Pediatric Thyroid Disorders: Learning About the King

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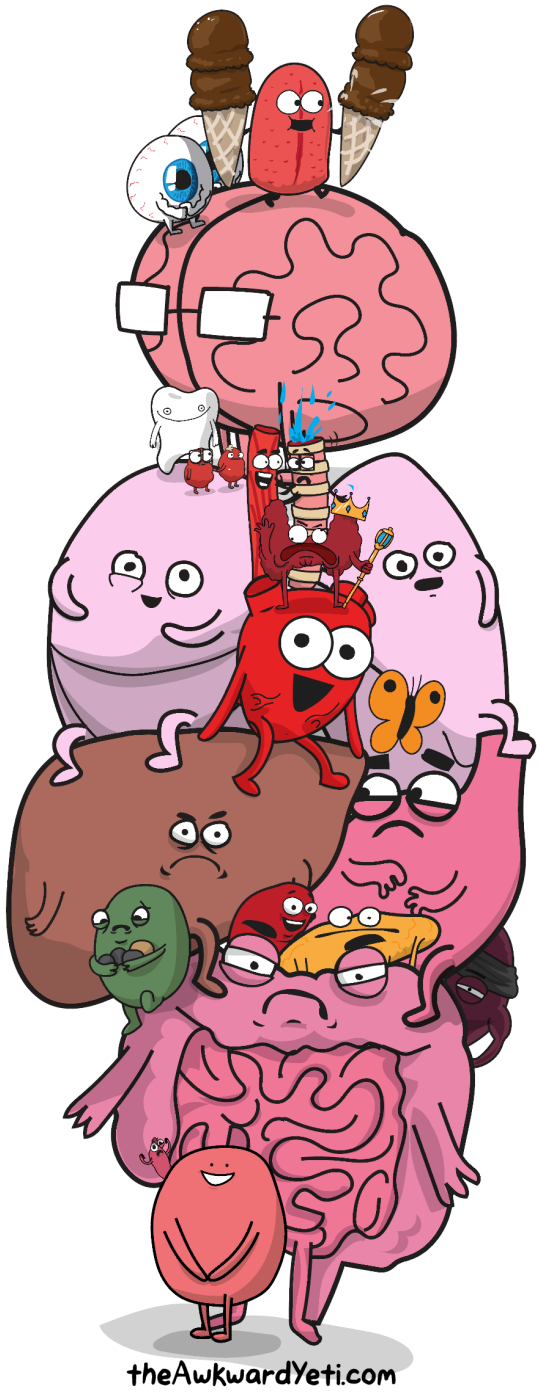
THE KING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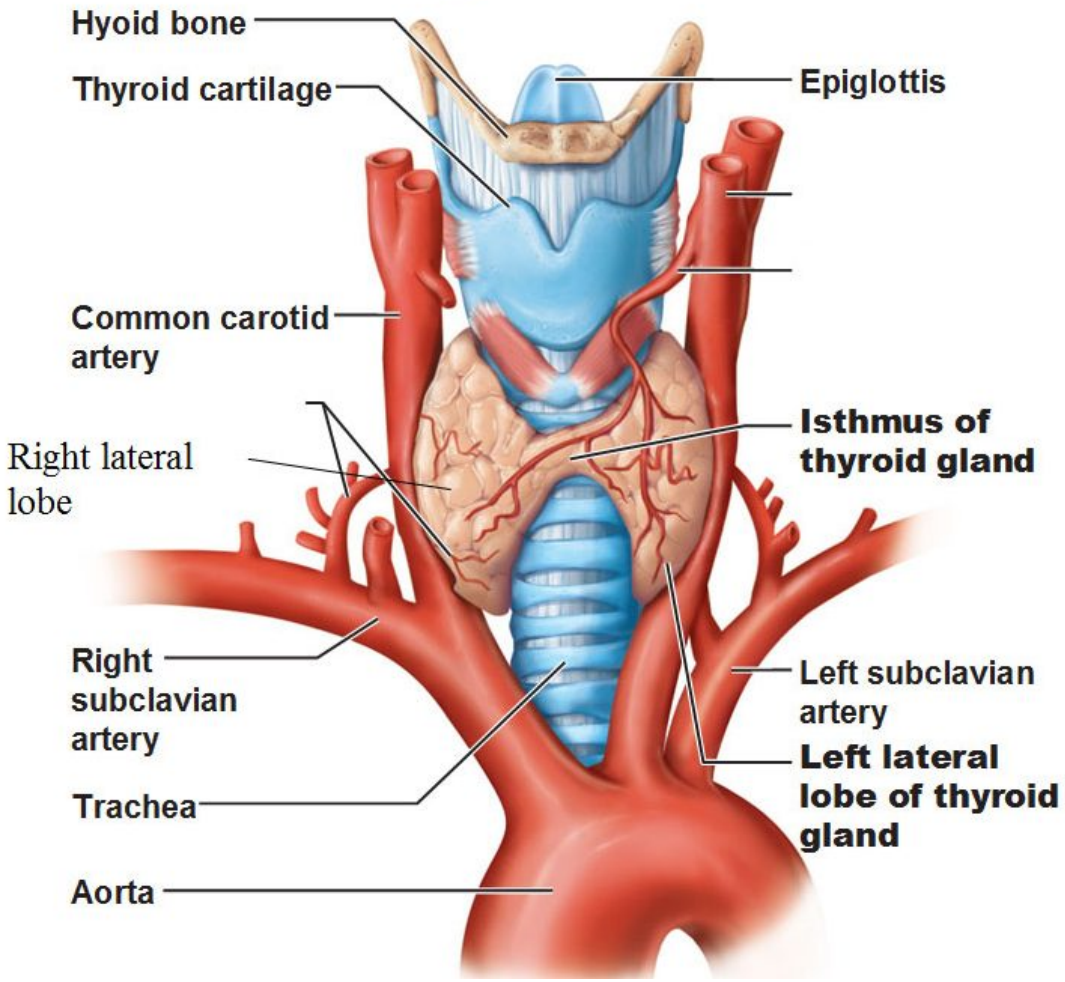
Objectives

