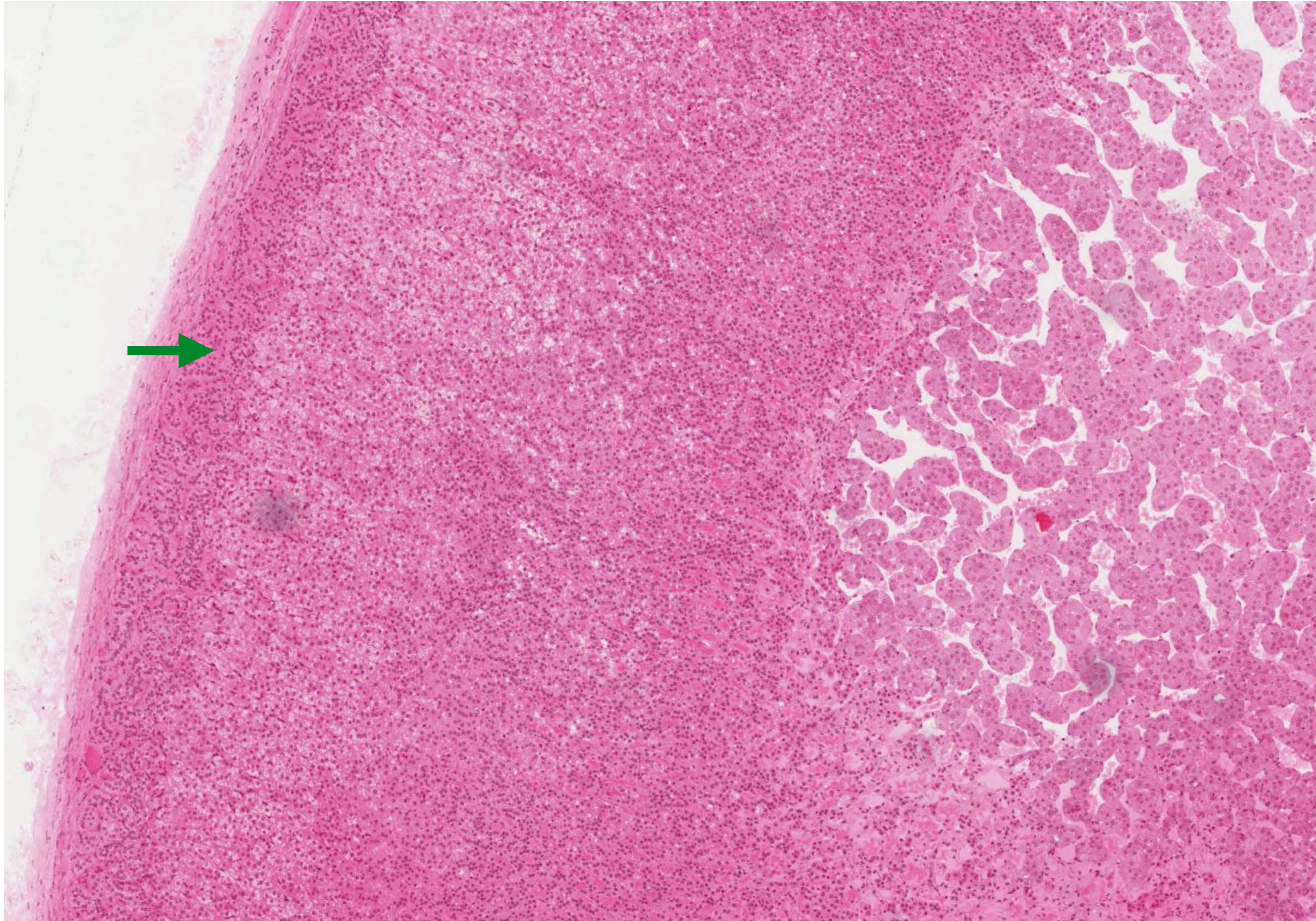# Endocrine System

Energy and Metabolism
