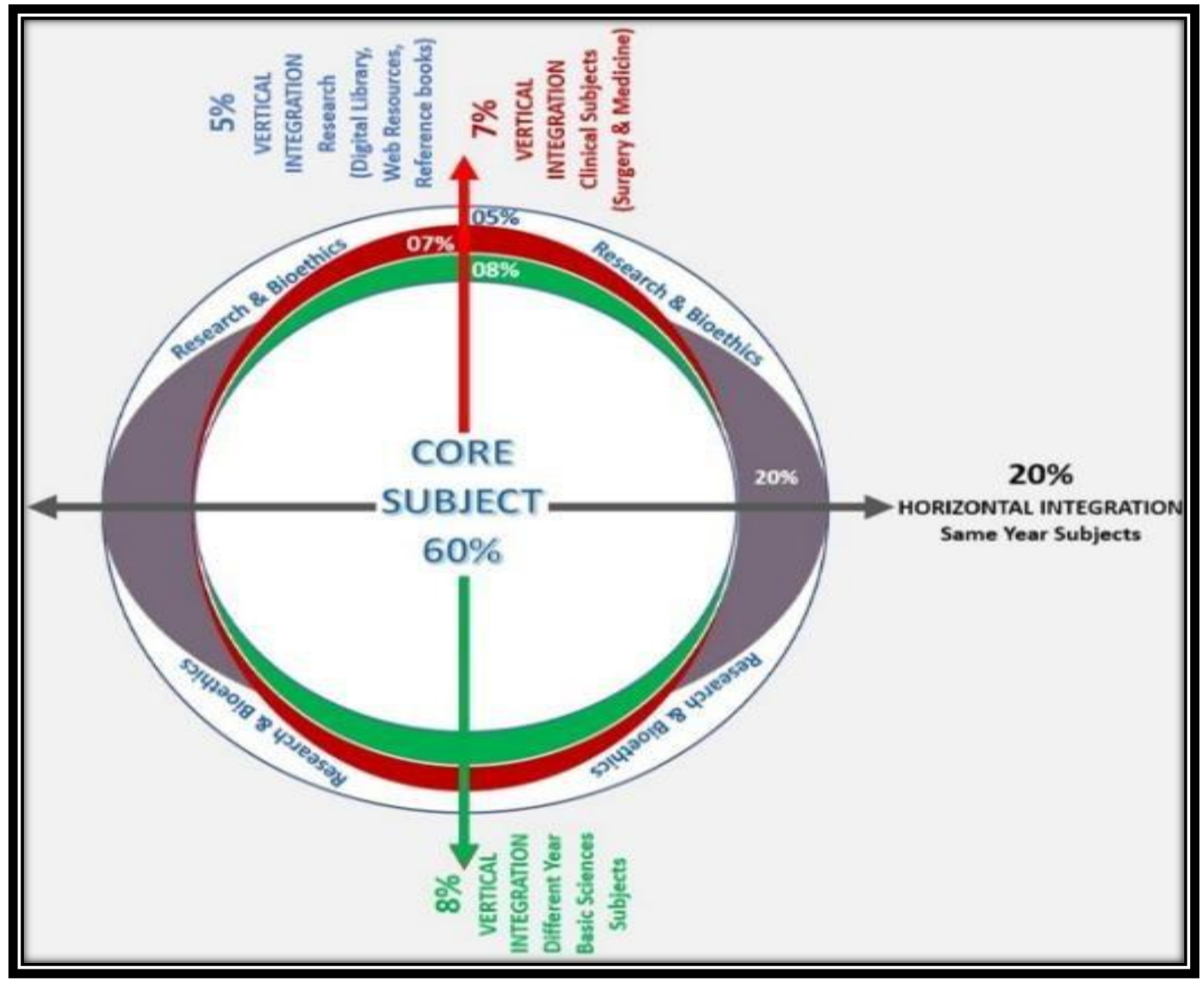
Case Vignette

A 50-year-old housewife complains of progressive weight gain of 10 Kgs in 1 year, fatigue, slight memory loss, slow speech, dry skin, constipation, and cold intolerance. Vital signs include a temperature 96.8 F, pulse 58/minute and regular, BP 140/100. She is moderately obese and speaks slowly and has a puffy face, with pale, cool, dry, and thick skin. The thyroid gland is slightly enlarged, firm, not nodular, mobile, and not tender. The deep tendon reflex time is delayed.

