**Review Worksheet ANSWERS: Adrenal Hormones**

1: Where are the adrenal glands located?

(1 mark)

*Just above the kidneys*

2: Give two examples of catecholamines and state where are they produced.

(2 marks)

*Catecholamines are produced in the adrenal medulla (0.5), glands that lie above each kidney (0.5). Examples include adrenalin (epinephrine)(0.5) and noradrenalin (norepinephrine) (0.5)*

3: Fill in the blanks:

(7 marks)

*Aldosterone*  is a mineralocorticoid. It is produced by the adrenal *cortex*

and has a role in maintaining *salt*  and *water* levels in the body. It acts on the *collecting ducts* in the kidney causing increased *sodium ion* and *water* absorption and *potassium* secretion.

Cortisol is a *glucocorticoid*, produced by the adrenal *cortex*. It has a role in response to *stress, illness* and *metabolism.*

4: a) What is the stimulus for aldosterone release from the adrenal cortex?

(1 mark)

*Rising blood K+ levels and falling Na+ levels.*

b) What is the target organ for aldosterone, and what is its response?

(3 marks)

*The kidneys are the target organ of aldosterone (1), and the response is for the collecting ducts (1) to reabsorb sodium ion and water (1) and secrete potassium ion.*

c) What would you expect to happen to the production of aldosterone once the Na+/K+ levels in the blood normalise?

(1 mark)

*The production of aldosterone would decrease (1) due to negative feedback (1).*

5: Draw a flow diagram showing the regulation of cortisol including its effects on the target tissues.

(8 marks)

Should include:

*Hypothalamus detects high levels of stress, low blood glucose (0.5)*

*Hypothalamus releases CRF in response (0.5)*

*CRF travels through blood vessels of infundibulum (0.5)*

*CRF stimulates anterior pituitary (0.5)*

*Anterior pituitary releases ACTH (0.5)*

*ACTH travels through systemic circulation (0.5)*

*ACTH binds to receptors on the cells of the Adrenal Cortex (0.5)*

*The Adrenal Cortex produces Cortisol (0.5)*

*Cortisol travels through the systemic circulation (0.5)*

*Cortisol targets body tissues (0.5)*

*Body tissues*

*Increase fat (0.5)and protein breakdown (0.5)*

*Increase blood glucose (0.5)*

*Produce potent anti-inflammatory effects (0.5)*

*Rising levels of Cortisol inhibit further production of CRH and ACTH (0.5)*

*By Negative Feedback (0.5)*

6: Catecholamines such as adrenalin are released from the adrenal medulla when threat is detected by the brain. Describe the pathway and type of messages between the hypothalamus and adrenal medulla that result in catecholamine release.

(1 mark)

*After threat is detected by the brain, the hypothalamus sends nerve signals to the spinal cord (0.5), which then sends them on to the adrenal medulla (0.5).*

7: How does the body respond to catecholamine release from the adrenal cortex?

(3 marks)

*Increased heart rate (0.5) and blood pressure (0.5) Dilation of bronchioles (0.5), conversion of glycogen to glucose (0.5) by the liver (0.5), decreased digestive system activity. (0.5)*

8: Describe how the body changes that occur due to catecholamine release would assist in the fight or flight response\*. (5 marks)

*Increase in heart rate, blood pressure and dilation of bronchioles allow increased oxygenation of tissues (1). Increased conversion of glycogen to glucose makes more glucose available to cells for cellular respiration (1). These, along with decreased digestive system activity (1) allows oxygen and glucose to be selectively used by muscles (1) to successfully fight or run away (1).*