CONTROL AND COORDINATION

Class- X

Module – 3

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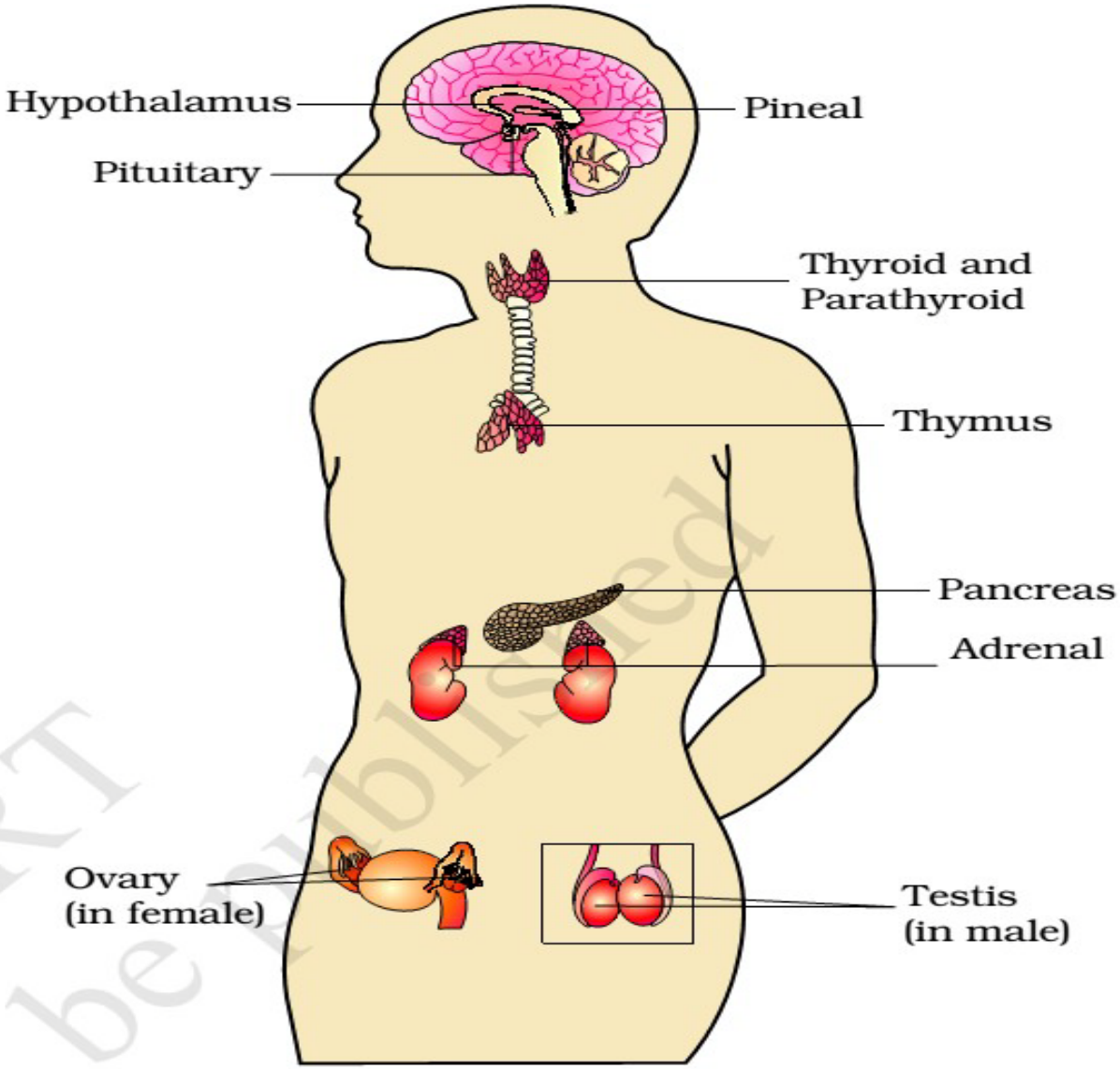
ENDOCRINE SYSTEM

- Endocrine system is a system of ductless glands that pour their secretions directly in the circulatory system.
- Circulatory system carries the secretions of the endocrine glands to the target organs and control various activities like metabolism,growth and differention .

