



Role of conacarpus erectus leaves extract in treatment of hypothyroidism

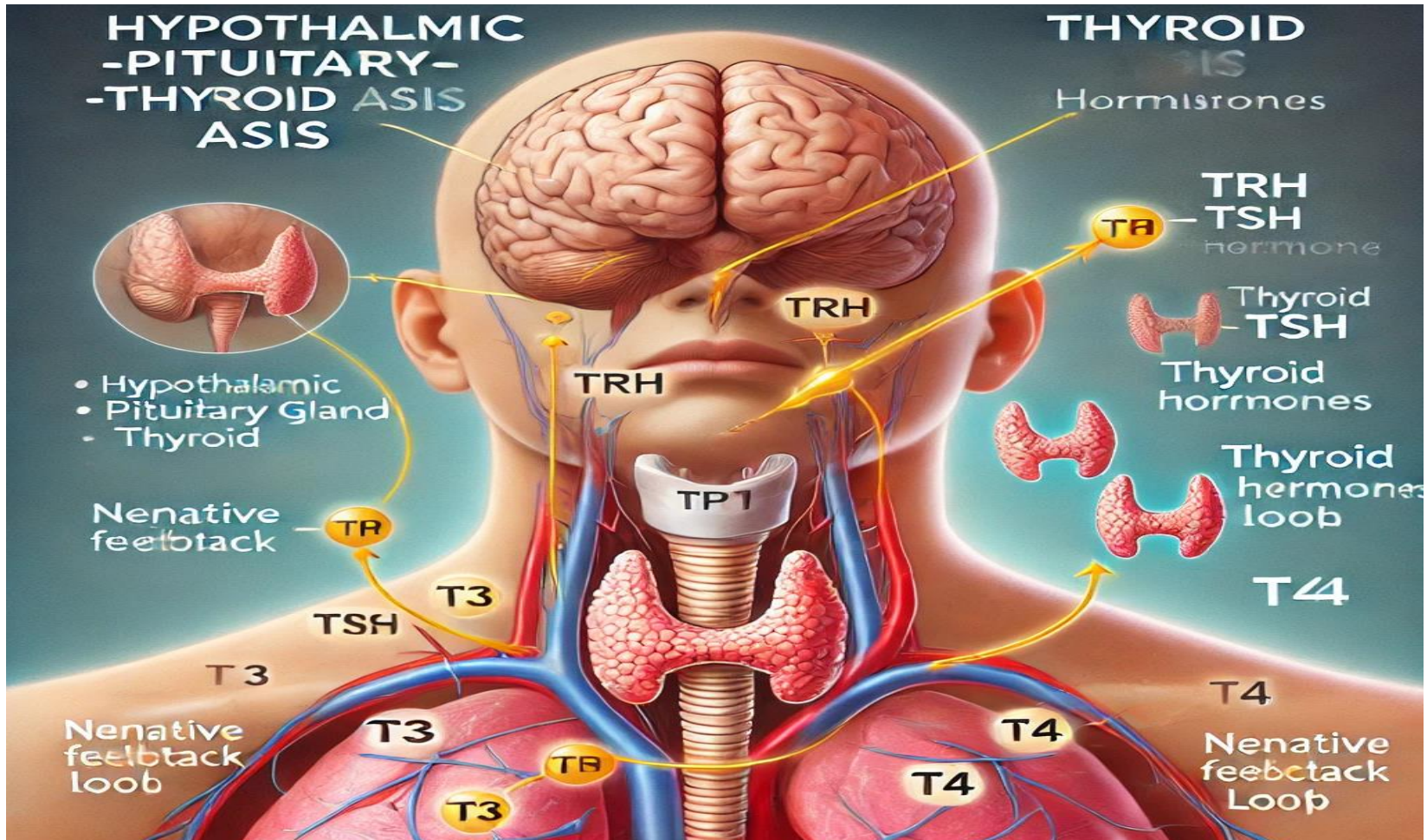
Lect. Mahmood K. Salih

Dep of Pharmacology and Toxicology

Thyroid Gland



Hypothalamus Pituitary Thyroid axis



Thyroid Hormone Synthesis

- 1. Iodine Uptake Process: Iodide ions (I^-) are actively transported from the bloodstream into thyroid follicular cells by the sodium-iodide symporter (NIS). Significance: This step ensures a sufficient supply of iodine, essential for thyroid hormone production.
- 2. Iodide Oxidation Process: Inside the follicular cells, iodide is oxidized to iodine (I^2) by the enzyme thyroid peroxidase (TPO). Location: This occurs at the apical membrane of the follicular cells.