- Understand common pediatric thyroid conditions
- Understand when to order labs and imaging
- Know when to refer

What is the thyroid, and what does it do?

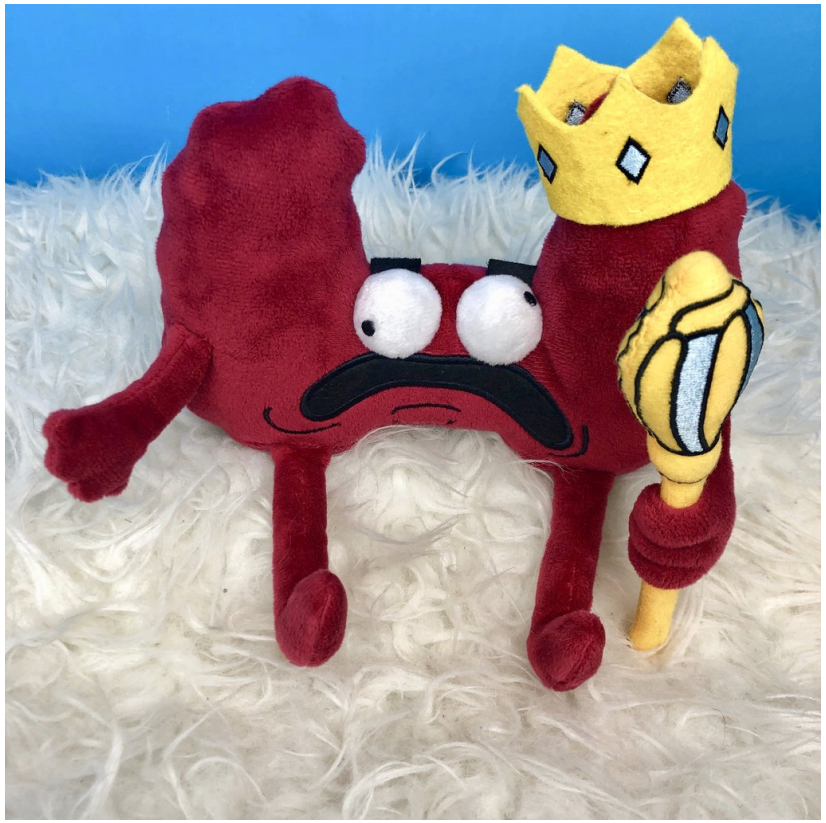
The Thyroid Gland



Functions of thyroid hormone

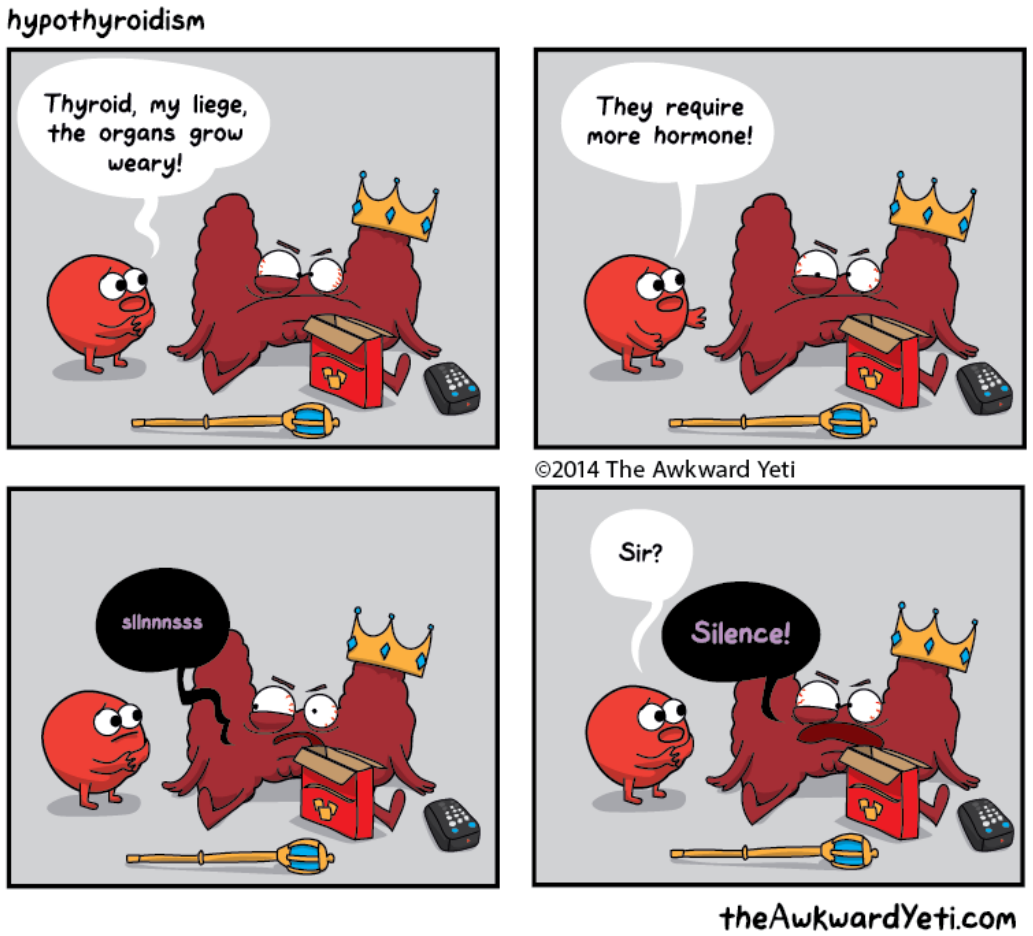
- Chronotropic and ionotropic effects: increase stroke volume
- Basal metabolic rate (BMR), heat production, and oxygen consumption elevate through thyroid hormone activation of mitochondrial uncoupling proteins.
- Resting respiratory rate and minute ventilation
- Bone development throughout life: both growth and bone density
- CNS and PNS activation
- Thyroid hormone also plays a role in reproductive health and other endocrine organ function.
- Growth hormone production and release are stimulated by thyroid hormone; thyroid hormone inhibits prolactin production and release.
- Renal clearance of many substances, including some medications, can be increased due to activated thyroid hormone stimulation of renal blood flow and glomerular filtration rate

BOW TO YOUR KING



Hypothyroidism

- POOR GROWTH
- Constipation
- Dry skin/hair
- Cold intolerance
- Lethargy/fatigue
- Goiter
- Irregular periods: ? Precocious puberty
- Usually Hashimoto's (autoimmune): + family history


