**6.5 Nerves**

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|  | **Assessment statement** | **Teacher’s notes** |
| 6.5.1 | State that the nervous system consists of the central nervous system (CNS) and peripheral nerves, and is composed of cells called neurons that can carry rapid electrical impulses. | No other structural or functional divisions of the nervous system are required. |
| 6.5.2 | Draw and label a diagram of the structure of a motor neuron. | Include dendrites, cell body with nucleus, axon, myelin sheath, nodes of Ranvier and motor end plates. |
| 6.5.3 | State that nerve impulses are conducted from receptors to the CNS by sensory neurons, within the CNS by relay neurons, and from the CNS to effectors by motor neurons. |  |
| 6.5.4 | Define *resting potential* and *action potential* (depolarization and repolarization). |  |
| 6.5.5 | Explain how a nerve impulse passes along a non-myelinated neuron. | Include the movement of Na+and K+ions to create a resting potential and an action potential. |
| 6.5.6 | Explain the principles of synaptic transmission. | Include the release, diffusion and binding of the neurotransmitter, initiation of an action potential in the post-synaptic membrane, and subsequent removal of the neurotransmitter. |

**6.5 continued: Hormones and Homeostasis**

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|  | **Assessment statement** | | | | **Teacher’s notes** |
| 6.5.7 | State that the endocrine system consists of glands that release hormones that are transported in the blood. | | | | The nature and action of hormones or direct comparisons between nerve and endocrine systems are not required. |
| 6.5.8 | State that homeostasis involves maintaining the internal environment between limits, including blood pH, carbon dioxide concentration, blood glucose concentration, body temperature and water balance. | | | | The internal environment consists of blood and tissue fluid. |
| 6.5.9 | Explain that homeostasis involves monitoring levels of variables and correcting changes in levels by negative feedback mechanisms. | | | |  |
| 6.5.10 | Explain the control of body temperature, including the transfer of heat in blood, and the roles of the hypothalamus, sweat glands, skin arterioles and shivering. | | | |  |
| 6.5.11 | Explain the control of blood glucose concentration, including the roles of glucagon, insulin and α and β cells in the pancreatic islets. | | | | The effects of adrenaline are not required here. |
| 6.5.12 | Distinguish between type I and type II diabetes. |  |  |  | **Aim 8:**Diabetes is having an increasing effect on human societies around the world, including personal suffering due to ill health from the diabetes directly but also from side-effects such as kidney failure. There are economic consequences relating to the health-care costs of treating diabetics.  **TOK:**The causes of the variation in rates of type II diabetes in different human populations could be analysed. Rates can be particularly high when individuals consume a diet very different to the traditional one of their ancestors, for example, when having migrated to a new country. There are genetic differences in our capacity to cope with high levels of refined sugar and fat in the diet. Humans also vary considerably in how prone they are to become obese. |

**H1 Hormonal control**

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|  | **Assessment statement** | **Teacher’s notes** |
| H.1.1 | State that hormones are chemical messengers secreted by endocrine glands into the blood and transported to specific target cells. |  |
| H.1.2 | State that hormones can be steroids, proteins and tyrosine derivatives, with one example of each. |  |
| H.1.3 | Distinguish between the mode of action of *steroid* hormones and *protein* hormones. | Steroid hormones enter cells and interact with genes directly. Protein hormones bind to receptors in the membrane, which causes the release of a secondary messenger inside the cell. |
| H.1.4 | Outline the relationship between the hypothalamus and the pituitary gland. | Include the portal vein connecting the hypothalamus and the anterior pituitary gland, and the neurosecretory cells connecting the hypothalamus and the posterior pituitary gland. |
| H.1.5 | Explain the control of ADH (vasopressin) secretion by negative feedback. | Include neurosecretory cells in the hypothalamus, transport of ADH to the posterior pituitary gland for storage, and release under stimulus by osmoreceptors in the hypothalamus. |

**11.3 The kidney**

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|  | **Assessment statement** | **Teacher’s notes** |
| 11.3.1 | Define *excretion*. | Excretion is the removal from the body of the waste |
|  |  | products of metabolic pathways. |
| 11.3.2 | Draw and label a diagram of the | Include the cortex, medulla, pelvis, ureter and renal |
|  | kidney. | blood vessels. |
| 11.3.3 | Annotate a diagram of a glomerulus |  |
|  | and associated nephron to show the |  |
|  | function of each part. |  |
| 11.3.4 | Explain the process of ultrafiltration, |  |
|  | including blood pressure, fenestrated |  |
|  | blood capillaries and basement |  |
|  | membrane. |  |
| 11.3.5 | Define *osmoregulation*. | Osmoregulation is the control of the water balance of the blood, tissue or cytoplasm of a living organism. |
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|  | **Assessment statement** | **Teacher’s notes** |
| 11.3.6 | Explain the reabsorption of glucose, water and salts in the proximal convoluted tubule, including the roles of microvilli, osmosis and active transport. |  |
| 11.3.7 | Explain the roles of the loop of Henle, medulla, collecting duct and ADH (vasopressin) in maintaining the water balance of the blood. | Details of the control of ADH secretion are only required in option H (see H.1.5). |
| 11.3.8 | Explain the differences in the concentration of proteins, glucose and urea between blood plasma, glomerular filtrate and urine. |  |
| 11.3.9 | Explain the presence of glucose in the urine of untreated diabetic patients. |  |