ENDOCRINE SYSTEM IN HUMAN



WHAT ARE HORMONES ?

A **hormone** is a chemical that is made by specialist cells, usually within an endocrine gland, and it is released into the bloodstream to send a message to another part of the body. It is often referred to as a 'chemical messenger'.

CHARACTERISTICS OF HORMONES

- **Hormones** are secreted by endocrine cells.
- **Hormones** are chemical messengers.
- They are chemical signals that circulate in the body fluids.
- The **hormones** regulate the behaviour of the target cells.
- **Hormones**, unlike enzymes do not catalyze any reaction

HYPOTHALAMUS

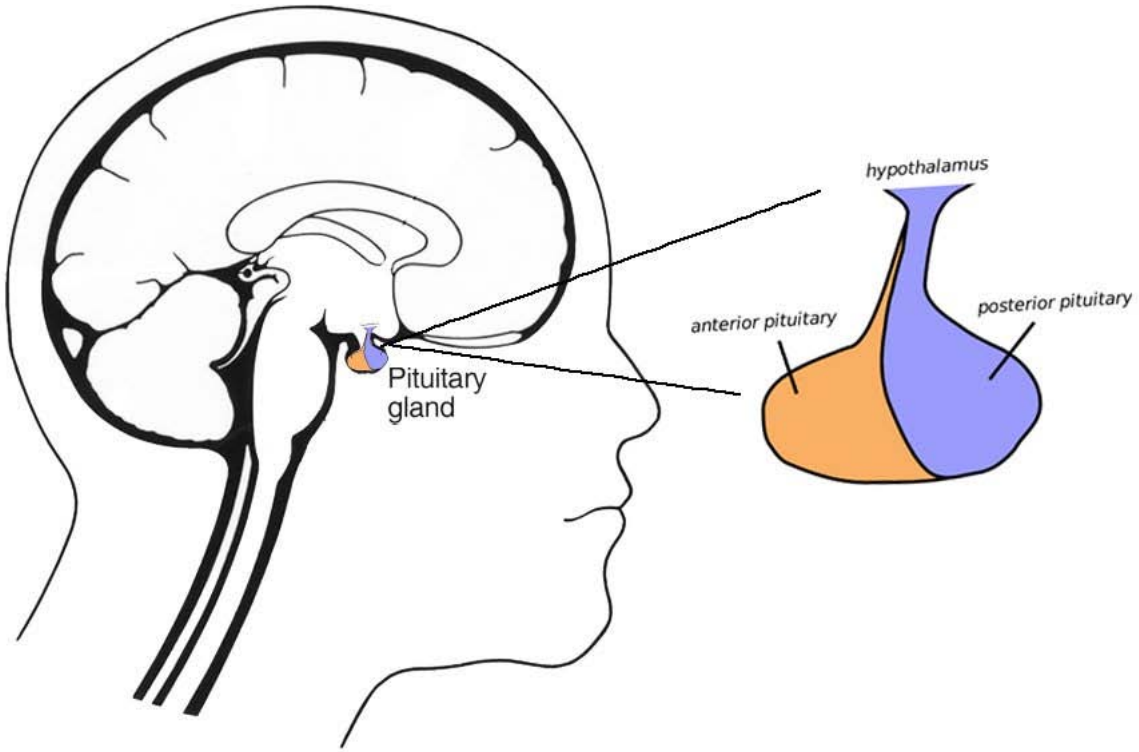
- The hypothalamus is a small region of the brain. It's located at the base of the brain, near the pituitary gland.
- While it's very small, the hypothalamus plays a crucial role in many important functions .The following are its main functions .

1. releasing hormones
2. regulating body temperature
3. maintaining daily physiological cycles
4. controlling appetite
5. managing of sexual behaviour
6. regulating emotional responses

PITUITARY

- The pituitary gland is a part of our endocrine system. Its main function is to secrete hormones into our bloodstream. These hormones can affect other organs and glands, especially our,
- thyroid
- reproductive organs
- adrenal glands
- The pituitary gland is sometimes called the master gland because it’s involved in so many processes.

