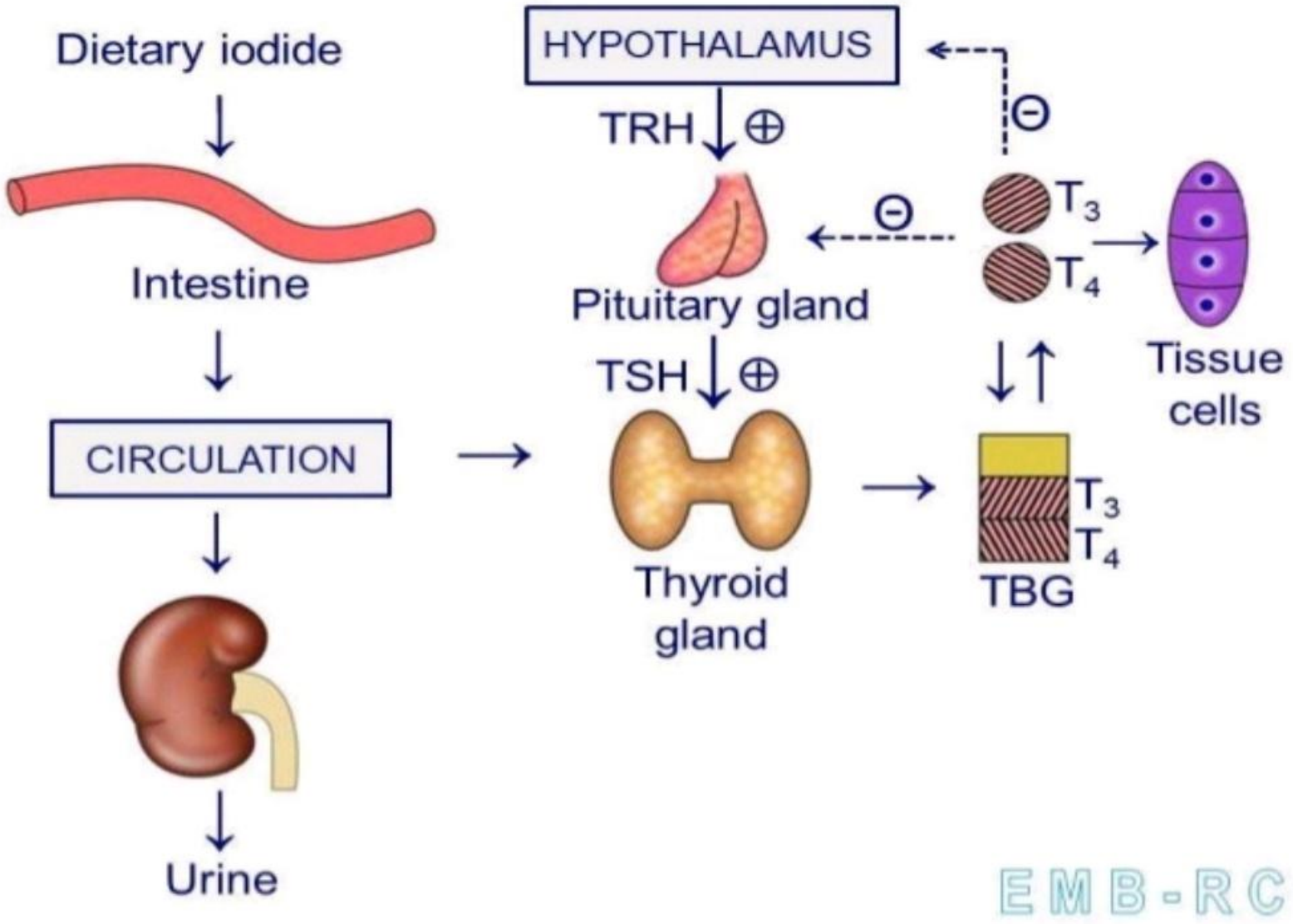
HYPOTHYROID.

Opera Winfrey

Opera is a new guest to Hypothyroid community !!!

Thyroid gland.

- Thyroid is a small gland found in the middle of the lower neck.
- Thyroid works with pituitary gland which produces thyroid stimulating hormone(TSH).
- TSH stimulate the thyroid gland to produce the thyroid hormone,T3 and T4.



