

## CHAPTER 17

**Q.1 What is myxoedema?**

**Ans.** A disease caused by decreased activity of the thyroid gland in adults and characterized by dry skin, swellings around the lips and nose, mental deterioration, and a subnormal basal metabolic rate.

**Q.2 Give commercial uses of NAA.**

**Ans.** Stimulates fruiting – help natural fruit set. Sometimes it causes fruit setting in absence of pollination (parthenocarpy).

**Q.3 Give commercial uses of 2-4, D.**

**Ans.** Selective weed killer kills broad leaved species (dicot). Used in cereal crops and lawns to eliminate weeds. Inhibits sprouting of potatoes. Prevents premature fruit drop (retard abscission).

**Q.4 What are the limitations of coordination?**

**Ans.** The organisms do not show response to every stimulus. Even the most developed animals like man is unable to detect and show response to many stimuli in our environment.

**Q.5 Can our eye see all the radiations?**

**Ans.** We can see only visible radiation of spectrum of light. But our eyes cannot detect the non-visible radiations.

**Q.6 Write physiological roles of  $T_3$  and  $T_4$ .**

**Ans.** Thyroxin and tri-iodothyronine act on the basal metabolic rate. They also act with somatotropin and increase growth. They affect the process of metamorphosis in amphibians.

**Q.7 Differentiate between circadian or diurnal rhythms and circannual rhythms?**

**Ans.** The biorhythms showing periodicity of about 24-hours are called circadian rhythms. It means about one day. So they are also called diurnal rhythms. If the biorhythms are less than or about 365 days, these rhythms in activity are called circannual rhythms.

**Q.8 Differentiate between receptors and effectors.**

**Ans.** The receptors are the cells or organs which receive stimuli. The cells or organs which carry out actions or responses are called effectors.

**Q.9 What is salutatory impulse?**

**Ans.** In myelinated neurons, the impulse jump from node to node. This is called salutatory impulse.

**Q.10 What is reticular formation?**

**Ans.** Midbrain contains reticular formation. It is a relay centre connecting hindbrain with the forebrain.

**Q.11 Differentiate between diabetes mellitus and diabetes insipidus.**

**Ans.** Diabetes mellitus disease is caused due to deficiency of hormone insulin. In this case glucose level in blood is raised. Diabetes insipidus disease is caused due to deficiency of hormone ADH. In this case excessive urine is produced.

**Q.12 Differentiation between kinesis and Taxis?**

**Ans. Kinesis:**

Change in activity rate in response to stimulus. Animal moves slower in response to unfavorable stimulus.

**Taxis:**

Automatic oriented movement towards or away from stimulus.

**Q.13 Differentiate between instinctive and learning behaviours.**

**Ans.** Instinctive behaviour is a part of one's inherited structure by which the individual responds to a particular stimulus. The modification of behaviour by life experiences is called learning.

**Q.14 What are the functions of adrenaline and nor adrenaline?**

**Ans.** Adrenaline dilates blood vessels in certain parts of the body such as the skeletal muscles. So it increases the heart output. Noradrenalin constricts blood vessels in certain areas like gut, so it decreases the heart output.

**Q.15 Give physiological roles of oestrogen in females.**

**Ans.** Roles of oestrogen in females are:

- (i) Promote formation of female secondary sex characteristics
- (ii) Accelerate metabolism
- (iii) Increase fat stores
- (iv) Stimulate endometrial growth
- (v) Increase uterine growth
- (vi) Reduce bone resorption, increase bone formation

**Q.16 Give two physiological roles of progesterone in females.**

**Ans.** Progesterone inhibits further FSH secretion from the pituitary. Thus it prevents the ripening of more follicles by causing changes in the uterus. It causes further thickening and vascularization of its wall.

**Q.17 What is hypoglycemia?**

**Ans.** In this case, excess insulin is produced and the utilization of sugar is too great. So glucose level falls in the blood. This condition is called hypoglycemia. It may upset nerve and muscle functioning.

**Q.18 What are adrenal cortex and adrenal medulla?**

**Ans.** Outer layer of adrenal gland is called adrenal cortex. The adrenal cortex secretes aldosterone, and androgenic hormones. Its inner layer is called adrenal medulla. The adrenal medulla produces the hormones adrenaline and noradrenalin.

**Q.19 What are functions of cortisol and aldosterone?**

**Ans.** Cortisol increases the blood glucose level. Aldosterone regulates mineral ion balance in the body.

**Q.20 Give the role of gastrin hormone in digestion.**

**Ans.** Gastrin is the hormone produced by mucosa of the pyloric stomach. It stimulates the secretion of gastric juice. It is produced under the influence of partially digested protein food in the stomach.

**Q.21 What are tropic hormones? Give example.**

**Ans.** The tropic hormones control the secretion of hormones of the other endocrine glands. Its examples are TSH, ACTH etc.

**Q.22 Write functions of SRF.**

**Ans.** It is secreted from hypothalamus throughout the life. When growth has mostly stopped after adolescence, the hormone continues to promote protein synthesis throughout the body.

**Q.23 What is a neurotransmitter?**

**Ans.** The message transmitted across synapse in the form of chemical messenger is called neurotransmitter. Neuro transmitters are chemicals which are released at the axon ending of the neurons at synapse.

**Q.24 Name some neurotransmitters.**

**Ans.** These are acetylcholine, adrenaline, nor-epinephrine, serotonin and dopamine. Acetylcholine is the main transmitter for synapses that lie outside the central nervous system.

**Q.25 What are cranium and meninges?**

**Ans.** Cranium is a part of skull. It protects the brain and neural arches. Beneath the cranium, the brain and spinal cord are protected by triple layer of meninges.

**Q.26 What is CSF? Give its function.**

**Ans.** The cerebrospinal fluid (CSF) is present between the layers of meninges. Its composition is similar to blood plasma. It bathes the neurons of brain and spinal cord and it protects the brain against the bumps and jolts.

**Q.27 What is the function of thalamus?**

**Ans.** It carries sensory information to the limbic system and cerebrum. The information includes sensory information from auditory (ear) and visual (eye) pathways. It also receives information from the skin and from within the body.

**Q.28 What are modalities of sensation?**

**Ans.** Each principal type of sensation that we can experience e.g. pain, touch, sight, sound etc., is called modalities of sensation.

**Q.29 All the receptors send sensation by same nerve impulses. How then they produce different modalities of sensation?**

**Ans.** Each nerve tract terminates at a specific point in the CNS. The type of sensation is determined by the point in the nervous system where nerve fiber ends.

**Q.30 Write two commercial uses of gibberellins.**

**Ans.** GA promotes fruit setting. GA<sub>3</sub> is used in the brewing industry.

**Q.31 Give commercial uses of cytokinins.**

**Ans.** Cytokinins delay aging of fresh leaf crops, such as cabbage and lettuce. They keep the flowers fresh. They can also be used to break dormancy of some seeds.

**Q.32 Give two physiological roles of abscissic acids.**

**Ans.** It inhibits stem and root growth especially during physiological stress, e.g., drought, water logging. It promotes bud and seed dormancy.

**Q.33 Write commercial applications of abscissic acid.**

**Ans.** Abscissic acid can be sprayed on tree crops. It regulates fruit drop at the end of the season. This removes the problems of picking fruits in a large time-span.

**Q.34 Write down summary of some endocrine disorders.**

**Ans.**

| Disease   | Cause                                                         | Symptoms                        |
|-----------|---------------------------------------------------------------|---------------------------------|
| Gigantism | Hypersecretion of <i>GH</i> starting in infancy or early life | Excessive growth of long bones. |
| Dwarfism  | Hyposecretion of <i>GH</i> in infancy of early life.          | Failure to grow.                |

|                     |                                                                                                         |                                                                                                                                         |
|---------------------|---------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------|
| Acromegaly          | Hypersecretion of <b>GH</b> after bone growth has stopped.                                              | Facial features become coarse; hands and feet enlarge; skin and tongue thicken.                                                         |
| Hyperthyroidism     | Overactivity of the thyroid gland                                                                       | <b>Nervousness</b> , inability to relax; weight loss; excess body heat and sweating; palpitations of the heart.                         |
| Hypothyroidism      | Underactivity of the thyroid gland                                                                      | <b>Fatigue</b> , reduced heart rate; <b>constipation</b> , <b>weight gain</b> , feel cold, dry skin.                                    |
| Hyperparathyroidism | Excess parathyroid hormone secretion, usually resulting from a benign tumor in the parathyroid gland.   | <b>Kidney stones</b> , indigestion, depression, loss of calcium from bones.                                                             |
| Hypoparathyroidism  | Hyposecretion of the parathyroid glands.                                                                | <i>Spasms in muscles</i> ; numbness in hands and feet, <i>dry skin</i> .                                                                |
| Diabetes insipidus  | Hyposecretion of <b>ADH</b> .                                                                           | Excessive drinking and urination, constipation.                                                                                         |
| Diabetes mellitus   | Insufficient <b>insulin</b> production or inability of target cells to respond to insulin.              | <b>Excessive urination</b> and <b>thirst</b> ; poor wound healing urinary tract infections; excess glucose in urine fatigue and apathy. |
| Cushing's syndrome  | Hypersecretion of hormones from adrenal cortex or more commonly, from cortisone treatment.              | Face and body become fatter; loss of muscle mass; weakness; fatigue; osteoporosis.                                                      |
| Addison's disease   | Gradual-decrease in production of hormones from adrenal gland most common cause is autoimmune reaction. | Loss of appetite and weight; fatigue and weakness, complete adrenal failure.                                                            |

**Q.35 Write briefly the function of brain and spinal cord.**

**Ans. Brain and Spinal Cord:**

- ♦ White matter consists mainly of nerve fibres. Grey matter consists mainly of cells bodies. The brain has grey matter on the outside enclosing the white matter. The spinal cord has white matter on the outside enclosing grey matter.
- ♦ The different parts of the brain and their functions:

|  | Parts of mammalian brain | Function(s) |
|--|--------------------------|-------------|
|--|--------------------------|-------------|

|                  |                                                                                                                                        |                                                                                                                                                                                               |
|------------------|----------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Forebrain</b> | <ul style="list-style-type: none"> <li>• Cerebral hemispheres (Cerebrum)</li> <li>• Hypothalamus</li> <li>• Pituitary gland</li> </ul> | <p>Intelligence, memory, voluntary actions, sensations.</p> <p>Regulation of body temperature and osmotic pressure in blood; appetite and emotions.</p> <p>Secretes a number of hormones.</p> |
| <b>Midbrain</b>  | <ul style="list-style-type: none"> <li>• Optic lobes</li> </ul>                                                                        | Concerned with sight and movement of eyeball.                                                                                                                                                 |
| <b>Hindbrain</b> | <ul style="list-style-type: none"> <li>• Cerebellum</li> <li>• Medulla oblongata</li> </ul>                                            | <p>Muscular co-ordination and bodily balance.</p> <p>Involuntary actions, e.g., heartbeat, respiratory movements, peristalsis.</p>                                                            |

- ◆ The spinal cord serves:
  - as a reflex centre,
  - to transmit impulses from receptor to brain,
  - to transmit impulses from brain to effector.

