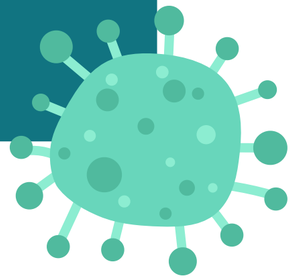
Introduction to the Immune System



Lesson created by Holly Sedgwick, University of Manchester, Olivia Shorthouse, University of Manchester and Rachel Hindmarsh, University of Oxford
as part of the *Thanks for the Memories* Public Engagement Project

Thanks for the Memories

wellcome

NUFFIELD DEPARTMENT of MEDICINE

UNIVERSITY OF OXFORD

MANCHESTER 1824
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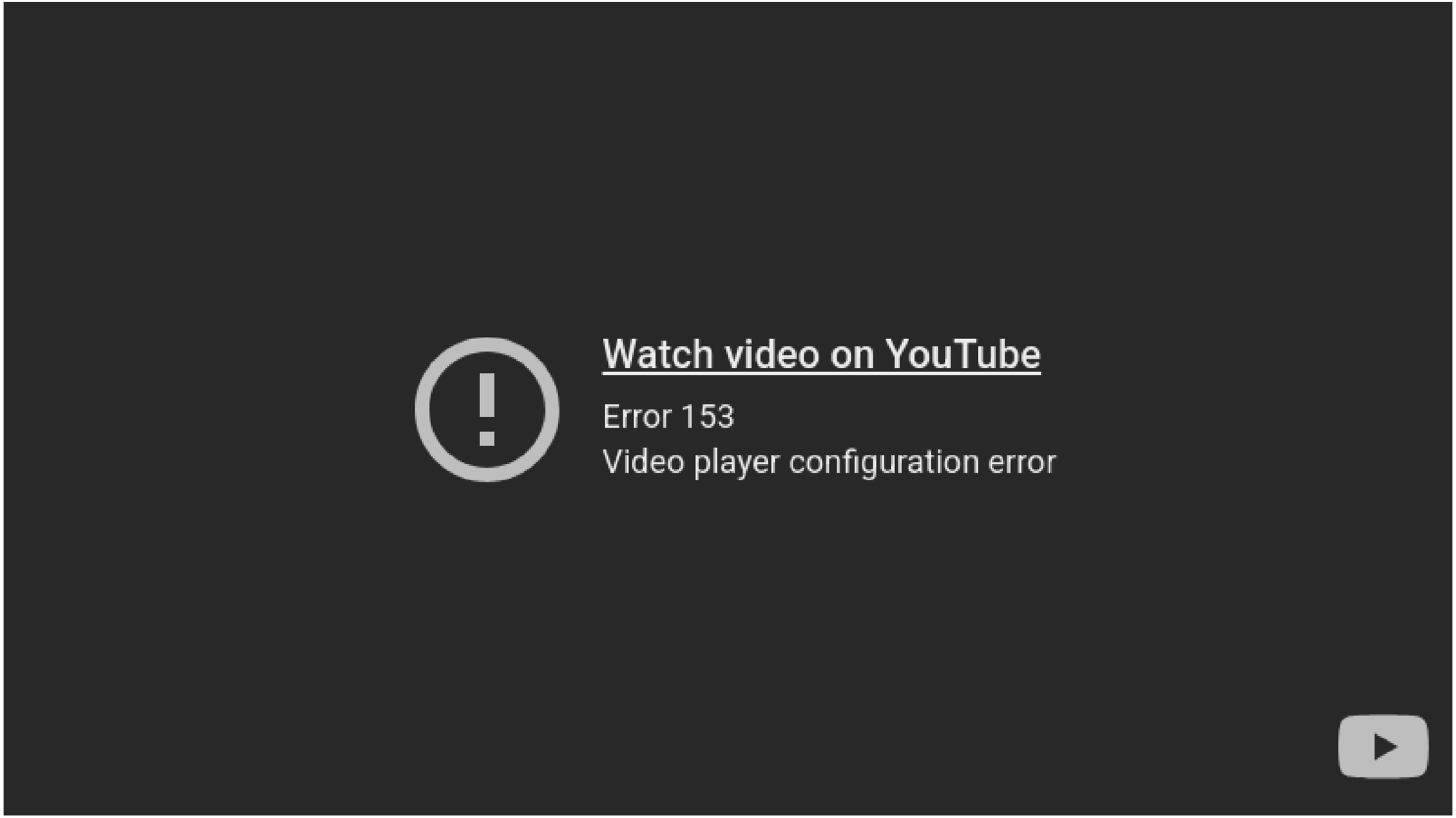
Learning Objectives

1. Describe the role of the immune system in protecting the body
2. Explain how white blood cells recognise and respond to pathogens
3. Understand the basic sequence of events in an immune response

What happens when you catch a cold and what helps you recover?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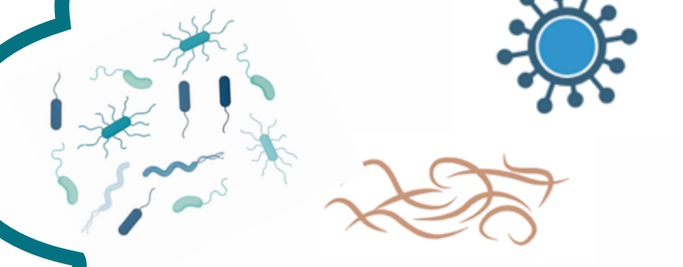
Pathogens



