

Thyroid Disorders

Free T4



Low Total T4
Antiseizure meds
Glucocorticoids

Hypothyroidism

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Primary
Hypothyroidism

Low free T4

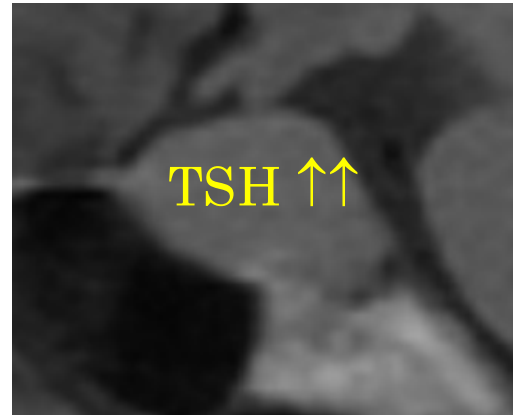
Primary = End organ failure



T4 = Φ

Primary
Hypothyroidism

High TSH
Low free T4



T4 = Φ

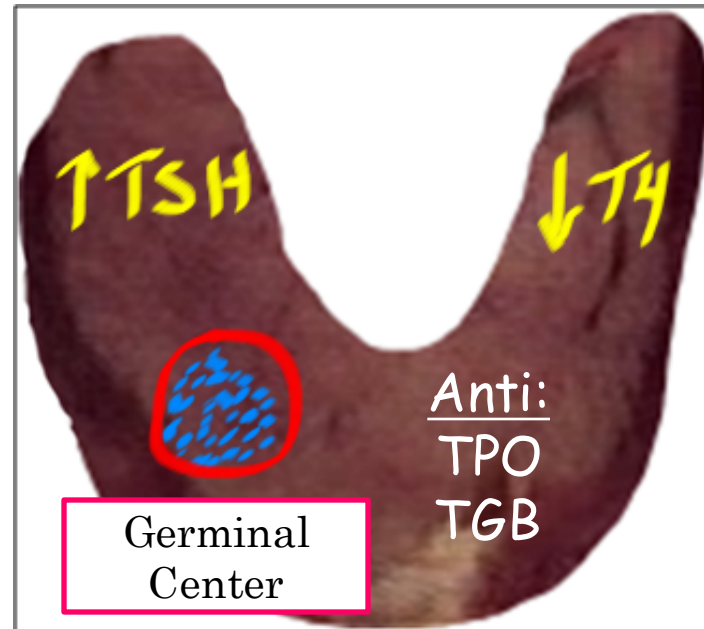
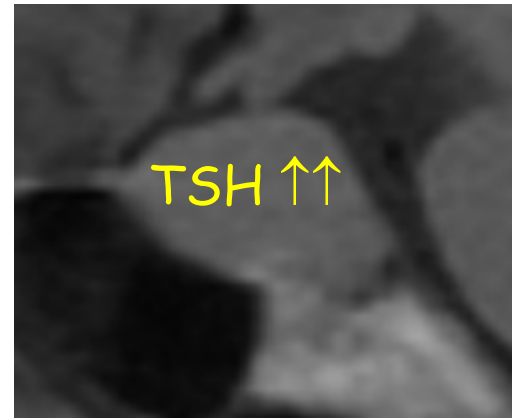
Primary
Hypothyroidism

High TSH
Low free T4

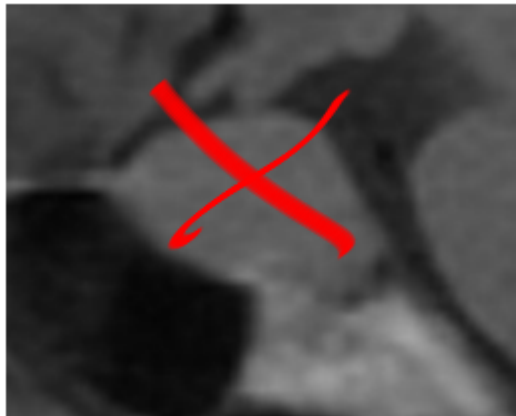


Autoimmune
Thyroiditis:
Hashimoto's

Neonatal



$T_4 = \emptyset$



TSH = Φ



T4 = Φ

Secondary
Hypothyroidism

Low TSH
Low T4



Pituitary Failure
Ischemic Necrosis
(Sheehan's Syndrome)

Panhypopituitarism
(especially failure to lactate)

TRH



TSH = Φ

The Language of Hypothyroidism

Basal Metabolic Rate	Matrix	β -Adrenoreceptor
Cold intolerance Weight Gain Hyporeflexia Constipation Fatigue Hypertension Metrorrhagia	Myxedema Macroglossia Dry Skin Brittle Hair	Bradycardia

T3 and mucopolysaccharides:

- Inhibits synthesis
- Increases degradation

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Myxedema Coma

Hypothermia, hypotension, hyponatremia, hypoglycemia



ADH

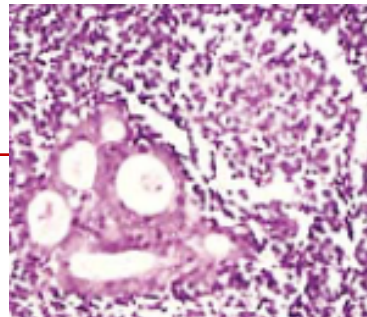
Autoimmune (Hashimoto's) Thyroiditis

- Background
 - Autoimmune disorder with progressive destruction of the gland
- Pathogenesis
 - Breakdown in self tolerance to thyroid autoantigens
 - The inciting events have not been elucidated 

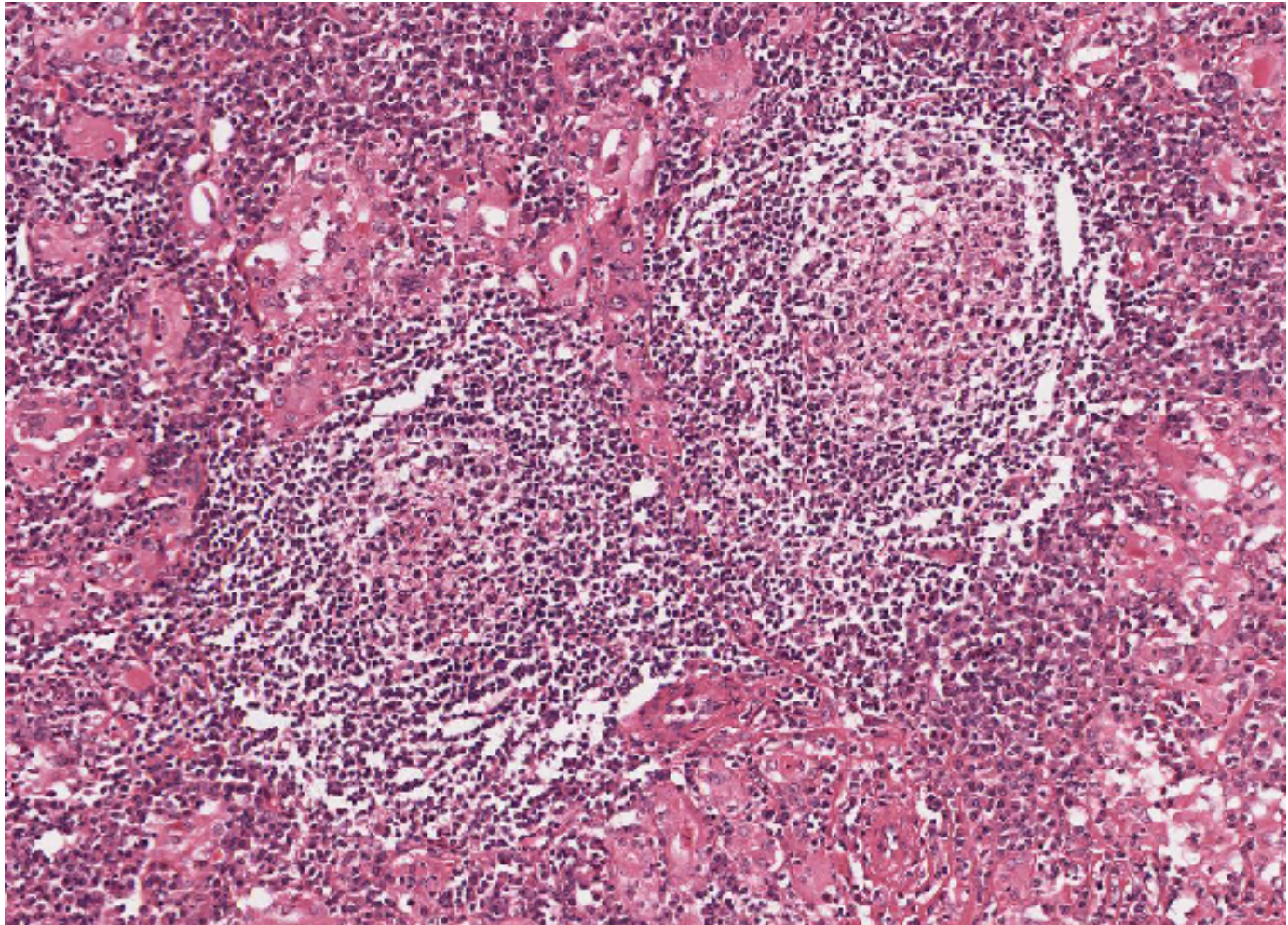
Autoimmune (Hashimoto's) Thyroiditis

- Background
 - Autoimmune disorder with progressive destruction of the gland
- Pathogenesis
 - Breakdown in self tolerance to thyroid autoantigens
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- Pathology
 - Depletion of epithelial cells with follicular **atrophy** and **fibrosis**
 - Intense lymphocytic/mononuclear infiltration with **well formed germinal centers**