PITUITARY GLAND



HORMONES SECRETED BY THE PITUITARY GLAND

- Anterior pituitary –The anterior pituitary secretes the following hormones
- Prolactin
- Follicle Stimulating Hormone (FSH)
- Luteinizing Hormone (LH)
- Thyroid-Stimulating Hormone (TSH)
- Adrenocorticotropic Hormone (ACTH)
- Growth Hormone (GH)

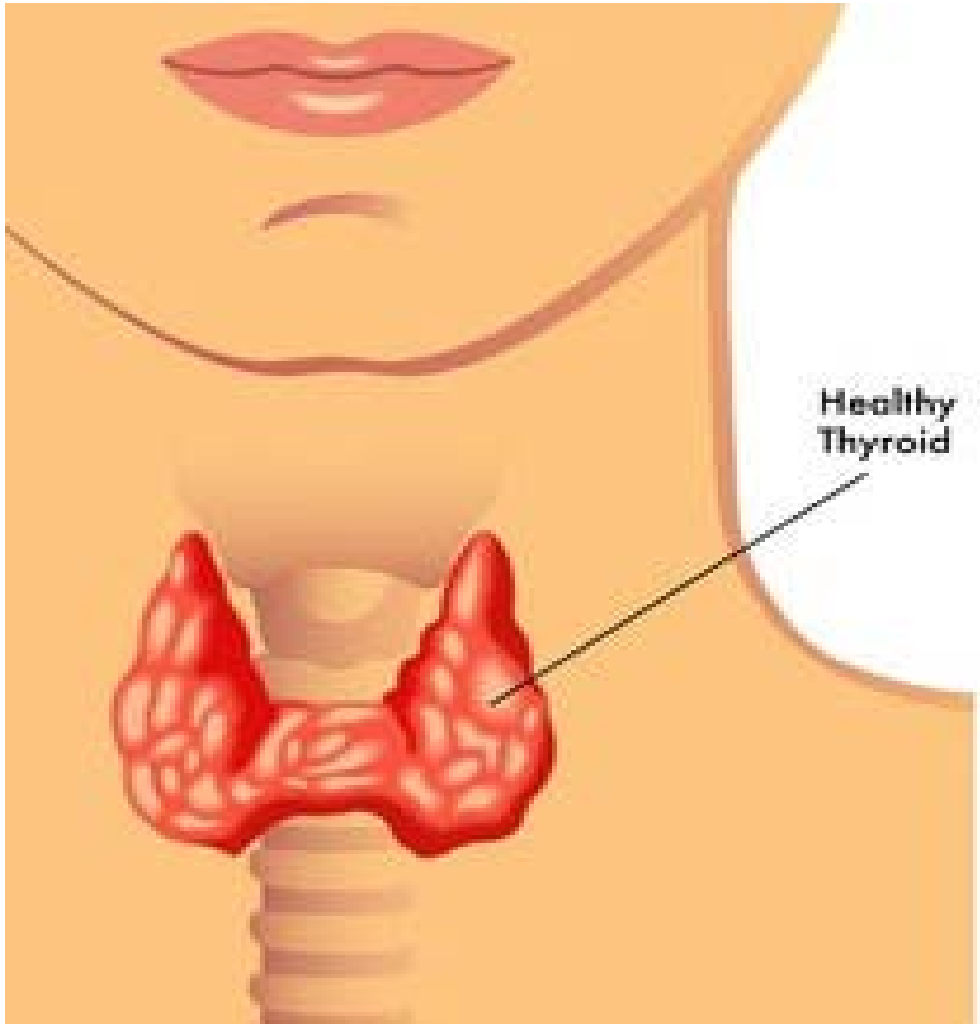
HORMONES SECRETED BY THE POSTERIOR LOBE

- **The posterior lobe secretes oxytocin and ADH.**
- Oxytocin stimulates uterine contractions to facilitate birth and also causes breast tissue to make milk .
- ADH, or antidiuretic hormone, is involved in the control of water retention within the kidneys. This hormone is released when the pituitary senses that the blood does not have enough water. In the kidneys, the hormone causes cellular changes which cause the tissues to retain as much water as possible.

