**Name: Ijaz Ulhaq**

**ID: 14558**

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**Instructor: Adnan Ahmed**

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**Q1: Write down a detail note on thyroid hormones.**

**Q2: Explain and classify Adrenocortical Hormone.**

**Q3: define and Explain Hyperthyroidism and hypothyroidism.**

**Q4: How calcium is regulated? Define Osteomalacia.**

**Q5: Writ a short note on sex hormones.**

 **\*\*\*Question No 1 Answer\*\*\***

 **Thyroid Hormones**

Thyroid hormone is produced by thyroid gland. The thyroid gland is located at the front of the neck just below the larynx. It butterfly shaped and consist of two lobes located either side of the windpipe. The thyroid hormone is also called anabolic hormone when it is normal in the body. The release of thyroid hormone from thyroid gland is controlled by thyroid stimulating hormone produced by pituitary gland. Iodine is important for the production of thyroid hormone.

 **Hormone of Thyroid Gland** The thyroid gland secretes three hormones namely the two thyroid hormones (thyroxine T4, triiodothyronine T3) and calcitonin ( play a role in calcium homeostasis).

 **Under and Over Production of Thyroid Hormone**

The excess production of thyroid hormone causes hyperthyroidism which is most often caused by Graves disease. The inadequate production of thyroid hormone causes hypothyroidism the most common cause of hypothyroidism is called Hashimotos thyroiditis.

 **Function**

 ●Thyroid hormones are concerned with mental development ,physical growth, maturation, basal metabolic rate maintain sensitivity to adrenergic system.

 **\*\*\*Question No 2 Answer\*\*\***

 **Adrenocortical Hormone**

The adrenocortical hormones are steroids molecules produced and released by the adrenal cortex. The adrenal cortex synthesizes two types of steroids namely corticosteroids and the androgen. The action of corticosteroids are described as glucocorticoids (carbohydrates regulating) and mineralocorticoids(electrolytes regulating).

 **Synthesis and Secretion of Adrenocortical Hormone**

 It takes place in the three distinct layer of adrenal cortex. **Zona Glomerulosa :-** It is outer most layer. It is the main site for the production of mineralocorticoids, mainly aldosterone. Mineralocorticoids hormone help to control the water and ions homeostasis . aldosterone is largely responsible for long term regulation of blood pressure.

 **Zona Reticularis:-** it is the inner most cortical layer and produces androgens. Androgen have action similar to testosterone.

**Zona Fasciculate :-**  it is situated between glomerulosa and fasciculata and it is responsible for the production of glucocorticoids hormones chiefly cortisol in human.

**●** Secretion of adrenocortical hormone is controlled by adrenocorticotrophic hormone(ACTH). ACTH plays a role in helping to regulate the amount of cortisol in the bloodstream relative to how much is produced. ACTH is generally decrease with the increase in cortisol.

 **Abnormalities in Adrenocortical Hormone**

**Hypoadrenalism:-** A decline in the concentration of ACTH in the blood leads to a reduction in the secretion of adrenal hormones, resulting in adrenal insufficiency (hypoadrenalism).Adrenal insufficiency leads to weight loss, lack of appetite (anorexia), weakness, nausea, vomiting, and low blood pressure (hypotension). **Hyperadrenalism:-** The excess of ACTH causes a syndrome called Cushing's disease where the body begins to store excess fat, increase blood sugar concentration and blood pressure. This particular disease can be caused by both issues at the level of the adrenal system, but can be primarily caused by ACTH being overproduced by a pituitary tumor.

 **Sign and symptoms**

Extreme fatigue.Weight loss and decreased appetite.Darkening of your skin (hyper pigmentation)Low blood pressure, even fainting.Low blood sugar (hypoglycemia)Nausea, diarrhea or vomiting (gastrointestinal symptoms)Abdominal pain.

 **\*\*\*Question No 3 Answer\*\*\***

 **Hyperthyroidism**

 **Hyper means** having too much and **thyroidism** **means** thyroid hormone. Excess production of thyroid hormone is called hyperthyroidism. When thyroid hormone secretes too much thyroid hormone causes hyperthyroidism.

