**Activity**

What does a T cell do?

- It can recognize antigens.
- It can divide to create more T cells.
- It can release cytokines.

**Question**

What is an antigen?

An antigen is a substance that triggers an immune response.

**Activity**

Draw your antibody here.

Make an antibody to fit exactly with the antigen on the plate.

- The antibody binds to the antigen.
- The antibody releases enzymes that kill the microbe.
- The antibody punches a hole in the microbe.

**Activity**

- The antibody kills the microbe.
- The antibody marks the microbe for destruction.
- The antibody releases chemicals that attract other immune cells.

**Fact File**

The B cell is a type of white blood cell called a lymphocyte.

- B cells are activated when they detect antigens in the body.
- They produce antibodies that can neutralize the antigen.

**Fact File**

The T cell is a type of white blood cell called a lymphocyte.

- T cells are activated when they detect antigens in the body.
- They help activate other immune cells and kill infected cells.

**Fact File**

Chemicals that kill the virus inside the cell.

- Interferon.
- Cytokines.
- Antibodies.

**Fact File**

Cells that are infected with a virus can produce interferon.

- Interferon prevents new viruses from entering cells.
- It also activates other immune cells.

**Fact File**

Cells that are infected with a virus can produce cytokines.

- Cytokines attract other immune cells.
- They also activate other immune cells.

**Fact File**

Cells that are infected with a virus can produce antibodies.

- Antibodies attach to the virus and mark it for destruction.
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Good And Helpful Bacteria
Not all microbes are bad! Some are very good and can help your super cells become even more super - and keep you healthy!

Here are some ways that microbes can help your immune system:

1. A helpful vaccine version of tetanus (Clostridium tetani) can show B cell Boy its antigens which B cell Boy will use to defeat bad tetanus bacteria

2. Gut bacteria producing helpful vitamins for The great T cells which makes the T cells stronger and able to fight a flu virus

3. Bacteria in the gut can tell macrophages when bad food poisoning bacteria (Escherichia coli) is there so the bad microbe gets eaten

4. Friendly bacteria live on us and when you are a baby they teach the immune system how to behave properly so they can fight off bad bacteria when you're older (e.g. Streptococcus pneumoniae)

Fact File
A neutrophil (said: new-tro-fill) is the most common white blood cell in your blood and is one of the first cells to attack a microbe.

Neutrophils are very good at killing bacteria and parasites but they can't kill viruses because they hide inside living cells. Neutrophils can get into parts of the body that other cells can't so they can fight microbes in hard to reach places.

Neutrophils kill microbes by producing granules which are mixtures of chemicals. And they can also eat some microbes although not as many as a macrophage! Granules can have different effects but a lot of them destroy the outside of the microbe or cause swelling which calls other super cells to come and fight.

Did you know? Pus is mostly made out of dead neutrophils!

Question
What cell is the most common type of white blood cell?

- a) B cell
- b) macrophage
- c) T cell
- d) neutrophil

Activity
Make granules out of play-dough, you can use different combinations of colours to make different granules. How many can you make?
Which of these are vaccines that should be given to all children on the NHS?

- (a) MMR
- (b) Polio
- (c) Tetanus
- (d) Whooping cough
- (e) Flu

Get if you are travelling to a new country and you will need the vaccines that you missed childhood. If you are travelling on holiday to a country where there is a certain disease, you should get the vaccine that is only given to people who need them. You should get the MMR vaccine if you've been in places where measles is common. You should get the polio vaccine if you've been in places where polio is common.

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The Super Cells

How bacteria and your immune system work together to keep you healthy

NAME: