

THE THYROID GLAND

PROF. ABDULMAJEED AL-DREES

DISEASES OF THE THYROID GLAND

PROF. ABDULMAJEED AL-DREES

OBJECTIVES

- DESCRIBE PATHOPHYSIOLOGY BEHINED THE CAUSES OF HYPER-HYPOTHYROIDISM.
- DESCRIBE PATHOPHYSIOLOGY BEHINED THE SIGNS AND SYMPTOMS OF HYPER-HYPOTHYROIDISM.
- LIST THE TREATMENT

HYPERTHYROIDISM

- **Over activity of the thyroid gland.**
- **Women : men ratio (8:1).**
- **Activity of gland :**
 - a)- **5- 10 times** increase in secretion.
 - b)- **2-3 times** increase in size.

CAUSES

1- Graves' disease :

- An autoimmune disorder.
- Increased circulating level of **thyroid-stimulating immunoglobulins (TSI)**.
- 95%.

2- Thyroid gland tumor:

- 95% is benign.

- History of head and neck irradiation and family history.

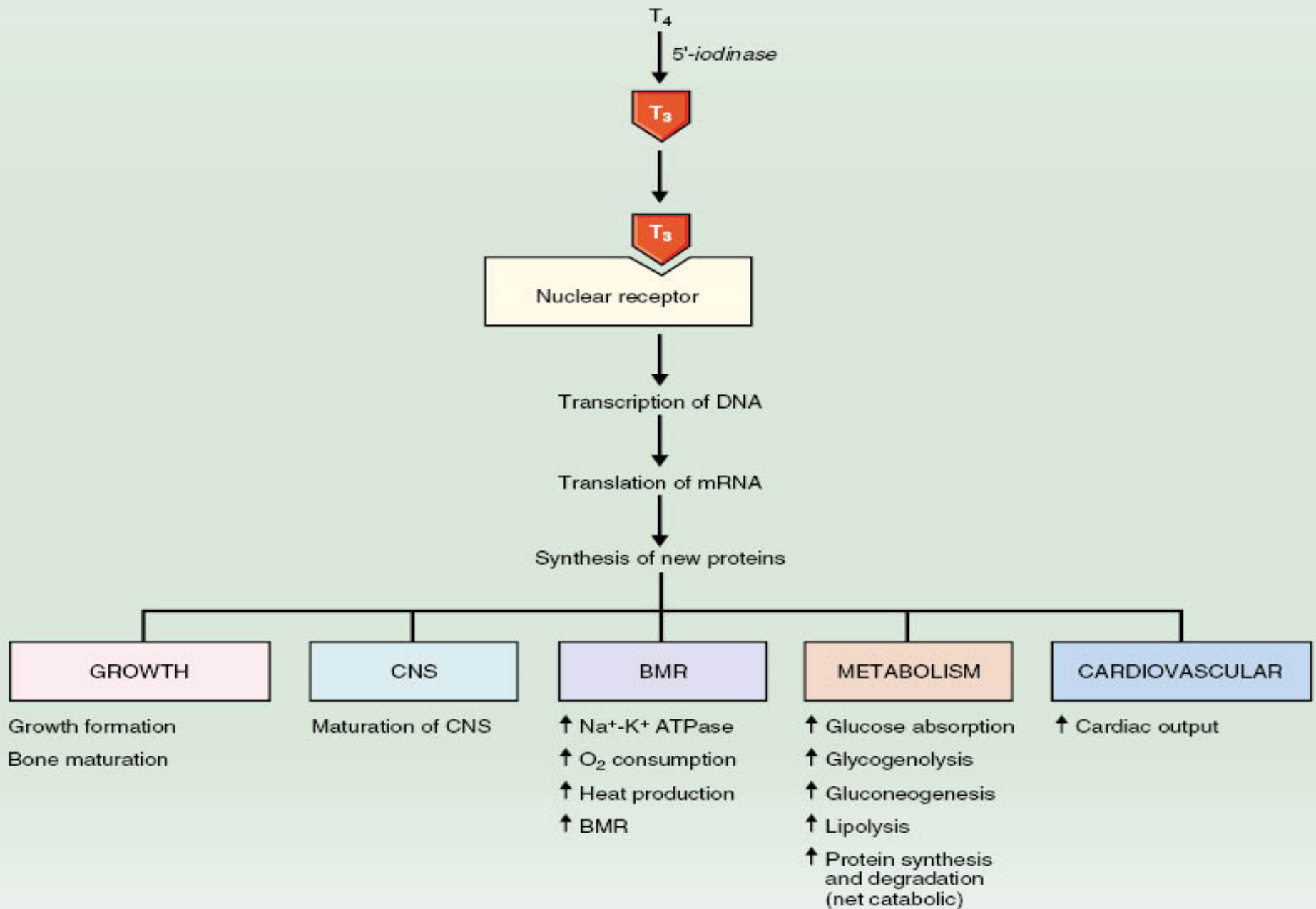
3- Exogenous T4:

(rarely cause)

4- Excess TSH secretion:

- **Diseases of the hypothalamus (TRH).**
- **Diseases of the pituitary (TSH).**

ACTIONS OF THYROID HORMONES



DIAGNOSIS

S+S :

1- Goiter.

2- Skin:

- smooth, warm and moist.
- heat intolerance, night sweating.

3- Musculoskeletal:

- Muscle atrophy.

4- Neurological:

- tremor.
- enhanced reflexes.
- irritability.

5- Cardiovascular:

- increase heart rate.
- increase stroke volume.
- arrhythmias.
- hypertension.

6- G.I tract:

- weight loss.
- diarrhea.

7- Exophthalmos:

- **anxious staring expression.**
- **protrusion of eye balls.**

8- Others:

- **menstrual cycle disturbance.**



INVESTIGATIONS

1- Serum T3, T4 ,TSH measurement.

In primary hyperthyroidism:

high T3, T4 and low TSH .

In secondary hyperthyroidism:

high T3, T4 and high TSH.

TREATMENT

1- Medical therapy:

start monthly

- with 3-4 monthly monitoring.

2- Radioactive iodine

3- Surgery:

- **thyroidectomy.**

- **Indication for surgery:**

- a)- Relapse after medical treatment.

- b)- Drug intolerance.

- c)- Cosmetic.

- d)- Suspected malignancy.

HYPOTHYROIDISM

Under activity of the thyroid gland

more in woman (30- 60 years).

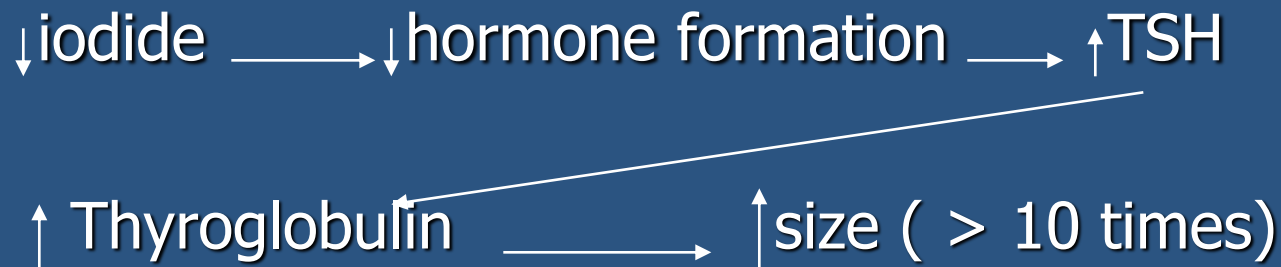
CAUSES

1- Inherited abnormalities of thyroid hormone synthesis :

- Peroxidase defect.
- Iodide trapping defect.
- Thyroglobulin defect.

2- Endemic Colloid Goiter:

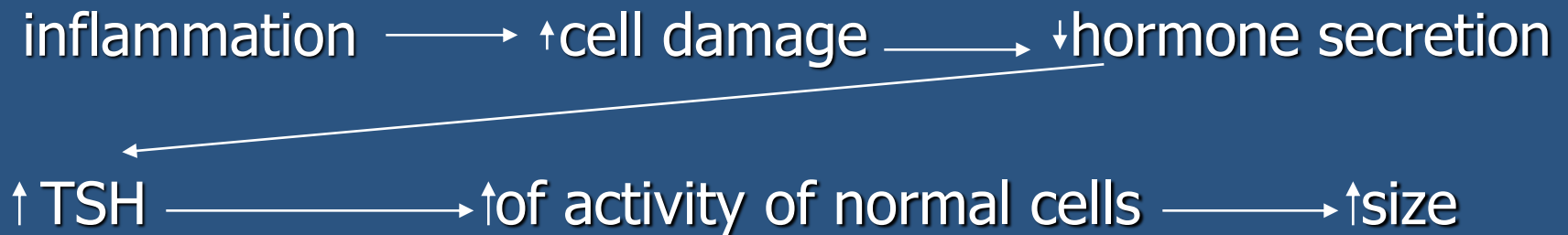
- table salt.





