**Name M Arif**

**Id 15042**

**Program Bs MLT 4th semester**

**Course Title Chemical pathology**

**Instructor name Mr Adnan Ahmad**

**Date 23 June 2020**

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

**Answer 1 : Thyroid hormones :**

**Introduction**

* Thyroid is an endocrine and gland situated at the root of the neck on either side of the trachea .
* TH secretes T3 (9%), T4 (90%) and calcitonin.
* The potency of T3 is four time more then that of T4
* TSH is necessary for secretory activity of the Thyroid gland .

Function of Thyroid hormones.

* To increase basel metabolic rate
* To stimulate growth

● Regulation of carbohydrates , lipids and protein metabolism

● Cardiovascular stimulation

●Gastrointestinal Regulation.

●Action on fat metabolism

● Action on body weight

* **Thyroid gland consist of 2 types cell**s .

FOLLICULAR CELL : these are the most , and the major secretory cell .they secrete thyroid harmone.

**C CELL** : these are fewer in number and interspersed . they secrete calcatonin .

THYROID HARMONE :

**The thyroid harmone** secretes three harmones .

Thyroxine or T 4 : having 4 atoms of iodine .(secretes in large amount)

**Thriodothyronine or T 3**: having 3 atoms of iodine( secrete in less amount)

**THYROID FUNCTION TESTS Measurement of plasma level of T3 and T4**.

* **Measurement of TRH and TSH.**
* **Measurement of basal metabolic rate.**

**Measurement Of plasma level of T3 and T4 :**

For hyperthyroidism or hypothyroidism, the most accurate diagnostic test is the direct measurement of concentration of “free” thyroid hormones in the plasma, i.e. T3 and T4.

**Measurement of TRH and TSH**

There is almost total absence of these two hormones in hyperthyroidism but increase in hypothyroidism. It is because of negative feedback mechanism, by the increased level of thyroid hormones.

**Q2: Exllain and classify Adrenocortical Hormone?**

**Answer 2 : Adrenocortical Hormone :**

**Introduction**

There are 2 adrenal glands

* **4** grams each .
* At the superior people of the 2 kidney
* Each gland is composed of 2 distinct parts :

**1 Adrenal Cortex**

**2 Adrenal medulla**

**1 Adrenal Cortex :**

* Secretes corticosteroids
* These hormones are all synthesized from the steroid cholesterol and they hormone all have similar chemical formulas.
* Different very important functions
* Slight difference in their moleculer structure

**2 Adrenal medulla :**

* The central 20% of the gland
* Related to the sympathetic nervous system
* It secretes epinephrine and norepinephrine

Synthesis and Secretion of Adrenocortical Hormones

* The adrenal cortex has three distinct layers:
* **(1 )The zona glomerulosa**:
* Thin layer of cells that lies just underneath the capsule; 15% of the cortex.
* Secrete Aldosterone; because these cells contain the enzyme *aldosterone synthase.*

(2) The zona fasiculata:

* The middle and widest layer; 75% of the cortex.
* Secretes the glucocorticoids cortisol and corticosterone, as well as small amounts of adrenal androgens and estrogens.
* The secretion is controlled by the hypothalamic-pituitary axis via

adrenocorticotropic hormone (ACTH).

# **3) .The  zona reticularis**is the innermost layer of the [adrenal cortex](https://en.m.wikipedia.org/wiki/Adrenal_cortex" \o "Adrenal cortex), lying deep to the [zona fasciculata](https://en.m.wikipedia.org/wiki/Zona_fasciculata" \o "Zona fasciculata) and superficial to the [adrenal medulla](https://en.m.wikipedia.org/wiki/Adrenal_medulla" \o "Adrenal medulla). The cells are arranged cords that project in different directions giving a net-like appearance .

Secretes the adrenal androgens dehydroepiandrosterone (DHEA) and androstenedione

● As well as small amounts of estrogens and some glucocorticoids.

* The secretion is controlled by ACTH, although other factors such as cortical androgen-stimulating hormone

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

**Answer3 : Hyperthyroidism (overactive Thyroid)**

Hyperthyroidism (overactive thyroid) occurs when your thyroid gland produces too much of the hormone thyroxine. Hyperthyroidism can accelerate your body's metabolism, causing unintentional weight loss and a rapid or irregular heartbeat.

Several treatments are available for hyperthyroidism. Doctors use anti-thyroid medications and radioactive iodine to slow the production of thyroid hormones. Sometimes, hyperthyroidism treatment involves surgery to remove all or part of your thyroid gland.