hypothyroidism
Thyroid, my liege, the organs grow weary!
They require more hormone!
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slnnnsss
Sir?
Silence!
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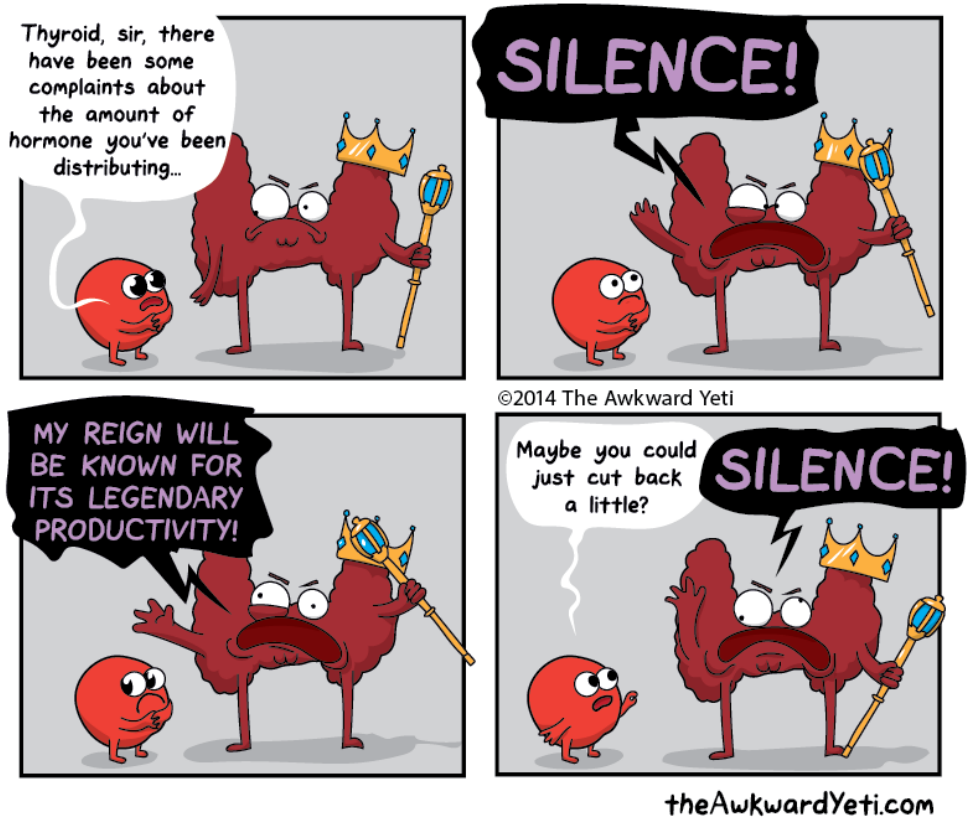
Hyperthyroidism

- POOR SLEEP
- Weight loss
- Heat intolerance
- Irregular periods
- Sometimes eye changes
- Hypertension
- Tachycardia/palpitations
- Goiter
- Usually due to Grave’s disease (autoimmune)

Grave's disease



Available labs and imaging

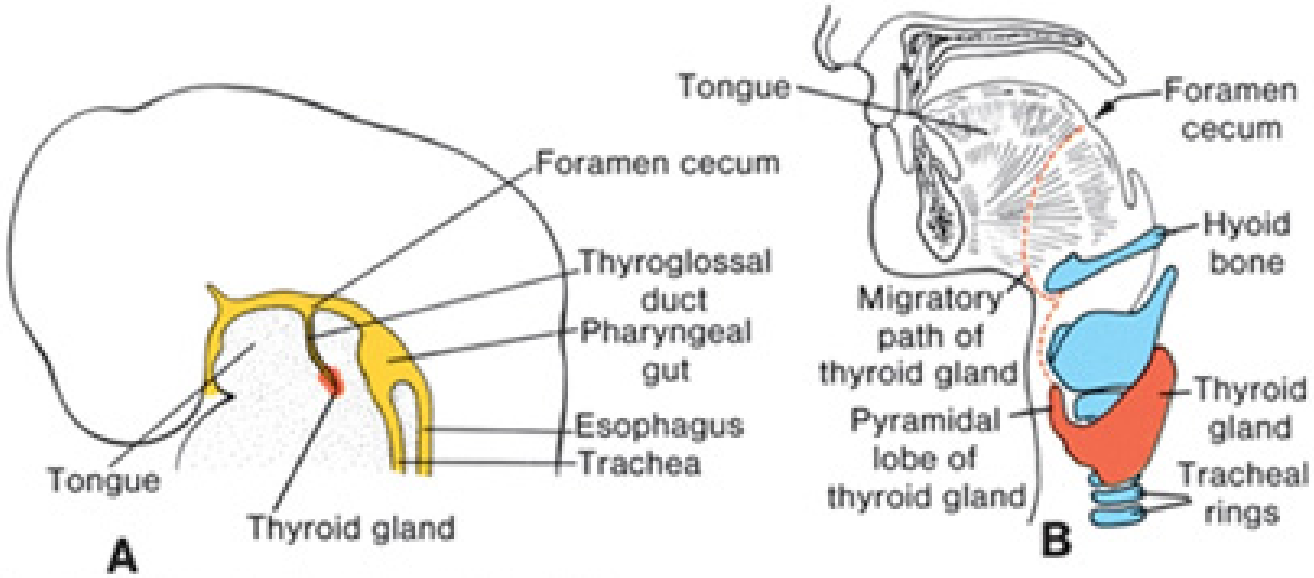
- Thyroid stimulating hormone
- Free Thyroxine/total thyroxine
- Triiodothyronine (T3)
- Reverse T3
- Resin uptake
- Thyroid ultrasound
- Radioactive iodine uptake/scan