Thyroxine Hormone

- Iodine, a trace mineral, is essential for the synthesis of thyroid hormone..
- Thyroxine(T4) and triiodothyronine (T3).
- 20 % of T3 derived directly from thyroid gland and 80 % by conversion from T4.
- Thyroid hormone regulate metabolism in every cell of the body and play a role in virtually all physiological function.

Regulating thyroid hormone.

- When the amount of thyroid hormone in the blood drops, the pituitary gland secretes a hormone called thyroid stimulating hormone(TSH).
- TSH then stimulate the thyroid gland to increase its uptake of iodine from the blood, so that more thyroxin(T4) can be synthesized.
- When necessary, thyroid is then converted to the metabolically active triodothyroxine(T3), a process that involves removing one iodine atom from T4.

TSH: THYROID STIMULATING HORMONE.

HYPOTHYROIDISM

- ELEVATED TSH.
- > 5mU/L

HYPERTHYROIDISM

- LOW TSH.
- < 0.5mU/L.

THYROID FUNCTION TEST.

TEST	FROM	TO	UNITS
TSH	0.25	5.00	mU/L
FT4	9.0	25.0	pmol/L
FT3	3.5	7.8	pmol/L

THYROID TEST

- TSH–NORMAL RANGE–0.25–5.0 mU/L.

- Symptomatic primary hypothyroidism > 20
- Mild symptomatic hypothyroidism 10 to 20
- Primary hyperthyroidism < 0.05.
- Thyroxine(T4)
- Triiodothyronine(T3)
- Free T3
- Free T4

Labs.

