MULTIPLE-CHOICE QUESTIONS

1. Which of the following statements is correct about receptors?

(a) Gustatory receptors detect taste, while olfactory receptors detect smell

(b) Both gustatory and olfactory receptors detect smell

(c) Auditory receptors detect smell, and olfactory receptors detect taste

(d) Olfactory receptors detect taste, and gustatory receptors smell

Soln:

The answer is (a) Gustatory receptors detect taste, while olfactory receptors detect smell

Explanation:

A receptor is a cell which is sensitive for the external stimulus such as light, taste, and smell. For example, Photoreceptors detect light, Gustatory receptors detect taste, and Olfactory receptors detect smell.

2. Electrical impulse travels in a neuron from

(a) Dendrite → axon → axonal end → cell body

(b) Cell body → dendrite → axon → axonal end

(c) Dendrite → cell body → axon → axonal end

(d) Axonal end → axon → cell body → dendrite

Soln:

The answer is (c) Dendrite → cell body → axon → axonal end

Explanation:

Stimulus is received by dendrites which are transmitted to cyton through the axon. Stimulus reaches the terminal branches called the axonal end, from where they are transmitted to another neuron.

3. In a synapse, a chemical signal is transmitted from

(a) dendritic end of one neuron to the axonal end of another neuron

(b) axon to the cell body of the same neuron

(c) cell body to the axonal end of the same neuron

(d) axonal end of one neuron to the dendritic end of another neuron

Soln:

The answer is (d) the axonal end of one neuron to the dendritic end of another neuron.

Explanation:

The electric impulse travels from the axon to the dendrite of another neuron through a synaptic gap which consists of SYNAPSE.

4. In a neuron, the conversion of electrical signal to a chemical signal occurs at/in

(a) cell body

(b) axonal end

(c) dendritic end

(d) axon

Soln:

The answer is (b) axonal end

Explanation:

At the axonal end, the electric impulse triggers the release of neurotransmitters. These chemicals enter the dendrite of another neuron to transmit the signal.

5. Which is the correct sequence of the components of a reflex arc?

(a) Receptors→ Muscles→ Sensory neuron→ Motor neuron→ Spinal cord

(b) Receptors→ Motor neuron → Spinal cord → Sensory neuron → Muscle

(c) Receptors → Spinal cord → Sensory neuron → Motor neuron → Muscle

(d) Receptors → Sensory neuron → Spinal cord → Motor neuron → Muscle

Soln:

The answer is (d) Receptors → Sensory neuron → Spinal cord → Motor neuron → Muscle

Explanation:

Sensory neurons receive signals from receptors. These signals are sent to the spinal cord, which reaches Muscles through the motor neuron.

6. Which of the following statements is true?

(i) Sudden action in response to something in the environment is called reflex action

(ii) Sensory neurons carry signals from the spinal cord to muscles

(iii) Motor neurons carry signals from receptors to the spinal cord

(iv) The path through which signals are transmitted from a receptor to a muscle or a gland is called the reflex arc

(a) (i) and (ii)

(b) (i) and (iii)

(c) (i) and (iv)

(d) (i), (ii) and (iii)

Soln:

The answer is (c) (i) and (iv)

Explanation:

Sensory neurons carry signals from muscles to the spinal cord hence statements ii) and iv) are wrong statements.

7. Which of the following statements is true about the brain?

(i) The main thinking part of the brain is the hindbrain

(ii) Centres of hearing, smell, memory, sight etc., are located in the forebrain.

(iii) Involuntary actions like salivation, vomiting, and blood pressure are controlled by the medulla in the hindbrain

(iv) Cerebellum does not control the posture and balance of the body

(a) (i) and (ii)

(b) (i), (ii) and (iii)

(c) (ii) and (iii)

(d) (iii) and (iv)

Soln:

The answer is (c) (ii) and (iii)

Explanation:

Forebrain is the thinking part of the brain hence statement i) is wrong. Cerebellum controls posture and balance of the body hence statement iv) is wrong

8. Posture and balance of the body is controlled by

(a) cerebrum

(b) cerebellum

(c) medulla

(d) pons

Soln:

The answer is (b) cerebellum

Explanation:

Cerebrum is responsible for sensory processing. Medulla controls involuntary functions. Pons regulates respiration and controls involuntary action sensations such as touch and pain.

9. Spinal cord originates from

(a) cerebrum

(b) medulla

(c) pons

(d) cerebellum

Soln:

The answer is (b) medulla

10. The movement of the shoot towards light is

(a) geotropism

(b) hydrotropism

(c) chemotropism

(d) phototropism

Soln:

The answer is (d) phototropism

Explanation:

The growth of plant roots towards or away from moisture is called hydrotropism. Plant growth in response to gravitational force is called geotropism. The growth of plants in response to the chemical stimulus is called chemotropism.