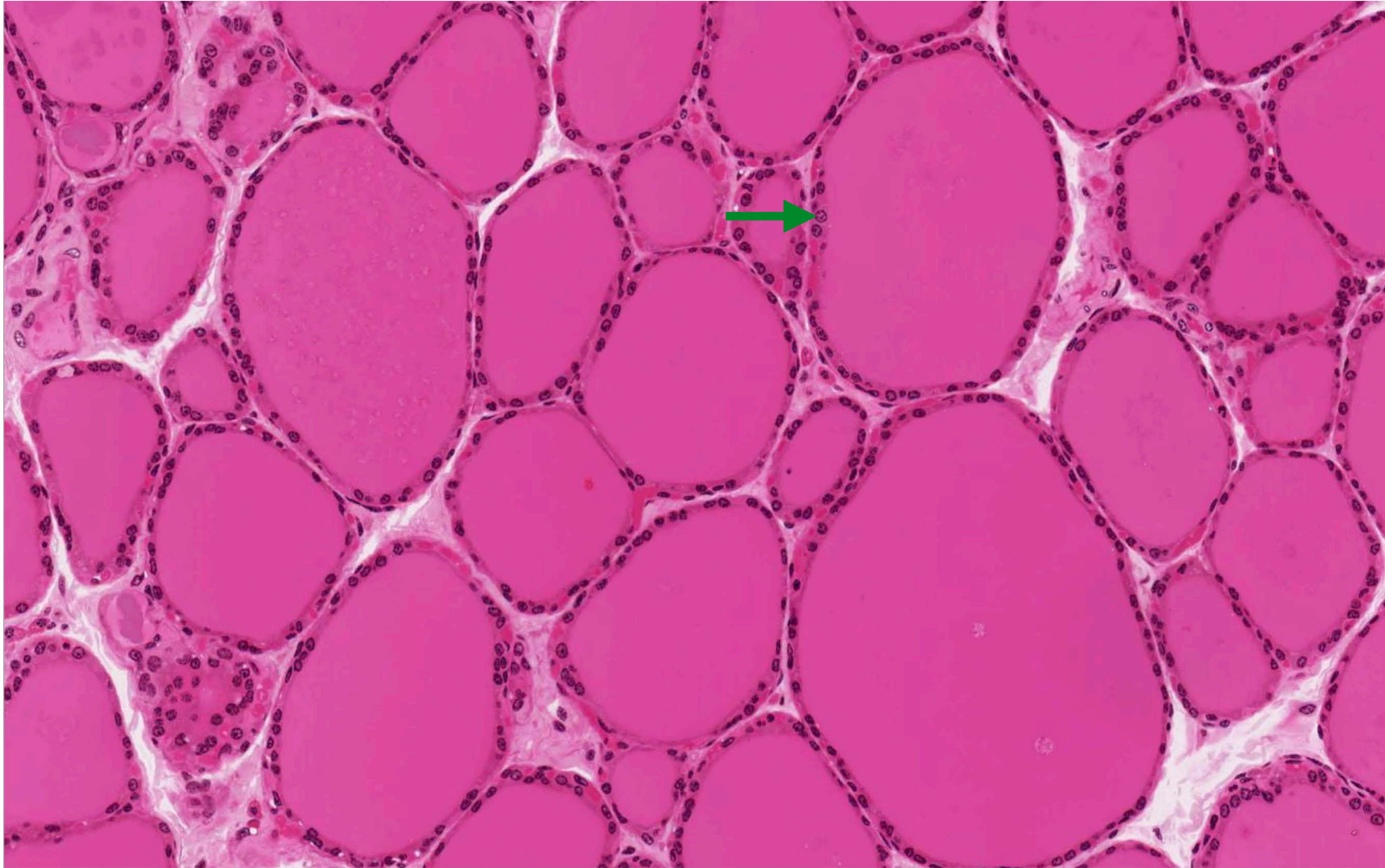
Readiness Assessment Questions

