Biology 20

## Unit D: Human body systems

# Defence and blood types

# A bacterial infection

- Skin stops most of the bacteria drawn on the surface.
- A macrophage engulfs the one that crossed, and Y shapes leave the B cell.

## Cells, then the labels on red cells

- Helper T cells activate B cells and killer T cells.
- Antibodies from B cells match a specific antigen.
- ABO and Rh types are antigens on erythrocytes plus antibodies in plasma.

# Key terms

**antibody**

A Y-shaped protein, released by a B cell, that attaches to a matching antigen.

**antigen**

A molecule on a cell surface that antibodies or immune cells can recognize.

**macrophage**

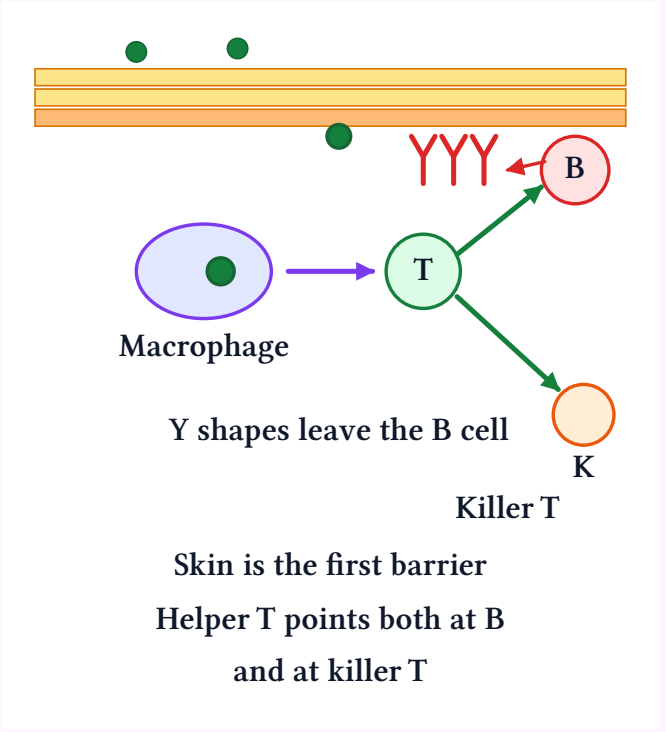
A large white cell that engulfs a pathogen and helps alert helper T cells.

**helper T cell**

A lymphocyte that coordinates the defence by activating B cells and killer T cells.

# Helper and killer T cells

- The macrophage is the cell that engulfs the bacterium.
- The helper T cell points at the B cell and the killer T cell.
- Antibodies are the Y shapes leaving the B cell.



# ABO cards before donation

- Write the antigen that sits on the red cell.
- Write the antibody that sits in that type's plasma.

# Benefits and limits of a technology

- A vaccine builds memory against an antigen.
- An artificial heart supports pumping and brings surgical risk.

# Cells and types

- Order skin, macrophage, helper T, B cell, and killer T.
- Give the antigen and antibody for one ABO type.

# Plasma is cleaned downstream

- The kidney keeps the plasma's water and salts in range.
- The nephron is the next structure.