11. The main function of abscisic acid in plants is to

(a) increase the length of cells

(b) promote cell division

(c) inhibit growth

(d) promote the growth of stem

Soln:

The answer is (c) inhibit growth

Explanation:

Auxins increase the length of cells. Cytokinins promote cell division. Gibberellins promote the growth of the stem.

12. Which of the following is not associated with the growth of a plant?

(a) Auxin

(b) Gibberellins

(c) Cytokinins

(d) Abscisic acid

Soln:

The answer is (d) Abscisic acid

Explanation:

Abscisic acid inhibits the growth of plants; hence, it is not associated with the growth of the plant.

13. Iodine is necessary for the synthesis of which hormone?

(a) Adrenaline

(b) Thyroxin

(c) Auxin

(d) Insulin

Soln:

The answer is (b) Thyroxin

14. Choose the incorrect statement about insulin

(a) It is produced from pancreas

(b) It regulates the growth and development of the body

(c) It regulates blood sugar level

(d) Insufficient secretion of insulin will cause diabetes

Soln:

The answer is (b) It regulates the growth and development of the body

15. Select the mismatched pair

(a) Adrenaline: Pituitary gland

(b) Testosterone: Testes

(c) Estrogen: Ovary

(d) Thyroxin: Thyroid gland

Soln:

The answer is (a) Adrenaline: Pituitary gland

Explanation:

Adrenaline is secreted by the Adrenal gland, and the Pituitary gland produces TSH, FSH and GSH hormones.

16. The shape of guard cells changes due to changes in the

(a) protein composition of cells

(b) temperature of cells

(c) amount of water in cells

(d) position of the nucleus in the cells

Soln:

The answer is (c) amount of water in cells

Explanation:

Excess of water will turn guard cells turgid, and loss of water will turn guard cells flaccid.

17. The growth of tendril in pea plants is due to

(a) effect of light

(b) effect of gravity

(c) rapid cell divisions in tendrillar cells that are away from the support

(d) rapid cell divisions in tendrillar cells in contact with the support

Soln:

The answer is (c) rapid cell divisions in tendrillar cells that are away from the support.

18. The growth of pollen tubes towards ovules is due to

(a) hydrotropism

(b) chemotropism

(c) geotropism

(d) phototropism

Soln:

The answer is (b) chemotropism

Explanation:

Chemicals released by ovules stimulate the growth of pollen tubes towards ovules.

19. The movement of the sunflower in accordance with the path of the sun is due to

(a) phototropism

(b) geotropism

(c) chemotropism

(d) hydrotropism

Soln:

The answer is (a) phototropism

Explanation:

The movement of shoot towards light is called phototropism.

Plant growth in response to gravitational force is called geotropism.

The growth of plant in response to chemical stimulus is called chemotropism.

The growth of plant roots towards or away from moisture is called hydrotropism.

20. The substance that triggers the fall of mature leaves and fruits from plants is due to

(a) auxin

(b) gibberellin

(c) abscisic acid

(d) cytokinin

Soln:

The answer is (c) abscisic acid

Explanation:

Abscisic acid forms a layer of abscission. This layer disconnects the living tissue of the leaf from the other parts.

21. Which of the following statements about the transmission of nerve impulse is incorrect?

(a) Nerve impulse travels from the dendritic end towards the axonal end

(b) At the dendritic end, electrical impulses bring about the release of some chemicals, which generate an electrical impulse at the axonal end of another neuron

(c) The chemicals released from the axonal end of one neuron cross the synapse and generate a similar electrical impulse in a dendrite of another neuron

(d) A neuron transmits electrical impulses not only to another neuron but also to muscle and gland cells

Soln:

The answer is (b) At the dendritic end, electrical impulses bring about the release of some chemicals, which generate an electrical impulse at the axonal end of another neuron.

Explanation:

Chemicals or neurotransmitters are released at the axonal end, not on the dendritic end. Hence, statement b) is incorrect.

22. Involuntary actions in the body are controlled by

(a) medulla in forebrain

(b) medulla in midbrain

(c) medulla in hindbrain

(d) medulla in the spinal cord

Soln:

The answer is (c) medulla in hindbrain.

Explanation:

Medulla is present only in the hindbrain.

