SNS COLLEGE OF PHYSIOTHERAPY

Affiliated To The Tamil Nadu Dr. MGR Medical University, Chennai
Coimbatore– 641035

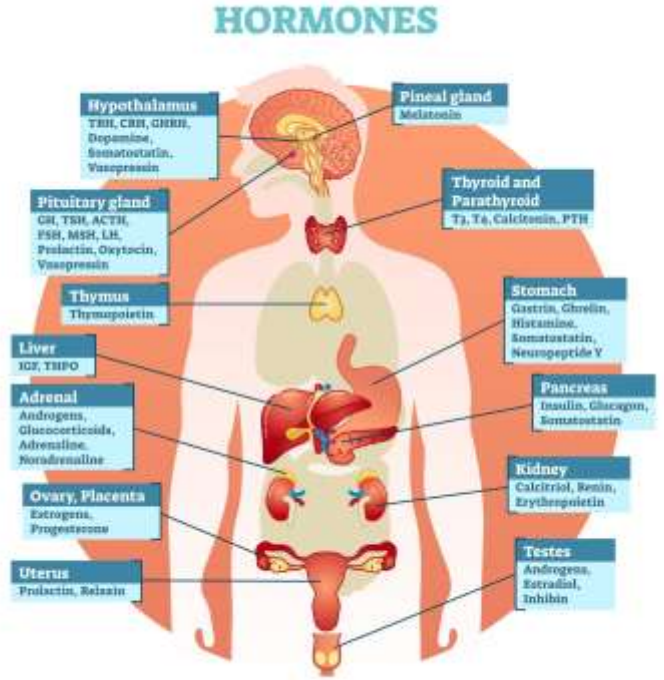
COURSE NAME: PHYSIOLOGY

SUBJECT CODE: 6281

TOPIC: ENDOCRINE

Introduction to the Endocrine Hormones

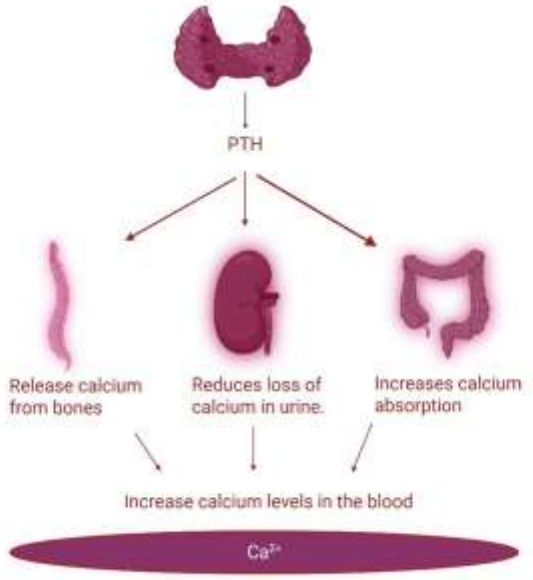
- Hormones are chemical messengers secreted by endocrine glands
- Regulate growth, metabolism, calcium balance, and energy homeostasis Parathyroid hormone (PTH) → calcium & phosphate regulation
- Thyroid hormones (T3 & T4) → metabolism, growth, development