THYROID GLAND

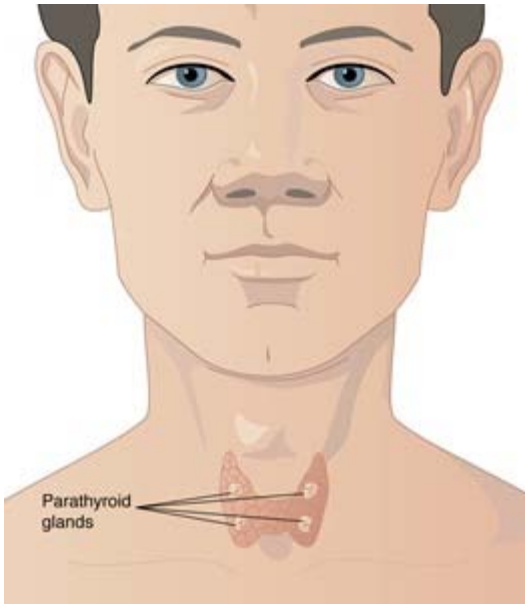
- The thyroid gland is a butterfly-shaped organ located in the base of our neck. It releases thyroxine hormone that control metabolism—the way our body uses energy. The thyroid hormones regulate vital body functions like
- Breathing
- Heart rate
- Central and peripheral nervous systems
- Body weight
- Muscle strength
- Menstrual cycles›
- Body temperature
- Cholesterol levels

THYROID GLAND LOCATION



PARATHYROID

The parathyroid glands are small pea-sized glands located in the neck just behind the butterfly-shaped thyroid gland. There are four parathyroid glands, with two parathyroid glands lying behind each 'wing' of the thyroid gland.



HORMONE SECRETED BY PARATHYROID

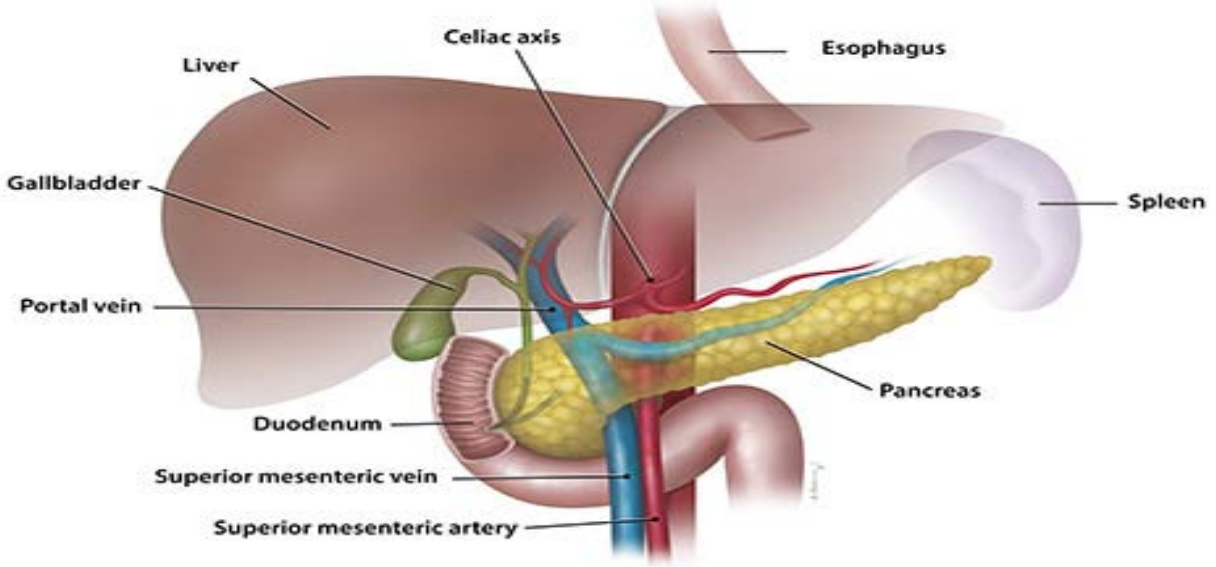
The parathyroid glands secrete parathyroid hormone which is important in tightly controlling calcium levels in the bloodstream. Because of this, calcium levels are generally very stable. If parathyroid hormone is secreted in excess quantity ,then it can have negative effects like brittle bones and kidney stones.