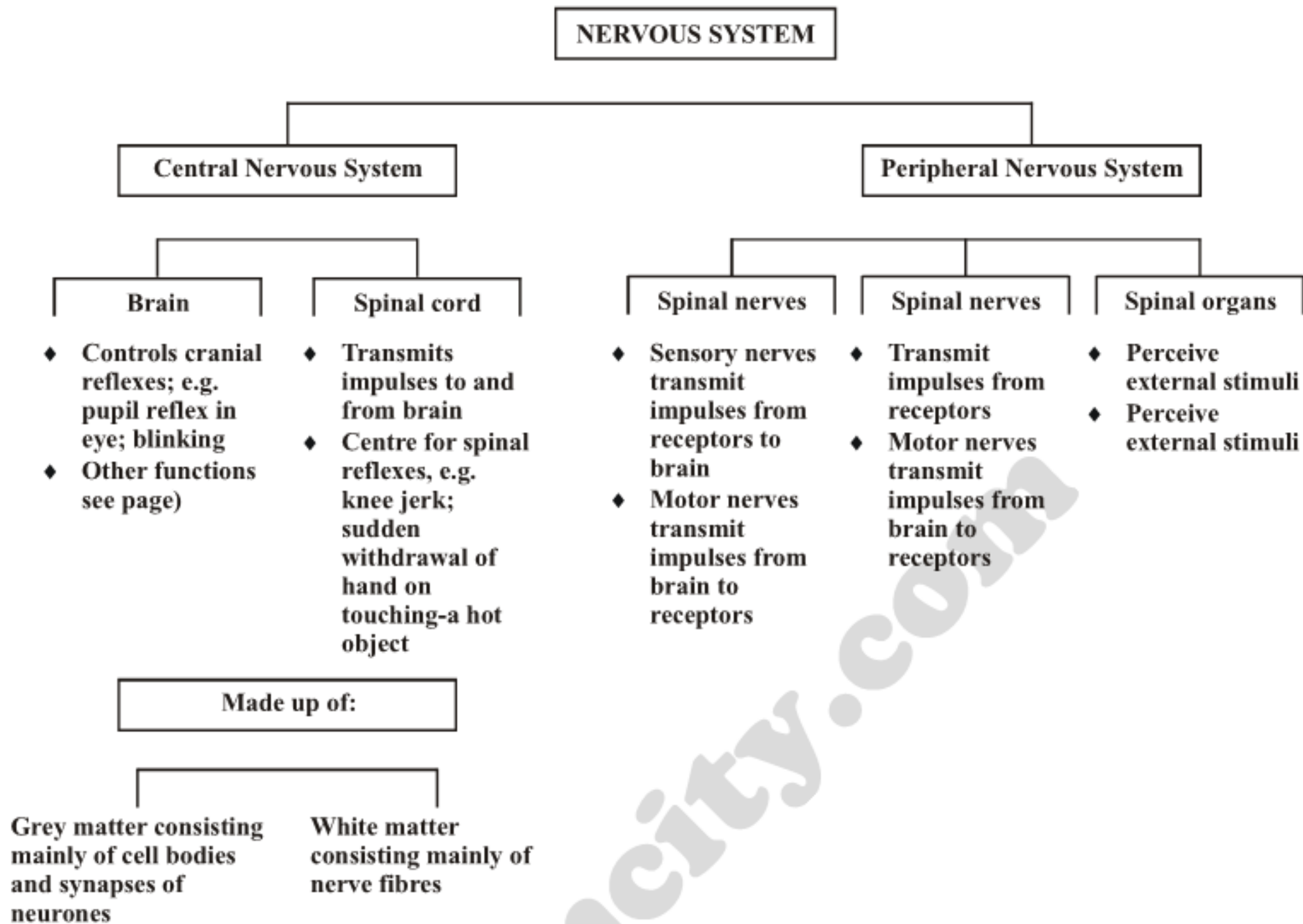
**Q.36 Describe reflex and voluntary action.**

**Ans. Reflex and Voluntary Actions:**

- ◆ A reflex action is a direct response to a specific stimulus without conscious control.
- ◆ A reflex arc is the shortest pathway by which impulses travel from the receptor to the effector in a reflex action.
- ◆ The parts centre (e.g., spinal cord), motor neurone, intermediate neurone in reflex centre (e.g., spinal cord), motor neurone and effector.
- ◆ A voluntary action is controlled by the will. It does not involve a sensory neurone.
- ◆ Examples of a spinal reflex: knee-jerk, sudden withdrawal of hand touching a hot object.
- ◆ Examples of a cranial reflex; pupil reflex, sudden blinking of eyes when an object moves past them.
- ◆ A conditioned reflex action is acquired from past experiences or learning with a stimulus which is originally ineffective in producing the response.

