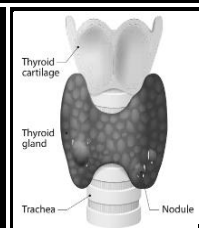


UNIT –16

PLANT AND ANIMAL HORMONES



I. Choose the correct answer

- Gibberellins cause:
 - Shortening of genetically tall plants
 - Elongation of dwarf plants**
 - Promotion of rooting
 - Yellowing of young leaves
 - The hormone which has positive effect on apical dominance is:
 - Cytokinin
 - Auxin**
 - Gibberellin
 - Ethylene
 - Which one of the following hormones is naturally not found in plants: [AUG – 2022]
 - 2, 4-D**
 - GA 3
 - Gibberellin
 - IAA
 - Avena coleoptile test was conducted by
 - Darwin
 - N. Smit
 - Paal
 - F.W. Went**
 - To increase the sugar production in sugarcanes they are sprayed with _____
 - Auxin
 - Cytokinin
 - Gibberellins**
 - Ethylene
- Hint :** Ethylene is concerned with maturation of fruits and increases the sucrose content. Gibberellin elongates the stem increasing the yield. But, ethylene is more appropriate as it is the gaseous hormone that has to be sprayed.
- LH is secreted by
 - Adrenal gland
 - Thyroid gland
 - Anterior pituitary**
 - Hypothalamus
 - Identify the exocrine gland [AUG – 2022]
 - Pituitary gland
 - Adrenal gland
 - Salivary gland**
 - Thyroid gland
 - Which organ acts as both exocrine gland as well as endocrine gland
 - Pancreas**
 - Kidney
 - Liver
 - Lungs
 - Which one is referred as “Master Gland”? [MAY - 2022, PTA – 2]
 - Pineal gland
 - Pituitary gland**
 - Thyroid gland
 - Adrenal gland

II. Fill in the blanks

- Auxins** causes cell elongation, apical dominance and prevents abscission.
- Ethylene** is a gaseous hormone involved in abscission of organs and acceleration of fruit ripening.
- Abscisic acid** causes stomatal closure.
- Gibberellins induce stem elongation in **rosette** plants.
- The hormone which has negative effect on apical dominance is **cytokinin**.
- Calcium metabolism of the body is controlled by **parathormone**.
- In the islets of Langerhans, beta cells secrete **insulin**. [PTA – 6]
- The growth and functions of thyroid gland is controlled by **thyroid stimulating hormone**.
- Decreased secretion of thyroid hormones in the children leads to **cretinism**.

III. a) Match Column I with columns II and III

Answer:

Column I	Column II	Column III
1. Auxin	<i>Coleoptile tip</i>	<i>Apical dominance</i>
2. Ethylene	<i>Fruits</i>	<i>Ripening</i>
3. Absciscic acid	<i>Chloroplast</i>	<i>Abscission</i>
4. Cytokinin	<i>Coconut milk</i>	<i>Cell division</i>
5. Gibberellins	<i>Gibberella fujikuroi</i>	<i>Internodal elongation</i>

III. b) Match the following hormones with their deficiency states

Hormones	Disorders	Answer
1. Thyroxine	Acromegaly	1. Simple goitre
2. Insulin	Tetany	2. Diabetes mellitus
3. Parathormone	Simple goitre	3. Tetany
4. Growth hormone	Diabetes insipidus	4. Acromegaly
5. ADH	Diabetes mellitus	5. Diabetes insipidus

IV. True or False: (if false give the correct statement)

- A plant hormone concerned with stimulation of cell division and promotion of nutrient mobilization is cytokinin. [True]
- Gibberellins cause parthenocarpy in tomato. [True]
- Ethylene retards senescence of leaves, flowers and fruits. [False]
 *Ethylene *hastens* senescence of leaves, flowers and fruits.
- Exophthalmic goitre is due to the over secretion of thyroxine. [True]
- Pituitary gland is divided into four lobes. [False]
 *Pituitary gland is divided into *two* lobes.
- Estrogen is secreted by corpus luteum. [False]
 *Estrogen is secreted by *graafian follicle* (OR) Progesterone is secreted by corpus luteum.