Hypothyroidism


5%
VERTICAL INTEGRATION
Research
(Digital Library, Web Resources, Reference books)
7%
VERTICAL INTEGRATION
Clinical Subjects
(Surgery & Medicine)
05%
07%
08%
Research & Bioethics
Research & Bioethics
CORE SUBJECT 60%
20%
20%
HORIZONTAL INTEGRATION
Same Year Subjects
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Basic Sciences
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LECTURE CONTENT ANALYSIS	
CORE CONTENT	60%
HORIZONTAL INTEGRATION	20%
VERTICAL INTEGRATION	15%
RESEARCH AND ETHICS	5%

Learning Objectives

At the end of this lecture, students should be able to:

1: Define hypothyroidism and describe its etiology.

2: Explain the pathophysiology of hypothyroidism.

3: Describe the clinical features and signs of hypothyroidism.

4: Describe the laboratory investigations used in the diagnosis of hypothyroidism.

Learning Objectives

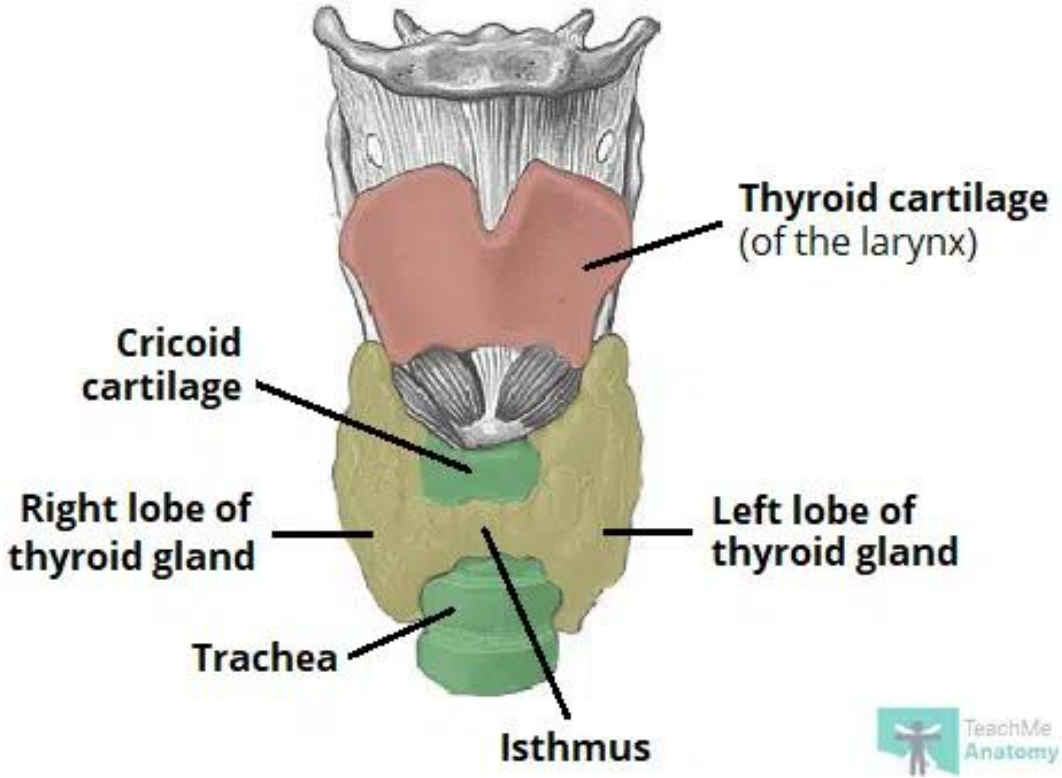
At the end of this lecture, students should be able to:

5: Differentiate between primary, secondary, and subclinical hypothyroidism based on laboratory findings.