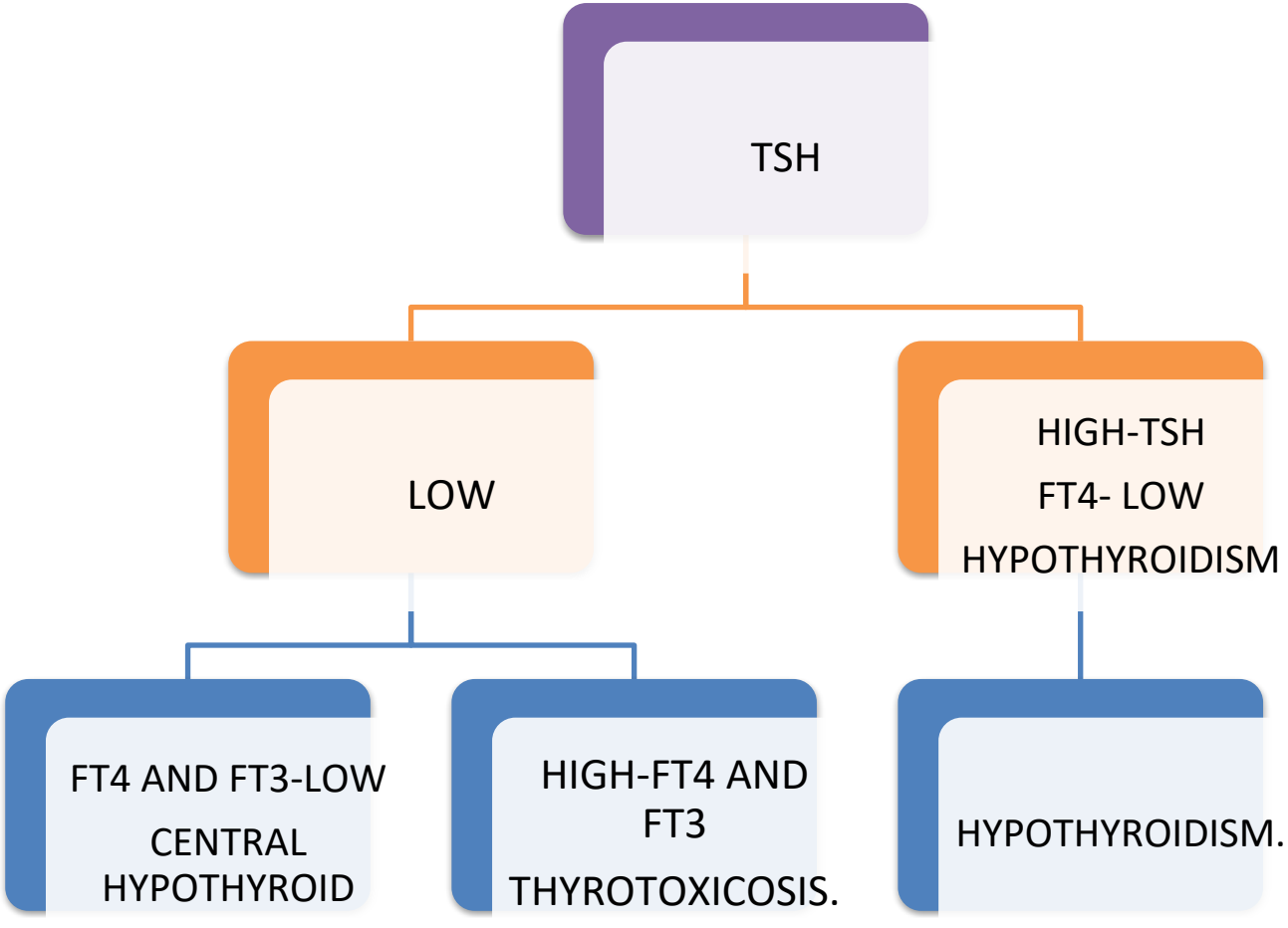
Hyperthyroidism

- ↑FT4
- ↓TSH

Hypothyroidism

- ↓FT4
- ↑TSH.

Labs.

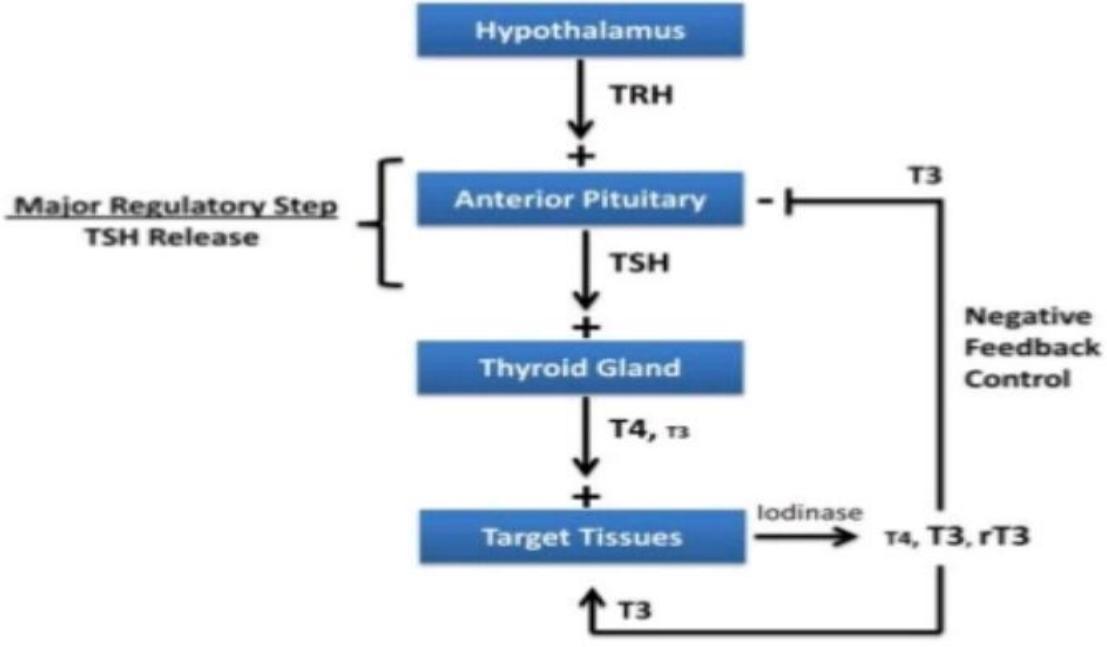


WHEN TO HAVE THYROID FUNCTION TEST.

- Swelling in the neck
- Abnormal menstrual cycle
- Fertility problem
- High cholesterol
- Weight gain
- Puffiness of Face, dry skin, hair loss
- Fatigue, lethargy, Anemia etc..

THYROID REGULATION.

Thyroid regulation



Physiological actions of Thyroxin hormones.

- Potentiates brain development.
- Increases heart rate.
- Increases cardiac output.
- Increases ventilation rate.
- Thickens of endometrium in female.

Metabolic effects of Thyroid hormones.

- The hormone exerts action on every cell on the body.
- Calorigenic effect or **thermogenesis** is the major effect of throid hormone.
- This thermogenic effect is mediated by uncoupling of oxidative phosphorylation.