Case 1

- You are seeing a newborn in follow-up and are reviewing the newborn screen result, which is presumptive positive for congenital hypothyroidism, with TSH 259 (normal range 0.5-5 mIU/L). What should you do next?
  - A. Check free T4
  - B. Check TSH
  - C. Repeat at the 2 month visit
  - D. Order STAT pituitary MRI
  - E. Order radioiodine uptake scan

Congenital hypothyroidism

- Occurs in 1 in 2000 births
- Preventable cause of mental retardation
- Prompt treatment and close follow-up is crucial
- True endocrine emergency
- Treatment is crushed tablets



Case 2

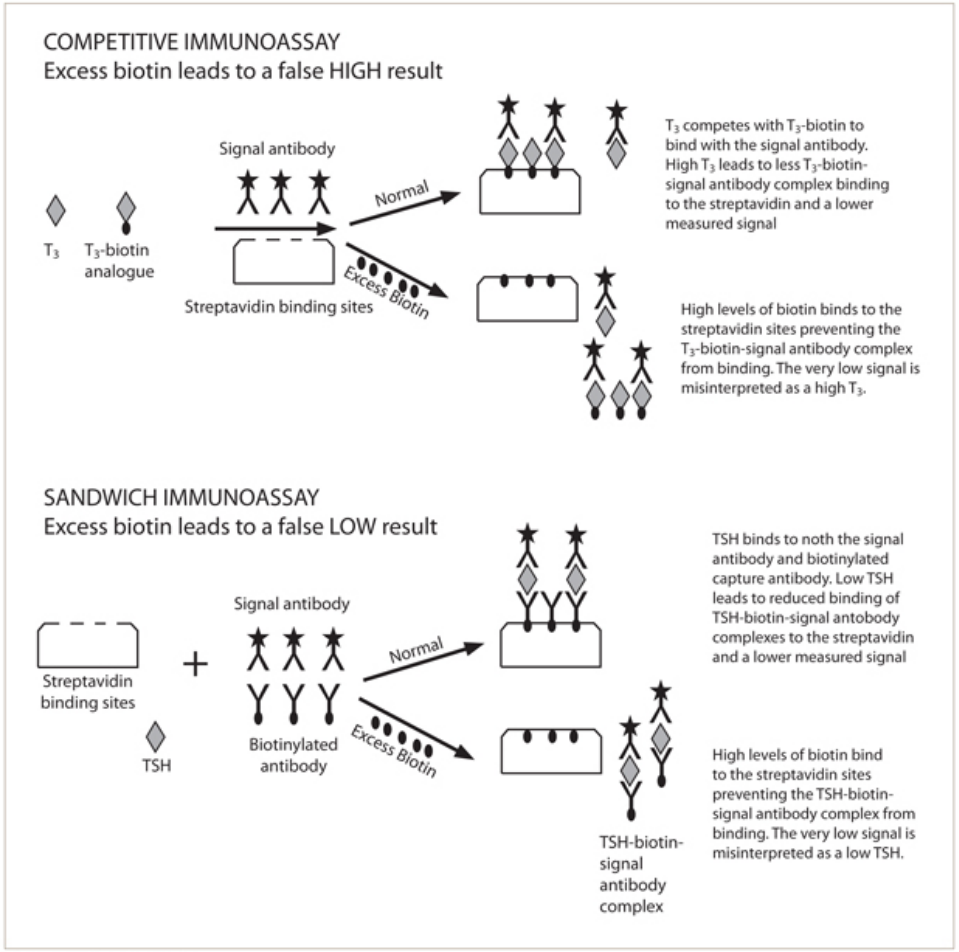
- Cooper is a 13 yo boy who comes to you for well adolescent care. He is a distance runner and is generally very healthy but has had no linear growth since his last annual physical. His mother has Crohn's disease; there is no family history of thyroid illness. What is on your differential?