23. Which of the following is not an involuntary action?

(a) Vomiting

(b) Salivation

(c) Heartbeat

(d) Chewing

Explanation:

The answer is (d) Chewing

24. When a person is suffering from severe cold, he or she cannot

(a) differentiate the taste of an apple from that of an ice cream

(b) differentiate the smell of a perfume from that of an agarbatti

(c) differentiate red light from green light

(d) differentiate a hot object from a cold object

Soln:

The answer is (b) differentiate the smell of a perfume from that of an agarbatti.

Explanation:

During cold olfactory receptors get blocked hence we cannot differentiate smell.

25. What is the correct direction of the flow of electrical impulses?

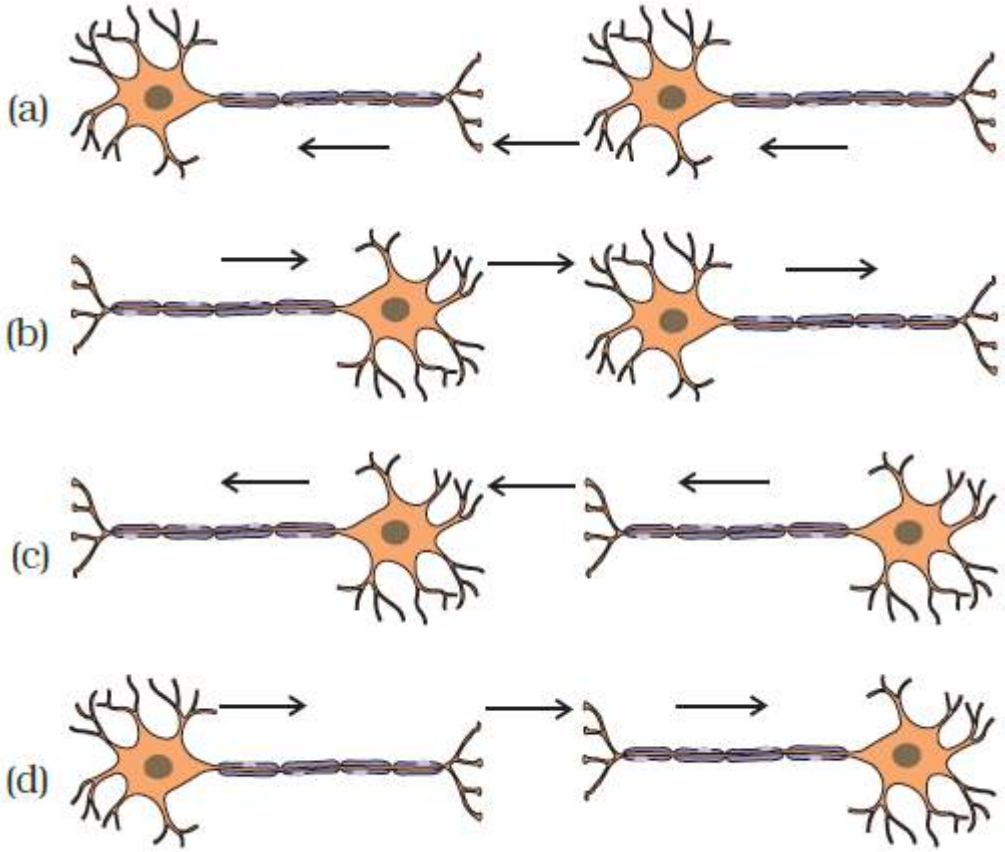


Fig. 7.1

Soln:

The answer is c)

Explanation:

The dendrites of a neuron receive electrical impulse from the axonal end of another neuron. After that, the electrical impulse travels through the cell body, axon, to the axonal end.

26. Which statement is not true about thyroxin?

(a) Iron is essential for the synthesis of thyroxin

(b) It regulates carbohydrates, protein and fat metabolism in the body

(c) The thyroid gland requires iodine to synthesise thyroxin

(d) Thyroxin is also called the thyroid hormone

Soln:

The answer is (a) Iron is essential for the synthesis of thyroxin

Explanation:

Iodine is essential for the synthesis of thyroxin but not iron hence statement a) is wrong

27. Dwarfism results due to

(a) Excess secretion of thyroxin

(b) Less secretion of growth hormone

(c) Less secretion of adrenaline

(d) Excess secretion of growth hormone

Soln:

The answer is (b) Less secretion of growth hormone

Explanation:

Growth hormones are responsible for the overall growth of an organism. When there is no secretion of growth hormones, it leads to dwarfism.

28. Dramatic changes of body features associated with puberty are mainly because of the secretion of

(a) oestrogen from testes and testosterone from ovary

(b) estrogen from adrenal gland and testosterone from pituitary gland

(c) testosterone from testes and estrogen from ovary

(d) testosterone from thyroid gland and estrogen from pituitary gland

Soln:

The answer is (c) testosterone from testes and estrogen from ovary.