1. Which condition activates these cells to produce hormone?

- Low serum glucose
- Stress
- Low serum calcium
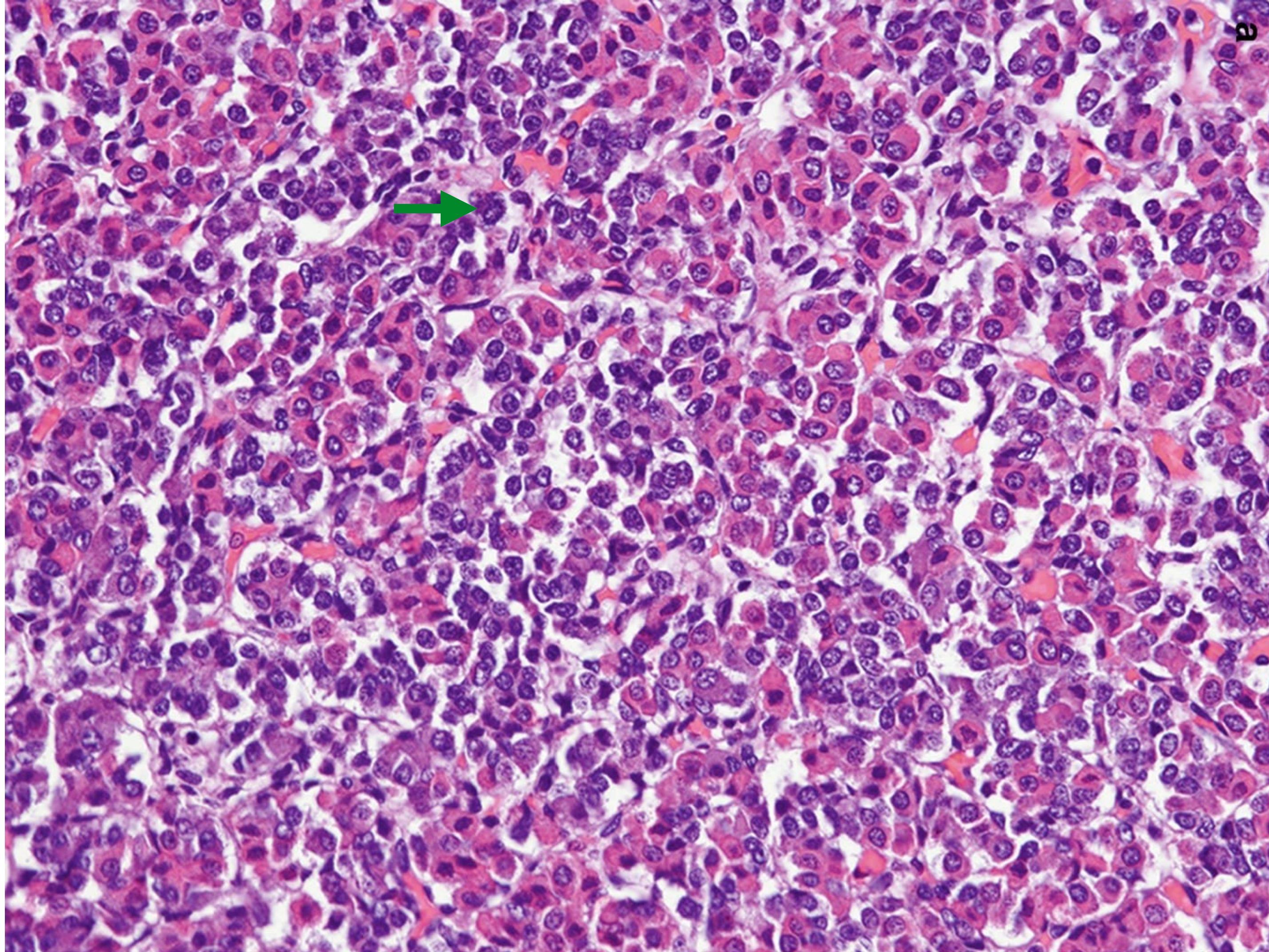- Low blood pressure