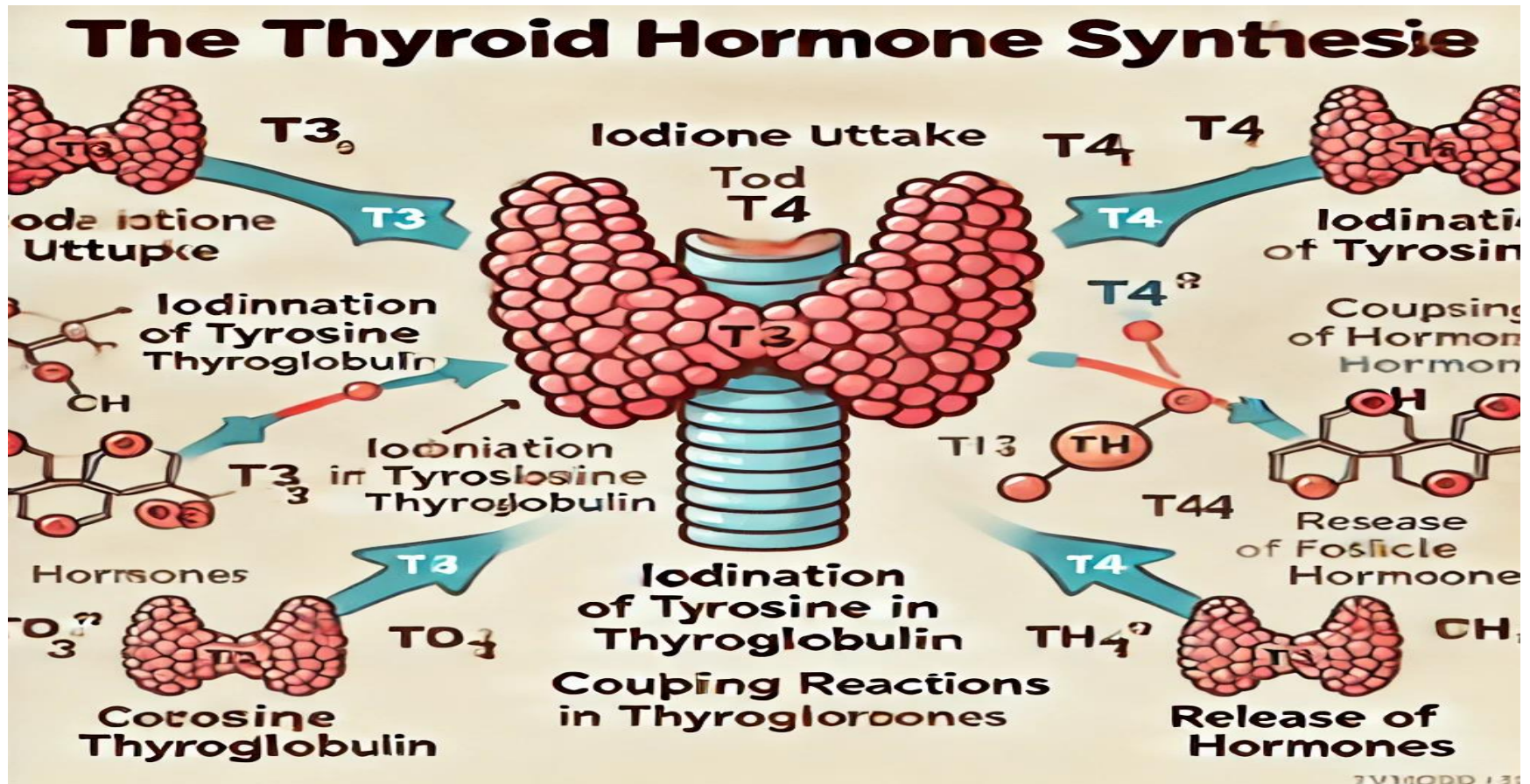
Thyroid Hormone Synthesis

- 3. Iodination of Tyrosine Process: Iodine reacts with tyrosine residues in thyroglobulin (a glycoprotein secreted into the colloid) to form:
 - Monoiodotyrosine (MIT): Tyrosine with one iodine atom.
 - Diiodotyrosine (DIT): Tyrosine with two iodine atoms.
 - Catalyst: This reaction is mediated by thyroid peroxidase (TPO).
- 4. Coupling of Iodotyrosines Process: Iodotyrosines combine to form thyroid hormones:
 - $\text{MIT} + \text{DIT} = \text{Triiodothyronine (T3)}$.
 - $\text{DIT} + \text{DIT} = \text{Thyroxine (T4)}$.
 - Location: This coupling occurs within the colloid.

Thyroid Hormone Synthesis

- 5. Storage in the Colloid Process: The iodinated thyroglobulin, containing T3 and T4, is stored in the follicular lumen (colloid) until needed.
- 6. Endocytosis of Thyroglobulin Process: When thyroid hormones are required, thyroglobulin is endocytosed back into the follicular cells.
- 7. Proteolysis and Hormone Release Process: Lysosomes digest thyroglobulin, releasing free T3 and T4. Result: T3 and T4 are released into the bloodstream.
- 8. Transport in the Blood Process: T3 and T4 bind to plasma proteins such as thyroxine-binding globulin (TBG) for transport to target tissues.

Thyroid Hormone Synthesis



Role of Thyroid Hormones

- Thyroid hormones, primarily **triiodothyronine (T3)** and **thyroxine (T4)**, play a vital role in regulating numerous physiological processes. These hormones are essential for maintaining metabolism, growth, and overall body homeostasis.

Key Functions of Thyroid Hormones