Explanation:

These are the sex hormones responsible for the secondary character that appear after puberty. Males secrete testosterone, and females secrete estrogen.

29. A doctor advised a person to take an injection of insulin because

(a) his blood pressure was low

(b) his heart was beating slowly

(c) he was suffering from goitre

(d) his sugar level in blood was high

Soln:

The answer is (d) his sugar level in blood was high.

Explanation:

Patients suffering from diabetes will have high blood glucose due to non-functioning or lack of insulin hormone. Such patients are administered with insulin injections to regulate blood glucose.

30. The hormone which increases fertility in males is called

(a) oestrogen

(b) testosterone

(c) insulin

(d) growth hormone

Soln:

The answer is (b) testosterone

31. Which of the following endocrine glands is unpaired?

(a) Adrenal

(b) Testes

(c) Pituitary

(d) Ovary

Soln:

The answer is (c) Pituitary

Explanation:

Adrenal glands are two, which are present on top of each kidney. Testes is a paired gland in males which produces male sex hormones. Ovary is a paired gland in females which produces female sex hormones. The pituitary gland is an independent gland present below the brain. It is called as master gland, as it secretes major of the hormones.

32. The junction between two neurons is called

(a) cell junction

(b) neuromuscular junction

(c) neural joint

(d) synapse

Soln:

The answer is (d) synapse

Explanation:

A synapse is a structure that allows a neuron to pass an electric signal to the next neuron or effector cell. Hence it is a junction between two neurons.

33. In humans, life processes are controlled and regulated by

(a) reproductive and endocrine systems

(b) respiratory and nervous systems

(c) endocrine and digestive systems

(d) nervous and endocrine systems

Soln:

The answer is (d) nervous and endocrine systems.

Explanation :

Reproductive, respiratory and digestive systems have no role to play in the control and regulation of life processes. It is the nervous system and the endocrine system that control and regulates all the processes, including the reproductive, respiratory and digestive systems.

SHORT ANSWER QUESTIONS

34. Label the parts (a), (b), (c) and (d) and show the direction of the flow of electrical signals in Figure 7.2.

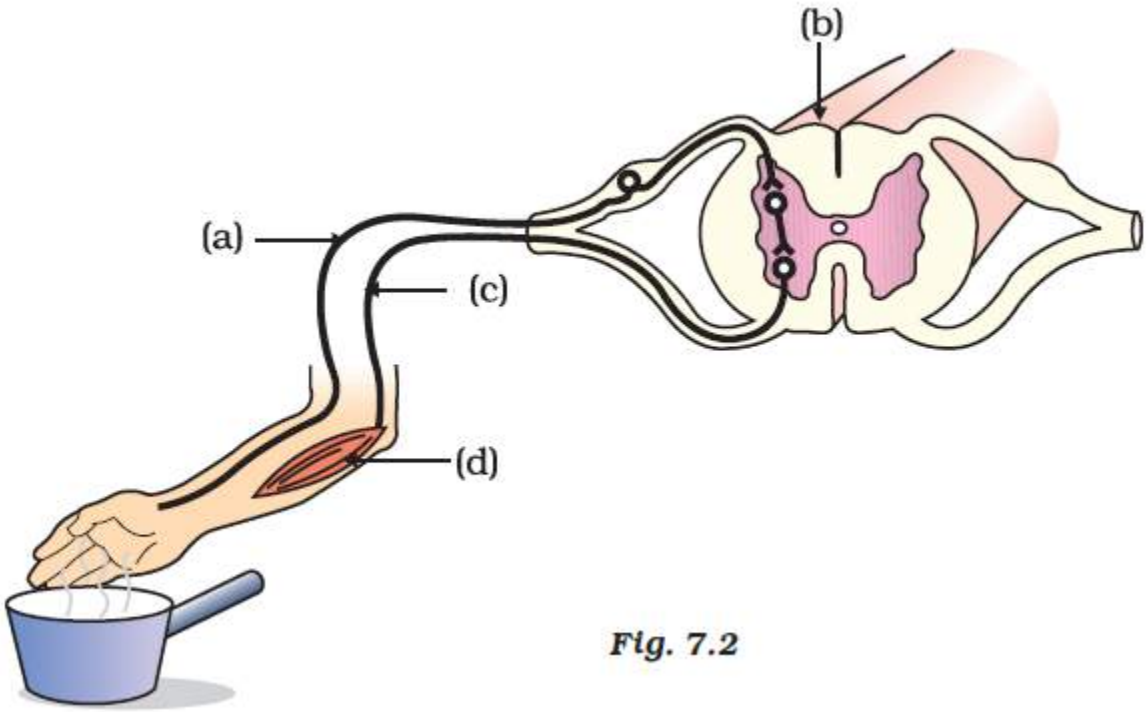


Fig. 7.2

Soln:

1. **Sensory neuron**
2. **Spinal cord**
3. **Motor neuron**
4. **Muscle**

35. Name the plant hormones responsible for the following

(a) elongation of cells

(b) growth of stem

(c) promotion of cell division

(d) falling of senescent leaves.