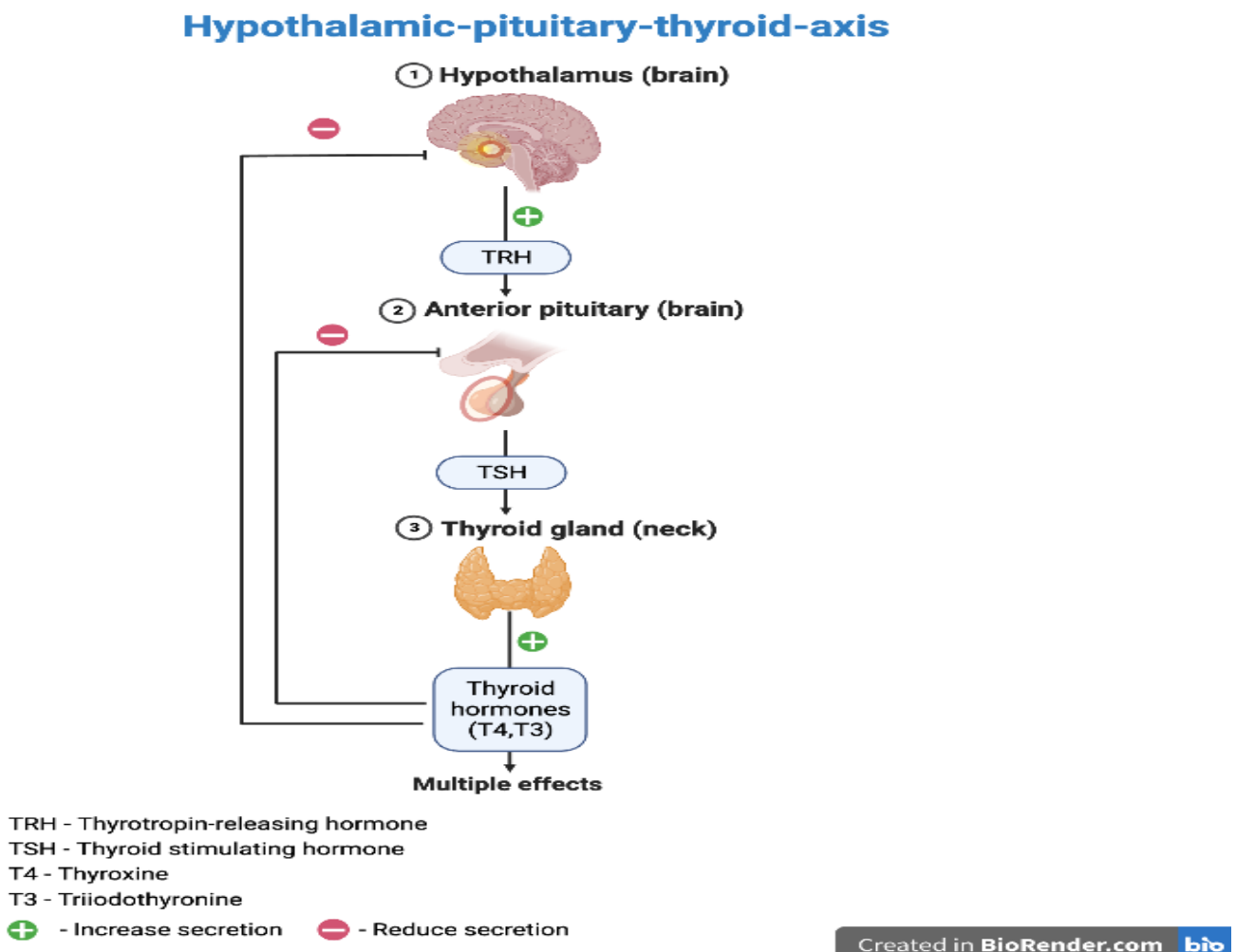
6: Recognize the potential complications of untreated hypothyroidism.

7: Outline the management of hypothyroidism.

