

1.5 Pathogens and the Spread of Disease

(p. 46-49)

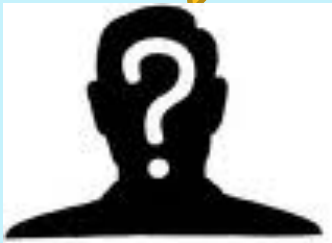


Who are we?

"I like warm, dark and moist places"

"I may be found on a fried breakfast in the form of mushrooms"

"I can cause problems such as athletes foot or thrush"



"I can be friend or foe"

"I can multiply very quickly"

"I can cause stomach aches or food poisoning"

"I don't like Dettol"



"Vaccines make me useless"

"I am the smallest of the three of us"

"I am responsible for HIV and AIDS"



We are microbes!!!!

"I like warm, dark and moist places"

"I may be found on a fried breakfast as mushrooms or in bread as yeast"

"I can cause problems such as athletes foot or thrush"

"I'm a **FUNGUS**"



"I can be friend or foe"

"I can multiply very quickly in warm conditions"

"I can cause stomach aches or food poisoning, I come as salmonella or E.Coli"

"I don't like Dettol (anti bacterial) as this can kill me"

"I'm **BACTERIA**"



"Vaccines make me useless as they can kill me"

"I am the smallest of the three of us"

"I am responsible for HIV and AIDS"

"I'm a **VIRUS**"



Big idea: Basic functions of the immune system

What are infectious diseases and how do they spread?

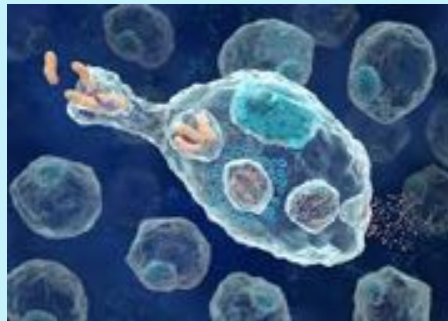
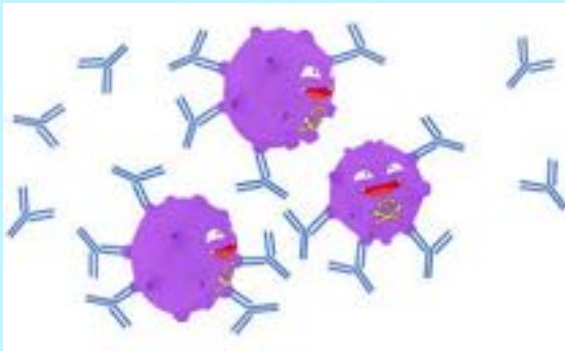


Small group discussion – talking circle on how current virus outbreak is affecting them and how can it be prevented



The Immune System

- Our body possesses the immune system, which helps to protect our bodies.
- We have many layers of defense that protect us from pathogens and infection.



Pathogens

Any agent causing disease.
Usually a living microorganism.
Capable of producing infection.
Poisons like Arsenic would be excluded.

VIRUSES

Multi-celled but can only reproduce inside a plant, animal, or person.

Hepatitis	SARS
Herpes, Mono	AIDS, HIV
Warts	Influenza
Chicken Pox	Cold Sores
Small Pox	Cold Germs
Bird Flu H5N1	Measles
Norovirus	Tetanus
Yellow Fever	Typhoid
Ebola Hemorrhagic Fever	

BACTERIA

Tiny one-celled creatures
Can live inside or outside the body.

Tuberculosis	Pneumonia
Anthrax	Urinary Tract Infection
Staph	Peritonitis
E. Coli	Strep Throat
Typhoid	Stomach Ulcers
Salmonella	Tularemia
Morgellons ?	Lyme Disease

FUNGI

Multi-celled but plant-like similar to tree fungus.
Takes nutrition from a plant, tree, or animal.

Ringworm	Yeast Infection
Adv Pneumonia	Histoplasmosis
Candidiasis	Cryptococcosis

PROTOZOA

One-celled creatures.
Usually spread through water.

Malaria	Giardiasis
Chagas Disease	Cryptosporidiosis

PARASITES

Actual complex living organism.
Can live in intestinal tract or blood stream.

Round Worm	Tape Worm
Morgellons ?	Trichinosis

PROTEIN

Multi-celled but can only reproduce inside a plant, animal, or person.

