CONTROL AND COORDINATION IN LIVING ORGANISMS

HORMONE - The bio chemical compound of low molecular weight secreated in trace amount from some specific group of cells transported through body fluid elsewhere to control the bio chemical reaction in certain target group of cell at the site of action is called hormone.

CHARACTERISTIC OF HORMONE

(i) Bio chemical compound of low molecular weight.
(ii) Secreated and acted in trace amount.
(iii) Secreted from specific group of cell (plant - meristem parenchyma; animal - endocrine gland)
(iv) Transported through body fluid by cell to cell diffusion or circulation.
(v) Hormone controls and coornate biochemical function of different tissue and organ to attend internal balance (homeostatis) in living organism. Hence hormone is often called chemical co-ordinater.
(vi) Hormone act slowly and has a long term affect
(vii) Hormone gets destroyed after its function is over (fate of
(viii) In many cases it function in feed back control system.

The secreation of from a gland is control by the bvel of it own hormone is called feed back control. If the secreation is less than the optimum in blood then it stimulates for more secreation of hormone representing the positive feed back control. If the secretion is more than optimum in blood that it inbibits for less secreation of hormone representing negative feed back control.

(ix) The process by which the same bio chemical reaction gets regulated by two different hormone is called dual control. Eg insulin and glucagon act in opposite manner to control blood sugar level.

(x) Hormone carries specific signal in the form of chemical substance from the source to regulate the bio course of reaction in some definate groups of cells. Hence hormone is also called chemical messenger.

Points of Difference	Hormone	Enzyme
Chemical nature	Varies	Protine.
Source	Specific groups of cells	All living cells
Fate After function	Destroyed	Unchanged
Site of action	Far away from source.	Near source.

Similarity. Both acts as catalyst.

Auxin -

Characteristics / feature / Properties

Auxin is an indole derivative plant hormone and its chemical name is ~~Indole Acetic Acid (IAA)~~ Indole Acetic Acid (IAA)

1) It controls phototropic and geotropic movement in plant organ.

2) Auxin is a polar hormone, as it's always transmitted unidirectionally from apex towards base in stem and root.

3) During polar movement, auxin hormone inhibits the growth of axillary bud and thus prevents branching. So it shows apical dominance.

function / Application

1) Auxin induces nuclear division or karyokinesis during somatic cell division in meristimetic tissue and thus helps in primary and secondary growth in plant.

2) Auxin induces root initiation through irregular division of Cambium tissue from the stem cutting and thus helps in vegetative propagation in plant.

3) Auxin induces growth of unfertilized ovary into seedless fruit in certain varieties of plant.

4) Auxin prevents immature falling of leaves, flowers and fruits.

5) Auxin helps in eradication of weeds.

6) Auxin prevent unwanted sprouting of buds to restore food value of tuber.

Gibberellin

Properties

- Acidic, non-nitrogenous, terpenoid group of plant hormone
- No control over tropic movement in plants
- It can be transmitted in reversible direction through plant axis and
- No role in apical dormance.

Function and Application

- It induces elongation of cell as well as stem internode and thus controls primary growth in plants.
- It can remove genetic dwarfism and can transform a short height plant into unusually tall height plant. So it's often applied in production of bamboo, jute, hemp etc.
- Gibberellin induces activation of α-amylase gene and the enzyme so formed hydrolysis starch to sugar. Thus providing nutrition to the embryo during germination. So synthetic gibberelic acid in certain dose can break seed dormancy to increase the production of seasonal fruit, flowers, crops etc

Cytokinin

Properties.

1) It is nitrogenous, alkaline, phyto hormone. It is an amino purine
2) Cytokinin can overcome apical dominance and thus facilitate growth of axillary bud resulting in branching
3) Richmond Lang affect cytokinin induces synthesis and preservation of chlorophyll and inhibits senescence.

Function

1) Role in growth
(i) It stimulates cytoplasmic division and thus adds along with auxin help in mitotic division in somatic cell. leading to overall growth of the plant.
2) Morphogenesis - Cytokinin in certain proportion causes differentiation of axillary bud. ~~in~~ e Auxin in cytokin in equal proportion helps in differentiation axillary bud and roots. and thus helps in formation of neumerous plant bts from thallus tissue in tissue culture.
3) It can retard abscission and senescence of plant organ.
4) It controls the opening of stomatal aperture along with sodium ion potassium ion.

Animal Hormone

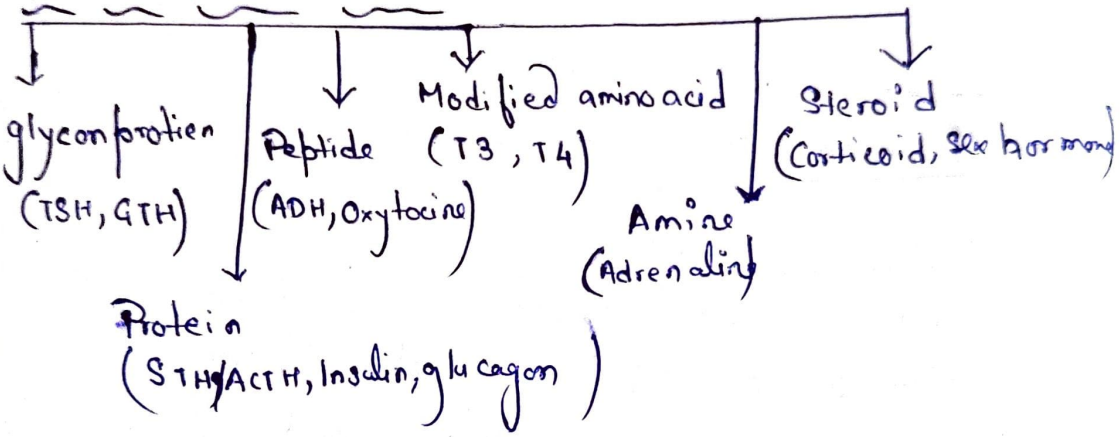
Source

(i) Endocrine gland - Eg: Thyroid, Pitutary (anterior),

(ii) Mixed gland - Eg: Pancreas, Testis

(iii) Neuro endocrine gland - Eg Hypothalamus, pos-terior pituitary, Adrenal medulla etc.