Parathyroid Hormone: Physiological Action

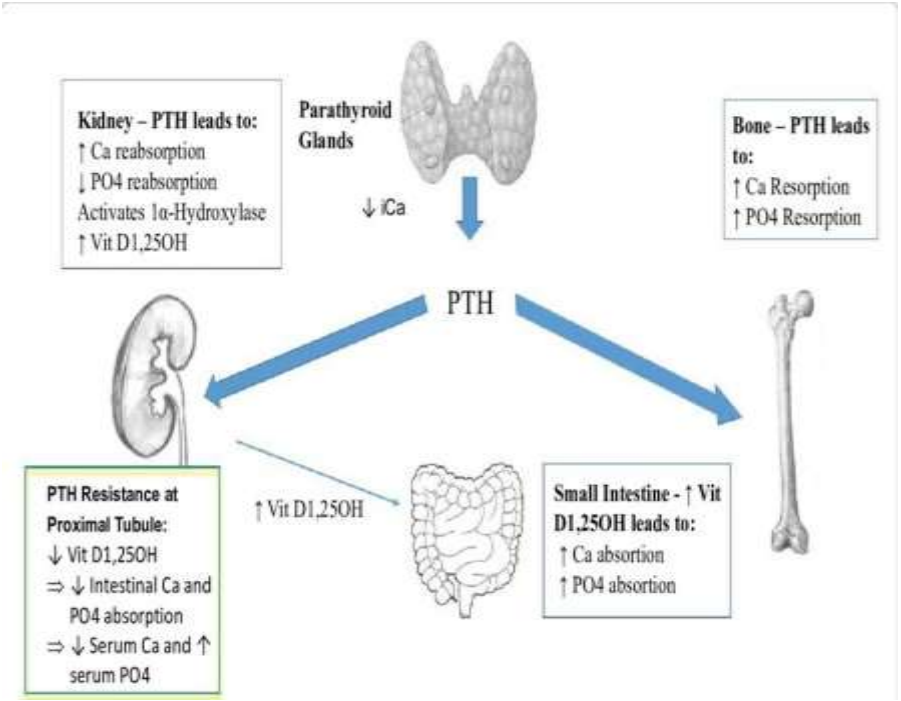
Actions of PTH

- Bone:
  - Increases osteoclastic activity
  - Releases calcium into blood
- Kidney:
  - Increases calcium reabsorption
  - Decreases phosphate reabsorption
  - Activates Vitamin D
- Intestine (indirect):
  - Increases calcium absorption via Vitamin D



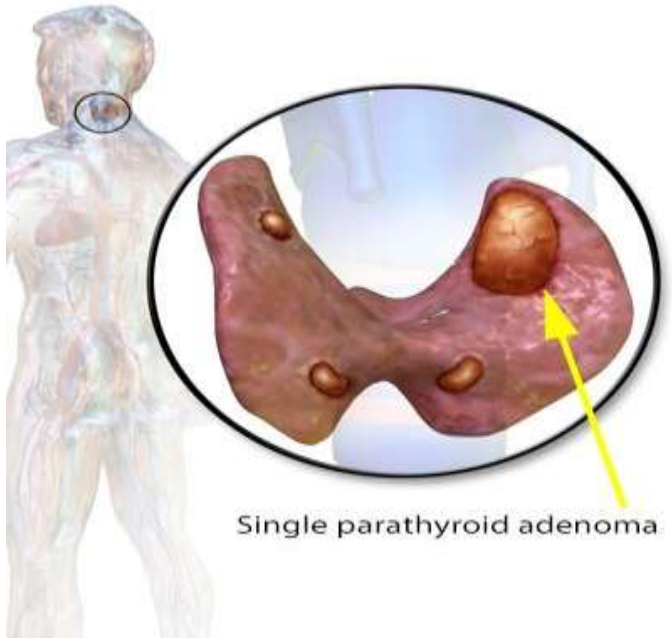
Regulation of Parathyroid Hormone

- Regulated by serum calcium levels
- ↓ Serum calcium → ↑ PTH secretion
- ↑ Serum calcium → ↓ PTH secretion
- Negative feedback mechanism Vitamin D inhibits PTH secretion
- Magnesium levels also influence PTH release



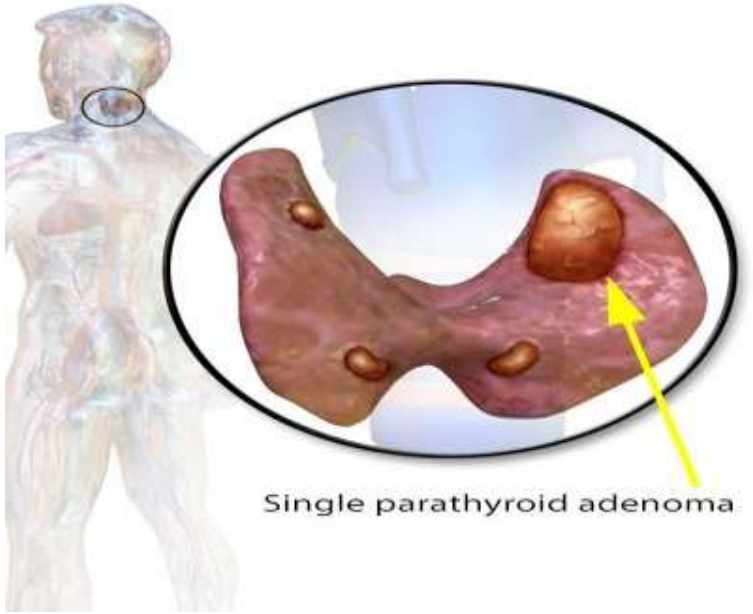
Disorder of Parathyroid Hormone

- Hyperparathyroidism
  - Causes:
    - Parathyroid adenoma
    - Chronic kidney disease
  - Features:
    - Hypercalcemia
    - Bone pain, Fracture
    - Kidney stones
    - Muscle weakness