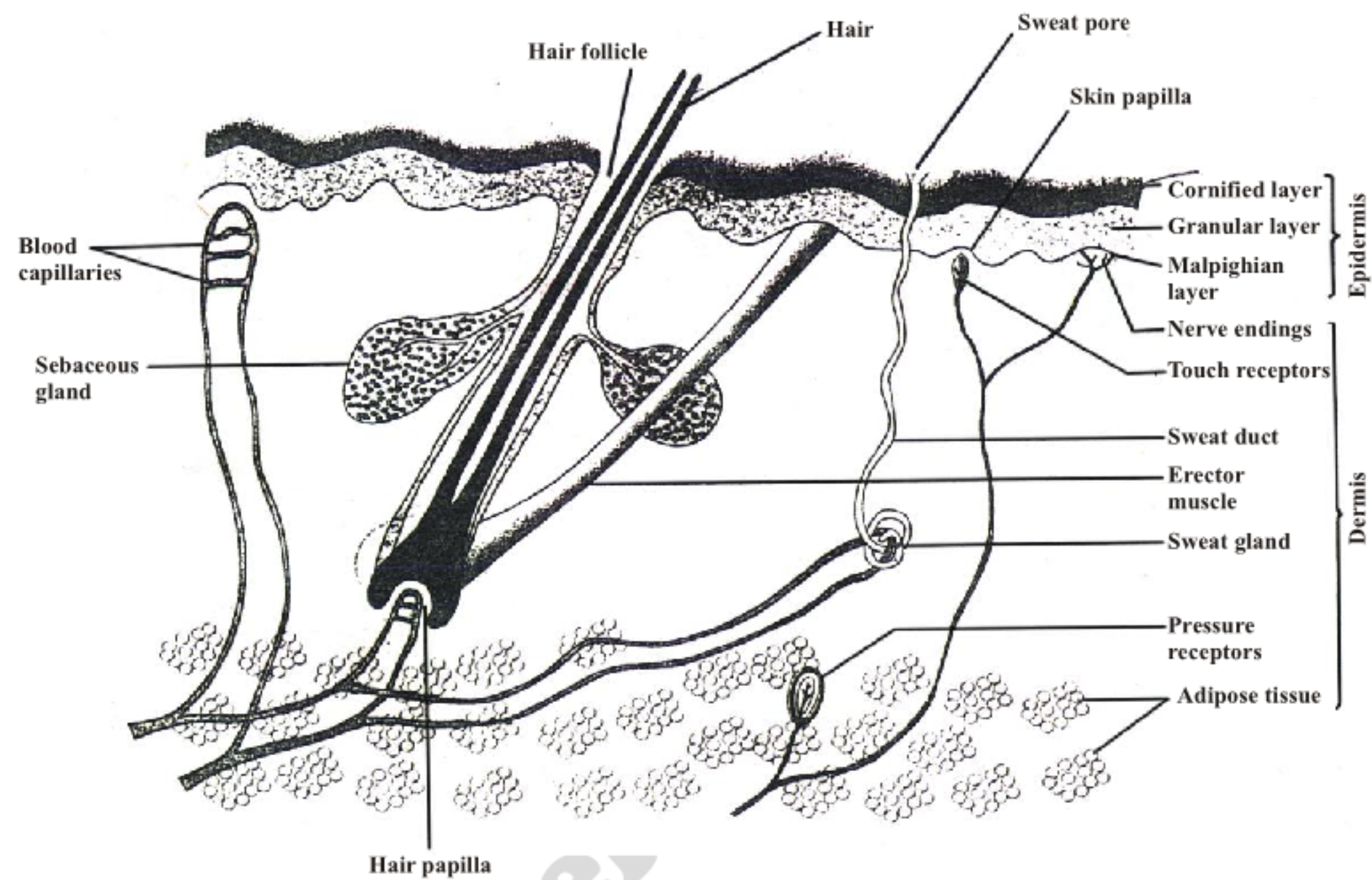
**Q.37 Write concept map of the mammalian nervous system.**