- **1. Metabolism Regulation**
- **Basal Metabolic Rate (BMR):** Thyroid hormones increase oxygen consumption and energy expenditure in most tissues, enhancing basal metabolic rate.
- **Thermogenesis:** They stimulate heat production, especially in brown adipose tissue, helping regulate body temperature.
- **2. Growth and Development**
- **Fetal and Childhood Development:**
 - Essential for brain development, especially during the prenatal and neonatal periods.
 - Promotes skeletal growth and bone maturation.
 - **Protein Synthesis:** Regulates the synthesis and degradation of proteins in various tissues.

Key Functions of Thyroid Hormones

- **3. Cardiovascular System**
- **Heart Rate and Output:** Thyroid hormones increase heart rate, cardiac contractility, and cardiac output.
- **Vasodilation:** Improve blood flow by relaxing blood vessels, ensuring better tissue oxygenation.
- **4. Nervous System**
- **Cognitive Function:** T3 and T4 influence memory, concentration, and mental alertness.
- **Nervous System Maturation:** Essential for the development of the central and peripheral nervous systems.
- **5. Lipid and Carbohydrate Metabolism**
- Stimulate the breakdown of fats (lipolysis) and regulate cholesterol levels.
- Increase glucose utilization and uptake by cells to meet energy demands.

- **6. Reproductive System**

- Support normal reproductive function by regulating menstrual cycles and maintaining fertility in both men and women.

- **7. Skeletal System**

- Promote bone formation and remodeling by stimulating osteoblast and osteoclast activity.