Hypoparathyroidism

- Causes:
  - Post-thyroid surgery
  - Autoimmune disorders
- Features:
  - Hypocalcaemia
  - Tetany
  - Muscle spasms
  - Chvostek’s & Trousseau’s signs



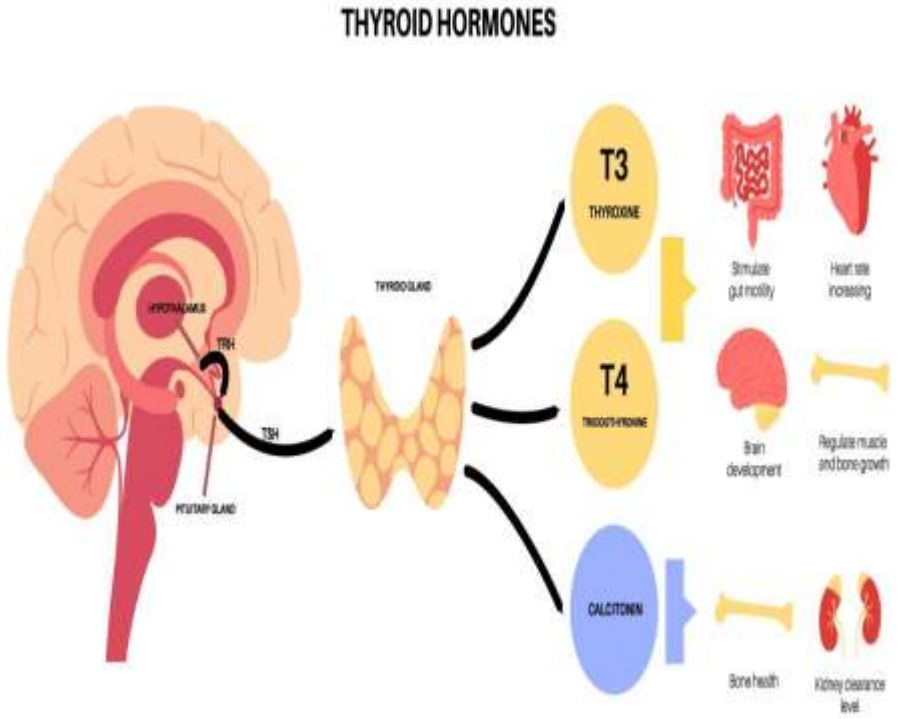
Thyroid Hormone (T3&T4): Physiological Action

Major hormones:

- Triiodothyronine (T3)
- Thyroxine (T4)

Physiological actions:

- Increase basal metabolic rate (BMR)
- Increase oxygen consumption
- Enhance carbohydrate, fat, and protein metabolism
- Essential for growth and CNS development
- Increase heart rate and cardiac output