**Ans.**



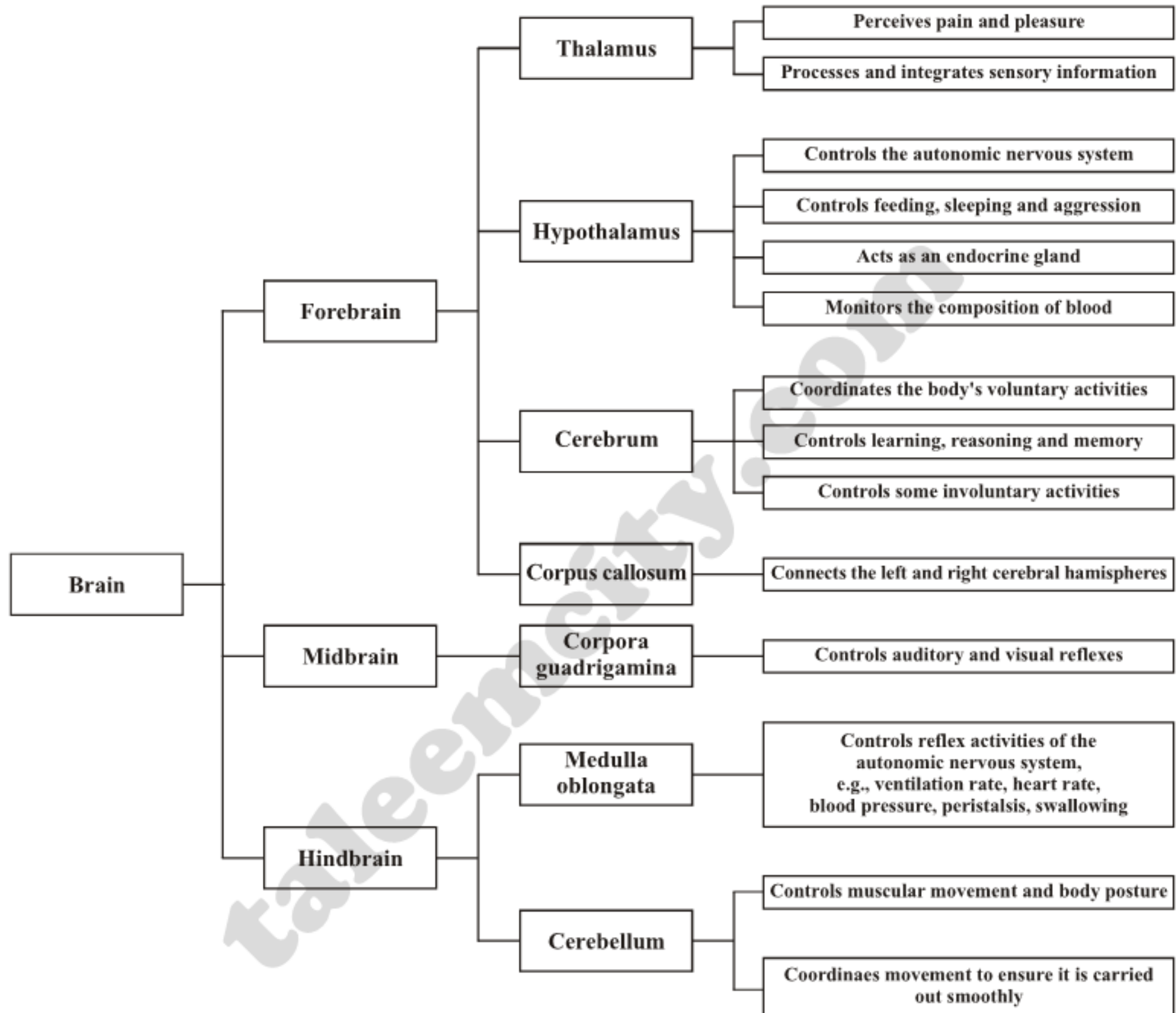
**Q.38 Draw section of the human skin.**

**Ans.**



**Q.39 Give a concept map about brain function?**

**Ans.**



**Q.40 Write comparison of some effects of sympathetic and parasympathetic nervous system.**

**Ans.** Comparison of some effects of the sympathetic and parasympathetic nervous systems:

| Sympathetic nervous system                      | Parasympathetic nervous system      |
|-------------------------------------------------|-------------------------------------|
| Increases cardiac output                        | Decreases cardiac output            |
| Increases blood pressure                        | Decreases blood pressure            |
| Dilates bronchioles                             | Constricts bronchioles              |
| Increases ventilation rate                      | Decreases ventilation rate          |
| Dilates pupils of the eyes                      | Constricts pupils of the eyes       |
| Contracts anal and bladder sphincters           | Relaxes anal and bladder sphincters |
| Contracts erector pili muscles, so raising hair | No comparable effect                |
| Increases sweat production                      | No comparable effect                |
| No comparable effect                            | Increases secretion of tears        |

**Q.41 What is cretinism?**

**Ans. Cretinism:**

The hormonal disease due to *deficiency of thyroxine* in the children is called cretinism.

**Symptoms:**

It is characterized by stunted growth, bodily deformity, defective mental development and retarded sexual development.

**Q.42 What is exophthalmic goiter?**

**Ans. Exophthalmic Goiter:**

The hormonal disease due to *over secretion of thyroxine* in which *swelling of neck occurs*, is called exophthalmic goitre.

**Symptoms:**

There is rapid heart beat, fast pulse rate, restlessness and nervousness, loss of weight and protruding eye balls.