V. Assertion and Reasoning

Direction: In each of the following questions, a statement of assertion (A) is given and a corresponding statement of reason (R) is given just below it. Mark the correct statement as.

- a) If both A and R are true and R is correct explanation of A c) A is true but R is false
 b) If both A and R are true but R is not the correct explanation of A d) Both A and R are false

- Assertion (A):** Application of cytokinin to marketed vegetables can keep them fresh for several days.
Reason (R): Cytokinins delay senescence of leaves and other organs by mobilisation of nutrients.

Ans. (a) Both A and R are true but R is correct explanation of A.

- Assertion (A):** Pituitary gland is referred as “Master gland”.
Reason (R): It controls the functioning of other endocrine glands.

Ans. (a) Both A and R are true and R is correct explanation of A.

- Assertion (A):** Diabetes mellitus increases the blood sugar levels.
Reason (R): Insulin decreases the blood sugar levels.

Ans. (b) Both A and R are true but R is not the correct explanation of A.

VI. Answer in a word or sentence

1. Which hormone promotes the production of male flowers in cucurbits?	Gibberellin
2. Write the name of a synthetic auxin.	2,4 D (2,4 Dichlorophenoxy acetic acid)
3. Which hormone induces parthenocarp in tomatoes?	Gibberellin
4. What is the hormone responsible for the secretion of milk in female after childbirth?	Prolactin
5. Name the hormones, which regulates water and mineral metabolism in man. [PTA – 5]	Vasopressin, Aldosterone & Parathyroid
6. Which hormone is secreted during emergency situation in man?	Adrenaline & Noradrenaline
7. Which gland secretes digestive enzymes and hormones?	Pancreas
8. Name the endocrine glands associated with kidneys.	Adrenal gland

VII. Short answer questions

1. What are synthetic auxins? Give examples. [MAY - 2022, PTA – 4]

These are artificially synthesized auxins that have properties like auxins.

Example: 2,4 D (2,4 Dichlorophenoxy acetic acid), Indole 3 Butyric Acid (IBA).

2. What is bolting? How can it be induced artificially? [MDL – 19]

❖ Bolting is the sudden shoot elongation followed by flowering.

❖ It can be induced artificially by treatment of gibberellin.

3. Bring out any two physiological activities of abscisic acid.

❖ It promotes abscission process. ❖ It promotes senescence in leaves.

4. What will you do to prevent leaf fall and fruit drop in plants? Support your answer with reason.

❖ Spraying auxins can prevent leaf fall and fruit drop.

❖ Because auxin prevents the formation of abscission layer.

5. What are chemical messengers?

❖ Hormones produced by Endocrine Glands are called Chemical Messengers.

❖ *Ex:* Growth hormone.

6. Write the differences between endocrine and exocrine gland.

S.No	Endocrine glands	Exocrine glands
1.	They do not have ducts. Secretions diffuse directly into blood.	They have ducts to carry secretions.
2.	Secrete hormones.	Secrete enzymes.
3.	<i>Ex :</i> Thyroid gland	<i>Ex :</i> Salivary gland

7. What is the role of parathormone?

❖ Parathormone regulates calcium and phosphorus metabolism.

❖ They maintain blood calcium levels.

8. What are the hormones secreted by posterior lobe of the pituitary gland? Mention the tissues on which they exert their effect. [PTA – 2]

Hormone	Tissues on which they exert their effect
<i>Vasopressin or Antidiuretic hormone (ADH)</i>	Kidney tubules
<i>Oxytocin</i>	Smooth muscles of uterus and mammary gland.

9. Why are thyroid hormones referred as personality hormones? [AUG – 2022, MDL – 19]
Thyroid hormones are essential for normal physical, mental and personality development. Hence, it is also known as personality hormone.

10. Which hormone requires iodine for its formation? What will happen if intake of iodine in our diet is low?

- ❖ Thyroid hormone requires iodine for its formation.
- ❖ If intake of iodine is low, it causes goiter.

