**Review Worksheet ANSWERS: Intro to Immune System, External Defences**

1: What is a pathogen? List categories of pathogens.

*A pathogen is something that causes disease (1). Examples are some types of bacteria (0.5), viruses (0.5), parasites, protozoa and fungi.*

2: Are all infectious diseases contagious/communicable? Explain your answer.

(3 marks)

*Not all infectious diseases are contagious/communicable. (1) For example, a skin wound can become infected with bacteria, but it can’t be passed on to someone else.(1) It is infectious, but not communicable. (1)*

3: What is the name given to harmless bacteria that naturally exist on or in the body?

(1 mark)

*Commensal bacteria (1).*

4: Which bacterium causes a fatal respiratory disease in babies?

(1 mark)

*Bordetella pertussis (0.5) which causes Whooping Cough.(0.5)*

5: What shape are the following bacterial types?

(1 mark)  
  
 Cocci: *Spherical (0.5)*

Bacilli: *Rod shaped (0.5)*

6: How do viruses differ from cellular organisms?\*

(2 marks)

*Viruses are not cells (0.5). They are DNA or RNA (0.5) in a protein coat (0.5). Technically viruses are not living. They cannot reproduce by themselves (0.5) – they need to invade body cells and use the organelles of the body cell to reproduce.*

7: List two viral diseases that are now extremely rare due to vaccination.

(1 marks)

*Any two of: Polio (0.5), Measles (0.5), Mumps (0.5)*

8: How do viruses replicate?

(4 marks)

*1: Attach to outside of host cell.*

*2: Viral DNA/RNA enters cell*

*3: Viral DNA/RNA becomes incorporated into the cell’s DNA/RNA*

*4: Host cell’s organelles manufacture copies of the virus in response to the DNA/RNA instructions.*

9: Not all viruses are pathogenic. What is one helpful use for viruses in human health?\*

(1 mark)

*Viruses can be used as vectors in biotechnology (0.5) for example to carry genes into human cells during gene therapy. (0.5)*

10: Define each of the following forms of disease transmission and give an example of a disease that is transmitted in this way:

(10 marks)

|  |  |  |
| --- | --- | --- |
| **Mode of Transmission** | **Definition** | **Disease** |
| Contact | *The disease is caught by touching the affected person (0.5), or touching something they have touched. (0.5)* | *Eg: common cold virus can be picked up when using a phone that has cold virus particles on it. (1)* |
| Transfer of body fluids | *The affected person’s body fluids (0.5) come into contact with the blood or mucous membranes of another person. (0.5)* | *Eg: cold sores (0.5) are transmitted via saliva.(0.5)* |
| Droplet/airborne/aerosol infection | *Pathogens in droplets of mucous (0.5) become airborne during sneezing or coughing (0.5) and are breathed in by people nearby. (0.5)* | *Eg: the common cold or COVID-19 (0.5)* |
| Ingestion | *Pathogens enter the body by being ingested (0.5) in food or drink (0.5)* | *Eg: Salmonella (1)* |
| Vector Transmission | *Pathogens are transmitted using another organism (0.5) as a carrier (0.5).* | *Eg: Malaria (0.5)is transmitted by the Anopheles mosquito (0.5)* |

11: List external defences against disease, and how each prevents disease entry:

(7 marks)

*Skin (0.5): Impermeable barrier prevents pathogen entry (0.5)*

*Mucous Membranes (0.5): Secrete mucus that interferes with pathogen entry (0.5)*

*Hairs at entrance to mucous membranes (0.5): Trap pathogens (0.5)*

*Cilia (0.5) lining trachea and bronchi (0.5): trap pathogens and waft mucus back towards mouth(0.5)*

*Acids (0.5) eg stomach acid (0.5): kill bacteria and other microorganisms (0.5)*

*Lysozyme (0.5), an enzyme that kills bacteria (0.5): contained in tears, saliva, sweat, earwax and other secretions (0.5)*

*Flushing action of body fluids (0.5): eg urine washes pathogens out of lower urinary tract (0.5)*

12: List protective reflexes and how each expels pathogens:  
(4 marks)

*Sneezing (0.5) – explosively expels pathogens and mucus from pharynx, via the mouth. (0.5)*

*Coughing (0.5) – explosively expels pathogens and mucus from upper respiratory tract (0.5)*

*Vomiting (0.5) – contractions of abdominal muscles and diaphragm expel pathogens from stomach (0.5)*

*Diarrhoea (0.5) – fluid accumulation and explosive contractions of intestinal wall expels pathogens (0.5)*

13: Discuss equipment and behaviours that would help minimise the spread of a respiratory illness:

(5 marks)

*Spread of respiratory illness can be minimised by the following equipment and behaviours:*

* *Good hygiene eg washing hands (0.5)*
  + *Before and after eating (0.5)*
  + *After using toilet (0.5)*
  + *After touching face (0.5)*
  + *After blowing nose (0.5)*
  + *After sneezing or coughing (0.5)*
  + *After removing mask (0.5)*
* *Regular cleaning of surfaces (0.5)*
* *Wearing a mask when unwell (or as part of pandemic advice) (0.5)*
* *Not sharing food or drink items (0.5)*
* *Sneezing or coughing into elbow (0.5)*



14: Describe in detail how the interactions between the hypothalamus and the anterior and posterior pituitary so that hormones can be released into the systemic circulation.

(8 marks)

*Hypothalamus and Anterior Pituitary:*

*The hypothalamus (0.5) produces Releasing Factors (0.5)*

*Releasing Factors travel through the blood vessels (0.5) of the infundibulum (0.5) to the anterior pituitary (0.5)*

*Releasing Factors stimulate the Anterior Pituitary to produce hormones (0.5) that are released into the systemic circulation (0.5)*

*Hypothalamus and Posterior Pituitary*

*Neurons (0.5) in the hypothalamus (0.5) produce hormones (0.5) which travel via axon extensions (0.5) through the infundibulum (0.5) to the posterior pituitary (0.5) where they are stored in the axon terminals (0.5) and released by nerve impulses (0.5) into the systemic circulation (0.5)*