

HORMONES OF HEART, KIDNEY AND GASTROINTESTINAL TRACT

Heart :

The atrial wall of our heart secretes a very important peptide hormone called atrial natriuretic factor (ANF), also called blood pressure lowering hormone. When blood pressure is increased, ANF is secreted from heart wall and causes dilation of the blood vessels. This reduces the blood pressure.

Kidney :

The juxtaglomerular cells of kidney produce a peptide hormone called erythropoietin which stimulates erythropoiesis (formation of RBC).

Gastro Intestinal Tract (GIT) :

Endocrine cells present in different parts of the gastro intestinal tract secrete four major peptide hormones, namely gastrin, secretin, cholecystokinin (CCK) and gastric inhibitory peptide (GIP)

- Gastrin act on the gastric glands and stimulates the secretion of HCl and pepsinogen.
- Secretin acts on the exocrine pancreas and stimulates secretion of water and bicarbonate ions in pancreatic juice.
- CCK acts on both pancreas and gall bladder and stimulates the secretion of pancreatic enzymes and bile juice from gall bladder respectively.
- GIP inhibits gastric secretion and motility.
- Several other non-endocrine tissues secrete hormones called growth factors. These factors are essential for the normal growth of tissues and their repairing / regeneration.

Hormones Which Always Remain In Tissue Fluid

There are some hormones which never reach upto blood stream but always remain in ECF.

These are as follows.

1. Neurohormone :-

These are secreted in the nodes of axons of nerve cells. Acetylcholine and Norepinephrine are the main neurohormones.

2. Prostaglandin :-

These are called local hormones. These are fatty acids. These are most active substances among all the known substances.

- Prostaglandin are of so many types. Kidneys, gonads, seminal vesicles, thymus, brain etc. organs and their cells secrete these hormones in ECF.
- These prostaglandins are first of all observed in semen of man. These stimulate contraction of unstriated muscles.
- These prostaglandins are secreted by seminal vesicles and reach upto vagina of female through semen of male, and then these activate the muscles of uterus of female.

3. Kinins :-

These are chemicals which are secreted by any organ of body at the time of chemical change in ECF, and reduce the B.P. by expanding blood vessels. These also reduce the time of blood clotting. Kinins are also called as "First aid hormone".

4. Pheromones or Ectohormones :-

- These are secreted by exocrine glands.
- These chemicals are secreted by animals and effect the other animal's behaviour and mode of life of the same species.

- First of all, pheromone Bombicol was studied. It is pheromone of female silk moth which attracts male for mating. Pheromones are volatile in nature, and travel through air from place to place.

Extra Points

- Heterocrine gland :- These are those endocrine glands which are involved in hormone secretion as well as some other function eg. pancreas, gonads, placenta, GI mucosa and kidneys.
- In females, prolactin and oxytocin induce maternalism i.e. strong emotional attachment.
- In male, prolactin and oxytocin promotes paternalism i.e. protective attitudes towards family members and intensive food gathering for the family.
- Contrary to thyroid dwarf (cretins), the pituitary dwarf have a normal mental development and proportionate body.
- Simmond's disease :- This condition is due to atrophy of the anterior lobe of pituitary gland.
- Growth hormone :- Stimulates the liver to form "Somatomedins" ("Insulin like growth factors"). These somatomedins have potent effects on bone growth.
- In heart CGMP has antagonistic effect to CAMP, CAMP mediate muscle contraction in response to adrenaline, while CGMP slow down muscle contraction is response to acetylcholine.
- CGMP used in second messenger in atrial natriuretic peptide and nitric oxide.
- Adrenal gland is also known as 4 - S gland

$$4 - S \left[\begin{array}{l} S - \text{Sugar metabolism} \\ S - \text{Salt retaining actions} \\ S - \text{Sex hormones} \\ S - \text{Stress reactions} \end{array} \right.$$

- In the presence of thyroxine and insulin, growth hormones becomes more active and help in body growth. In this way this hormone is important for the growth of body.
- Pituitary tumor may cause visual problem because it exerts pressure on optic chiasma and thus affect and transmission of sight impulses.
- The cortisol hormone of adrenal cortex serves to maintain the body in living condition and recover it from the severe effects of stress reactions. Thus, an increased output of cortisol is "life saving" in "shock conditions".
- So it is also known as life-saving hormone.
- The hormones of adrenal medulla prepare the animal for fear, fight or flight in emergency conditions, (by excess secretion of these hormones) Adrenaline hormone is called 3F = FFF hormone and adrenal gland is called "triple F gland" (FFF gland)
- The amount of cortisol and ACTH in blood is maximum in the morning and minimum in early part of night.
- Secretion of thymin decreases the neuromuscular transmission, so hypersecretion of thymine may cause myasthenia gravis. It provides the antibody against receptor & block the NM junction.