Regulation of Thyroid Hormone

Hypothalamic–Pituitary–Thyroid Axis

Hypothalamus → TRH

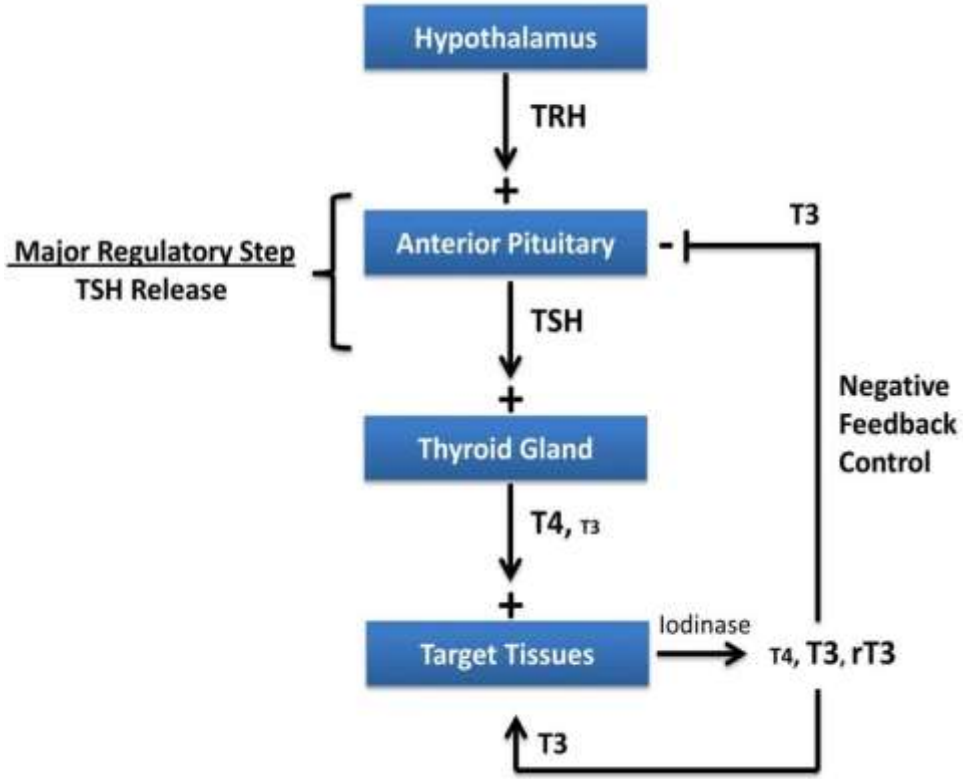
Pituitary → TSH

Thyroid gland → T3 & T4

Feedback control:

↑ T3 & T4 → ↓ TSH secretion

Iodine availability is essential for synthesis



Hyperthyroidism : Disorder of Thyroid Hormone

Definition :

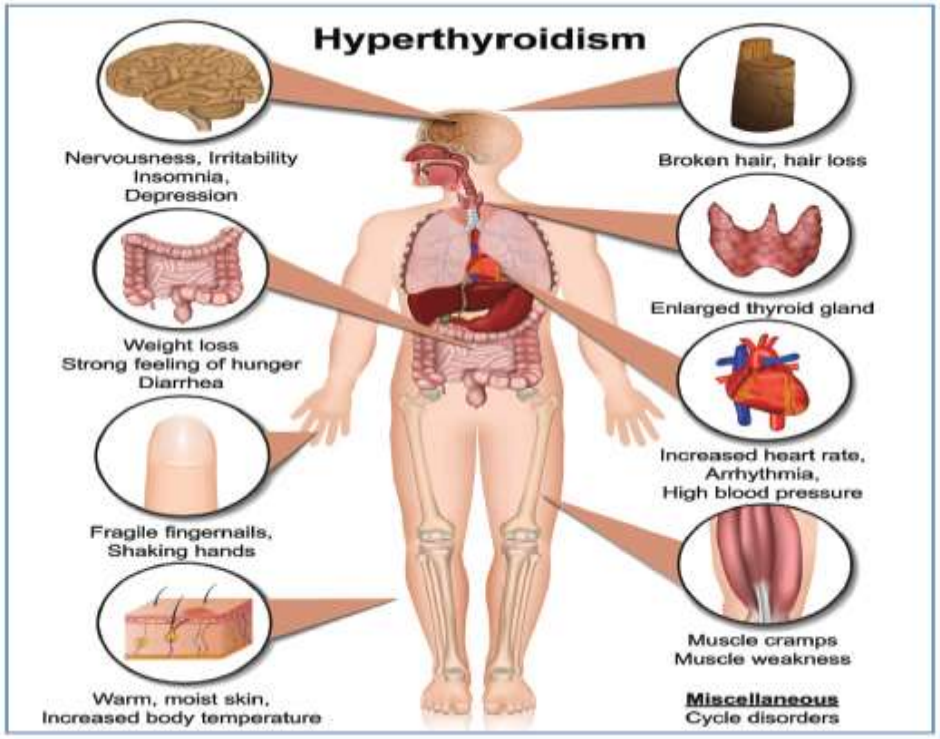
Hyperthyroidism is a condition in which the thyroid gland produces and releases excessive amounts of thyroid hormones (thyroxine-T4 and triiodothyronine-T3), leading to an increase in the body's metabolic rate.