Soln:

1. Auxin
2. Gibberellin
3. Cytokinin
4. Abscisic acid

36. Label the endocrine glands in Figure 7.3.

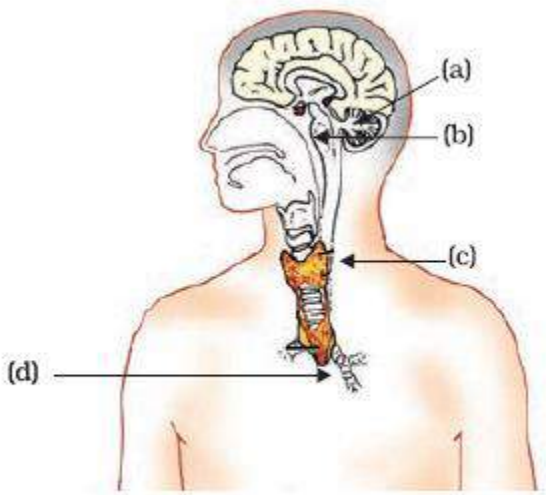


Fig. 7.3

Soln:

1. Pineal Gland
2. Pituitary gland
3. Thyroid gland
4. Thymus

37. In Figure 7.4 (a), (b) and (c), which appears more accurate and why?

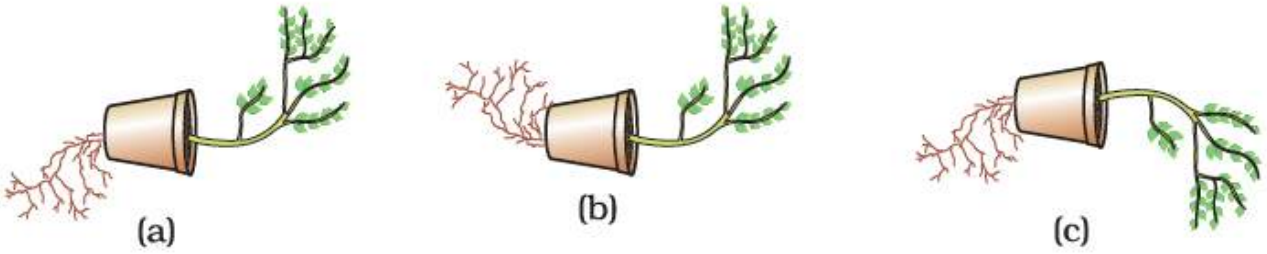
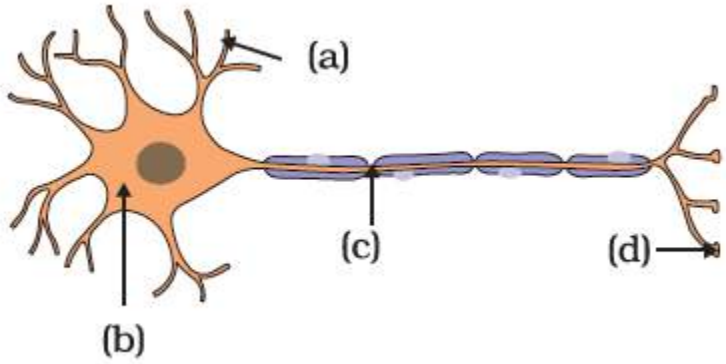


Fig. 7.4

Soln:

Figure a) is more accurate because, in the figure, a plant root shows positive geotropism, and a shoot shows positive phototropism.

38. Label the parts of a neuron in Figure 7.5.



Soln:

1. Dendrite
2. Cell body
3. Axon
4. Axon terminal

39. Match the terms of Column (A) with those of Column (B)

Column A	**Column B**
(a) Olfactory receptors	**(i) Tongue**
(b) Thermo receptors (temperature receptors)	**(ii) Eye**
(c) Gustatoreceptors	**(iii) Nose**
(d) Photoreceptors	**(iv) Skin**

Soln:

Column A	Column B
(a) Olfactory receptors	(iii) Nose
(b) Thermo receptors (temperature receptors)	(iv) Skin

(c) Gustatoreceptors	(i) Tongue
(d) Photoreceptors	(ii) Eye

40. What is a tropic movement? Explain with an example.

Soln:

The directional growth movement of a plant due to an external stimulus is called a tropic movement. Movement can be either toward the stimulus or away from the stimulus. For example, roots show positive geotropic movement, and they grow with the direction of gravity, whereas shoots show negative geotropic movement.

