**Review Worksheet ANSWERS: Growth Hormone and Adrenal Hormones**

1: Growth Hormone affects a variety of body tissues. How does it cause its effect on target cells?\*

(6 marks)

*Growth hormone is a protein/peptide/amine hormone (1). It is not water soluble so cannot pass through the lipid membrane surrounding target cells (1). It binds to a specific (1) receptor on the cell surface (1). This triggers the release of a second messenger (1) within the cell, which then changes the type, activity or quantity of proteins produced by the cell. (1)*

2: List six effects on the body of Growth Hormone.

(3 marks)

*Growth hormone increases*

*Height in children and adolescents (0.5)*

*Protein Synthesis (0.5)*

*Fat metabolism (0.5)*

*Muscle Mass (0.5)*

*Bone mineralisation and density (0.5)*

*Growth of internal organs (0.5)*

3: What are the stimuli for Growth Hormone release? Where are they detected, and what is the response?

(9 marks)

*The stimuli for Growth Hormone release include*

*Sex hormone interactions in puberty (0.5)*

*Action of some neurotransmitters (0.5)*

*Deep sleep (0.5)*

*Good nutrition (0.5)*

*Exercise (0.5)*

*These are detected by the hypothalamus (1) which releases Growth Hormone Releasing Factor (GHRF) (1) into the blood vessels of the infundibulum (1) where it travels to the anterior pituitary (1). This stimulates the anterior pituitary to release Growth Hormone (1) into the systemic circulation (1) where it travels to the target cells.(0.5)*

4: What is somatostatin, and what causes it to be released?

(6 marks)

*Somatostatin is an inhibitory hormone (0.5) produced by the hypothalamus (0.5). It is part of the negative feedback (1) mechanism in Growth Hormone regulation. Rising levels of Growth Hormone in the blood (0.5), rising levels of fatty acids (0.5), glucose uptake by muscle (0.5) and low amino acid levels (0.5) are detected by the hypothalamus (1) and somatostatin is produced to inhibit further Growth Hormone release (1)*

5: a) What aspects of physical appearance would make you suspect that a child had Gigantism?

(2 marks)

*Greater than normal height (0.5)*

*Larger than proportion hands and feet (0.5)*

*Prominent jaw and forehead (0.5)*

*Coarse facial features (0.5)*

b) What causes the condition and how could it be treated?

(4 marks)

*Gigantism is most commonly caused by benign tumours (0.5) on the pituitary gland (0.5) causing hypersecretion of growth hormone (1). Gigantism can be treated by:*

*Targeted radiation therapy to shrink tumours (0.5)*

*Microsurgery to remove tumours (0.5)*

*Somatostatin medication (0.5) to inhibit GH release (0.5)*

6: How would suspected Growth Hormone Deficiency be diagnosed in an adult?

(1 mark)

*A blood test would be taken (0.5) to look for abnormally low GH levels (0.5).*