THYMUS

The **thymus gland**, located behind our sternum and between our lungs, is only active until puberty. After puberty, the **thymus** starts to slowly shrink and become replaced by fat. Thymosin is the hormone of the **thymus**, and it stimulates the development of disease-fighting T cells.

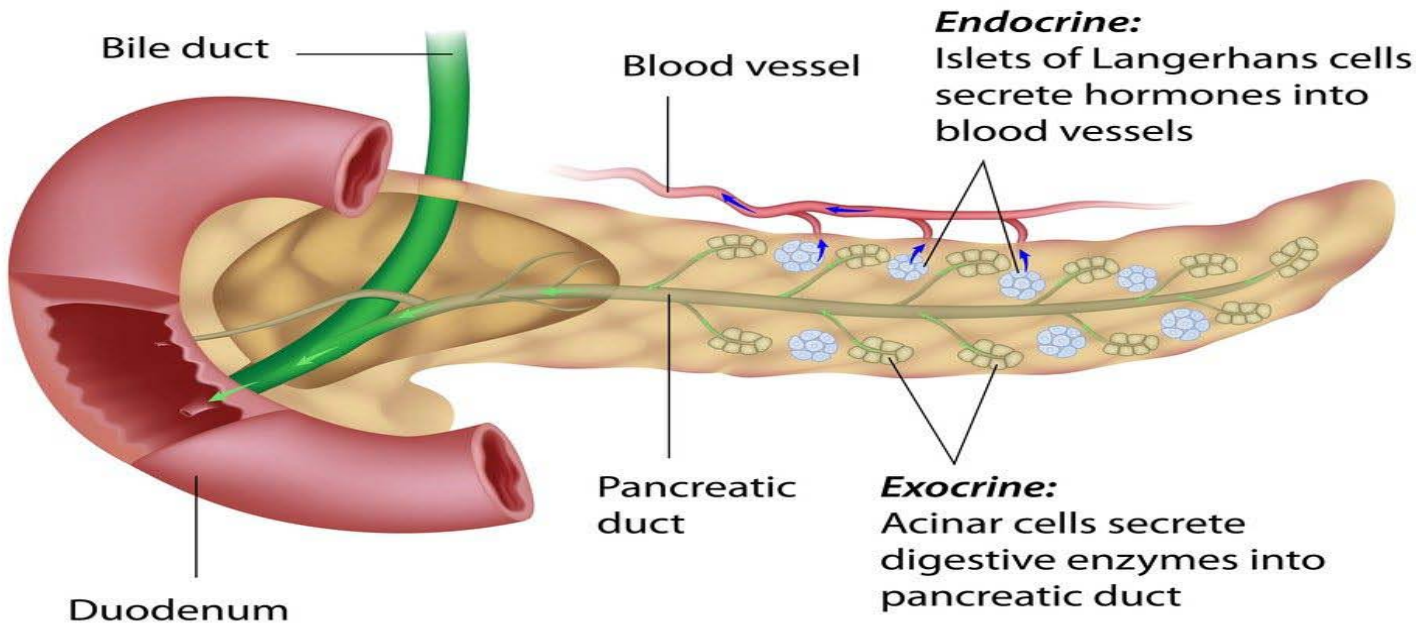
PANCREAS

The **pancreas** is an organ located in the abdomen. It plays an essential role in converting the food we eat into fuel for the body's cells. The **pancreas** has two main functions: an exocrine function that helps in digestion and an endocrine function that regulates blood sugar.



PANCREAS AS ENDOCRINE GLAND

Functioning as an endocrine gland, the pancreas secretes the hormones insulin and glucagon to control blood sugar levels throughout the day.