Causes:

- Graves' disease
- Thyroid adenoma
- Excess iodine intake

Clinical features:

- Weight loss
- Heat intolerance
- Tachycardia
- Tremors
- Nervousness
- Exophthalmos (Graves' disease)



Hypothyroidism: Disorder of Thyroid Hormone

Definition:

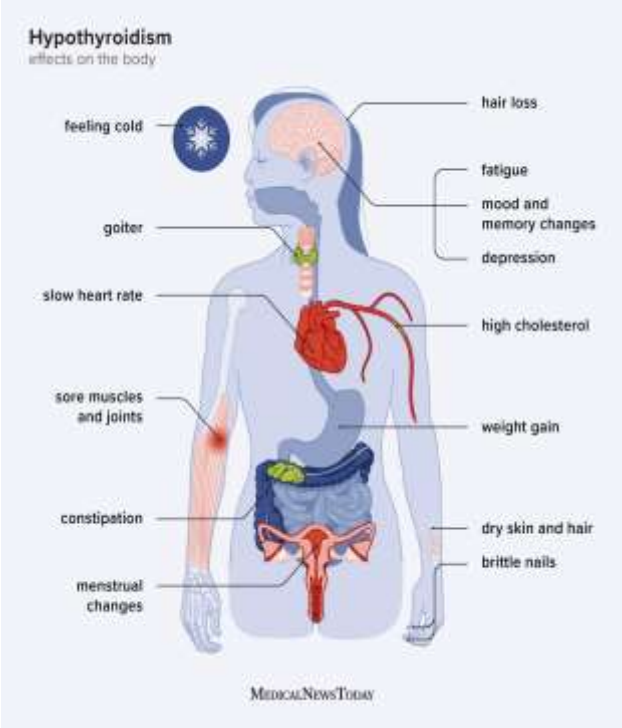
Hypothyroidism is a condition in which the thyroid gland produces insufficient amounts of thyroid hormones (thyroxine-T4 and triiodothyronine-T3), resulting in a decrease in the body's metabolic activity.

Causes:

- Iodine deficiency
- Hashimoto's thyroiditis
- Thyroidectomy

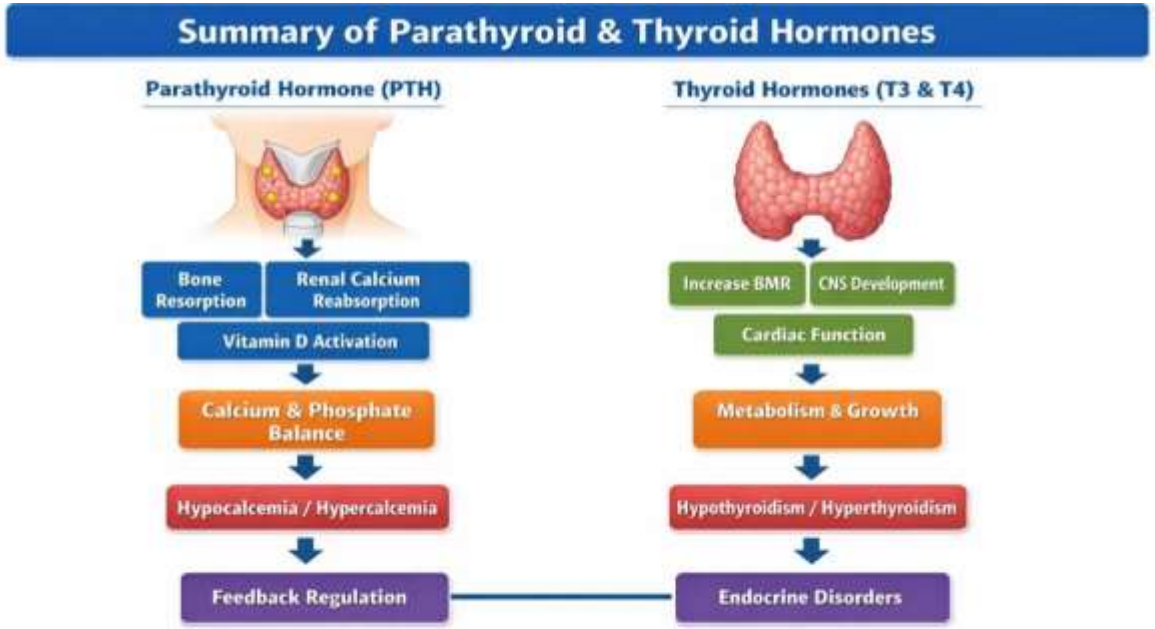
Clinical features:

- Weight gain
- Cold intolerance
- Bradycardia
- Lethargy
- Dry skin



Summary

- Parathyroid hormone regulates calcium and phosphate balance
- Thyroid hormones regulate metabolism, growth, and development
- Hormonal regulation occurs via feedback mechanisms
- Disorders lead to significant metabolic and neuromuscular changes
- Understanding endocrine physiology is essential for clinical practice



Thank you