2. Which condition would cause these cells to become columnar?

- High serum TSH
- High serum T3
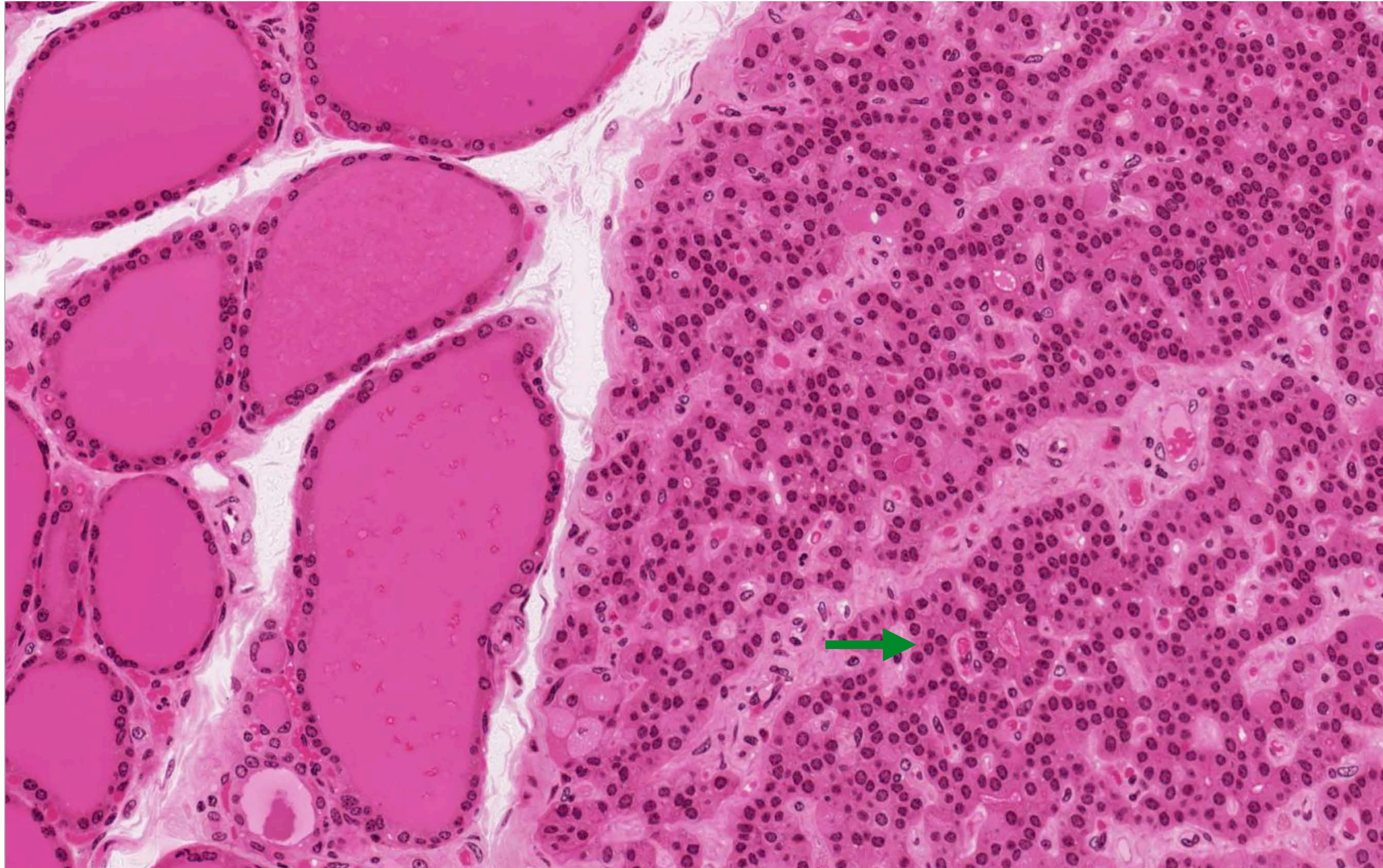- Low serum calcium
- Low serum TSH

