

Monoclonal antibodies

Monoclonal antibodies are made by white blood cells called **lymphocytes**.

How are monoclonal antibodies made?

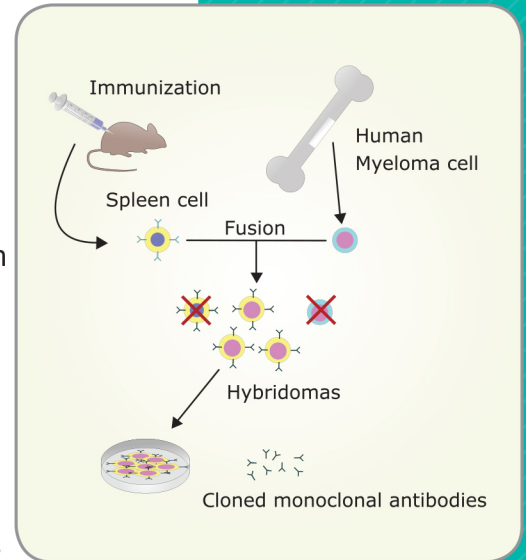
Monoclonal antibodies are made by stimulating mouse lymphocytes.

- 1 The mouse is injected with an **antigen**. An antigen is a foreign substance that triggers an immune response in the body.
- 2 This stimulates one of the mouse lymphocytes to form many **clones** of itself.
- 3 These cloned lymphocytes make antibodies that are **complementary** to the antigen. All of the monoclonal antibodies are identical.
- 4 The lymphocytes are combined with a type of tumour cell to make a **hybridoma** cell.
- 5 Hybridoma cells can divide and make the antibody.

This method can be used to make a large amount of monoclonal antibodies. These antibodies can then be collected and **purified**.

What do monoclonal antibodies bind to?

Monoclonal antibodies have a specific 'Y' shape that binds only to the **binding site** on the antigen. The antigen is usually a **protein**. The shape of the antibody is complementary to the shape of the binding site. This means that the antibodies cannot bind to any other antigen, and can be used to target a particular protein, chemical, or cell in the body.



SNAP IT!

Make a copy of the diagram above, and take a photo to revise from later.

WORK IT!

Explain how monoclonal antibodies can be made to target a particular cell in the body. (4 marks)

An antigen from the cell is injected into a mouse. (1)

Mouse lymphocytes are stimulated to make many monoclonal antibodies that are complementary to the cell's antigen. (1)

The lymphocytes are combined with a tumour cell to make a hybridoma. (1)

The hybridoma makes many monoclonal antibodies that can target the cell. (1)



CHECK IT!

- 1 What type of cell produces antibodies?
- 2 Describe how the monoclonal antibody binds to the antigen.
- 3 Suggest what would happen if monoclonal antibodies from a mouse were injected into a rabbit.