**Q.43 How does pancreas play as endocrinal and exocrinal role?**

**Ans. Pancreas as Exocrine and Endocrine Gland:**

**Lobules:**

It consists of several lobules which are held together by connective tissue. The lobules secrete pancreatic juice which is *digestive in function*.

**Islets of Langerhans:**

Among the lobules lie groups of cells called islets of Langerhans.

These islands of cells constitute the endocrine part of the pancreas.

The  $\alpha$  cells of the islets secrete the hormone glucagon.

The  $\beta$  cells secrete insulin.

**Q.44 What do you know about hypothalamus?**

**Ans. Hypothalamus:**

Until recently, it was considered that the pituitary gland was the chief gland of the endocrine system.

It is now known that the pituitary itself is under the control of the hypothalamus of the brain. The pituitary gland is connected to the hypothalamus by the pituitary stalk. The anterior pituitary is connected to the hypothalamus by nerve fibres.

The function of the anterior pituitary is regulated by hormones (neurohormones) secreted by the *neurosecretory* cells of the hypothalamus and secretions of the hypothalamus which are vasopressin and oxytocin stored in the posterior pituitary.

**Q.45 What types of condition are produced by extra thyroxine?**

**Ans. Excess of Thyroxine:**

Following abnormalities take place by extra thyroxine:

- (i) It increases basal metabolic rate.
- (ii) Grave's disease with exophthalmic goiter takes place.
- (iii) It causes cardiac failure in prolonged condition.
- (iv) The cause of Grave's disease is due to production of an abnormal protein. It stimulates the thyroid to excessive secretion.

**Q.46 Define:**

- (i) Autonomic nervous system      (ii) Peripheral nervous system
- (iii) Central nervous system      (iv) Spinal cord
- (v) Meninges

**Ans. (i) Autonomic Nervous System:**

The part of peripheral nervous system which controls activities inside the body that are normally *involuntary*, such as *heart rate*, *peristalsis* and *sweating*.

**(ii) Peripheral Nervous System:**

The nervous system which consists of all body nerves i.e. *spinal nerves* and *cranial nerves*, they all enter or leave the central nervous system.

**(iii) Central Nervous System:**

The system consists of the *brain* and *spinal cord* which is responsible for coordination.

**(iv) Spinal Cord:**

A cylinder or nervous tissue running from the base of the brain down to back which contain grey matter and white matter.

**(v) Meninges:**

The central nervous system is surrounded by three layers or membranes called meninges.

**Q.47 Give comparison of nervous coordination and chemical coordination.**

**Ans. Similarities of Nervous & Chemical Coordination:**

**(i) Synthesis of Chemical Messenger:**

Both hormone producing cells and nerve cells (neurons) synthesize chemical “messenger”.

**(ii) Release Chemicals in Spaces:**

Both release the messenger chemicals in extra cellular spaces of the body.

**(iii) Help in Coordination:**

Both help in coordination of the body.

**(iv) Respond:**

Both function in response to specific stimuli either from within the body or from the external environment.

**(v) Homeostatic:**

Both are homeostatic in function.

**Q.48 What is myxoedema?**

**Ans. Myxoedema:**

The hormonal disease due to under secretion of thyroxine in the adults is called myxoedema.

**Symptoms:**

This results in loss of hair, increased thickness and dryness of skin, increase in weight, muscular weakness, slowing of mental process etc.

**Q.49 What are the basic characteristics of endocrine glands?**

**Ans. Characteristics of Endocrine Glands:**

- (i) They secrete chemicals called hormones.
- (ii) They are without ducts i.e. ductless glands.
- (iii) Hormone is secreted directly into blood stream.
- (iv) They have a rich supply of blood with a relatively large number of blood vessels.

**Q.50 Give the properties of hormones.**

**Ans. Properties of Hormones:**

- (i) It travels in the blood.
- (ii) It is produced at one place and affects on other area or target.
- (iii) It fits into receptor molecule in the target like a key in a lock.
- (iv) It is secreted in small amount.
- (v) It is a soluble organic molecule.
- (vi) It is effective in low concentrations.

**Q.51 What is diabetes mellitus?**

**Ans. Diabetes Mellitus:**

More and more glucose accumulates in the blood (hyperglycaemia). The excess of glucose is eliminated through the urine (glycosuria). This condition is called diabetes mellitus.