GET FAMILIAR WITH YOUR IMMUNE SYSTEM

WCT COVID-19 Task Force
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What does the immune system do?

• It defends the body from infections caused by pathogens (bacteria and viruses)

• It is capable of “remembering” some infections you may have contracted previously and can produce antibodies to fight them in case you are exposed to it again

• Immunity can be naturally acquired through previous exposure or acquired through vaccines

• At the moment there is no known vaccine for COVID-19
The Defence System
There Are Three Lines Of Defense

- Skin
- Mucous membranes
- Tears
- Digestive enzymes

Non-Specific Response

Primary

Secondary

Tertiary

Specific Response

Innate Immunity

Acquired Immunity

- Lymphocytes
- Antibodies

- Phagocytic white blood cells
- Antimicrobial proteins
- The inflammatory response
The Defence System

The Innate Immune System: The first line of defense

Physical and chemical barriers that try to keep foreign invaders from getting into the body.

- Physical barriers like ...
  - Skin
  - Tears
  - Earwax
  - Mucus
  - Urine
  - Stomach acid

Bacteria, viruses and fungi are constantly invading.

Sometimes some get around the barriers

Innate immune cells try to do what they can.

They are like the garbage man and target anything foreign.

Sometimes backup is needed.

Cells signal to the adaptive immune system for help!
The Defence System

The Adaptive Immune Response:
Cells that are called in to fight the infection. This response is specific to the type of invader.

Meet the team:
The Special Defense Unit: T cells and B cells

The Helper
Uses chemical signals to call on the B cells and other T cells to help fight the invader.

The B Cell
Creates antibodies that identify foreign invaders that need to be killed.

The Killer
Identifies infected host cells and employs chemical signals to cause them to die and be eliminated from the body.
The Defence System

The Skin!

- Our skin is the body’s first line of defence.
- The skin is like a plastic wrap (several times more effective!) to keep pathogens from getting into our body.
- Glands in the skin also make substances that can kill certain bacteria (anti-bacterial chemicals).
The Defence System

More External Defences

- Our nose, mouth and eyes are the early points of attack
- The mucous membranes which line the mouth, nose, throat, lungs and bowel, act as barriers for germs
- Saliva in the mouth and the tears produced in the eyes have special enzymes which destroy many bacteria and viruses
- By touching your eyes, nose or mouth without washing your hands that may be contaminated, you risk infecting yourself with novel coronavirus
- Wash your hands often for at least 20 seconds with soap and water
- Use tissue to catch your sneeze and dispose of it and wash your hands
The Defence System

Internal Defence System - First Line Of Attack

White Blood Cells:

- Our blood is mainly made up of red blood cells (RBCs) and white blood cells (WBCs). There are several different types of WBCs which work together to seek out and destroy bacteria and viruses. The disease-fighting WBCs are specialists.

Some of the white blood cells are:

- **Neutrophils** which move around the body in the blood and seek out foreign material and bacteria

- **Macrophages** are the biggest blood cells. They clean up other damaged white blood cells, eg. cleaning up pus that forms when neutrophils work to keep a wound clean
Cells of Innate and Acquired Immune Systems

- Mast Cells
- Neutrophils
- Monocytes
- PBMC
- Dendritic Cells
- Macrophages
- Natural Killer Cells
- B Cells with Antibodies
- T Cells
- T Regulatory Cells
- CD3+
- CD4+
- CD8+
THE DEFENCE SYSTEM

INTERNAL DEFENCE SYSTEM - SECOND LINE OF ATTACK

LYMPHOCYTES (Two types)

• **B cells** produce antibodies

• **T cells** hunt down cells that are hiding invaders (pathogens) and kill them
White Blood Cells

NEUTROPHILS

• Attack pathogens by ‘eating’ them
• Release chemicals to recruit other cells to fight off the invading pathogens
• Respond to bacterial infections

LYMPHOCYTES

• Produce antibodies against pathogens
• Influence immunity
• Are known to be particularly responsive to viral infections
Comparing Body’s Defence System to our Defenders

Lymphocytes (B and T cells)
- Special forces soldiers
- (specific targeted response)

Neutrophil
- Street cop
- (rapid response)

Macrophage
- Riot police
- (longer lasting)
People With Weak Immune Systems are More Susceptible to Infections

- Some people are born with a weak immune system
- Those who are diabetic
- Those on oral steroids or other medicines to suppress the immune system
- Patients who have cancer (especially blood cancer)
- Patient who have had recent chemotherapy
- Elderly or Old people
- Those who drink a lot of alcohol
- Those who have HIV or are active TB patients
Factors Affecting the Immune System

If your immune system is weak –

- You catch infections frequently
- Wounds take longer to heal
- You feel tired easily
- Lymph nodes swell up
- It is harder to fight infections

Sometimes the immune system will make mistakes. For eg. allergies are caused by the immune system overreacting to something that is not really a threat.
BOOST YOUR IMMUNE SYSTEM!

- Eat Healthy
- Exercise
- Sleep well
- Stay positive
- Quit smoking
- Limit Alcohol
- Laugh Often