- **8. Other Functions**

- immune Regulation: Modulate immune responses and inflammatory processes.
- Gut Motility: Increase gastrointestinal motility and digestion efficiency.
- Skin and Hair: Regulate skin hydration and hair growth

Thyroid Hormone Imbalances

1. Hypothyroidism (Low T3/T4): Symptoms: Fatigue, weight gain, cold intolerance, depression, dry skin, and hair thinning. Effects: Slowed metabolism, bradycardia, and decreased cognitive function

2. Hyperthyroidism (High T3/T4): Symptoms: Weight loss, heat intolerance, increased appetite, anxiety, and palpitations. Effects: Accelerated metabolism, tachycardia, and potential muscle weakness

What is Hypothyroidism?

- Hypothyroidism is a condition where the thyroid gland does not produce enough thyroid hormones, leading to slowed metabolism and various symptoms.

Causes of Hypothyroidism

- - Autoimmune diseases (e.g., Hashimoto's thyroiditis)
- - Iodine deficiency
- - Thyroid surgery or radiation
- - Medications
- - Congenital conditions
- - Pituitary gland disorders

Symptoms of Hypothyroidism

- - Fatigue and weakness
- - Weight gain
- - Cold intolerance
- - Dry skin and hair
- - Depression
- - Slow heart rate
- - Memory and concentration issues

Diagnosis of Hypothyroidism

- Hypothyroidism is diagnosed using:
 - - Blood tests (TSH and free T4 levels)
 - - Medical history and physical examination
 - - Imaging (ultrasound) if needed

Treatment of Hypothyroidism

- - Hormone replacement therapy (levothyroxine)
- - Regular monitoring of thyroid hormone levels
- - Dietary and lifestyle adjustments
- - Managing underlying causes (e.g., autoimmune conditions)

Conacarpus Erectus



Conocarpus Erectus

- *Conocarpus erectus* (Buttonwood Tree) Overview *Conocarpus erectus*, commonly known as Buttonwood or Button Mangrove, is a salt-tolerant tree or shrub native to tropical and subtropical coastal regions. It is widely used in landscaping and has several ecological and medicinal benefits.



Conacarpus Erectus

- Cultivation Climate: Thrives in tropical and subtropical regions.
- Grows well in coastal areas due to its high salt tolerance.
- Soil Requirements: Prefers sandy, loamy, or saline soils with good drainage.
- Tolerant of nutrient-poor soils.
- Growth Conditions: Requires full sunlight but can tolerate partial shade.
- Moderate water needs; highly drought-tolerant once established.
- Propagation: Propagated via seeds or cuttings.
- Seeds germinate easily with proper moisture and warmth.



Uses

- Landscaping:
- Erosion Control: Stabilizes soil in coastal areas, reducing erosion.
- Shade and Shelter: Provides shade in urban and rural landscapes. Acts as a shelter for birds and other wildlife.
- Timber: Durable wood is used for firewood, charcoal, and construction in local settings.
- Medicinal Uses: Leaves, bark, and other parts are traditionally used for medicinal purposes.

Advantages of Conacarpus erectus Leaf Extract

- **Antioxidant Properties:** Contains bioactive compounds like flavonoids and phenolics that scavenge free radicals, reducing oxidative stress.
- **Antimicrobial Activity:** Effective against a range of bacterial and fungal pathogens.
- **Anti-inflammatory Effects:** Reduces inflammation, offering potential in treating inflammatory conditions
- **Wound Healing:** Enhances the healing of cuts and abrasions due to its antimicrobial and regenerative properties.
- **Anti-diabetic Potential:** Some studies suggest its extracts may help regulate blood sugar levels.
- **Environmental Benefits:** Leaves are used in composting, adding organic matter to soil and improving fertility.

Key Advantages

- Highly adaptable to extreme conditions (salinity, drought, and poor soil).
- Ecologically beneficial for coastal stabilization and habitat support.
- Medicinal uses of its extracts are gaining interest for pharmaceutical applications.

THANKS

Thanks for listening