41. What will happen if the intake of iodine in our diet is low?

Iodine is essential for the synthesis of the hormone thyroxin. If we take a low iodine diet, it leads to hypothyroidism which results in a disease called goitre.

42. What happens at the synapse between two neurons?

Soln:

At Synapse nerve impulse of a nerve cell gets converted to neurotransmitters which travel towards the dendrites of the next neuron, leading to an electric impulse.

43. Answer the following :

(a) Which hormone is responsible for the changes noticed in females at puberty?

(b) Dwarfism results due to deficiency of which hormone?

(c) Blood sugar level rises due to deficiency of which hormone?

(d) Iodine is necessary for the synthesis of which hormone?

Soln:

a) **Oestrogen** hormone is responsible for the changes noticed in females at puberty

b) Dwarfism results due to deficiency of **Growth Hormones.**

c) Blood sugar level rises due to deficiency of **Insulin** Hormone

d) Iodine is necessary for the synthesis of **Thyroxine** Hormone

44. Answer the following :

(a) Name the endocrine gland associated with the brain.

(b) Which gland secretes digestive enzymes as well as hormones?

(c) Name the endocrine gland associated with kidneys.

(d) Which endocrine gland is present in males but not in females?

Soln:

a) Pituitary gland is associated with the brain.

b) The pancreas secretes digestive enzymes as well as hormones.

c) Adrenal gland is associated with kidneys.

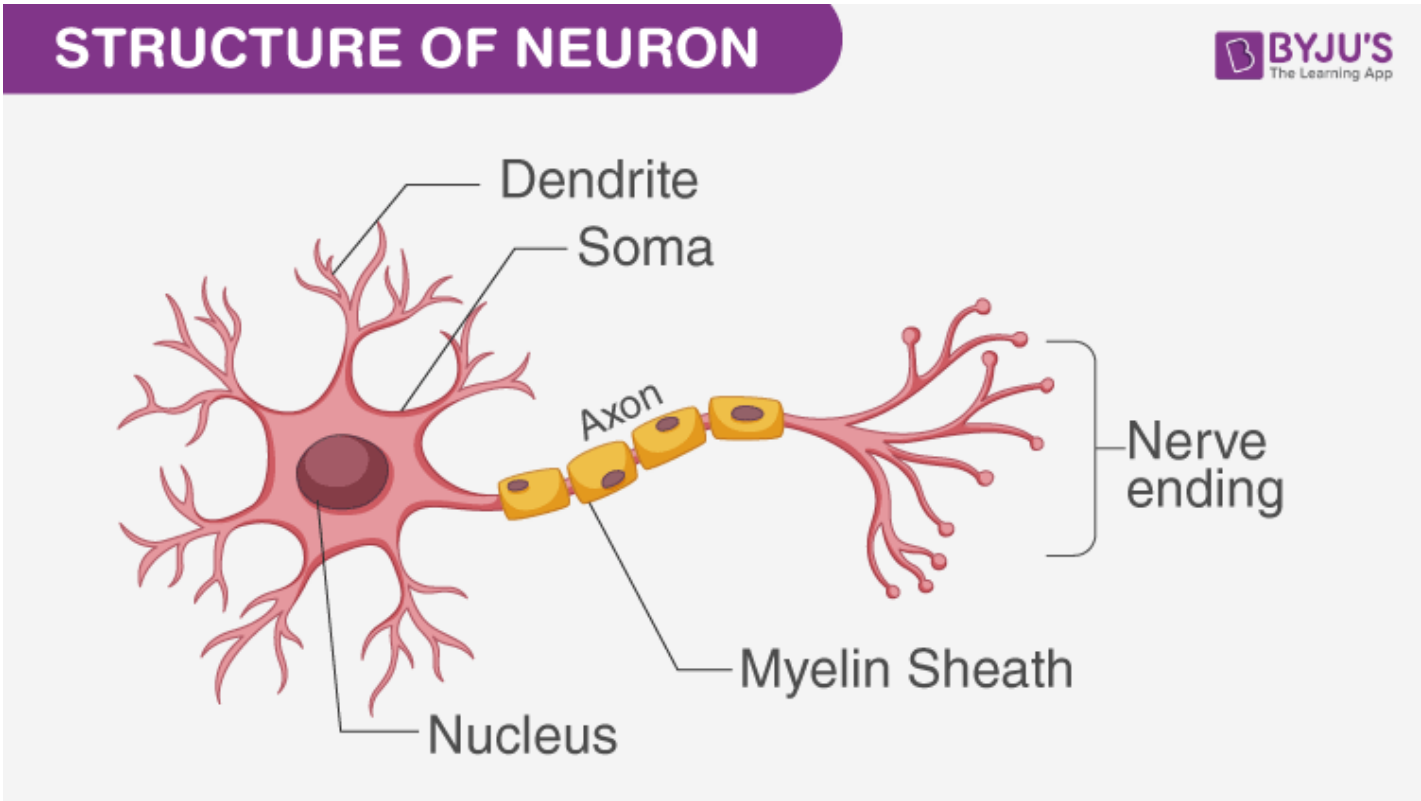
d) The testis is present in males but not in females.

