

# Mid-Term Assignment

Course Title: Human Physiology

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Total Marks: 30

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1. Explain homeostatic mechanism regarding the control of calcium in the body with reference to parathyroid hormone and calcitonin.

## **ANS: CALCIUM HOMEOSTASIS:**

It is the process through which the level of calcium level in the blood is maintained in order to protect the person from hypercalcemia or hypocalcemia. The calcium receptor within the parathyroid gland senses the changes in the extracellular fluid of calcium.

## **REGULATION OF HOMEOSTASIS WITH REFERENCE TO PARATHYROID GLAND:**

Parathyroid gland releases parathyroid hormone through chief cells to control calcium level in the blood.

- Parathyroid hormone is released when the calcium level is low than usual.
- It helps to increase the calcium level in the blood
- It works on bones and kidneys to solve this issue.
- It starts up the formation of new osteoclast to form more osteoclast. This process is slower than the other one.
- Parathyroid hormone starts up the calcium pump to extract calcium and phosphate from the bones.
- It also works on the kidney by increasing the rate of soaking up of calcium from the distal tube.

## **REGULATION OF HOMEOSTASIS WITH REFERENCE TO CALCITONIN:**

It is also known as calcium lowering hormone.

1. Calcitonin is released by the medullary cells of thyroid gland.
2. It helps to decrease the calcium level in the blood.

**CALCITONIN WORKS IN TWO DIFFERENT WAYS;**

1. Inhibits the activity of osteoclasts (which are bone dissolving cells) so that osteoblasts can form bone
2. Stops the soaking up of calcium in kidneys.

By this way calcitonin gets rid of extra calcium from the body in case of increased calcium level in the blood ( hypercalcemia )

## **EFFECTS OF CALCITONIN ON CALCIUM IN ADULTS:**

Remodling of bones happens rapidly about 5grams eachday.  
Also, the rate of absorbtion of calcium is smaller that kids or infants.

2. Give clinical differentiation between hypothyroidism and hyperthyroidism.

### **Ans: HYPOTHYROIDISM:**

Hypo means under so hypothyroidism means when the thyroid gland produces or released a less or not enough number of thyroid harmones the thyroid gland is said to be underactive.

#### **EFFECTS OF HYPOTHYROIDISM ON CIRCULATORY SYSTEM:**

Hypothyroidism slows down your breathing and heart rate it slows down the pumping of blood and narrows down the arteries. This can also result in blood pressure. It can also increase the cholesterol level and block the arteries which increases the risk of a heart attack

#### **EFFECTS OF HYPOTHYROIDISM ON THE MUSCLES:**

Muscles are effected by hypothyroidism in different ways. This thyroid disease weakens the muscles it makes the joints swelled up and itchy, the muscles start to work slower than usual.

#### **EFFECTS OF HYPOTHYROIDISM ON SLEEP:**

In hypothyroidism there is always a desire to sleep more. The patient can sleep upto 14 hours, and still feel sleey.

#### **EFFECTS OF HYPOTHYROIDISM ON METABOLISM:**

Due to hypothyroidism the metabolism of the patient slows down and due to which he gains weight resulting in fatigue.

#### **EFFECTS OF HYPOTHYROIDISM ON DIGESTION:**

Hypothyroidism results in slow metabolism which result in swollen stomach because the food passes from the digestive tract slowly. Hypothyroidism can also cause constipation.

#### **EFFECTS HYPOTHYROIDISM ON GROWTH:**

Hypothyroidism can result in retardation of brain.

## **HYPERTHYROIDISM:**

Hyper means over active. This is a thyroid disease in which the thyroid gland produces more than enough thyroid harmones in this case the thyroid gland is said to be over- active.

#### **EFFECTS OF HYPERTHYROIDISM ON CARDIOVASCULAR SYSTEM:**

There is an increase in heart rate due to hyperthyroidism. The heart of a hyperthyroidism patient beats 90 beats per minute. This heart rate is the same even if that person is at rest or even sleeping

#### **EFFECTS OF HYPERTHYROIDISM ON MUSCLES:**

The muscles of these patients are very energetic but they become weak too because of protein catabolism.

#### **EFFECTS OF HYPERTHYROIDISM ON SLEEP:**

It is difficult to sleep in this case because of the activity of the excited neurons the person becomes very tired and wants to sleep but the high energy in his brain does not let him sleep.

#### **EFFECTS OF HYPERTHYROIDISM ON METABOLISM:**

The metabolism of this patient works very fast which result in weight loss not a good weight loss but the type of weight loss in which weakness is involved. Diarrhea is also associated with hyperthyroidism.

3. Classify enzymes and their function in digestion.

#### **Ans: DIGESTIVE ENZYMES:**

These are the enzymes which help in the digestion of our food. These are released when you think about food or when you eat it. All of them are present in the digestive system some are in the mouth some in stomach and some are in the other organs of the digestive system.

#### **IMPORTANCE OF DIGESTIVE ENZYMES:**

Enzymes are important in digestion because they are chemical which helps our bodies to break some large molecules into smaller molecules to make it easier for us to digest our food and to give our body the nutrients that are needed for a healthy life.

- Enzymes are classified on the base of their substrates.

#### **Enzymes:**

##### **TRIPSIN:**

- Its substrate is protein.
- Trypsin is found in small intestine.
- Trypsinogen from pancreas goes into stomach to form trypsin
- When it is not active it is called trypsinogen

##### **FUNCTION:**

It is used to hydrolyze proteins. The peptide bond in proteins are broken down by this enzyme in the intestines. The proteins which are digested due to this enzyme are called trypsinized.

### **CARBOXYPEPTIDASE:**

- A type of proteases
- These are exopeptidases
- Its substrate is protein
- It is found in the small intestine.
- Also synthesized in pancreas.

### **FUNCTION:**

Splits off terminal amino acid from the carboxyl end of proteins. It can also hydrolyze first peptide

### **LIPASE:**

- Formed by the cells in the stomach and in the mouth.
- Hydrolyzes the fats
- Also produced in large number through pancreas
- It is secreted in active form

### **FUNCTION:**

Lipase usually breaks down the fat substances like butter fat food etc. It breaks the fat into fatty acids and glycerol.

### **AMYLASE:**

- Secreted by the salivary glands and pancreas
- Helps in the hydrolysis of starch

### **FUNCTION:**

It turns polysaccharides into oligosaccharides it converts the starch into sugars. It is also important for digestion of carbohydrates.

### **RIBONUCLEASE:**

Its substrate is nucleic acid

### **FUNCTION:**

It breaks the nucleic acid into free mononucleotides.