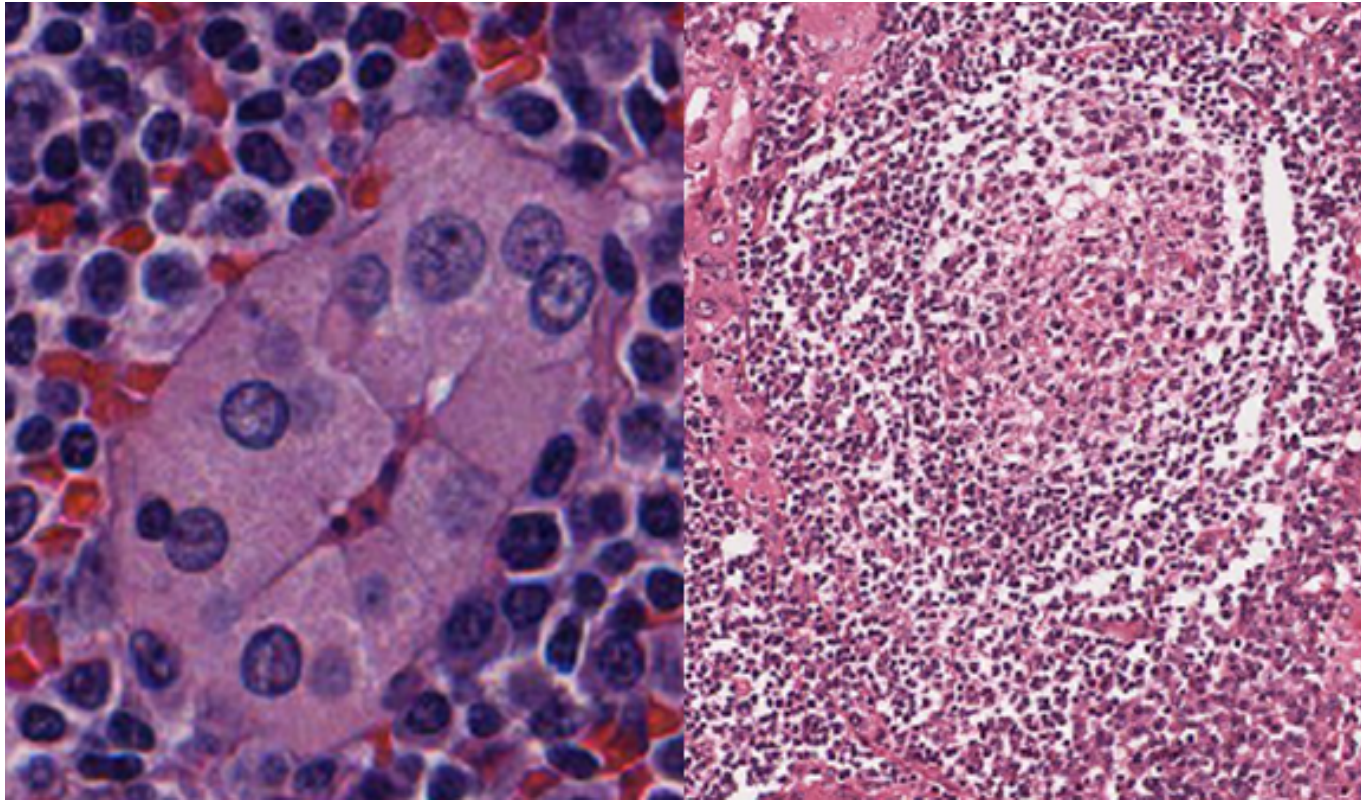
Atrophy/Fibrosis



Germinal Center



Germinal Centers may also be seen in Graves disease and Lymphocytic Thyroiditis.



Hurthle cells:

Represent a metaplastic response to ongoing injury of the thyroid epithelium.

Description: epithelial cells with abundant eosinophilic cytoplasm.

Seen also in follicular adenoma/neoplasm

Autoimmune (Hashimoto's) Thyroiditis

- Clinical
 - Diffuse, nontender glandular enlargement
 - Signs and symptoms of hypothyroidism
 - May present with initial hyperthyroid phase: 'hashitoxicosis'
- Diagnostics
 - Elevated TSH, low free T4
 - Antibodies: TPO, TGB, Microsomal
 - Imaging: Φ

Autoimmune (Hashimoto's) Thyroiditis

Half-lives of Thyroid Hormones	
T4	1 week
T3	2-3 days



- Notes
 - Increased risk of thyroid lymphoma
 - Rx: Replacement therapy – **T4, long ½ life v T3**
 - Associated with other autoimmune syndromes/polyglandular syndromes (endo: DM1, adrenalitis; non-endo: SLE, myasthenia)

Cretinism

(neonatal hypothyroidism due to **maternal hypothyroidism**)

- Background
 - Hallmark is impaired development of skeletal system and **CNS**
 - Seen in iodine deficient regions of the globe
- **Pathogenesis**
 - T3/T4 normally cross the placenta AND is required for normal fetal brain development.
 - After week 12, the fetus synthesizes their own T4
 - **If there is maternal deficiency, before development of fetal thyroid gland,** mental retardation will develop.

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- **Clinical**
 - MSK: coarse facial features, short stature, umbilical hernia
 - CNS: mental retardation, protruding tongue
- **Notes**
 - If the mother develops hypothyroidism later in the pregnancy, **after the fetal thyroid has become functional, there is NO affect on brain development.**

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Hypothyroidism

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