BSE Mad Cow Disease
vCJD Disease



Diseases can be spread by:

- **Direct contact** - shaking hands, sharing body fluids
- **Indirect contact** - sneezing, coughing
- **Water and Food** - eating foods or drinking water infected with pathogens
- **Animal bites** – being bitten by an animal carrying rabies virus, for example

Fighting Infections

First Line of Defense – Skin and linings of internal organs

- **Skin** – provides a physical barrier
- **Sweat** and **oil** - slightly acidic, preventing some pathogens from growing
- **Gastric** juice - secreted by the lining of the stomach
- **Mucus** and **Cilia** - line the nose preventing pathogens from entering respiratory system

The Safe Sneeze - Mythbusters

<https://www.youtube.com/watch?v=3vw0hls2L>

Eg

“Entry point”	Entry blocked by...
Eyes	Tears, eyelashes
Ears	Ear wax
Nose	Mucus, cilia
Mouth (and stomach)	Gastric juice

First lines of defense

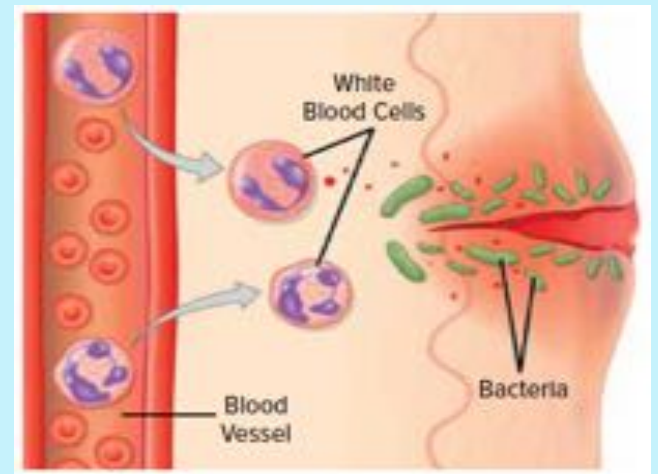


Second and Third Line of Defense

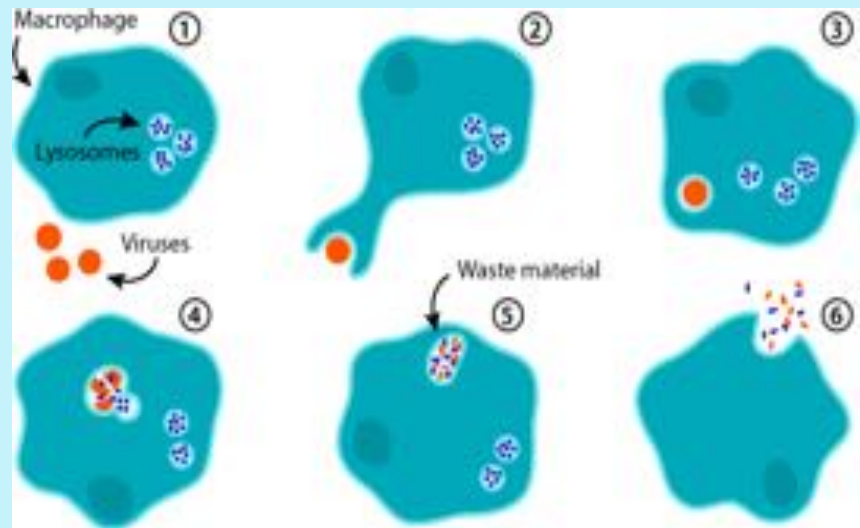
- Once an invader gets into your body, your body will mount an immune response. There are two types of responses:
 - Innate Immune Response
 - Acquired Immune Response

Innate Immune Response (2nd Line)

- general, non-specific (same for any invader)
- Swelling occurs due to **increased** blood flow in the area of infection.
- This is called **inflammation**.
- Fever and redness occurs as well.



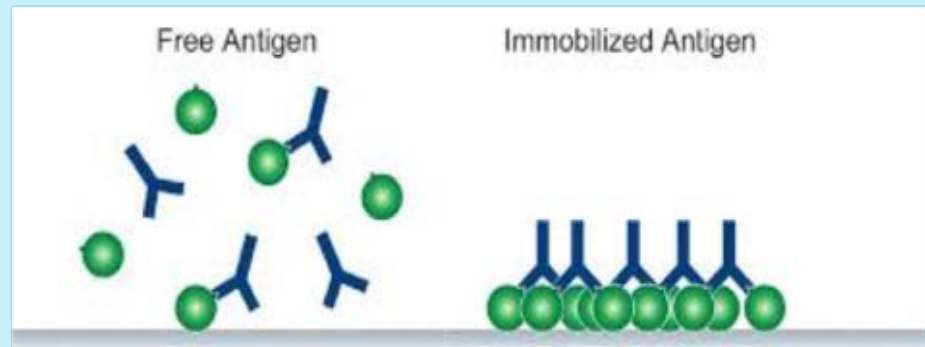
- Increase in blood flow brings more white blood cells (WBCs) to the infected area.
- **Phagocytes** (a type of WBC) swallow whatever is invading the body.



<https://www.youtube.com/watch?v=X-ubClcAh4M>

Acquired Immune Response (3rd Line)

- more **specific** attack on a particular pathogen
- Your body has special white blood cells and **antibodies** that can memorize the specific pathogen by its **antigens**, unique substances on the surface of pathogens and invading cells.
- If your body has seen this pathogen or virus before, it will easily fight it off, essentially giving you **immunity**.



Antibodies

Lymphocytes produce antibodies that are a specific shape to the antigen of the pathogen.

The antibodies stop the pathogen from being able to cause the disease by blocking the antigens (1).

Antibodies also cause pathogens to stick to each other making them easier to engulf (2).

