**Review Worksheet ANSWERS: Types of Immunity**

1: Explain what is meant by the term “active immunity” and outline how the process of active immunity occurs in the body.

(4 marks)

*Active immunity is the immunity that the body develops after an antigen is recognised by the immune system (1), and antibody mediated immunity and cell mediated immunity processes occur (1). The antigen is recognised by lymphocytes (0.5), that then produce antibody to remove pathogens in body fluids (0.5), cytotoxic T-cells to remove pathogens that have damaged cells (0.5) and memory cells so the process occurs more quickly after a second encounter with the same pathogen (0.5).*

2: Explain what is meant by the term “passive immunity” and describe how this occurs.

(5 marks)

*Passive occurs when the body gets “ready-made” antibody from another source (0.5). For example, a mother uses active immunity to develop antibody against disease (0.5) , and this antibody (0.5) transfers to her baby (0.5) via breastmilk (0.5). The baby is temporarily (0.5) immune (0.5) because of the antibody (0.5), but the baby’s immune system has not encountered the antigen (0.5), so does not develop active or long-term immunity (0.5)*

3: Explain the difference between Natural and Artificial Immunity.

(3 marks)

*Natural immunity occurs due to natural processes (0.5) such as exposure to disease (0.5), or antibody transfer in breastmilk (0.5) . Artificial immunity occurs due to human intervention (0.5), such as vaccines (0.5) or antivenom (0.5).*

4: For each of the following, circle two options to show what type of immunity is being described.

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| Rebecca sneezes on Jenna and Jenna gets infected with the measles virus. Jenna’s APC encounter the measles virus and present the measles antigen to the lymphocytes, which go through the process of antibody-mediated and cell-mediated immunity to eliminate the measles virus. | Active  Passive  Artificial  Natural |
| Years later, Jenna gets infected with measles again. Memory cells produced the first time she got infected respond quickly and proliferate to produce antibody and killer T-cells. The virus is eliminated before symptoms develop | Active  Passive  Artificial  Natural |
| Ms Byrne gets bitten by a bat which is thought to be carrying a rabies-like virus. She goes to the hospital and receives an infusion of rabies antibody. It binds to the rabies virus and eliminates it. | Active  Passive  Artificial  Natural |
| Doug gets his tetanus toxoid vaccine at the medical practice. It contains a modified version of the tetanus toxin that can’t damage cells but still has the antigenic site present. Doug’s APC phagocytose the toxoid, and present the antigen to the lymphocytes, which trigger antibody-mediated and cell-mediated immunity to destroy the toxoid, and produce memory cells so that the process can occur more quickly in future | Active  Passive  Artificial  Natural |
| Darren has never been vaccinated against tetanus. He steps on a rusty nail and starts to develop neurological symptoms as a result of the tetanus toxin. He goes to hospital and is given an infusion of tetanus antitoxin, containing antibodies for the toxin, which bind and eliminate it. | Active  Passive  Artificial  Natural |
| Sarah is immune to measles. Measles antibody travels via her breastmilk to her baby. The baby is exposed to measles virus and the antibody from the breastmilk neutralises the virus before it can make the baby sick. | Active  Passive  Artificial  Natural |

5: Someone is bitten by a snake, receives antivenom, and recovers in hospital. Explain why they aren’t protected from further bites by the same type of snake:

(4 marks)

*Antivenom provides passive immunity (0.5). It contains antibodies (0.5) that will bind to the snake venom (0.5), neutralising it so that it can’t cause damage (0.5). It does not contain venom, or the antigenic site for the venom (0.5), so active immunity is not triggered (0.5). The body doesn’t make its own antibody to clear the venom (0.5), or create memory cells (0.5) in case the venom is encountered again.*

6: List and describe the functions of the cerebrospinal fluid

(4 marks)

*Protection (0.5) CSF acts as a shock absorber (0.5) for force injuries to the skull. The blood-brain barrier is tight (0.5), so pathogens can’t enter the CSF easily (0.5).*

*Support (0.5) CSF supports the brain within the skull (0.5), so that it doesn’t compress or become damaged against the inside of the skull. (0.5)*

*Transport (0.5) CSF transports gases, nutrients and wastes (0.5) to and from the brain and spinal cord. (0.5)*