LONG ANSWER QUESTIONS

45. Draw the structure of a neuron and explain its function.

Soln:

The neuron is a highly specialised cell responsible for the transmission of nerve impulses.



Soma or cell body is a star-shaped hair-like structure. Hair-like structures are called dendrites. Dendrites receive nerve impulses.

Axon is the tail of the nucleus it ends in hair-like structures which makes nerve endings. Nerve endings relay nerve impulses.

Myelin sheath acts as an insulator around the axon. It insulates axons from the electrical impulses from the surroundings.

The function of a neuron is to process and transmit information from the brain to all parts of the body.

46. What are the major parts of the brain? Mention the functions of different parts.

Soln:

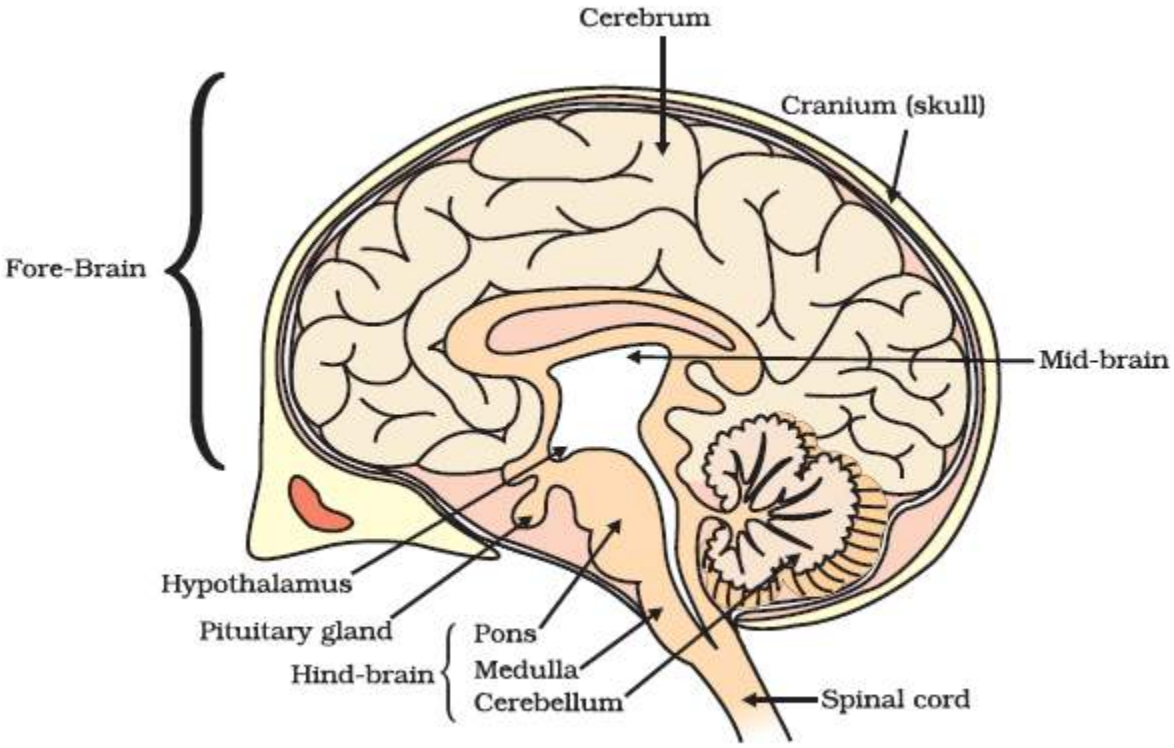


Figure 7.3 *Human brain*

Functions of brain Parts

Forebrain:

The forebrain is the main thinking part of the brain. It has regions which receive sensory impulses from various receptors. Separate areas of the fore-brain are specialised for hearing, smell, sight and so on.

