1.18 Human Defences, Vaccination and Drug Development: 10-minute Pack

AQA 8464 · Calculator allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 The human body has several physical and chemical defences that stop pathogens entering the body, before the immune system needs to respond. State the function of each of the following defences against pathogens: (i) the skin (ii) stomach acid (iii) mucus produced in the airways.

(Total for Question 1 is 3 marks)

2 White blood cells are central to the body's specific immune response against pathogens. Describe the different roles of phagocytes and lymphocytes in defending the body against pathogens.

(Total for Question 2 is 3 marks)

3 Vaccination programmes aim to protect not just the people who are vaccinated, but also the wider population. Explain what is meant by the term 'herd immunity', and explain why it protects people who cannot be vaccinated.

(Total for Question 3 is 3 marks)

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Mark scheme · 1.18 Human Defences, Vaccination and Drug Development: 10-minute Pack

Question 1

skin - acts as a physical barrier to pathogens (and produces sebum, an antimicrobial oil, on its surface) (oe; either point) **B1**

stomach acid - kills most pathogens/bacteria that are swallowed with food or drink (oe) **B1**

mucus (produced in the airways/nose) - traps pathogens (and dust/particles) before they can reach the lungs (oe) **B1**

Answer: Skin: physical barrier that also produces antimicrobial sebum. Stomach acid: kills swallowed pathogens. Mucus in the airways: traps pathogens before they reach the lungs.

Question 2

phagocytes are white blood cells that engulf and digest pathogens (phagocytosis) (oe) **B1**

lymphocytes are white blood cells that produce antibodies specific to a particular antigen on a pathogen (oe) **B1**

lymphocytes can also produce antitoxins, which neutralise toxins produced by some pathogens (oe) **B1**

Answer: Phagocytes engulf and digest pathogens; lymphocytes produce antibodies (and antitoxins) specific to a particular pathogen.

Question 3

herd immunity is when a large enough proportion of a population is immune to (e.g. vaccinated against) a disease that the disease cannot spread easily through the population (oe) **B1**

this means people who are not vaccinated (e.g. babies, or people who cannot be vaccinated for medical reasons) are much less likely to come into contact with an infected person (oe) **B1**

so they are indirectly protected from catching the disease, even though they are not immune themselves (oe) **B1**

Answer: Herd immunity is when enough of a population is vaccinated/immune that a disease cannot spread easily; this indirectly protects unvaccinated individuals because they are much less likely to encounter an infected person.

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