- Basal metabolic rate (BMR) is increased.
- Thyroxine increases cellular metabolism.
- Earliest effect of T4 is stimulation of RNA synthesis and consequent increase in protein

- synthesis Higher concentration of T3 causes **protein catabolism** and negative nitrogen balance.

- Loss of body weight is a prominent feature of hyperthyroidism.

- **Gluconeogenesis** and carbohydrate oxidation are increased.

- Glucose tolerance test shows rapid absorption.

- Fatty acid metabolism is increased.

- **Cholesterol** degradation is increased and hence cholesterol level in blood is decreased, which is another hallmark of hyperthyroidism.

CAUSE OF HYPOTHYROIDISM.

Thyroid disorders

Causes of hypothyroidism

Primary	Secondary	Tertiary
Iodine deficiency Excess iodide intake Thyroid ablation (Surgery) Hashimoto's thyroiditis Sub acute thyroiditis Genetic abnormalities Goiterogenic food (cabbage) Drugs – Lithium – Amiodarone – Anti thyroid agents	Hypopituitarism - Adenoma - Ablative therapy - Pituitary destruction	Hypothalamic dysfunction

HYPOTHYROIDISM.

- Hypothyroidism is a thyroid problem caused by an underactive thyroid gland that produces insufficient amount of thyroid hormones.
- Hypothyroidism is seen in both sexes, but is more common in women.
- In pregnancy new born is at risk of cretinism.

SYMPTOMS OF HYPOTHYROIDISM.

- Cold intolerance
- Constipation.
- Lethargy
- Dry and course skin and hair
- Facial puffiness
- Anemia
- Impaired memory
- Confusion
- Dementia
- Low speech and motor activity.

Hypothyroidism

Hypothyroidism is the result from any condition that results in TH deficiency.

Iodine deficiency

Primary thyroid disease: Inflammatory diseases of the thyroid that destroy parts of the gland are clearly an important cause of hypothyroidism.

Symptoms of hypothyroidism

Lethargy, fatigue, cold-intolerance, weakness, hair loss and reproductive failure.

If these signs are severe, the clinical condition is called *myxedema*.

congenital thyroid deficiency- **cretinism**, a form of irreversible growth and mental retardation.

Summary

Disease	Total serum T4	Total serum T3	T3 resin uptake	Free T4 index	Radioactive iodine uptake test	TSH
Hypothyroidism	↓	↓	↓	↓	↓	↑ 1^0 / ↓ 2^0, 3^0
Hyperthyroidism	↑	↑	↑	↑	↑	↓
T3 toxicosis	No change	↑	No change	No change	No change ↑	↓
Euthyroid sick syndrome	No change ↓	↓	↑	variable	No change	No change

Thyroid disorders

Carcinoma thyroid

Metastatic Carcinoma thyroid

Complications.

- Untreated condition, patient is at risk for–
- Diabetes.
- High blood pressure.
- Arthritis.
- Depression.
- Recurrent infection.
- Migraine.

Classification of hypothyroidism.

PRIMARY. Due to failure of the thyroid gland itself.

SECONDARY. Due to hypopituitarism.

TERTIARY. Due to failure of hypothalmus.

Hypothyroidism(GOITRE).

- Excess stimulation by TSH due to decreased level of circulating thyroid hormones, leads to enlargement of thyroid gland.
- Reason:
- 1. Iodine deficiency.
- 2.certain antithyroid drugs.
- 3.Hashimoto’s thyroiditis.

Case history (your diagnosis)

An 11-yo female with no significant past medical history presented with symptoms of weight loss and heat intolerance. She has also experienced a decline in grades at school. The physician ordered thyroid function tests including Free T_4, T_3, TSH, anti-TSH receptor antibodies, anti-thyroglobulin and anti-thyroid peroxidase antibodies. The results are shown below.

Test	Result	Ref Range	Units
Free T_4	2.87	0.73–1.77	ng/dL
T_4	18.2	5.0–12.0	ug/dL
T_3	374.00	123–211	ng/dL
TSH	<0.018	0.36–5.80	uIU/mL
anti-thyroglobulin Ab	>3000	<60	IU/mL
anti-thyroid peroxidase Ab	2667	<60	IU/mL
anti-TSH receptor Ab	69.6	<16.0	%