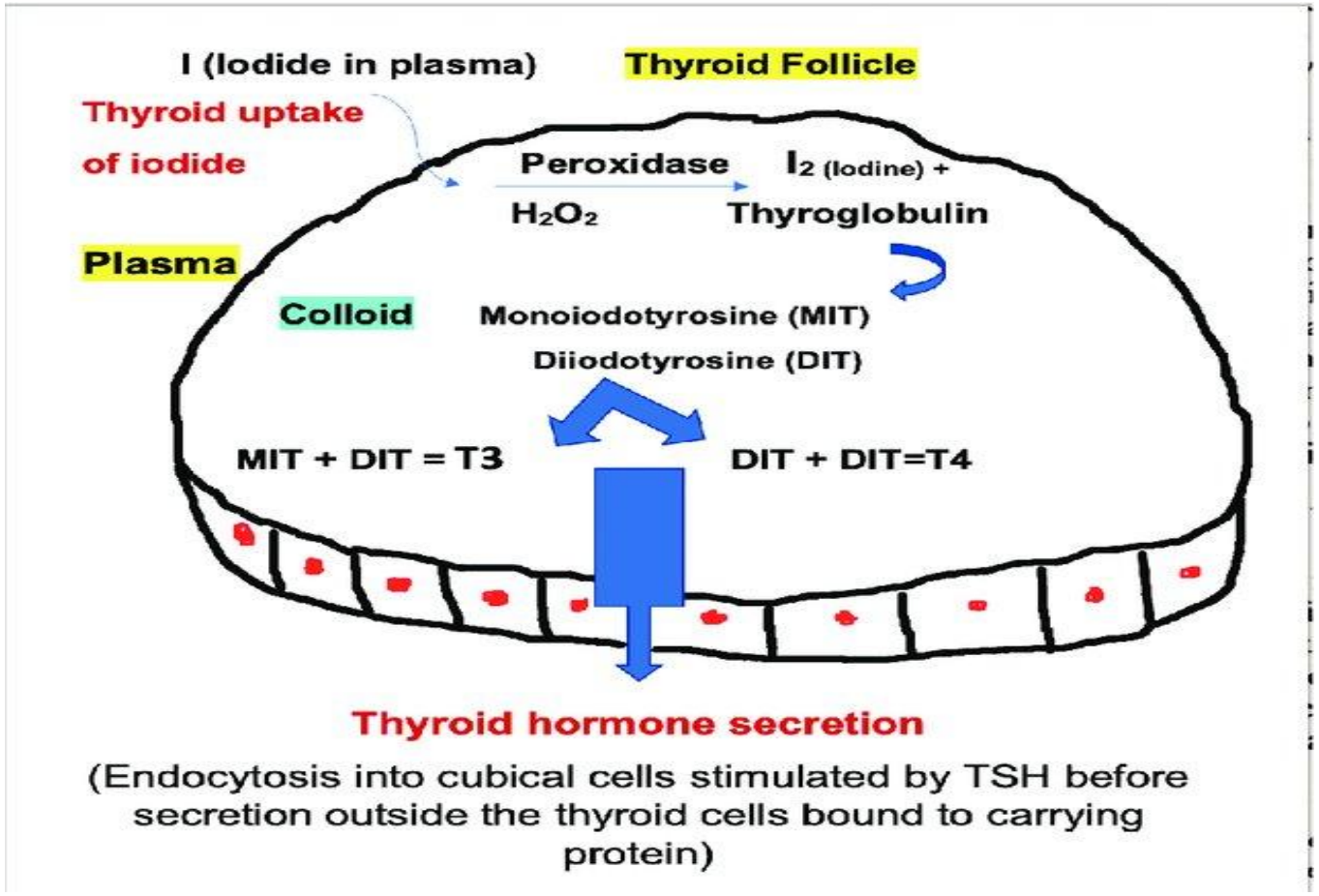
Structure of Thyroid gland



Physiology of Thyroid Hormone production



Synthesis and secretion of thyroid hormones



Functions of Thyroid Hormone

1: Cardiac output, and resting heart rate increase through positive chronotropic and inotropic effects.

2: Increase in BMR, thermogenesis.

3: Resting respiratory rate and minute ventilation.

4: Promote fetal growth, skeletal maturation.

5: T3 stimulates the nervous system resulting in increased wakefulness, alertness, and responsiveness to external stimuli.

6: Increase gut motility.

7: Increase serum glucose, promote growth hormone, catecholamine synthesis, and inhibit prolactin synthesis.

Definition

Hypothyroidism is a common endocrine disorder resulting from deficiency of thyroid hormone.

Etiologies of Hypothyroidism

Etiologies of Hypothyroidism

Primary hypothyroidism is defined as low levels of blood thyroid hormone due to destruction of the thyroid gland.

Secondary hypothyroidism, also known as central hypothyroidism is caused by a defect in the hypothalamic-pituitary axis.

Etiologies of Hypothyroidism

Primary Hypothyroidism

1. Chronic autoimmune thyroiditis
2. Iodine deficiency
3. Thyroidectomy
4. Therapy with radioactive iodine
5. External radiotherapy.
6. Drugs
7. Thyroid agenesis or dysgenesis.