- What do you expect to find on exam?

Case 3

- Jayden is an 8 year old boy who comes to you with abnormal labs after seeing a local psychiatrist for ADHD management. TSH is 0.02 (low), free T4 is 4 (high). All other labs are normal. His first cousin has T1DM. He is happy and playful; HR 82 and BP normal for age at 88/46. He is sleeping well at night. Exam is normal.
- What do you need to ask next?

This is why we ask about medications and supplements!



Source: Stephanie L. Lee, MD, PhD, ECNU

Case 4

- Ava is a 12 year old Caucasian female whose mother brings her in for evaluation of fatigue and abnormal weight gain. She is 65 inches tall and weighs 247 lb (BMI >95th percentile). She is tired and complains of hair loss. Her mother insists that she is “very active” and “drinks a lot of water” and is distressed about her abnormal weight gain. Her linear growth has been excellent. She has a generous precervical fat pad, and you are unsure whether you feel her thyroid gland. Her mother saw on Oprah that thyroid disease is a cause of weight gain and fatigue and insists that you check a “full panel.” What do you do (more than one answer may be correct)?
  - A. Check thyroid US
  - B. Check TSH
  - C. Check free T4
  - D. Check T3
  - E. Check reverse T3
  - F. Check anti-TPO antibodies
  - G. Check total T4
  - H. Check thyroglobulin

Thyrotropin resistance of obesity

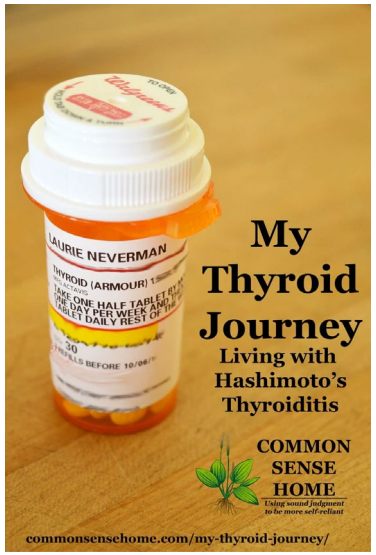
- TSH 5-10 is unlikely to be thyroid disease; repeat and consider antibodies
- Hypothyroidism is more likely to cause poor weight gain
- Watch growth velocity
- Please, whatever you do, DO NOT TELL FAMILIES THAT THYROID DISEASE EXPLAINS THEIR WEIGHT GAIN

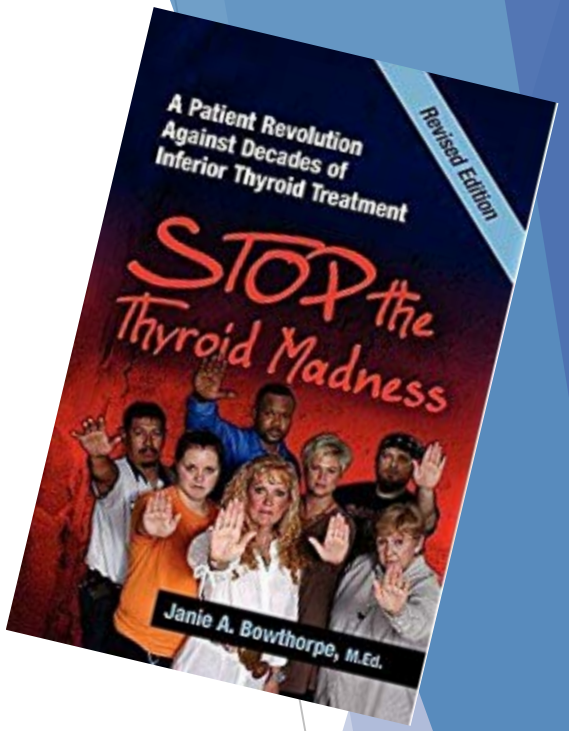
Don’t forget to screen high-risk populations

- T1DM
- Turner syndrome
- Down syndrome

- What about family history? +TPO antibodies?

Watch out for the woo





Questions?