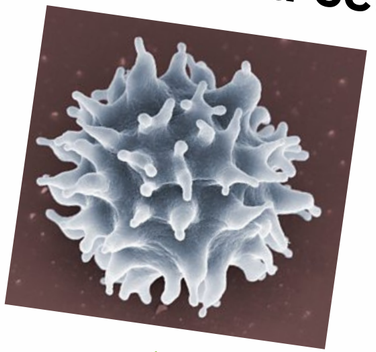
Natural barriers

Mucus

Toxins

Antigens and antibodies

White blood cells



Activity 1: Immune Response

1. Carefully read the cards - each describing a different stage of an infection and immune response

2. Arrange the cards - on your own - into the correct chronological order

3. Explain why you have chosen this order to the person sat next to you

4. Answer the questions on your worksheet about immune response

A	**Antibodies Attach to Pathogens** The antibodies stick to the pathogens, marking them so they can be destroyed.
B	**Phagocytes Engulf and Digest the Pathogen** Some white blood cells, called phagocytes, surround the pathogen and break it down.
C	**Pathogen Enters the Body** A virus or bacterium gets into your body through a cut, your mouth, or your nose.
D	**Pathogens are Destroyed** The antibodies and white blood cells work together to kill the invading microbes.
E	**Pathogen Reproduces and Spreads** The pathogen multiplies quickly, making you feel unwell.
F	**Lymphocytes Produce Antibodies** Other white blood cells, called lymphocytes, make antibodies that are specific to the pathogen.
G	**White Blood Cells Detect the Pathogen** White blood cells recognise the foreign invader in your body.

Answers!

C	**Pathogen Enters the Body** A virus or bacterium gets into your body through a cut, your mouth, or your nose.
E	**Pathogen Reproduces and Spreads** The pathogen multiplies quickly, making you feel unwell.
G	**White Blood Cells Detect the Pathogen** White blood cells recognise the foreign invader in your body.
B	**Phagocytes Engulf and Digest the Pathogen** Some white blood cells, called phagocytes, surround the pathogen and break it down.
F	**Lymphocytes Produce Antibodies** Other white blood cells, called lymphocytes, make antibodies that are specific to the pathogen.
A	**Antibodies Attach to Pathogens** The antibodies stick to the pathogens, marking them so they can be destroyed.
D	**Pathogens are Destroyed** The antibodies and white blood cells work together to kill the invading microbes.

Activity 2: Becoming an Immune Cell

1. Time to put into practice what we have learnt! In groups of 8, assign each person one of the following roles:

Pathogen	**Toxin**	**White Blood Cell (Phagocyte)**	**Antibody**
Antigen	**Mucus**	**White Blood Cell (Lymphocyte)**	**The Host (The Human Body)**

Activity 2: Becoming an Immune Cell

Success criteria

Understanding of Immune Response - Cleary show how the immune system overcomes infection - remember to include correct chronological order from Activity 1

Accuracy of Roles - Each of the 8 different roles must be correctly shown and explained

Creativity and Communication - Make the scene imaginative, engaging, and easy to understand!

Teamwork and Participation - Everyone must take part and contribute equally

Clarity of Scientific Ideas -

1. Focus particularly on how white blood cells behave in immune response
2. Add these must-use words in your scene: pathogen, antigen, antibody, white blood cell

Activity 2: Becoming an Immune Cell

2. Spend 10 minutes in your group designing a scene that demonstrates how the immune system overcomes infection. Make sure your scene can be performed start-to-finish in 2 minutes

Extension:
Create a label on your worksheet with an image and a description of your role

Activity 2: Becoming an Immune Cell

3. Spend 5 minutes rehearsing your performance

Keep the 5 success criteria points in mind!

- ☑ **Understanding of Immune Response**
- ☑ **Accuracy of Roles**
- ☑ **Creativity and Communication**
- ☑ **Teamwork and Participation;**
- ☑ **Clarity of Scientific Ideas**

Activity 2: Becoming an Immune Cell

4. Now each group takes it in turns to perform their scene!

While you’re watching, score each group out of 5 for each success criteria on your worksheet

Quick Quiz!

What is a pathogen?

Quick Quiz!

How do white blood cells recognise pathogens?

Quick Quiz!

What do antibodies do?

Quick Quiz!

Why does your body produce mucus?

Quick Quiz!

Answers!

1. What is a pathogen? A pathogen is a tiny organism, like a virus, bacteria, or fungus, that can enter your body and make you sick.
2. How do white blood cells recognise pathogens? White blood cells spot pathogens by detecting special markers (called antigens) on their surface that don’t belong to your body.
3. What do antibodies do? Antibodies are special proteins made by white blood cells that stick to pathogens, helping to destroy them or stop them from spreading.
4. Why does your body produce mucus? Your body makes mucus to trap dust, dirt, and germs, helping to stop them from getting into your lungs and making you ill.

Reflection

Write 1 thing you have learned today, and 1 question that you still have