

# Thyroid Cases

**American Thyroid Association Annual Meeting  
Corporate Leadership Council  
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## Case History

A 28 year old woman with 4 month history of fatigue, palpitations and heat intolerance.

**PE:** BP 148/70 P 108 Ht 5'6" Wt 115 lb.

**Thyroid:** diffusely enlarged (3 x normal)

**Eyes:** bulging eyes with swollen eyelids

**Lab:** TSH < 0.03 mU/L (nl: 0.45-4.5)

Free T4 7.8 ng/dl (nl: 0.8-1.8)

Total T3 698 ng/dl (nl: 90-190)

# Graves' Disease

## Extrathyriodal Features

**Graves' Orbitopathy**



**Pretibial Myxedema**

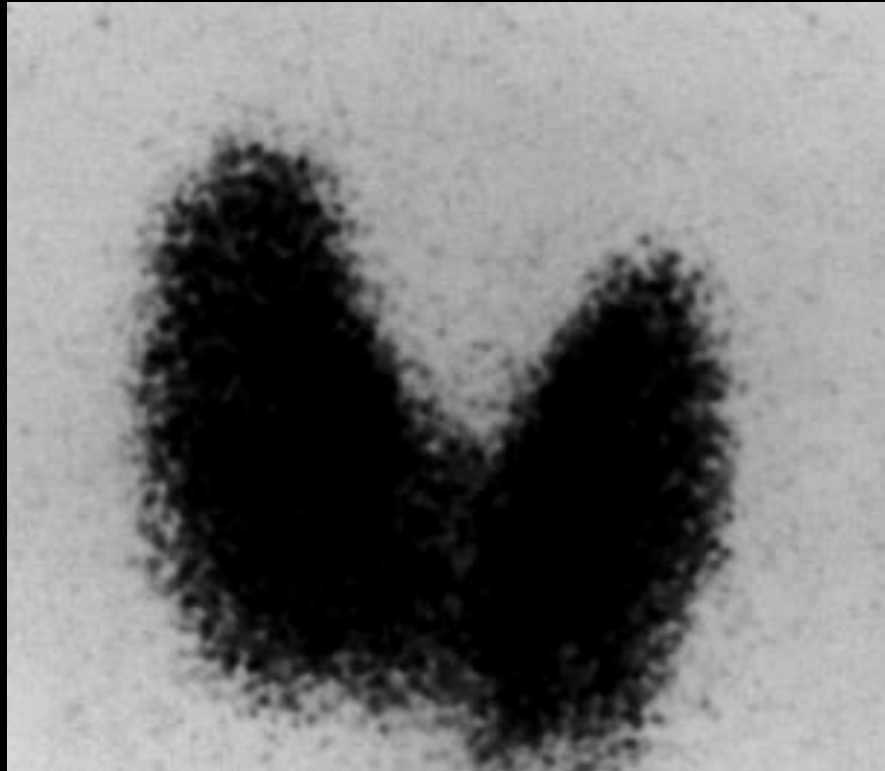


**Thyroid  
Acropachy**



# Graves' Disease

## Thyroid Scan - Diffuse Uptake



**Autonomous Function in All Thyroid Cells - Scan**

**TSH Receptor Antibodies – TRAb**

# Graves' Disease

## Treatment

### Anti-Thyroid Drugs for 12-18 Months

- **Methimazole:** most patients
- **Propylthiouracil:** occasional patient
- **Goal:** Symptom Relief → Remission ~ 20-40%

### Radioiodine (I-131)

- **Hypothyroidism:** ~ 80-100% (3-12 Months)

### Thyroidectomy

- **Hypothyroidism:** ~ 80-100% (1-2 Weeks)

Ross D. Thyroid 2016; 26:1343-1420

McDermott M. Ann Intern Med 2012; 157: ITC 1-14

## Case History

A 33 year old woman complains of fatigue and weight gain of 15 lb over the past 6 months.

