Human Biology 3A/B Medical Technology Assignment Validation

Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Mark /38

1. An important research programme is under way. It hopes to develop technologies that restore the function of diseased and damaged organs and tissues like bone, cartilage, blood vessels and pancreas. Several scientific disciplines converge in this research: biologists, chemists, nanotechnologists and engineers all work together. The research is directed towards speeding up patient recovery.

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| The hope is to use innovative methods to stimulate the body to generate new tissue by itself, exactly where needed. An example is growing a substantial mass tissue with cells that belong to the patient himself. First, the tissue will grow on a biodegradable material that is placed in the body. This so-called scaffold gradually ‘melts away’ during the healing process. An example of this might be to stimulate the individual's own cells to form bone on a ceramic template at the site of a non-healing fracture.   1. What is this technology called?   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  (1 mark)   1. Give two advantages of this technology?   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ |

(2 marks)

2. During bypass surgeries, doctors graft veins or arteries from other parts of the patient’s body to replace blocked sections of important arteries, such as the coronary artery. The donor vessels often come from the leg or the wall of the inner chest.

1. Why would the tissue being grafted be taken from the patient’s own body?

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(2 mark)

1. What is the name for this type of tissue graft?

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(1 mark)

3. a. What is meant by Pharmaceutical treatments?

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(1 mark)

b. A man is suffering from a disorder where certain neurons in a part of the brain called the substantia nigra die. Normally, these cells produce dopamine.

What disorder has this man got?

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(1 mark)

1. What are the symptoms of this disorder?

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(2marks)

1. What are the possible pharmaceutical treatments for this disorder?

(2 marks)

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4. One group of man-made drugs closely resemble cortisol, a hormone that your adrenal cortex produces naturally .

a. What do we call this group of drugs?

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(1 mark)

b. What disorders can this group of drugs be used to treat?

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(1 mark)

5. Trini has had a kidney transplant.

a. When would it be appropriate for someone to have an organ transplant?

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(1 mark)

b. What type of testing would be given to Trini before the transplant?

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(1 mark)

c. Why might immunosuppressant drugs be given to Trini?

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(3 marks)

6. John is 60 years old postman. He is experiencing knee pain due to degeneration of joint cartilage and the underlying bone.

a. What disorder is John suffering from?

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(1 mark)

b. What dietary changes could John make to help manage this problem?

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1. marks)

c. If further degeneration of the knee joint occurs, what other options may be available to John to help relieve the pain and lack of mobility caused by this disorder?

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(4 mark)

7. One disease seen in older people is characterized by a build-up of protein [**Plaques**](http://alzheimers.about.com/od/glossary/g/plaques.htm) in the brain. These [**Plaques**](http://alzheimers.about.com/od/glossary/g/plaques.htm) are deposits of the protein [*beta-amyloid*](http://alzheimers.about.com/od/glossary/g/betaamyloid.htm) that accumulate in the spaces between nerve cells Scientists are still studying how plaques are related to the disease. One theory is that they block nerve cells’ ability to communicate with each other, making it difficult for the cells to survive.

a. What disease is this?

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(1 mark)

b. What are some of its symptoms?

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1. mark)

8. An 80-year-old woman has had no major medical problems, but she has never been physically active for most of her life. One day she falls out of bed and immediately notes a sharp pain in her left hip. She is subsequently unable to walk without severe pain. Radiographs show ;a fracture of the left femur.

a. Give four reasons disclosed in the question that could have led to the woman being more susceptible to this fracture?

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1. marks)

b. The woman in the question has a 12 year old granddaughter. What advice might the woman give to the granddaughter to help the granddaughter reduce her chances of having the same problem of easily breaking leg bones when the granddaughter reaches 80 years of age?

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(4 marks)