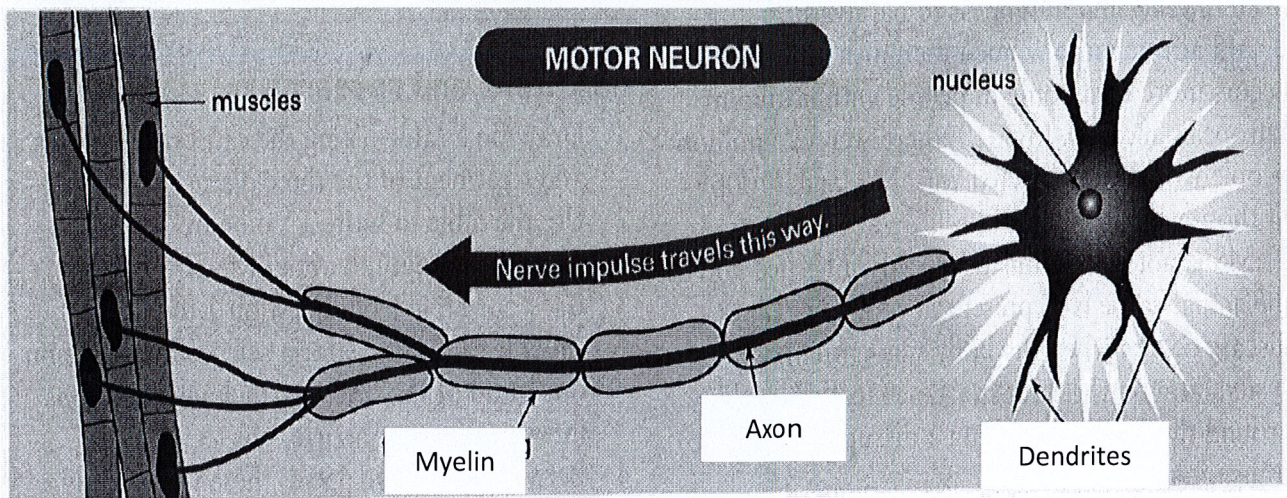


Learning Goal 6: Understand that the coordination of all body systems is carried out by the Nervous and Endocrine systems.

7. Use the following diagram to help you match the word to its meaning in the table below:

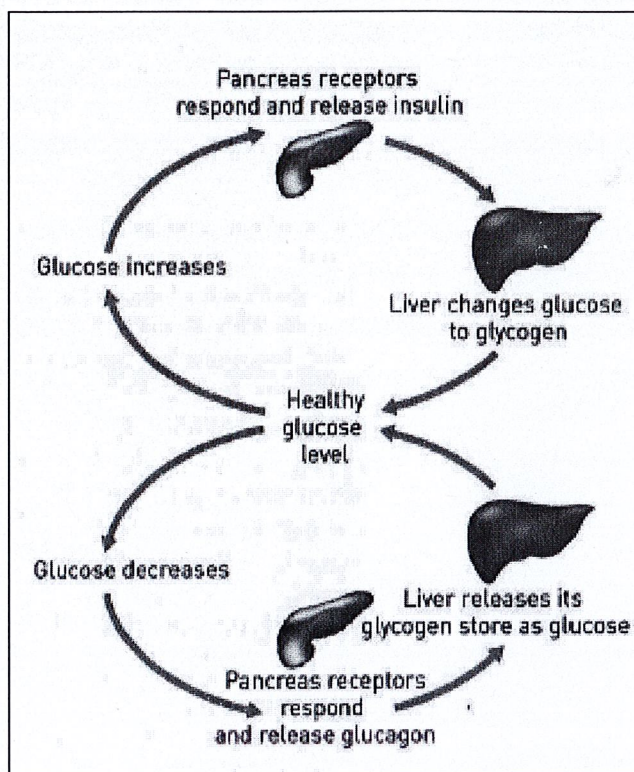


	Word	Meaning
1	neurotransmitter	The branches on the nucleus end of a neuron 7
2	neurons	The gap between two nerve cells 6
3	axon	An electrochemical signal that travels along a nerve cell 4
4	Nerve impulse	The main bundle of nerve fibres that leaves the brain 9
5	myelin	Nerve cell 2
6	synapse	A chemical that makes the connection between across the gap between two neurons. 1
7	dendrite	A type of nerve signal that does not require input from the brain 8
8	reflex	A nerve fibre 3
9	spinal cord	The organ that controls the nervous system 10
10	brain	A fatty coating around the axon which acts like insulation. 5

8. Match the gland in column A, with the hormone it produces in Column B, and with the main effect in column C.

Column A	Column B	Column C
Adrenal Gland	Testosterone	Helps control high blood sugar levels.
Testes	Adrenaline	Stimulates cell growth and replication.
Ovaries	Insulin	Prepares the body for fight or flight.
Pituitary Gland	Oestrogen	Sperm production and secondary male characteristics.
Pancreas	Growth Hormone	Egg production and secondary female characteristics.

9. Use the following diagram to explain how the pancreas and liver work together to maintain healthy glucose levels in the body.



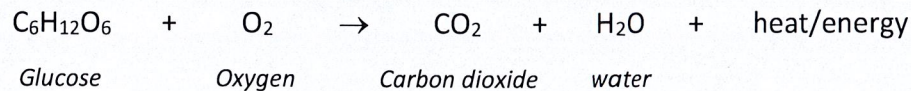
- ① After eating, glucose ^(in blood) levels rise, the pancreas releases insulin which causes cells to take up glucose and ② the liver to convert glucose to glycogen for storage. This reduces glucose level in blood.
- ① If fasting, glucose in blood lowers, the pancreas releases glucagon which stimulates the liver to breakdown glycogen into glucose. This increases glucose ~~low~~ level in the blood.