**PMH:** Type 1 Diabetes Mellitus since age 5

**Meds:** Insulin Pump Therapy

**PE:** BP 134/80 P 64 Ht 5'6" Wt 154 lb.

**Thyroid:** enlarged firm, granular thyroid

**Eyes:** swelling around the eyes

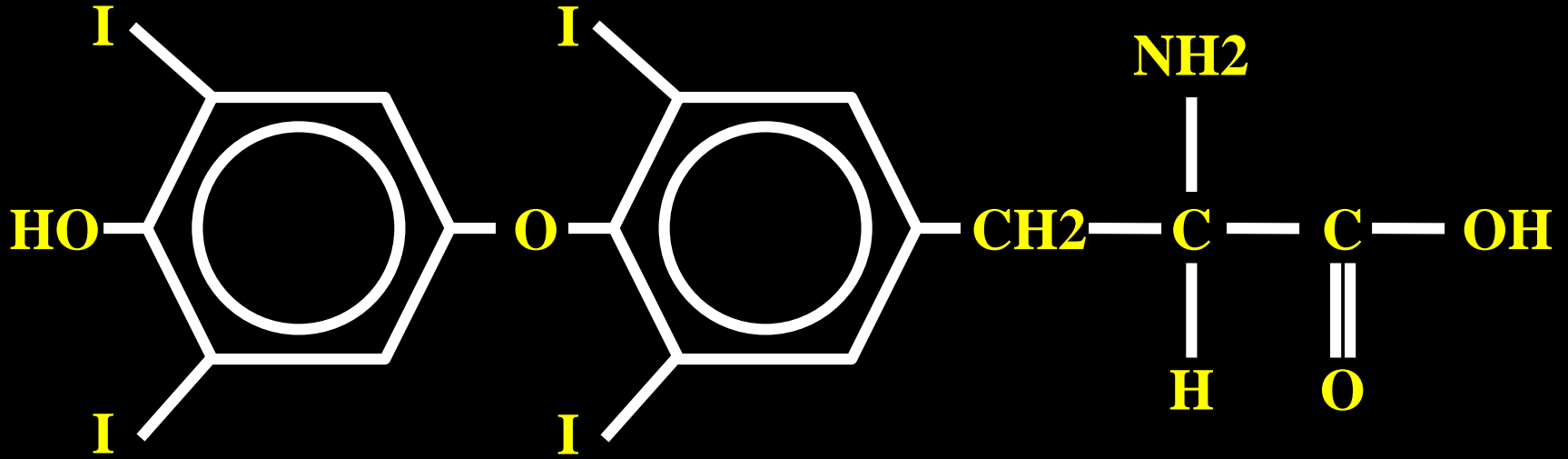
**Reflexes:** reflexes slow to react and return

**Lab:** TSH 112 mU/L (nl: 0.45-4.5)

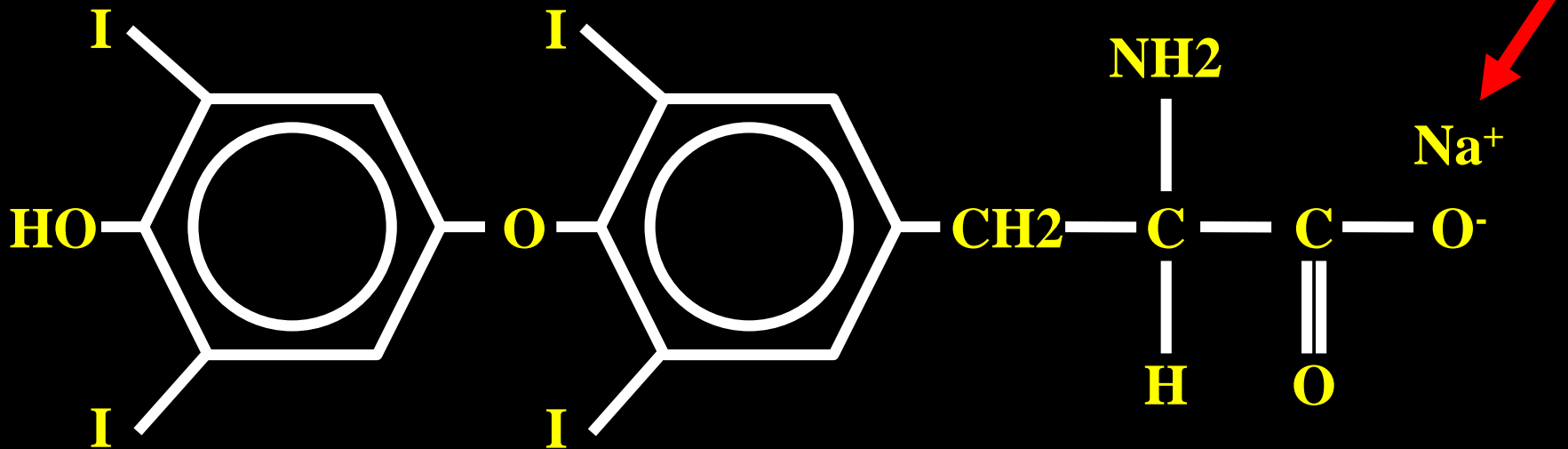
TPO antibodies 72.5 units (nl < 0.3)