## **Symptoms**

Hyperthyroidism can mimic other health problems, which can make it difficult for your doctor to diagnose. It can also cause a wide variety of signs and symptoms, including:

* Unintentional weight loss, even when your appetite and food intake stay the same or increase
* Rapid heartbeat (tachycardia) — commonly more than 100 beats a minute
* Irregular heartbeat (arrhythmia)
* Pounding of your heart (palpitations)
* Increased appetite

**Signs and symptoms of Graves' ophthalmopathy include:**

* Dry eyes
* Red or swollen eyes
* Excessive tearing or discomfort in one or both eyes
* Light sensitivity, blurry or double vision, inflammation, or reduced eye movement
* Protruding eyeballs

# **[Hypothyroidism (underactive thyroid)](https://www.mayoclinic.org/diseases-conditions/hypothyroidism/symptoms-causes/syc-20350284)**

Hypothyroidism (underactive thyroid) is a condition in which your thyroid gland doesn't produce enough of certain crucial hormones.

Hypothyroidism may not cause noticeable symptoms in the early stages. Over time, untreated hypothyroidism can cause a number of health problems, such as obesity, joint pain, infertility and heart disease.

## **Symptoms**

The signs and symptoms of hypothyroidism vary, depending on the severity of the hormone deficiency. Problems tend to develop slowly, often over a number of years.

Hypothyroidism signs and symptoms may include:

* Fatigue
* Increased sensitivity to cold
* Constipation
* Dry skin
* Weight gain
* Thinning hair
* Slowed heart rate
* Depression

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

**ans**wer 4 : **Calcium regulated.:** Blood calcium levels are regulated by parathyroid harmone whichis produced by the parathyroid gland

Parathyroid harmone is released in response to low blood calcium levels. It increase calcium levels

by targeting the skeleton, the kidney and the intestines. Normal calcium regulation depends on the complex interactions of several systems. The specific calcium regulating hormones, parathyroid hormone, calcitriol and calcitonin, affect calcium and phosphorus concentration and supply by acting on bone, kidney and intestine. The changing concentration and supply of ions not only regulate these hormones, but may also influence the function of the target organs, particularly bone, directly. Systemic hormones such as growth hormone and somatomedins, glucocorticoids, sex hormones and thyroid hormone are essential for skeletal growth and development and interact with calcium regulators. Prostaglandins and osteoclast activating factor may he important in local regulation of bone.

**osteomalacia** :

Osteomalacia means soft bones. Bone is a living, active tissue that’s continually being removed and replaced. This process is known as bone turnover. Bone consists of a hard outer shell (the cortex) made up of minerals, mainly calcium and phosphorus, and a softer inner mesh (the matrix) made up of collagen fibres.

When normal bone is formed, these fibres are coated with mineral. This process is called mineralisation. The strength of the new bone depends on the amount of mineral covering the collagen matrix. The more mineral laid down, the stronger the bone.

**• Symptoms of osteomalacia :** pain in the bones

• Muscle spasms or cramps

• Muscle weakness

• Waddling gait

• Feeling of pain and needle.

Causes of osteomalacia :

Vitamin D deficiency

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

Answer 5 : DEFINITION: Hormones are chemical substances synthesized in small amounts by endocrine tissues and carried by blood stream to another tissue, where it acts as a messenger to regulate the function of the target tissue or organ.

**Follicle stimulating harmone :**

Is a glycoprotein gonadotropin secreted by the anterior pituitary in

response to gonadotropin by hypothalamus.

• FSH and LH work together in the reproductive system.

• In women, FSH stimulate the ovarian follicle causing an egg to grow

• It also trigger the production of estrogen in the follicle.

• The rise of estrogen tells your pituitary gland to stop producing FSH and to start **more LH**

# **LH ;**

# **Luteinizing harmone** :

The pituitary gland also secrete LH another gonadotropin harmone

• It involves in reproductive system

• In men ,LH stimulates testosterone production from the interstitial cell of the tissues

• In ,men FSH acts on the cells of the testes to stimulate sperm production and maturation.

**Estrogen :**

Estrogen is one of two main sex hormones that women have. The other one is

progesterone. Estrogen is responsible for female physical features and reproduction. Men

have estrogen, too, but in smaller amounts**.**

**progesterone** :

Progesterone, hormone secreted by the female

reproductive system that functions mainly to regulate the condition of the

inner lining (endometrium) of the uterus. Progesterone is produced by the

ovaries, placenta, and adrenal glands

\*\* \*\*\*\*\*\*\*\* End\*\*\*\*\*\*\*\*\*\*