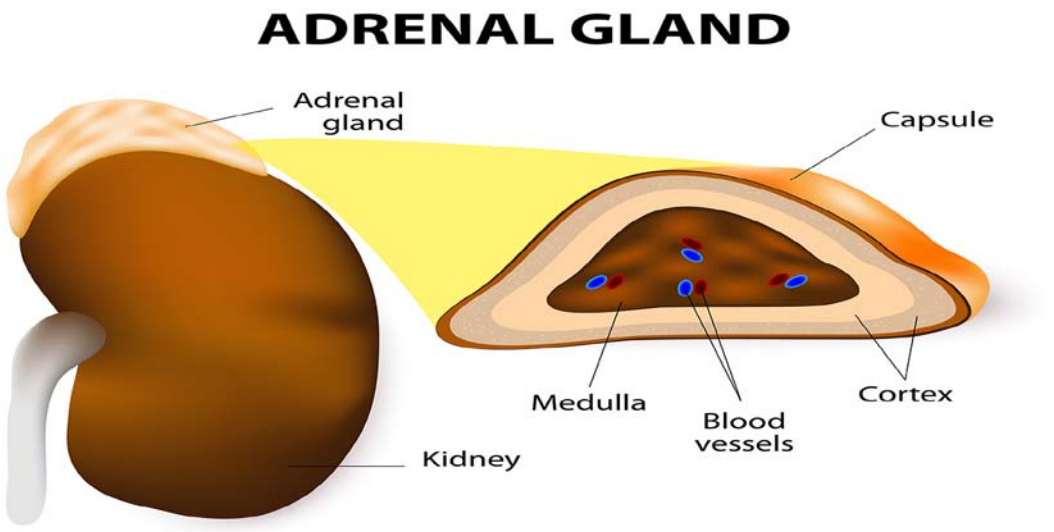


INSULIN AND GLUCAGON FUNCTION

- The alpha cells of the pancreas produce *glucagon*. Glucagon raises blood glucose levels by stimulating the liver to metabolize glycogen into glucose molecules and to release glucose into the blood. Glucagon also stimulates adipose tissue to metabolize triglycerides into glucose and to release glucose into the blood.
- *Insulin* is produced by the beta cells of the pancreas. This hormone lowers blood glucose levels after a meal by stimulating the absorption of glucose by liver, muscle, and adipose tissues. Insulin triggers the formation of glycogen in the muscles and liver and triglycerides in adipose to store the absorbed glucose.

ADRENAL GLANDS

Adrenal glands produce hormones that help regulate our metabolism, immune system, blood pressure, response to stress and other essential functions. **Adrenal glands** are composed of two parts — the **cortex** and the **medulla** — which are each responsible for producing different hormones.