**Treatment:** Levothyroxine 112 mcg daily

## Thyroxine Structure



## Levothyroxine Sodium



## Case History

26 yo woman recently noted a lump in her neck. No hoarseness or dysphagia.

**PH:** No thyroid disease, No XRT    **FH:** No Thyroid Ca

**PE:**    **Thyroid:** 1.5 cm right nodule

**Neck:** no lymphadenopathy

**Lab:** TSH 1.2 mU/L (nl: 0.45-4.5)

**Neck US:** 1.6 cm right isoechoic thyroid nodule



# Isoechoic Solid Regular Margin



**Risk: Low**  
**5-10%**

**Biopsy**  
 **$\geq 1.5$  cm**

Figure 2, 2015 ATA Guidelines  
Haugen B, Thyroid 2016; 26:1-133

## Case History

26 yo woman recently noted a lump in her neck. No hoarseness or dysphagia.

**PH:** No thyroid disease, No XRT    **FH:** No Thyroid Ca

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**Neck US:** 1.6 cm right isoechoic thyroid nodule

**FNA:** Atypia of Undetermined Significance (AUS)

**Likelihood of Malignancy:** 6-48% (Avg. 14%)

**Molecular Marker Test Ordered:**

Benign nodule

# Molecular Markers

## Indeterminate FNA (AUS, FLUS, FN)

- **Afirma**
- **ThyroSeq v3**

## Case History

72 yo woman had a thyroid nodule discovered on PET scan during metastatic breast cancer evaluation.

**PH:** No thyroid disease, No XRT    **FH:** No Thyroid Ca

**PE:**    **Thyroid:** 4 cm left nodule

**Neck:** palpable lymph nodes

**Lab:** TSH 2.0 mU/L (nl: 0.45-4.5)

**Neck US:** 4.3 cm left hypoechoic nodule, regular margins.

Multiple suspicious neck lymph nodes.

# Hypoechoic Solid Regular Margin



**Risk: Intermediate**  
**10-20%**

**Biopsy**  
**≥ 1.0 cm**

Figure 2, 2015 ATA Guidelines  
Haugen B, Thyroid 2016; 26:1-133

## Case History

72 yo woman had a thyroid nodule discovered on PET scan during metastatic breast cancer evaluation.

**PH:** No thyroid disease, No XRT    **FH:** No Thyroid Ca

**PE:**    **Thyroid:** 4 cm left nodule    **Neck:** + lymph nodes

**Lab:** TSH 2.0 mU/L (nl: 0.45-4.5)

**Neck US:** 4.3 cm left hypoechoic nodule, regular margins. Multiple suspicious neck lymph nodes.

**FNA (Biopsy):** Papillary Thyroid Cancer

Thyroglobulin < 0.1 ng/ml, Tg antibodies 185 (nl < 60)

**Management:** Refer for Thyroidectomy.

## Case History

**72 yo woman had a thyroid nodule discovered on PET scan during metastatic breast cancer evaluation.**

**Surgery: 4.3 cm tumor. Multiple positive LN central and lateral compartments. Gross extension to strap muscles.**

**Pathology: Tall cell variant Papillary Thyroid Cancer**

## Case History

72 yo woman 4.3 cm papillary thyroid cancer (tall cell) with positive cervical lymph nodes and local extension.

**Two months** after thyroidectomy.

**Serum Thyroglobulin**: < 0.1 ng/ml – Pre-op

**Thyroglobulin Antibodies**: 185 units (nl < 60) – Pre-op

**Tumor Stage**: T3bN1bM1, Stage IVb

**Treatment**: I-131 therapy, 150 mCi.

**Pretreatment**: rhTSH (Thyrogen)

**Post-Therapy Scan**: Uptake in thyroid bed, multiple cervical lymph nodes and pulmonary nodules.



## Case History

72 yo woman 4.3 cm papillary thyroid cancer (tall cell) with positive cervical lymph nodes and local extension.

