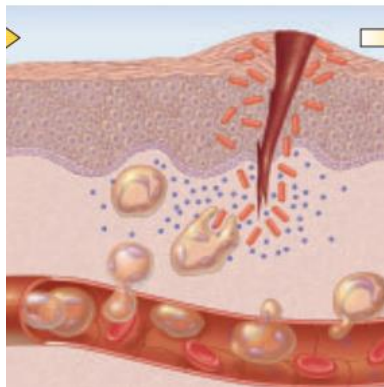
The circulatory system (and the blood cells it carries) act as the second line of defense

When pathogens enter the body through a cut / opening, special white blood cells leave the bloodstream and go to the affected (infected) area.

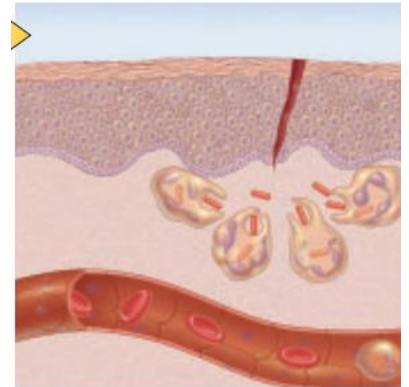
Use your textbook to write descriptions for each stage of the secondary defense below the images.



→ pathogens enter body
→ invaders release chemicals that alert 2nd line of defense



→ White blood cells attracted to area
→ more blood flow to area = more white blood cells



→ White blood cells engulf + digest invaders
→ Body heals tissues

Define **pus**: the remains of digested pathogens + white blood cells

If pathogens get past the second line of defense, a third line of defense is ready!

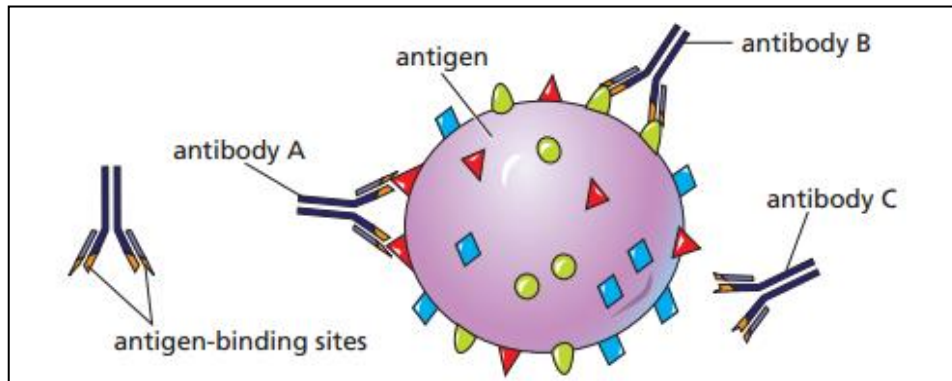
Third Line of Defense ("Tertiary")

The Immune System is the third line of defense. It is a "specific defense"

SPECIFIC DEFENSES: protect against specific pathogens WHEN THEY'RE ATTACKING THE BODY

Pathogens that have specific markers on their surface (antigens) trigger white blood cells to produce antibodies that match the antigen. They label the cells for destruction!

Antibodies are specifically designed for one type of pathogen, like a lock + key (e.x. if you get the chicken pox virus, the antibodies you make won't work against the flu virus)

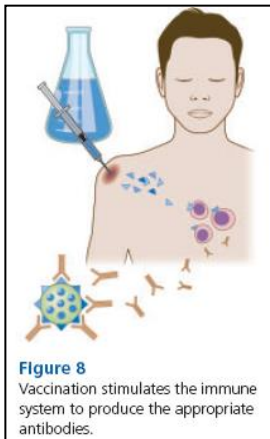


Once the white blood cells have made many antibodies they are spread throughout the body via the bloodstream.

The antibodies label any cells with the matching antigen that they encounter. Another type of white blood cell searches for the labeled cells and attacks and destroys them!

Your body "remembers" all of the antibodies it has produced in the past!

HOW CAN WE TAKE EXTRA PRECAUTIONS TO PROTECT OUR BODY FROM PATHOGENS?



VACCINES!!

(inactive)

- Injection of a dead virus or viral serum
- Your body produces antibodies, and remembers them (so it can destroy it in future before it has a chance to cause infection/disease in the body)

ANTIBIOTICS:

- **Only attack BACTERIA**, not body cells. (But they also kill good bacteria!)
- Antibiotics **DO NOT FIGHT** VIRUSES.