3- Idiopathic Nontoxic Colloid Goiter:

- I intake is normal.
- **thyroiditis?**



4- Gland destruction (surgery).

5- Pituitary diseases or tumor.

6- Hypothalamus diseases or tumor.

DIAGNOSIS

1- Skin :

- dry skin.
- cold intolerance.

2- Musculo skeletal:

- ↑ muscle bulk.
- ↓ in skeletal growth.
- muscle sluggishness

3- Neurological:

- slow movement.
- impaired memory.
- decrease mental capacity.

4- Cardiovascular:

- heart rate
- stroke volume.

5- G.I tract:

- constipation**
- increase weight.**

6- Myxoedema:

An edematous appearance throughout body.

7- others:

- loss of libido.**
- menstrual cycle disturbance.**



INVESTIGATIONS

1- Serum T3,T4 are low.

- TSH is elevated in primary.

**- TSH is low in secondary
hypothyroidism.**

TREATMENT

- **L- thyroxine**
- Starting dose is 25-50 μg .
- - At 2-4 weeks period.

The first response seen is the **weight loss.**



Table 9-9 Pathophysiology of Thyroid Hormones

| | Hyperthyroidism | Hypothyroidism |
|-------------------|--|--|
| Symptoms | <p>Increased basal metabolic rate</p> <p>Weight loss</p> <p>Negative nitrogen balance</p> <p>Increased heat production</p> <p>Sweating</p> <p>Increased cardiac output</p> <p>Dyspnea (shortness of breath)</p> <p>Tremor, muscle weakness</p> <p>Exophthalmos</p> <p>Goiter</p> | <p>Decreased basal metabolic rate</p> <p>Weight gain</p> <p>Positive nitrogen balance</p> <p>Decreased heat production</p> <p>Cold sensitivity</p> <p>Decreased cardiac output</p> <p>Hypoventilation</p> <p>Lethargy, mental slowness</p> <p>Drooping eyelids</p> <p>Myxedema</p> <p>Growth retardation</p> <p>Mental retardation (perinatal)</p> <p>Goiter</p> |
| Causes | <p>Graves' disease (increased thyroid-stimulating immunoglobulins)</p> <p>Thyroid neoplasm</p> <p>Excess TSH secretion</p> <p>Exogenous T₃ or T₄ (factitious)</p> | <p>Thyroiditis (autoimmune or Hashimoto's thyroiditis)</p> <p>Surgery for hyperthyroidism</p> <p>I⁻ deficiency</p> <p>Congenital (cretinism)</p> <p>Decreased TRH or TSH</p> |
| TSH Levels | <p>Decreased (feedback inhibition of T₃ on the anterior lobe)</p> <p>Increased (if defect is in anterior pituitary)</p> | <p>Increased (by negative feedback if primary defect is in thyroid gland)</p> <p>Decreased (if defect is in hypothalamus or anterior pituitary)</p> |
| Treatment | <p>Propylthiouracil (inhibits peroxidase enzyme and thyroid hormone synthesis)</p> <p>Thyroidectomy</p> <p>¹³¹I⁻ (destroys thyroid)</p> <p>β-Adrenergic blocking agents (adjunct therapy)</p> | <p>Thyroid hormone replacement therapy</p> |

CRETINISM

Extreme hypothyroidism during infancy and childhood (failure of growth).

CAUSES

- 1- Congenital lack of thyroid gland (congenital cretinism).**
- 2- Genetic deficiency leading to failure to produce hormone.**
- 3- Iodine lack in the diet (endemic cretinism).**

SYMPTOMS

- 1- Infant is normal at birth but abnormality appears within weeks.**
- 2- Protruding tongue.**
- 3- Dwarf with short limbs.**
- 4- Mental retardation.**
- 5- Often umbilical hernia.**



TREATMENT

Changes are irreversible unless treatment is given early.