**Six months** after I-131 therapy.

**Serum Thyroglobulin**: < 0.1 ng/ml

**Thyroglobulin Antibodies**: 390 units (nl < 60)

**Chest CT Scan**: multiple probable metastases present

**I-131 Whole Body Scan**: faint uptake in cervical LN and some pulmonary metastases. **Pretreatment**: rhTSH

**Treatment**: I-131 therapy, 200 mCi (2<sup>nd</sup> dose).

**Pretreatment**: LT4 withdrawal.

**Post-Therapy Scan**: Faint uptake in thyroid bed, multiple cervical lymph nodes and pulmonary nodules.

## Case History

72 yo woman 4.3 cm papillary thyroid cancer (tall cell) with positive cervical lymph nodes and local extension.

**One year later.** I-131 therapy, 150 mCi 18 months ago and 200 mCi 12 months ago. Radioiodine resistant now.

**Serum Thyroglobulin:** < 0.1 ng/ml

**Thyroglobulin Antibodies:** 565 units (nl < 60)

**Chest CT Scan:** metastases increased in size

**I-131 Whole Body Scan:** no uptake (after rhTH).

**Treatment:**

**Targeted Agents Discussed:** Lenvatinib vs Sorafenib

**Chosen:** Lenvatinib

# Thank You



# Overt Hypothyroidism Treatment

**Age < 60 Years and No CAD**

- **Levothyroxine: 1.6 mcg/kg QD**
- **TSH Recheck: 6 Weeks**
- **Dose Titration: TSH in Reference Range**

Jonklass J. Thyroid 2014; 24: 1670-1751

McDermott M. Ann Intern Med 2009; 151: ITC 61

## Case History

56 yo man, from Europe, complains of intermittent hoarseness, difficulty swallowing and neck fullness.