10. The following table shows the blood glucose levels of two people after consuming 50 g of glucose in a can of drink:

Time after drinking a can of fruit juice (minutes)	Blood glucose level (mg/100 ml)	
	Bill	Dianne
0	86	85
15	110	125
30	140	170
45	115	190
60	90	210
75	80	210
90	84	200
105	85	180
120	85	145

- a. Which person suffers from diabetes? Dianne
- b. Rapid-acting insulin can begin working within 1 hour. At what time should the diabetic person have taken the injection? ideally just before or when drinking
- c. What causes the non-diabetic person's blood glucose levels to fall? pancreas releasing insulin
- d. Why did the diabetic person's blood glucose level eventually fall?
Glucose in blood is used in cellular respiration (takes time)

11. The human body's source of energy is the process of cellular respiration. This process is essentially a chemical reaction between glucose and oxygen. The chemical reaction produces carbon dioxide and water, and also releases a considerable amount of energy and heat that is used within the cells of the body. The chemical reaction for cellular respiration is shown below



For this reaction to occur in each cell, the body must have a way of supplying each body with the necessary glucose and oxygen, and a way of getting rid of the carbon dioxide and water.

Answer the following questions about these processes.

- a) Explain how the digestive system and circulatory system combine to supply the cells with glucose.

Digestive system - breakdown of food into nutrients which include glucose, these are absorbed into bloodstream. The circulatory system then transport nutrients including glucose to cells where it can be used for cellular respiration.

- b) Explain how the respiratory system and circulatory system combine to supply the cells with oxygen.

The lungs of the respiratory system are where gas exchange occurs, and O_2 is absorbed into the bloodstream in the alveoli. The circulatory system transports the O_2 throughout the body to cells.

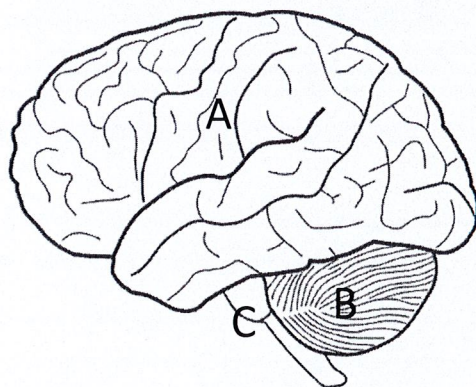
- c) Explain how the circulatory system and the respiratory system combine to excrete carbon dioxide from the body.

CO_2 is excreted from cells into bloodstream. The circulatory system transport the CO_2 throughout body, eventually to the lungs. The lungs of the respiratory system is where CO_2 is transferred from the blood (circulatory system) into the air and breathed out of the body.

- d) Explain how the excretory system and circulatory system combine to regulate (control) the amount of water in the body.

(eaten and drunk)
The water ingested, and the water produced by respiration is absorbed into the blood (circulatory system) - where it eventually reaches the kidneys of the excretory system. In the kidneys, excess water in blood is removed as urine. If there is little water in blood, very little water is removed. This regulates the water level within the body.

12. Label the following diagram of the brain and describe the main function of each.



Main Functions:

A Cerebrum — thinking (conscious thought)

B Cerebellum — co-ordination (body movement)

C Brain Stem — Unconscious action/control

13. Complete the following table showing similarities and differences between the nervous system and the endocrine system

	NERVOUS SYSTEM	ENDOCRINE SYSTEM
What is the main function?	respond to stimuli maintain homeostasis	maintain homeostasis respond to stimuli.
What type of signal is sent by the system?	nervous impulse (electrical)	hormones (chemical)
How does the signal travel through the body?	neurons	in the blood.
How fast does the signal travel?	quickly (relatively) 1m/s to 80m/s	slowly (speed of blood)
How long does the action last for?	not long, seconds or less	long time period (minutes to months)

Learning Goal 6: Understand the immune system protects the body from pathogens and their toxins.

1. Match each of the following words to their meaning:

Word	Meaning
Pathogen	Can only reproduce inside host cells and are responsible for colds, flu, measles and many more diseases.
Virus	Can attack and engulf foreign particles.
Bacteria	Can be activated if a pathogen enters a cut in your skin.
White Blood Cells	Examples are: sneezing, coughing and eating contaminated food.
Disease Transmission	Anything that can cause a disease.
Inflammatory Response	Able to reproduce without invading a host cell. They release a variety of toxins some of which are harmful to humans. They can be killed by antibiotics.

2. Describe each of the three levels of immune system defence

① Skin & Mucal linings - provide a physical barrier to stop infection. This is often called passive defense.

swelling
redness → ② Phagocytes - white blood cells that can destroy microorganisms. There are not specific (inmate) and can kill a range of pathogens

③ Antibodies / T-cells - recognising specific pathogens and creates antibodies & killer T cells to destroy it. This is adaptive & takes time.

3. The immune system does not "attack" every virus or bacteria which enters, or is in your body. Is this a bad thing? Explain your answer.

~~Many~~ No, it's a 'good' thing. There are many microorganisms that are NOT harmful, and many that live naturally on or in the human body. For example - a healthy digestive system depends on a useful mix of microorganism. So killing ALL microorganisms in your body would actually cause you harm.