Animal hormone (Chemical nature)



Tropic Hormone -

Write the difference between Tactic movement and tropic movement.

Tactic movement	Tropic movement
1) It is the movement of locomotion.	1) It is the movement of curvature.
2) ~~Stimuli control the direction of movement.~~	2) ~~Both intensity and~~ direction of stimuli control the movement.
2) Both intensity and direction control the movement	
3) Unicellular plants perform this movements.	3) Some parts of higher plants are involve in this movement.

What is neuro hormone?

→ Certain neuro secretary cells present in the nervous system (hypothalamus) produce the chemical substances known as neuro hormone. Eg: Vasopressine and oxytocine.

What is local hormone?

Local hormones are the hormones which are liberated from the number of tissues of the body and act near the site of origin. Eg: gastrine secreted from stomach and stimulates stomach to secrete gastric juice from it.

What do you mean by releasing hormone.

→ Releasing hormone are neuro hormone secreted from hypothalamus which comes to pitutary gland and stimulate it to secrete tropic hormone. Eg: TRH (Thyroid releasing hormone) stimulate pitutary to secrete TSH.

Name one endocrine gland present outside the body. Mention its nature.

→ Testis.

Nature - Testis is a mixed type of gland because it perform two functions. formation of sperms and ~~seer~~ secretion of testosterone.

Explain geotropic movement with example.

→ The movement of curvature of plant organs when induced by force of gravity is called geotropic movement. Eg: Primary roots are positively geotropic as they grow towards the gravitational force.

Which hormone is called emergency hormone and why.

→ Adrenaline is called emergency hormone.

It is called emergency hormone because it initiates a rapid reaction that helps the person think rapidly and respond to stress. by fight or flight response.

Differentiate between nervous and endocrine system

Nervous System	Endocrine System
1) Electrochemical impulses and neuro-transmiter are the means of signal ~~transmis~~ transmission.	1) Chemicals called hormone are the means of signal transmission
2) Signal transmission is fast but the functions are not ~~prolonged~~. long lasting	2) Signal transmission is slow but the function are long lasting.

3) Uses the neurons to transmit the signal 4) The neuro transmiter acts locally	3) Use the circulatory system to transmit the signal 4) Hormones are carried by blood and act on various tissues far away from the place of origin

Write a short note on Hypothalamus.

The Hypothalamus is located below the thalamus just above the brain stem. It is responsible for sudden metabolic process and other activites of autonomic nervous system. It synthensis and secretes certain neuro hormones which in tern stimulate or inhibit the secretation of pitutary hormones. It regulates body temperature apitide, sleep, emotional expression etc

Classify the following as conditioned or Unconditioned reflex

(i) Applying the break of a car at red signal - Conditioned

(ii) Sweating - Unconditioned

(iii) Opening the door on hearing the door bell - Conditioned

(iv) Looking left or right before crossing the road -

(v) knee jerk -

Why nerve cells don't divide ?

Nerve cell don't have ~~centrosome~~. because it lacks centrosome. therefore in animal body number of neurone present in a new born baby is same as that present in a adult ie the number remain unchanged only the size increases.

Diffrentiate

Rod cell	Cone cell
1) Cylindrical in shape.	1) It is pyramidal in shape
2) It contain the pigment rhodopsin	2) It contain the pigment iodopsin
3) It is sensetive to dimlight but not to colour.	3) It helps in bright light vision and colour differenciation
4) Each retina contain 110-125 million number of rod cell.	4) Each retina contain 5.6-6.5 million number of cone cell

How cataract can be rectified?

Cataract can be rectified by surgically removing the lens and it has to be replaced by a convex lens. Nowadays intraocular lenses are used after ~~free~~ phaco surgery by replacing the opaque lens

Differentiate between CNS and PNS

CNS	PNS
1) Made up of brain and spinal cord.	1) Made up of cranial, spinal and atonomic nerves
2) It lies within skull and vertebral column	2) It lies outside the human skeleton.
3) It is covered with three meninges	3) It is covered by neurolemma
4) It interprets sensory impulse and give rise to motor response.	4) It propagates sensory impluse and motor response.

Monocular vision	Binocular vision
Eyes are located on each side of the head.	Eyes are located side by side infront of head
2) Overlapping of visual ~~fir~~ feild. ~~Does not occur poor perception of depth.~~	2) Does not occur poor perception of depth.

Differentiate between monocular vision and binocular vision

Monocular Vision	Binocular Vision
1) Eyes are located on each side of the head	1) Eyes are located side b Side infront of head
2) ~~Over~~ Overlopping of visual feild. Does not occur poor perception of depth	2) Vision is overlopped to give increased depth perception.
3) Provides wider range of vision which is useful to spot predators.	3) Allows 3-D vision beyond obstacles.