 **Causes**

* It causes by graves disease ( an autoimmune condition in which the thyroid gland is over stimulated.
* Cause by too much thyroid hormone secretion.

 **Symptoms**

* Weight loss
* Heat intolerance
* Rapid heart rate, sweeting, hyperactivity, anxiety and insomnia.
* Sympathetic overstimulation of muscle that control eye movement .

 **Diagnosis**

* Measuring blood levels of TSH,T3 and T4.
* Radioactive iodine uptake test and thyroid scan
* Thyrotropin releasing hormone injection.

 **Treatment**

* Beta blockers ( to treat immediate symptoms)
* Anti thyroid drugs(block thyroid hormone production and release)
* Radio Iodine therapy can be used.
* Thyroid remove surgery.

**Hypothyroidism**

 **Hypo means** low and **thyroidism means** thyroid hormone

Hypothyroidism is often accompanied by an enlargement of the thyroid gland known as goiter.Goiter: A general term for thyroid swelling. Goiters can be harmless, or can represent iodine deficiency or a condition associated with thyroid inflammation called Hashimoto’s thyroiditis.

 **Causes**

* It is caused by hashimotos thyroiditis.
* It is also caused by iodine deficiency.

**Symptoms**

* Weight gain
* Fatigue and dry skin
* Constipation and hair loss
* Fluid retention(edema, pleural effusion and ascites)
* Female can have amenorrhea.

**Diagnosis**

* Blood test which measure the level of TSH and sometimes the level of the thyroid hormone thyroxine.

**Treatment**

* Standard treatment for this condition involves daily use of synthetic thyroid hormone levothyroxine. This oral medication restores adequate hormone level

**\*\*\* Question No 4 Answer\*\*\***

 **Calcium Regulation**

Calcium is regulated by three important hormones

**Vitamin D (**active form**)**

**Parathyroid hormone**

**Calcitonin**

There are at least three hormones intimately involved in the regulation of the level of calcium in the blood: parathyroid hormone (PTH), calcitonin and calcitriol (1, 25 dihydroxyvitamin D, the active form of vitamin D). PTH comes from the parathyroid glands located behind the thyroid gland in the lower part of the neck and calcitonin comes from cells in the thyroid gland, both of which monitor and maintain calcium levels in the blood. The active form of vitamin D is synthesized in the kidney under the control of PTH.

Special cells that reside in the thyroid gland along with thyroid hormone containing cells release another hormone, calcitonin, into the blood. Calcitonin signals osteoclasts to slow down removal of calcium from bone; this action tends to lower levels of blood calcium. Conversely, shutting off calcitonin allows osteoclasts to get back in business to release needed calcium from bone.

The PTH system provides long-term, day-to-day regulation of calcium levels by many hormones working in concert. This hormonal “feedback loop” is governed by the parathyroid glands and the calcitonin-secreting cells of the thyroid gland by their constant monitoring of the blood calcium levels. The body also has a minute to minute regulation of calcium levels from osteocytes in bone—these cells can instantly release needed calcium or instantly stop releasing calcium depending on immediate needs (too little or too much calcium coming into the bloodstream).

 **Osteomalacia**

 Osteomalacia is loss bone related to a vitamin D deficiency caused by inadequate deposits of calcium and phosphorous in the bone matrix.

●It is the adult equivalent of rickets and vitamin D deficiency in children.

●Osteomalacia can be caused by liver and pancreatic disorders, chronic kidney disease and bone tumors.

 **\*\*\*Question No 5 Answer\*\*\***

 **Sex Hormones**

The changes that occur during adolescence are due to the production of sex hormones.

Sex hormones are different in male and female.

**Testosterone :-** testosterone is male sex hormone which is produced in the testis which effects changes in the body during adolescence for example growth of sex organ , production of sperm, growth of hair in the groin areas of body and change in the voice etc.

**Estrogen and progesterone :-** these are female sex hormone which are produced in the ovaries.

**Estrogen:-** it effects changes in the body during adolescence for example growth of sex organ, production of ovum and regulation of menstrual cycle etc.

**Progesterone:-** it helps in pregnancy, regulation of menstrual cycle, maintenance of the embryo and development of uterus etc.

 **THE END**