**PH:** Negative    **FH:** Goiters    **Meds:** None

**PE:** BP 124/77    P 76    Ht 5'6"    Wt 159 lb.

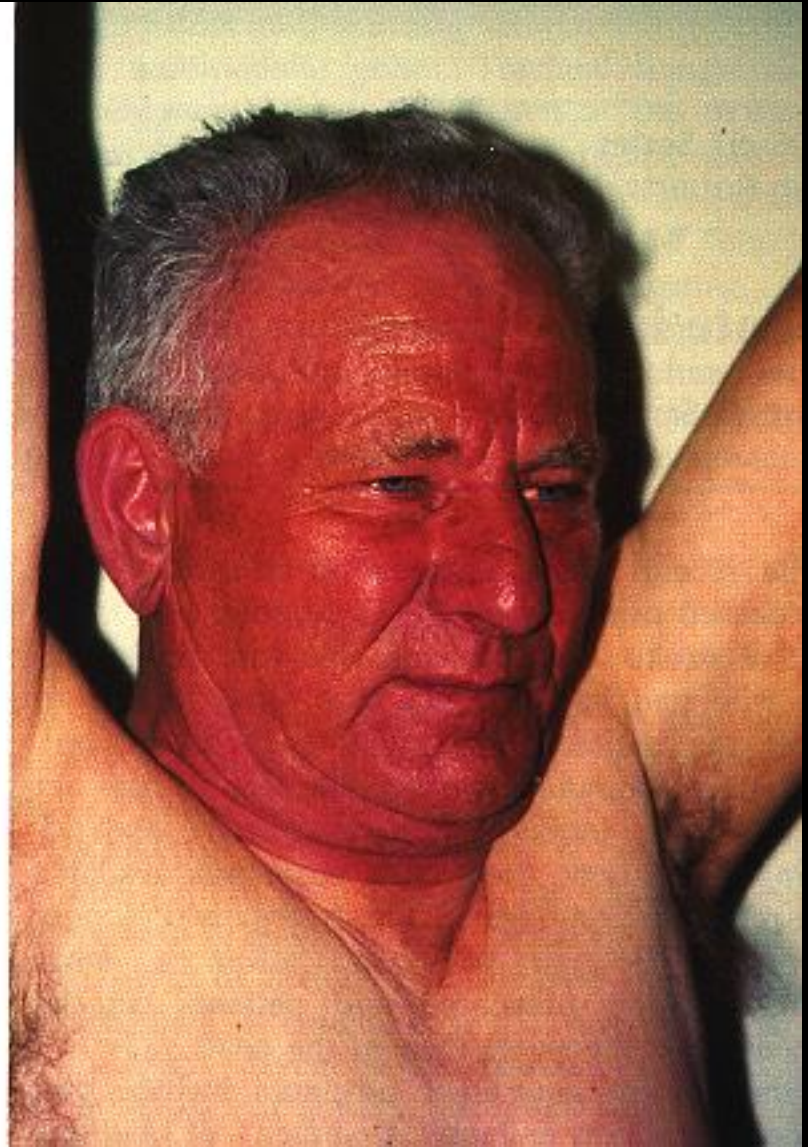
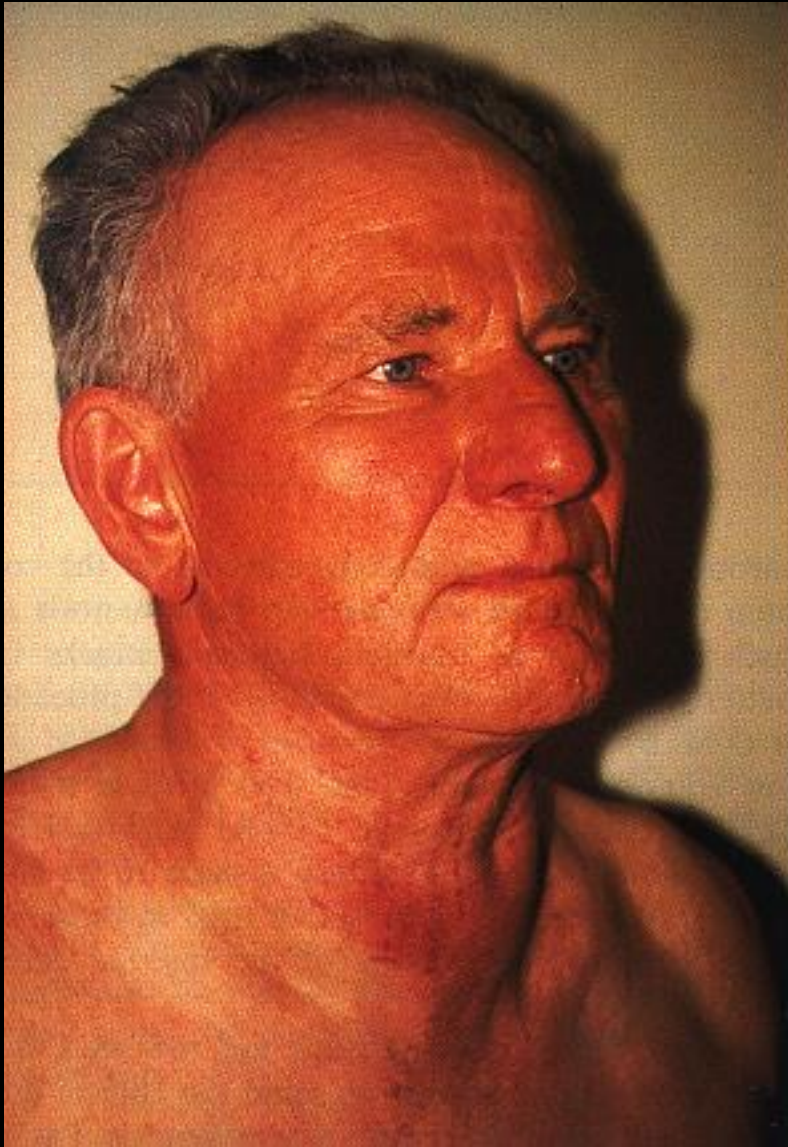
**Thyroid:** enlarged (4 X), multiple firm nodules

**Lab:** TSH 0.9 mU/L (nl: 0.45-4.5)

**Neck US:** large goiter with multiple nodules; two largest nodules are 2.3 and 2.8 cm. No suspicious features.

**FNA of 2 Largest Nodules:** benign colloid nodules

# Pemberton's Sign



**SVC Obstruction**

# Primary Hypothyroidism

## Etiology

### Lymphocytic Thyroiditis

(Hashimoto's Disease)

