

# Human Defence Systems Key Facts

Body Defence Mechanism	How It Stops Pathogens
Nose	Nasal hair keeps out dust and larger micro organisms. The production of mucus also helps trap pathogens.
Skin	The skin is a complete barrier against pathogens (unless cut) and produces antimicrobial secretions.
Trachea	Produces mucus to catch pathogens and are lined with cilia (hairs).
Bronchi	Produces mucus to catch pathogens and are lined with cilia (hairs).
Stomach	The stomach produces hydrochloric acid to kill any pathogens that may enter the stomach.

## White blood cells defend the body in three different ways:

1. phagocytosis
2. antibodies
3. antitoxins



## Phagocytosis

Phagocytes are a type of white blood cell that engulf pathogens in the following way:

- pathogen is identified and binds to the phagocyte;
- cytoplasm surrounds and engulfs pathogen;
- pathogen is killed and digested;
- indigestible residue is removed.

## Antibodies

- Pathogens contain antigens (unique molecules) on their surface.
- When white blood cells detect these antigens, they produce antibodies (proteins) in response.
- The antibodies lock onto the antigens rendering them useless, whilst other white blood cells now destroy them.
- Antibodies are specific to a particular pathogen .

## Antitoxins

- Bacteria can produce toxins that are harmful to the human body.
- White blood cells detect the toxins and produce antitoxins.
- The antitoxins neutralise the effect of toxins.

## How Do Vaccines Work?

- A small amount of dead or inactive pathogen is injected into the body.
- The pathogen has an antigen on its surface.
- White blood cells detect the antigen as a foreign body.
- White blood cells produce antibodies which lock onto the antigen destroying it.
- Memory white blood cells are produced.
- If the pathogen re-enters the body, the antibodies are mass produced very quickly, preventing re-infection.