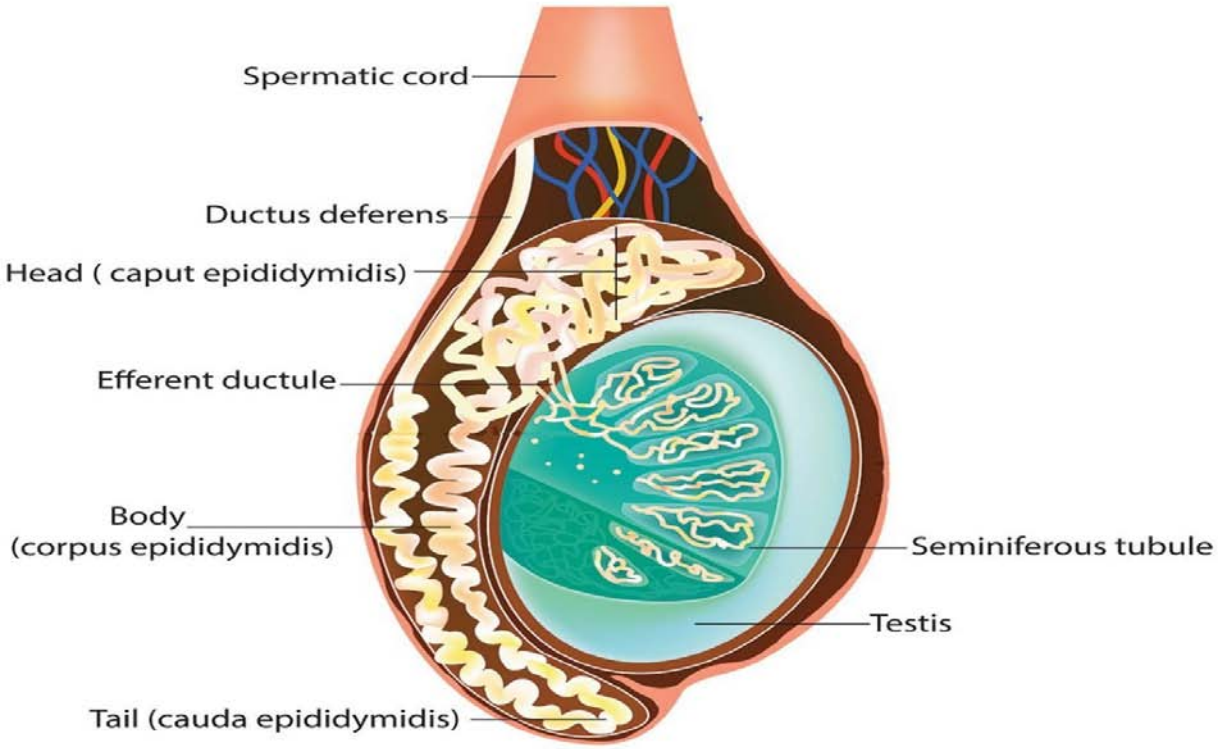


MAIN HORMONES SECRETED BY ADRENAL GLANDS

- Adrenal cortex secretes various hormones like aldosterone , cortisol, androgens, estrogens etc.
- The hormones produced by the adrenal medulla are called catecholamines. They act as hormones and as neurotransmitters (chemical messengers in the nervous system). They manage the body's response to stress. The 2 more important catecholamines are epinephrine and norepinephrine.
- **Epinephrine (adrenaline)** is released during times of short-term stress such as sudden shock or fear. It increases heart rate, blood pressure and blood sugar levels.
- **Norepinephrine (noradrenaline)** constricts blood vessels. Like epinephrine, it increases heart rate, blood pressure and blood sugar levels.

TESTES

The two main functions of the testes are to produce sperm and to produce the male sex hormones (androgens). This makes the testis both an endocrine and exocrine gland .



FUNCTIONS OF TESTOSTERONE

1. Growth and development of male reproductive organs (penis and testes)
2. Growth spurt at puberty
3. Production and maturation of sperm
4. Growth of facial and body hair
5. Deepening voice
6. Growth of the Adam's apple

   Maintenance of bone density
7. Maintenance of muscle mass and strength
8. Fetal development of male reproductive organs
9. Increasing red blood cell count

OVARIES

There are two ovaries in the reproductive s ystem of every human female .The ovaries produce and release eggs (oocytes) into the female reproductive tract at the mid-point of each menstrual cycle. They also produce the female **hormones** oestrogen and progesterone.

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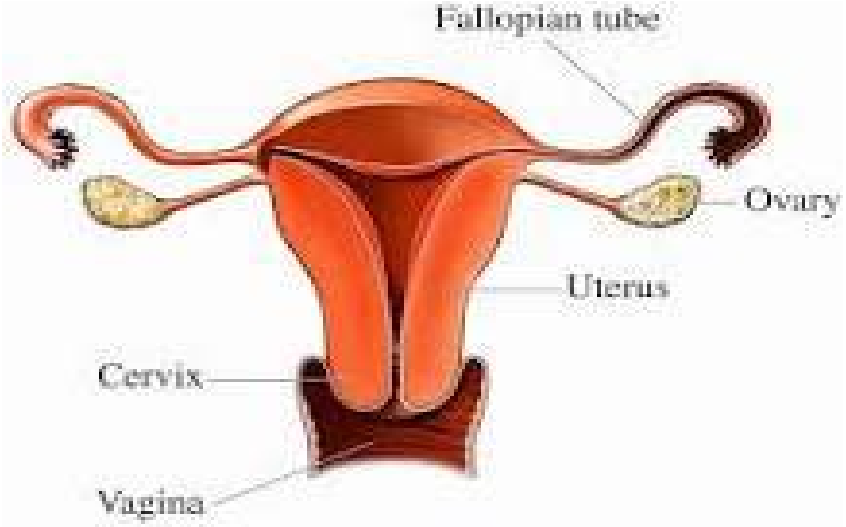

FUNCTIONS OF ESTROGEN AND PROGESTERONE

1. **Estrogen**, or **oestrogen**, is the primary female sex hormone. It is responsible for the development and regulation of the female reproductive system and secondary
2. Progesterone prepares the endometrium for the potential of pregnancy after ovulation. It triggers the lining to thicken to accept a fertilized egg. It also prohibits the muscle contractions in the **uterus** that would cause the body to reject an egg.

THANK YOU