### Thyroidectomy

### I-131 Ablation

### Medications:

- Lithium
- Amiodarone
- Alpha Interferon
- Multi-kinase Inhibitors

# Overt Hypothyroidism

## Treatment

**Age > 60 Years or CAD**

- **Levothyroxine: 25-50 mcg QD**
- **TSH Recheck: 6 Weeks**
- **Dose Titration: TSH in Reference Range**
  - **Age  $\geq$  70:  $4.0 < \text{TSH} < 6.0$  mU/L**

Jonklass J. Thyroid 2014; 24: 1670-1751

McDermott M. Ann Intern Med 2009; 151: ITC 61



# Spongiform



**Risk: Very Low**  
**< 3%**

**Biopsy**  
 **$\geq 2$  cm**

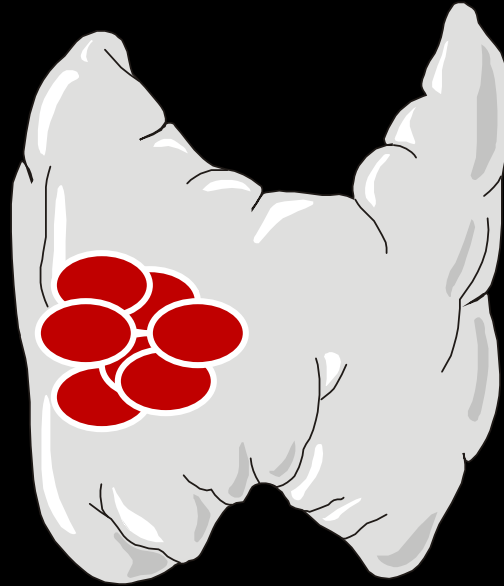
Figure 2, 2015 ATA Guidelines  
Haugen B, Thyroid 2016; 26:1-133