Midbrain and Hindbrain:

Involuntary actions are controlled by the mid-brain and hind-brain.

Cerebellum:

Responsible for voluntary actions and maintaining the posture and balance of the body.

Cerebrum:

Cerebrum is responsible for sensory processing.

Medulla:

Medulla controls involuntary functions.

Pons:

Pons regulates respiration and controls involuntary action sensations such as touch and pain.

Hypothalamus:

Hypothalamus control the sleep and wake cycle

47. What constitutes the central and peripheral nervous systems? How are the components of the central nervous system protected?

Soln:

The central nervous system comprises of brain and spinal cord. The peripheral nervous system is composed of nerves which are outside the spinal cord.

The central nervous system has a well-developed system for its protection. The brain is enclosed in a hard shell known as the skull. The spinal cord is enclosed in the vertebral column for its protection. Along with these, there is a cerebrospinal fluid which protects the brain from mechanical shocks.

48. Mention one function for each of these hormones :

(a) Thyroxin

(b) Insulin

(c) Adrenaline

(d) Growth hormone

(e) Testosterone.

Soln:

Thyroxin:

Thyroxin regulates carbohydrate, protein and fat metabolism in the body so as to provide the best balance for growth.

Insulin:

Insulin regulates blood glucose levels. If insulin is not secreted at an appropriate level, it leads to a rise in blood glucose level which results in many adverse effects on life processes.

Adrenaline:

Adrenaline prepares our body for emergency situations. Adrenaline is also called a fight and flight hormone.

Growth Hormone:

Growth hormone is responsible for the growth and regulation of growth.

Testosterone:

Testosterone is responsible for the expression of secondary sexual characteristics in the body.

49. Name various plant hormones. Also, give their physiological effects on plant growth and development.

Soln:

1. Auxin- responsible for the elongation of cells
2. Gibberellin- responsible for the growth of the stem and thereby increases the girth of the stem
3. Cytokinin promotes cell division in plants
4. Abscisic acid stops the growth of the plant, and it makes leaves and fruits fall from the plant.

50. What are reflex actions? Give two examples. Explain a reflex arc.

The sudden involuntary movement in a voluntary organ; in response to a stimulus; is called reflex action.

Examples of reflex action:

(a) Moving your hand away from a hot iron plate

(b) Blinking of eyes

Reflex Arc.

The reflex arc is a path of electrical impulse during a reflex action. It is composed of sensory neurons, the spinal cord, motor neurons and muscles.

Steps of the reflex arc

• The sensory neuron picks signals from the stimulus and carries the signals to the spinal cord.

• Spinal cord process the signals and sends a message through the motor neuron.

• Motor neuron transmits the signals to the effector muscle so that the muscle can take immediate action.

51. "Nervous and hormonal systems together perform the function of control and coordination in human beings." Justify the statement.

Control and coordination in human beings are under the influence of the nervous system. Brain control all the organelles and organ system. The control is obtained by the network of neurons, which carry signals through neurotransmitters in the form of electric impulses to the brain and from the brain.

The hormonal system consists of varieties of hormones secreted by various glands in our body. The hormonal system coordinates the function of the nervous system. Hormones indirectly control the life processes by a feedback mechanism. They can produce hormones when required and can stop production when not required.

52. How does chemical coordination take place in animals?

Soln:

Chemical coordination takes place in animals through hormones produced by glands present in animals. Hormones are directly released into the bloodstream to reach the target site. Hormones control the behaviour of the target tissue.

Example:

The adrenal gland secretes Adrenalin which reaches the heart, lungs and Gastrointestinal tract. The heart speeds up its pumping action so that more blood can be supplied to the limbs and facial muscles. But the activity of the GI tract is slowed down to ensure better blood supply in limbs. Thus, adrenalin prepares the body for a fight or flight situation.

53. Why is the flow of signals in a synapse from the axonal end of one neuron to the dendritic end of another neuron but not the reverse?

Soln:

The electrical impulse travels through a neuron. But to be transmitted to another neuron, it needs to be passed in the form of neurotransmitters. Neurotransmitters are specialized chemicals. They can enter a neuron only through specialized channels. Such channels are present in dendrites but not in axons. On the other hand, a neurotransmitter can enter a dendrite. Due to this, the flow of signals in a synapse is from the axonal end of one neuron to the dendritic end of another neuron but not the reverse.