VIII. long answer question

1. (a) Name the gaseous plant hormone. Describe its three different actions (physiological effects) in plants. [SEP – 2021, PTA – 3]

Gaseous plant hormone - **Ethylene**

- ❖ It promotes the ripening of fruits.
- ❖ It inhibits the elongation of stem and root in dicots.
- ❖ It hastens senescence.
- ❖ It stimulates formation of abscission zone leading to premature shedding.

- (b) Which hormone is known as stress hormone in plants? Why?

Stress hormone - **Abscisic acid**. Because it increases tolerance of plants to various stress.

2. Describe an experiment which demonstrates that growth stimulating hormone is produced at the tip of coleoptile.

Frits Warmolt Went demonstrated that auxin is produced at the tip of coleoptile.

In his first experiment,

- ❖ He removed the tips. The cut tips did not grow.
- ❖ Indicate that the tips produced something essential for growth.

In his second experiment,

- ❖ He placed agar blocks on the removed tips. There is no response.

In his next experiment,

- ❖ He placed cut tips on agar blocks. After an hour, he removed the tips and placed this agar block on the cut plant. It grew straight up.
- ❖ Indicates that some chemical had diffused from the cut tips into agar block.

Conclusion: This Chemical was responsible for growth, and Went named it as “**Auxin**”.

3. Write the physiological effects of gibberellins.

- ❖ Gibberellin stimulates extraordinary *elongation of internode*.
- ❖ *Bolting* is achieved by gibberellin.
- ❖ It promote the *production of male flowers*.
- ❖ It *break dormancy* of potato tubers.
- ❖ It induces *parthenocarpic fruits*.

4. Where are estrogens produced? What is the role of estrogens in the human body?

Estrogen is produced in graafian follicles of ovary.

Functions of estrogens:

- ❖ It brings changes during puberty.
- ❖ It initiates oogenesis.
- ❖ It stimulates the maturation of ovarian follicles.
- ❖ It helps in development of secondary sexual characters.

5. What are the conditions, which occur due to lack of ADH and insulin? How are the conditions different from one another?

S.No	Deficiency of ADH causes Diabetes Insipidus	Deficiency of insulin causes Diabetes Mellitus
1.	Increases water loss through urine.	Glycosuria - Excretion of excess glucose in urine.
2.	Causes Polyuria	Causes Polyuria, Polydipsia, Polyphagia
3.	Reduces reabsorption of water.	Hyperglycemia - Increased blood sugar level.

IX. Higher Order Thinking Skills (HOTS)

1. What would be expected to happen if,

a) Gibberellin is applied to rice seedlings.	Internodal elongation and increase in height.
b) A rotten fruit gets mixed with unripe fruits.	Ethylene from ripe fruits will hasten the ripening.
c) When cytokinin is not added to culture medium?	Culture tissue will not show any growth.

2. A plant hormone was first discovered in Japan when rice plants were suffering from Bakanae disease caused by *Gibberella fujikuroi*. Based on this information answer the following questions:

a) Identify the hormone involved in this process.	Gibberellin.
b) Which property of this hormone causes the disease?	Internodal elongation.

c) Give two functions of this hormone.

- ❖ Gibberellin stimulates extraordinary *elongation of internode*.
- ❖ *Bolting* is achieved by gibberellin.

3. Senthil has high blood pressure, protruded eyeball and an increased body temperature. Name the endocrine gland involved and hormone secretion responsible for this condition.

- ❖ Thyroid gland and thyroid hormones are responsible for this condition.

4. Sanjay is sitting in the exam hall. Before the start of the exam, he sweats a lot, with increased rate of heartbeat. Why does this condition occur?

- ❖ It is due to the secretion of emergency hormones during stress and emotion.

5. Susan's father feels very tired and frequently urinates. After clinical diagnosis, he was advised to take an injection daily to maintain his blood glucose level. What would be the possible cause for this? Suggest preventive measures.

It is due to deficiency of insulin, which leads to Diabetes mellitus.

Preventive measures:

- ❖ Eat healthy foods
- ❖ Exercise regularly
- ❖ Avoid smoking