# Thyroid Cancer

## Classification and Frequency

**Papillary**

**60-80%**



**Follicular**

**10-15%**

**Medullary**

**2-5%**

**Hurthle Cell**

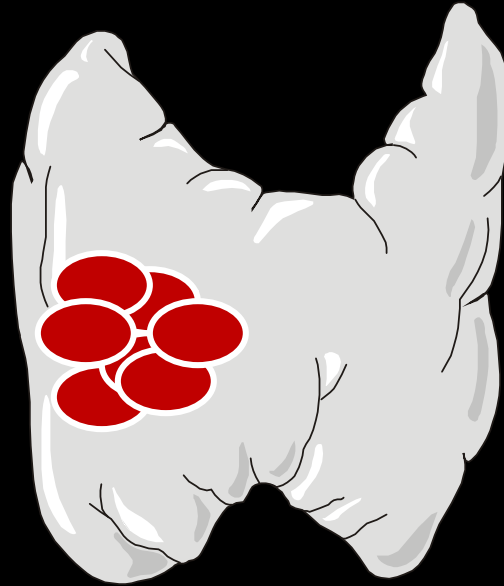
**2-5%**

**Anaplastic**

**2-5%**

# Thyroid Cancer

## Prognosis - Survival



**Papillary**

**10 Yr: > 90%**

**Follicular**

**10 Yr: > 90%**

**Medullary**

**10 Yr: > 60%**

**Hurthle Cell**

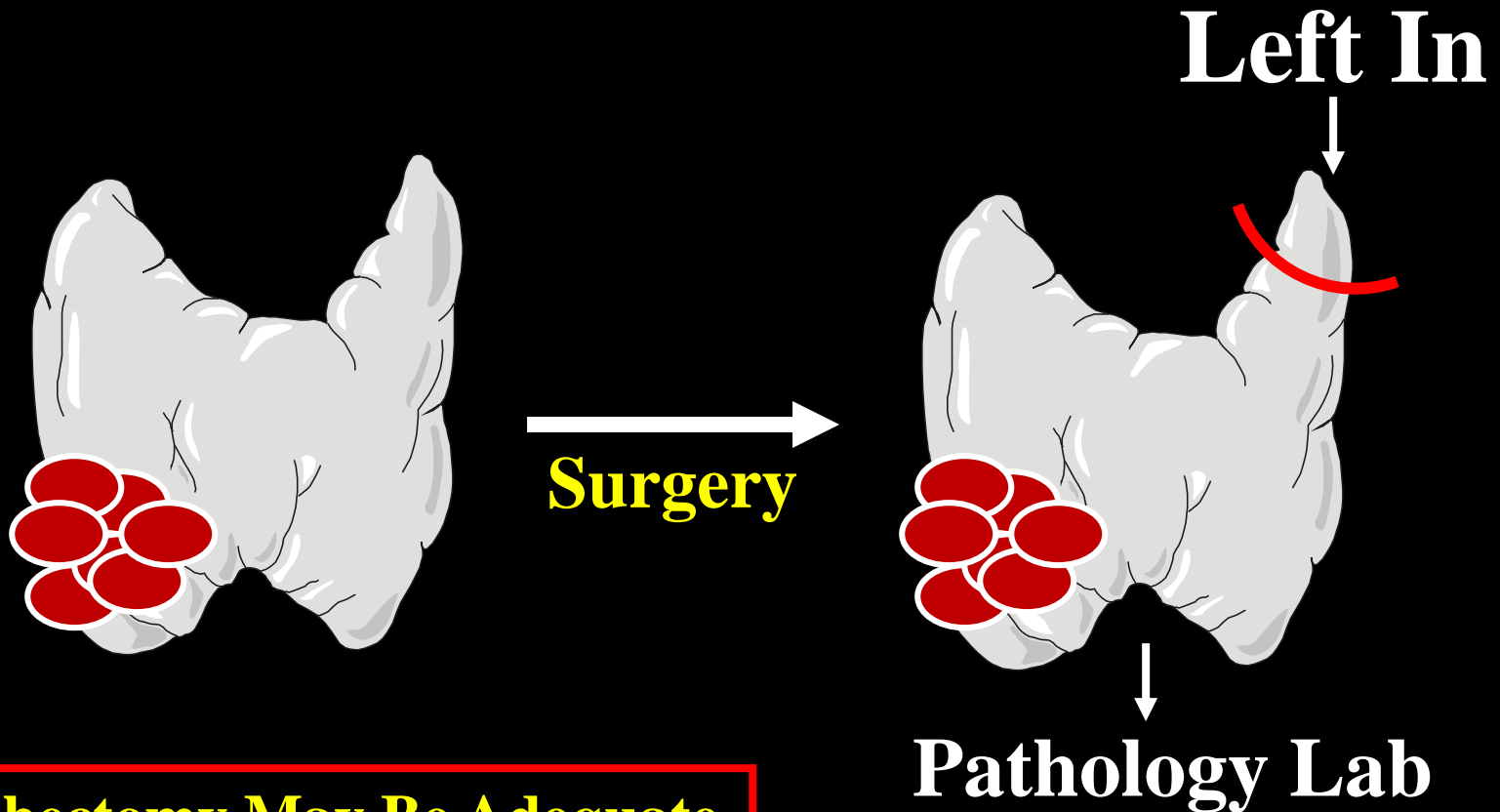
**10 Yr: > 90%**

**Anaplastic**

**1 Yr: < 5%**

# Thyroid Cancer Treatment

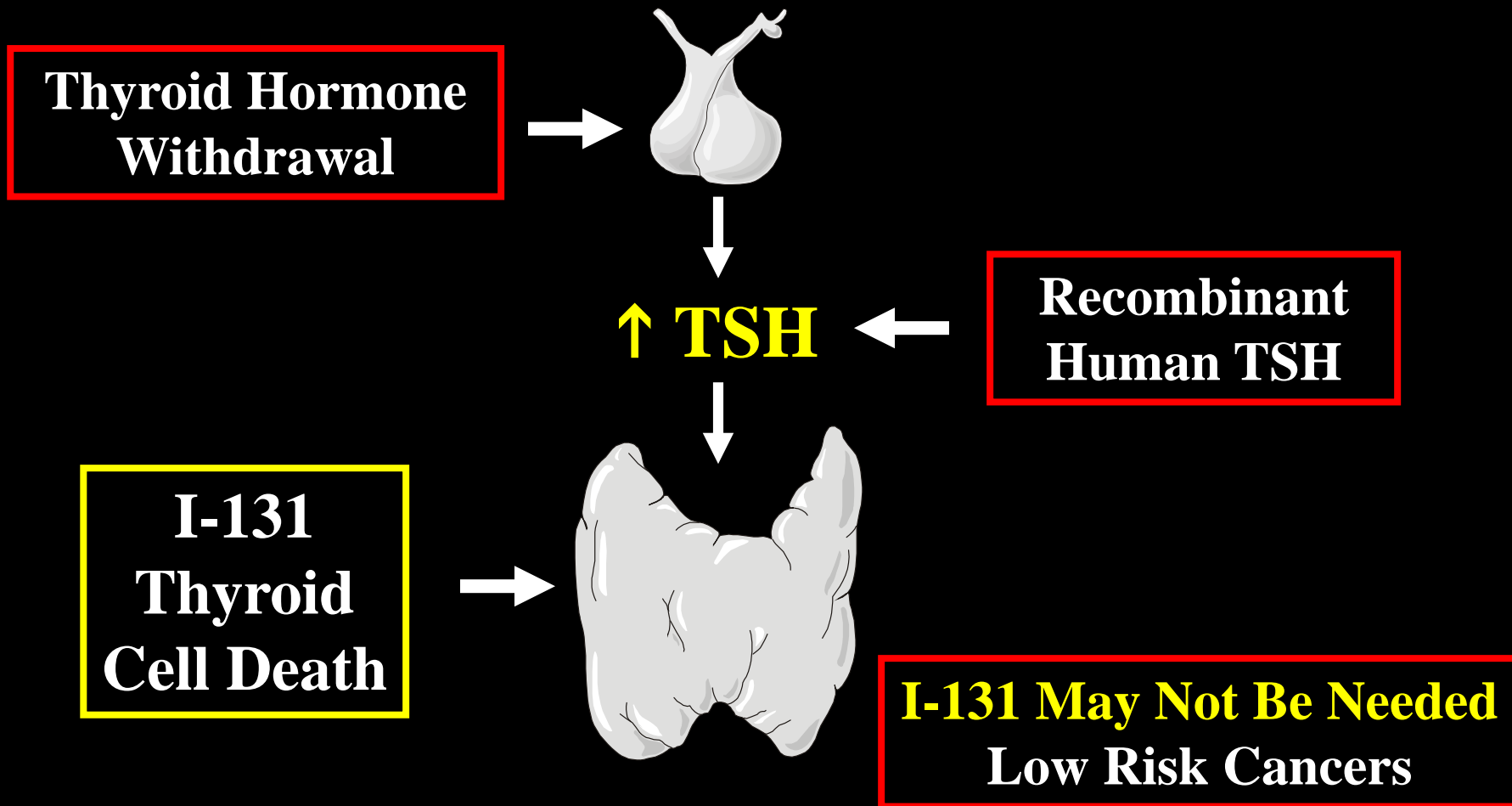
## Near Total Thyroidectomy



**Lobectomy May Be Adequate  
For Small, Low Risk Cancers**

# Thyroid Cancer Treatment

## I-131 Therapy – TSH Must be High

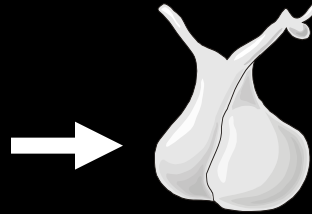


# Thyroid Cancer Treatment

## Thyroid Hormone Suppression Therapy

### LT4 Therapy

[1.8-2.0 mcg/kg]  
TSH < 0.5 mU/L



↓ TSH



**When Can Suppression Be  
Changed to Replacement?**

Cure Demonstrated  
Elderly Patients

Suppresses  
Thyroid  
Cancer  
Growth

# Molecular Markers

**Indeterminate FNA (AUS, FLUS)**

**Gene Expression Classifier (Afirma)**

**Fingerprint of Benign Tumors (mRNA)**

**Positive Predictive Value: Moderate**

**Negative Predictive Value: High**

**Value: When is Surgery Not Needed?**

# Molecular Markers

**Indeterminate FNA (AUS, FLUS)**

**Oncogene Panel (ThyroSeq)**

## Oncogenes of Malignant Tumors (DNA)

**Positive Predictive Value: High**

**Negative Predictive Value: Moderate**

**Value: When is Surgery Needed?**