Etiologies of Hypothyroidism

Secondary Hypothyroidism

1. Pituitary adenomas
2. History of pituitary surgery or radiotherapy
3. History of head trauma
4. History of pituitary apoplexy
5. Hypothalamic or suprasellar tumors
6. History of hypothalamic surgery or radiotherapy

Clinical Symptoms and signs

Clinical features

- Fatigue
- Lethargy
- Constipation
- Cold intolerance
- Somnolence
- Weight gain
- Dry skin
- Hair loss
- Deep hoarse voice
- OSA
- Dull expression less face, sparse hair, periorbital puffiness
- Depression, Psychosis
- Menorrhagia
- Macroglossia
- Bradycardia
- Delayed relaxation of tendon reflexes

Clinical features

Laboratory Investigations

Diagnostic test for Hypothyroidism

Primary Hypothyroidism	Secondary Hypothyroidism	Subclinical Hypothyroidism
TSH ↑	TSH normal or ↓	TSH ↑
T3 ↓	T3 ↓	T3 normal
T4 ↓	T4 ↓	T4 normal

Abnormal Lab investigations in hypothyroidism

Antibodies: TPO, TG, TSH receptor antibodies

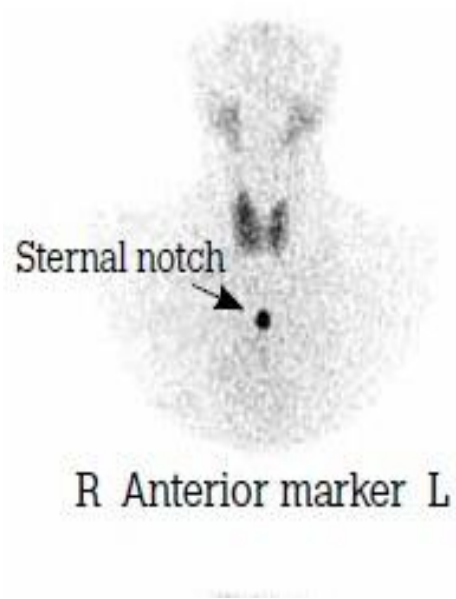
Anemia, Hyponatremia, Hypoglycemia

Increased TG levels, Increased CK level

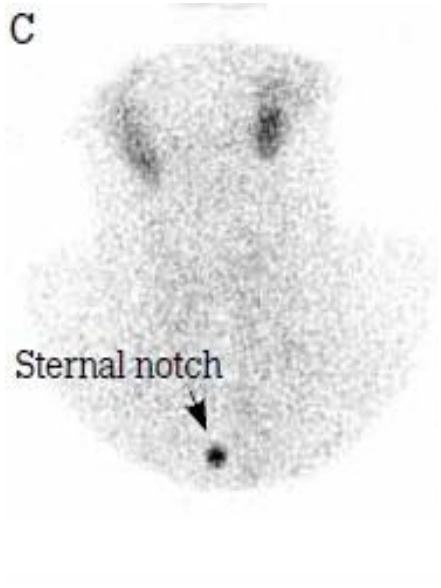
Abnormal Imaging in hypothyroidism

THYROID SCAN

NORMAL



HYPOTHYROID



Complications

Complications of Hypothyroidism

- Myxedema Coma → Altered mental status, Hypothermia, Hypotension, Hyponatremia, Hypoglycemia, Hypoventilation, Bradycardia
- Cardiomyopathy
- Pericardial effusion
- Infertility
- Depression and Psychosis
- Congenital hypothyroidism

Management

Management of Hypothyroidism

1: Levothyroxine (oral T4 hormone)

2: Dose 1.6 to 1.8 ug/kg/day.

3: TSH levels are monitored to assess the response to the therapy.

ETHICAL ISSUES

Ethical Issue	Key Concerns
Informed Consent and Patient Education	Educating patients about lifelong levothyroxine therapy, potential side effects, and the need for regular monitoring.
Patient Autonomy	Respecting patient decisions regarding treatment, particularly in subclinical hypothyroidism or alternative therapies.
Equity in Access to Care	Ensuring access to thyroid function tests, medications, and follow-up care for patients from low-resource settings.
Overtreatment and Harm Prevention	Preventing excessive thyroid hormone replacement, which can cause osteoporosis, atrial fibrillation, and cardiovascular issues.
Special Populations (Pregnancy, Elderly, Pediatrics)	Ethical considerations in managing hypothyroidism in vulnerable populations with distinct therapeutic requirements.
Research and Innovation	Adhering to ethical standards in research involving new formulations or personalized therapies for hypothyroidism.
Healthcare Provider Responsibility	Ensuring accurate diagnosis and avoiding mislabeling patients with non-specific symptoms as hypothyroid.

Thank you