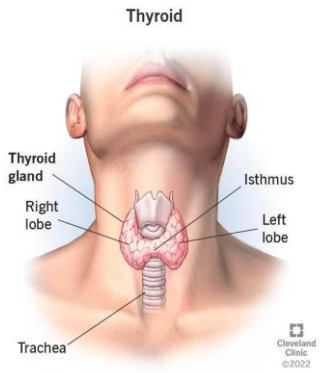
# Thyroid Function Tests

- **Introduction**
- Thyroid function tests (TFTs) are a set of blood tests that measure the levels of thyroid hormones to assess how well the thyroid gland is working.
- The thyroid produces hormones that regulate metabolism, growth, and energy use in the body.
- These tests are essential for diagnosing thyroid disorders such as hypothyroidism (underactive thyroid) and hyperthyroidism (overactive thyroid).




## Common Thyroid Function Tests :

1. **TSH (Thyroid Stimulating Hormone)**
    - **What it measures**: TSH is produced by the pituitary gland and stimulates the thyroid to release thyroid hormones (T3 and T4).
    - **Normal range**: 0.4 – 4.0 mIU/L (varies slightly depending on lab).
    - **Clinical Significance**:
        - **High TSH**: Suggests hypothyroidism (underactive thyroid).
        - **Low TSH**: Suggests hyperthyroidism (overactive thyroid).

2. **Free T4 (Thyroxine)**
    - **What it measures**: Free T4 is the active form of the thyroid hormone thyroxine, which is not bound to proteins in the blood.
    - **Normal range**: 0.8 – 1.8 ng/dL (varies slightly).
    - **Clinical Significance**:
        - **Low Free T4**: Suggests hypothyroidism.
        - **High Free T4**: Suggests hyperthyroidism.

3. **Free T3 (Triiodothyronine)**
    - **What it measures**: Free T3 is the active form of thyroid hormone T3, which is derived from T4.
    - **Normal range**: 2.3 – 4.2 pg/mL (varies slightly).
    - **Clinical Significance**:
        - **Low Free T3**: Suggests hypothyroidism.
        - **High Free T3**: Suggests hyperthyroidism.

4. **Thyroid Antibodies (Anti-TPO, Anti-TG)**
    - **What it measures**: These antibodies are produced by the immune system in autoimmune thyroid diseases.
    - **Clinical Significance**:
        - **High Anti-TPO or Anti-TG**: Indicates autoimmune thyroid disease like **Hashimoto's thyroiditis** (leading to hypothyroidism) or **Graves' disease** (leading to hyperthyroidism).

5. **Total T4 and Total T3**
    - **What it measures**: Total T4 and T3 measure both bound and unbound forms of the thyroid hormones.
    - **Clinical Significance**: These tests are less commonly used today because **free T4** and **free T3** provide more accurate insights into thyroid function.

**Interpretation and Clinical Relevance**

- **Hypothyroidism (Underactive Thyroid)**:
    - **High TSH** and **Low Free T4**: Primary hypothyroidism (problem with the thyroid gland itself).
    - **Low TSH** and **Low Free T4**: Secondary hypothyroidism (problem with the pituitary or hypothalamus).
- **Hyperthyroidism (Overactive Thyroid)**:
    - **Low TSH** and **High Free T4** or **High Free T3**: Primary hyperthyroidism (problem with the thyroid).
    - **High TSH** and **High Free T4**: Secondary hyperthyroidism (problem with the pituitary).

- **Autoimmune Thyroid Diseases**:
    - **High thyroid antibodies** (Anti-TPO, Anti-TG) suggest conditions like **Hashimoto's thyroiditis** or **Graves' disease**.

**Conclusion**

- Thyroid function tests are critical for diagnosing thyroid disorders.
- Tests like **TSH**, **Free T4**, and **thyroid antibodies** provide valuable information about thyroid health.