

Mid-Term Assignment

Course Title: Human Physiology

Instructor: Dr Sara Naeem

Total Marks: 30

1. Explain homeostatic mechanism regarding the control of calcium in the body with reference to parathyroid hormone and calcitonin.
2. Give clinical differentiation between hypothyroidism and hyperthyroidism.
3. Classify enzymes and their function in digestion.

Q1. Explain homeostatic mechanism regarding the control of calcium in the body with reference to parathyroid hormone and calcitonin.

Ans:

Calcium Homeostasis:

- Calcium homeostasis regulates calcium flow to and from the bones
- Calcitriol regulates the level of calcium and phosphorus in the blood and helps to maintain a healthy skeletal system
- Bone resorption by osteoclasts release calcium into the blood stream which helps regulating calcium homeostasis

Parathyroid hormone in regulating calcium homeostasis:

- These glands plays a vital role in maintaining the body's homeostasis by producing hormones
- These hormones regulates the body metabolism and free calcium level
- Variation in thyroid hormone can lead to drastic changes in energy level, growth, development and reproduction

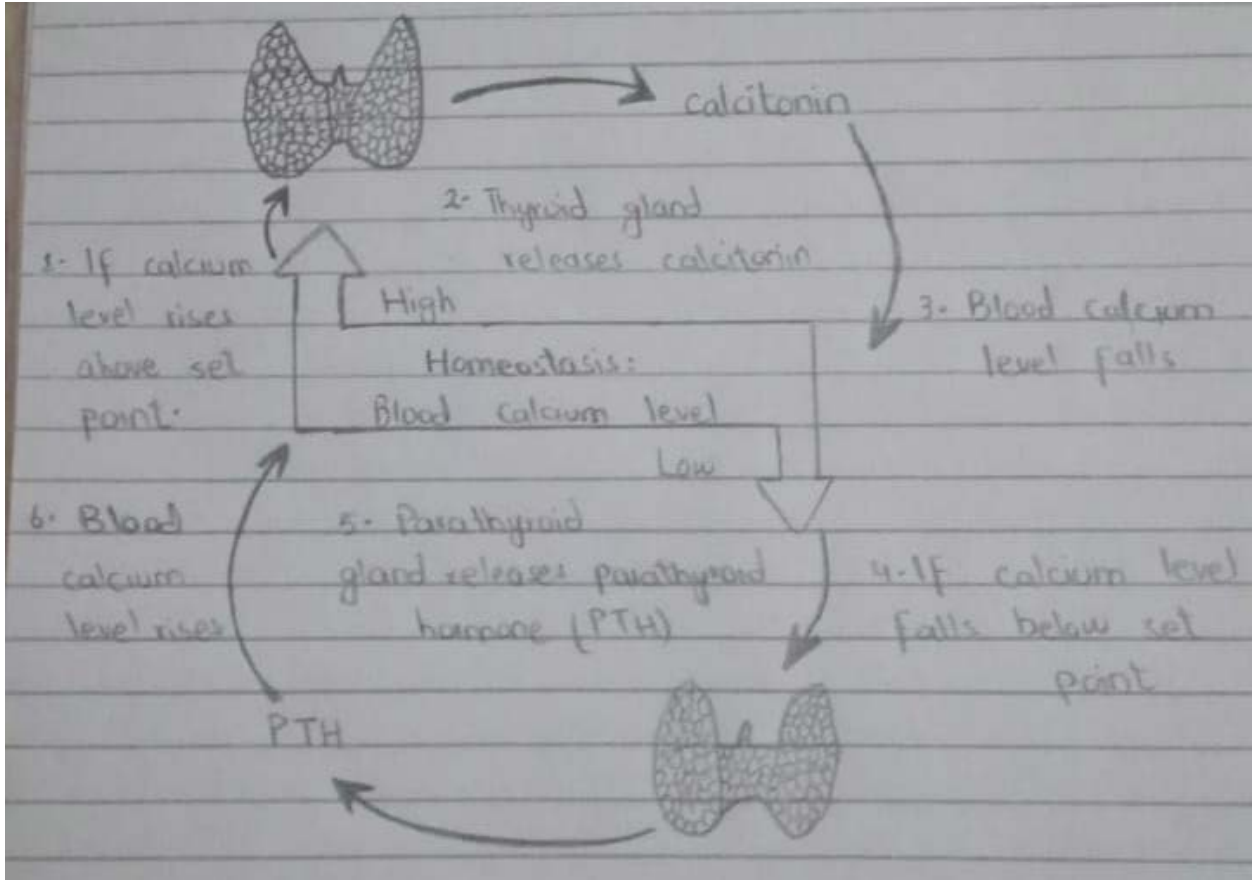
Mechanisms:

- Parathyroid hormones regulates calcium level in the blood largely by increasing the level when they are too low
- It does this through its action on the kidneys, bones and intestine
- Bones parathyroid hormones stimulates the release of calcium from large calcium stores in the bones into bloodstream

Calcitonin and Parathyroid:

- Calcitonin, that is produce by the thyroid to maintain blood calcium level
- Parathyroid hormone acts to increase the blood calcium level
- While calcitonin acts to decrease the blood calcium level

Please see below figure:



Q2. Give clinical differentiation between hypothyroidism and hyperthyroidism.

Ans:

Hypothyroidism:

In simple terms, with hypothyroidism or underactive thyroid, the thyroid gland doesn't make enough thyroid hormone for the body's need.

Causes of Hypothyroidism:

The most common cause of hypothyroidism is an autoimmune disease called "Hashimoto's disease".

Hashimoto's Disease:

A condition where the immune system makes antibodies that destroy thyroid cells and stop them from making thyroid hormone.

Clinical Symptoms of Hypothyroidism:

As a result of an underactive thyroid you may experience following:

- Fatigue
- Forgetfulness
- Dry Skin
- Dry Hair
- Brittle Nails
- Constipation
- Weight Gain
- Muscle Cramps
- Depression
- Swelling in the front of the neck (goiter)

Treatment:

- There are certain medication that can treat the disease
- The main purpose of the medication is to improve our body's thyroid function

Hyperthyroidism:

In simple terms with hyperthyroidism or overactive thyroid, the thyroid makes too much hormones even more than the need of our body.

Causes of Hyperthyroidism:

The common form of hyperthyroidism is a condition called “Grave’s Disease”

Grave’s Disease:

Some people with Grave’s Disease have swelling in the front of their neck from an enlarged thyroid gland, called a goiter, as well as eyes that appear enlarged because of inflammation.

Clinical Symptoms of Hyperthyroidism:

As a result of an overactive thyroid you may experience following:

- Feeling hot
- Sweating
- Problem falling asleep
- Racing thoughts
- Difficulty focusing on one thought
- Forgetfulness
- Elevated heart rate and palpitation
- Weight loss
- Menstrual problem
- Fatigue

Treatment:

The treatment of hyperthyroidism is medication and surgery, if left untreated it can cause bone loss or irregular heartbeat.

Q3. Classify enzymes and their function in digestion.

Ans:

Enzymes and their function:

There are different enzymes which helps in digestion are given below:

Enzymes:

1- Trypsin, chymotrypsin elastase

Substrate: Protein is the substrate of this enzyme

Action: Break peptide bonds in protein to form peptide fragments

2- Carboxypeptidase:

Substrate: Protein is the substrate of this enzyme

Action: Splits of terminal amino acid from carboxyl end of protein

3- Lipase (non proteolytic):

Substrate: Fats is the substrate of this enzyme

Action: Split fatty acid of fats and oils

4- Amylase (non proteolytic): It is produced in the mouth

Substrate: Polysaccharides is the substrate of this enzyme

Action: Split polysaccharides into glucose and maltose in its active form

5- Ribonuclease and Deoxyribonuclease: Produced in pancreas

Substrate: Nucleic acid is the substrate of this enzyme

Action: Split nucleic acid into free mononucleotides

Please see figure on next page

