Fighting Diseases

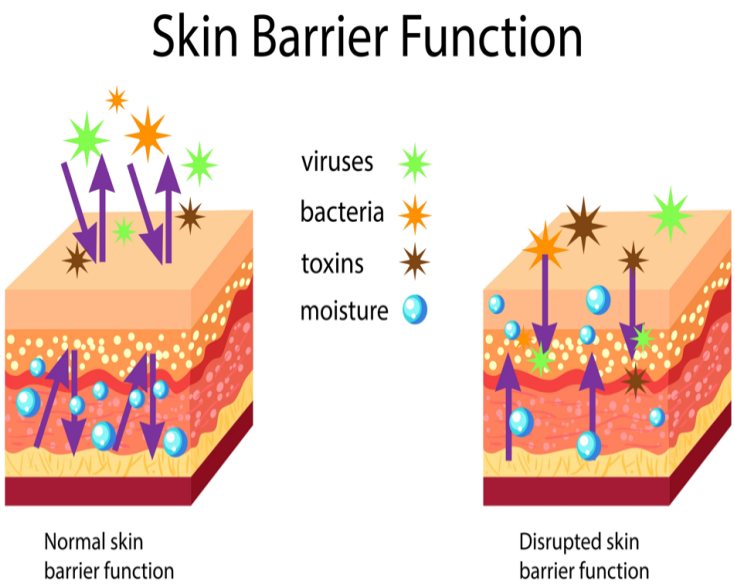
Human defence systems against disease

The body is constantly defending against attacks from pathogens.

- The first line of defence against infection stops the pathogens from entering your body.
- These first lines are general defences, and are not specific to fight against certain types of pathogen. They are called non-specific, and they can be physical or chemical barriers.
- There are some physical and chemical barrier as defence system in human body

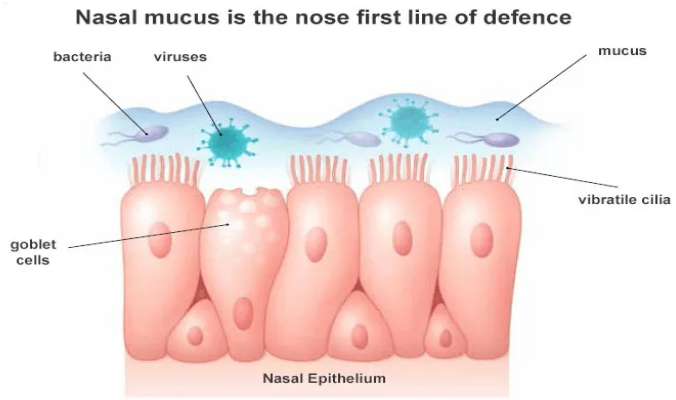
1- Skin

- **It is physical barrier of human body defence system**
- The skin covers almost all parts of your body to prevent infection from pathogens.
- If it is cut immediately begins to heal itself, often by forming a scab, which prevents infection as the skin acts as a physical barrier.
- Parts of the body that do not have skin have developed other ways to prevent infection. For example, the eyes produce tears, which contain enzymes, and these are chemical barriers.



2- Nose

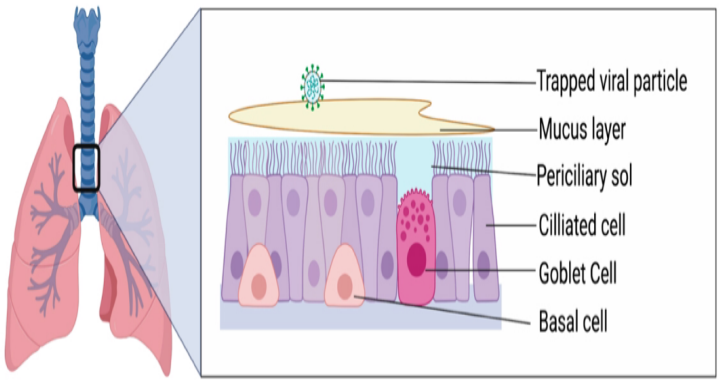
- The nose has internal hairs, which act as a physical barrier to infection.
- Cells in the nose produce mucus. This traps pathogens before they can enter the lungs.
- When the nose is blown, mucus is removed and any pathogens are trapped within it.



Mucus traps noxious substances (viruses, bacteria, dust particles, pollen etc.) on the surface of mucus and vibratile cilia transport the mucus towards the pharynx to get rid of it

3- Trachea and bronchi

- Cilliated cells reduce the amount of mucus and pathogens entering the lungs
- The trachea runs from the nose towards the lungs. The cells that line the trachea also have hairs called cilia, which are much smaller than those in the nose. These are called ciliated cells.
- The ciliated cells waft their hairs and move mucus and pathogens upwards towards the throat where it is swallowed into your stomach. Other cells called goblet cells create the mucus in order to trap pathogens.
- The production of mucus in your airways is a physical barrier.



3- Stomach

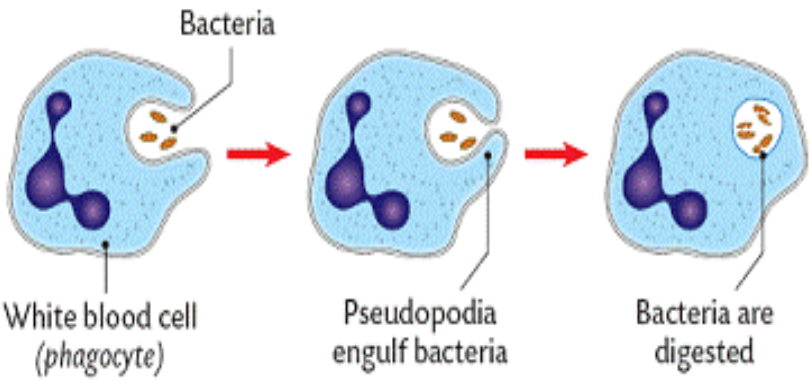
- Stomach acid is a chemical barrier against infection.
- Stomach acid is part of the body's non-specific first line of defence. It produces hydrochloric acid and while it does us no harm.
- it is strong chemical to kill any pathogens that have been caught in mucus in the airways or consumed in food or water.

The immune system of the human body in defence against disease

- If pathogens pass the non-specific first line of defence they will cause an infection.
- However, the body has a second line of defence to stop or minimise this infection. This is called the **immune system.**
- There are two types of white blood cell called **Phagocytosis** and **Lymphocytes**

Phagocytes

- Phagocytes surround any pathogens in the blood and engulf them. They are attracted to pathogens and bind to them.
- The phagocytes membrane surrounds the pathogen and enzymes found inside the cell break down the pathogen in order to destroy it.



Lymphocytes

- Lymphocytes are another type of white blood cell.
- They recognize proteins on the surface of pathogens called **antigens**.
- Lymphocytes detect that these are foreign not naturally occurring within your body and produce antibodies.

- The antibodies cause pathogens to stick together and make it easier for phagocytes to engulf them.
- Some pathogens produce toxins which make you feel ill. Lymphocytes can also produce **antitoxins** to neutralize these toxins.
- Both the antibodies and antitoxins are highly specific to the antigen on the pathogen.