**Primary Schools:
Discovering the Immune System**

Approximate timing: 55 minutes

Required resources: PowerPoint presentation, fact sheet, lesson plan, glitter gel, plant mister with water for a mock sneeze (optional), balloons, sticky tape, scissors, different shapes for antigens (slide 13) and antibodies (slide 14) printed out

This lesson will introduce students tothe basic principles of the immune system. Firstly, an activity that shows how easily microorganisms can be transferred to each other through glitter gel handshakes, before an introduction into good & bad microorganisms and what defences our body has against them. Finally, a practical activity that develops students understanding of how antibodies and antigens work, showing how our immune system uses microorganisms to develop an adaptive response.

**This lesson supports:**

*Primary Curriculum – working scientifically*

Pupils should be encouraged to recognise the power of rational explanation and develop a sense of excitement and curiosity about natural phenomena. They should be encouraged to understand how science can be used to explain what is occurring, predict how things will behave, and analyse causes.

*AQA GCSE Biology*
4.3.1.6 Human defence systems
4.3.1.7 Vaccination

*EDEXCEL GCSE Biology*
5.13 Explain the role of the specific immune system of the human body in defence against disease

*OCR GCSE Biology*
B2.1 What are the causes of disease?
B2.2 How do organisms protect themselves against pathogens?

Links to Babraham Institute research themes:

<https://www.babraham.ac.uk/our-research/healthy-ageing>

<https://www.babraham.ac.uk/our-research/lymphocyte>

Links to Babraham Institute scientific services

<https://www.babraham.ac.uk/science-services/flow-cytometry>

Immune cell army - <http://immunearmy.babraham.ac.uk/>

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| **Learning outcomes** |
| All students will: | Be able to explain how infections can spread |
| Most students will: | Describe ways that our immune system defends us from illness |
| Some students will: | Explain how antibodies recognise antigens or invaders |
| Key word/s | Antibodies, immune system, infections, bacteria, viruses |

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| **Teaching notes** | **Student learning activities**  |
| **Starter or ice-breaker activity** (10 mins)Glitter gel bacteria: Tell the students we’re going to discover how easily microorganisms can be transferred between people. | Slide 21. Put a small amount of glitter gel on the first pupil’s hand and see how many people it can be transferred to by handshakes. This shows how microorganisms can be easily transferred around – emphasise how hand washing is good! |
| **Development** (15 mins) Go over slide content – refer to slide notes & fact sheet for background information | Slides 3 - 10Tips for running presentation:* Present the slides as questions
* Ask the students for their ideas before you give explanations
* Suggest students discuss some questions in groups rather than individually
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| **Principal Activity** (25 mins)Balloon microorganismsPrint and cut out shapes from slides 13 and 14Give a very basic and brief overview of immune system, initially mentioning barriers such as the skin and physical defences such as saliva, tears, stomach acidTalk about the immune system army, with many ‘cells’ that have different jobs to protect us such as cells that fight against bad microorganisms, each with different jobs:Dendritic cell – collect parts of micro-organisms and show them to T cells and B cells. T cells – co-ordinate the attack on the microorganisms – asking B-cells to make signposts called antibodies to direct macrophages to ‘eat’ them, so eliminating the ‘bad’ micro-organisms from the body.  | Slides 11 - 14Students to make balloon microorganisms.Each student should cut out 4 coloured shapes representing antigens from slide 13 and stick them on to an inflated balloon.Students then swap balloons (spreading the microorganisms). Students stick on antibodies (Y shapes on slide 14) to match the antigens on the microorganism they haveStudents stick the antibodies on to the antigens on their microorganism and take it to an adult who will be acting as a macrophage by killing the labelled microorganisms (popping the balloons) |
| **Summary (5 mins)**Ask students what they have learned during lesson & what they should remember to keep them more healthy | Slide 15Students answer questions on summary slide 15 to assess learning. |
| **Homework**Suggested area of research or follow-up activity – use resources on website for reference | WMD colouring sheetVDJ Game (online / brochure)WMD Video on Immune Army websiteImmune cells guide |