3. In this sample from the pituitary, the marked cell could secrete which hormone?

- Prolactin

- Growth hormone

- ACTH

- Oxytocin

4. These cells release hormone under which condition?

- Low blood pressure
- Low serum calcium
- High serum ACTH
- High serum TSH

5. The marked region releases hormone at a high rate under which condition?

- Hypothermia
- External stress
- Child birth
- Hypocalcemia

Application Questions

A 30-year old presents complaining of progressive weight gain. The patient has a history of type 2 diabetes and hypertension. A physical exam reveals facial plethora (swelling/puffiness), accumulation of abdominal fat and weakness in the peripheral muscles. A blood test finds above normal concentrations of serum glucose (375 mg/dL) and ACTH (45 pg/ml). A 24-hour urine test measures of 126 mcg of cortisol (normal 45 - 60 mcg/24 hours). A pituitary MRI is inconclusive, but a pituitary biopsy produces the image below.
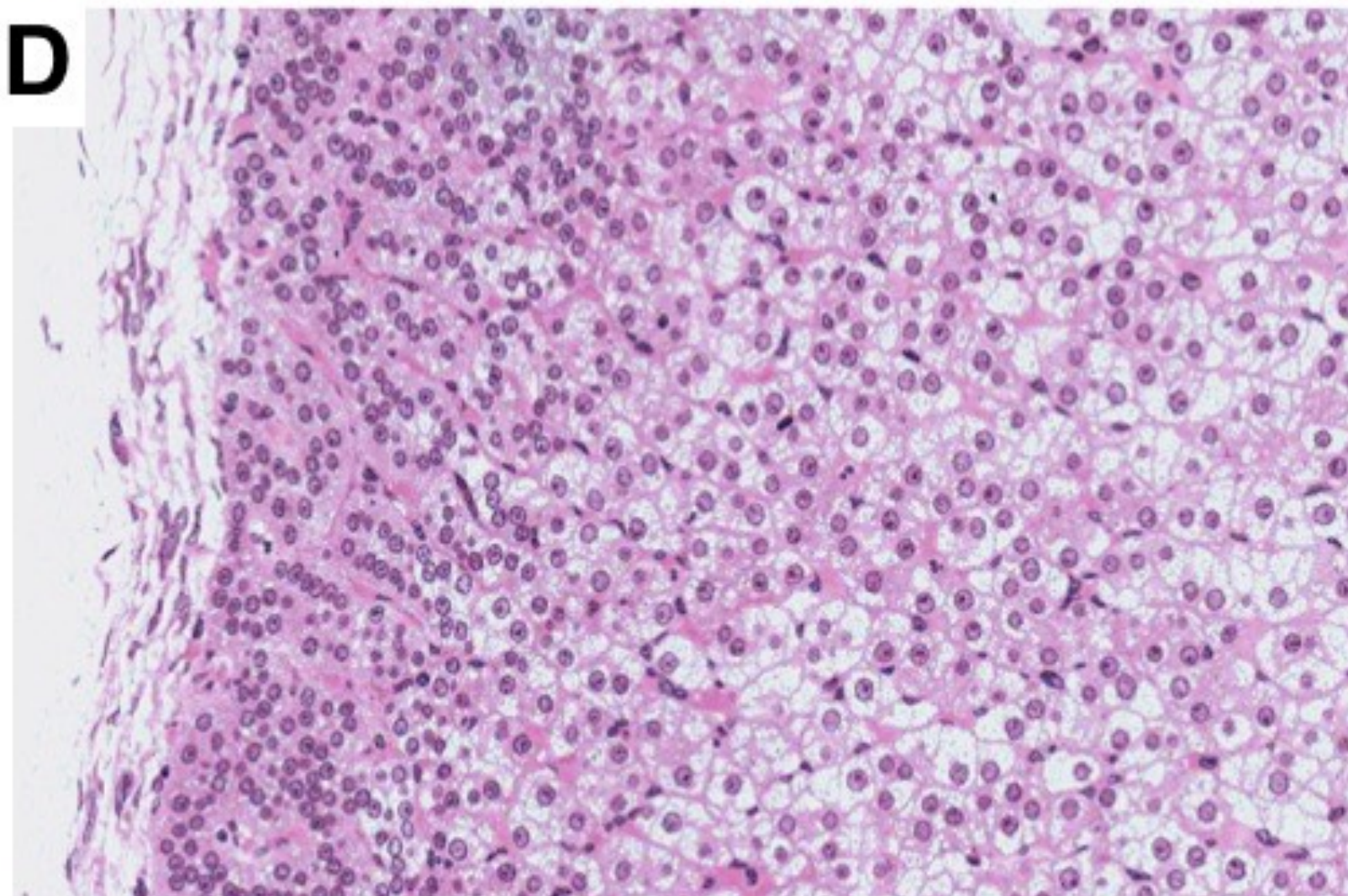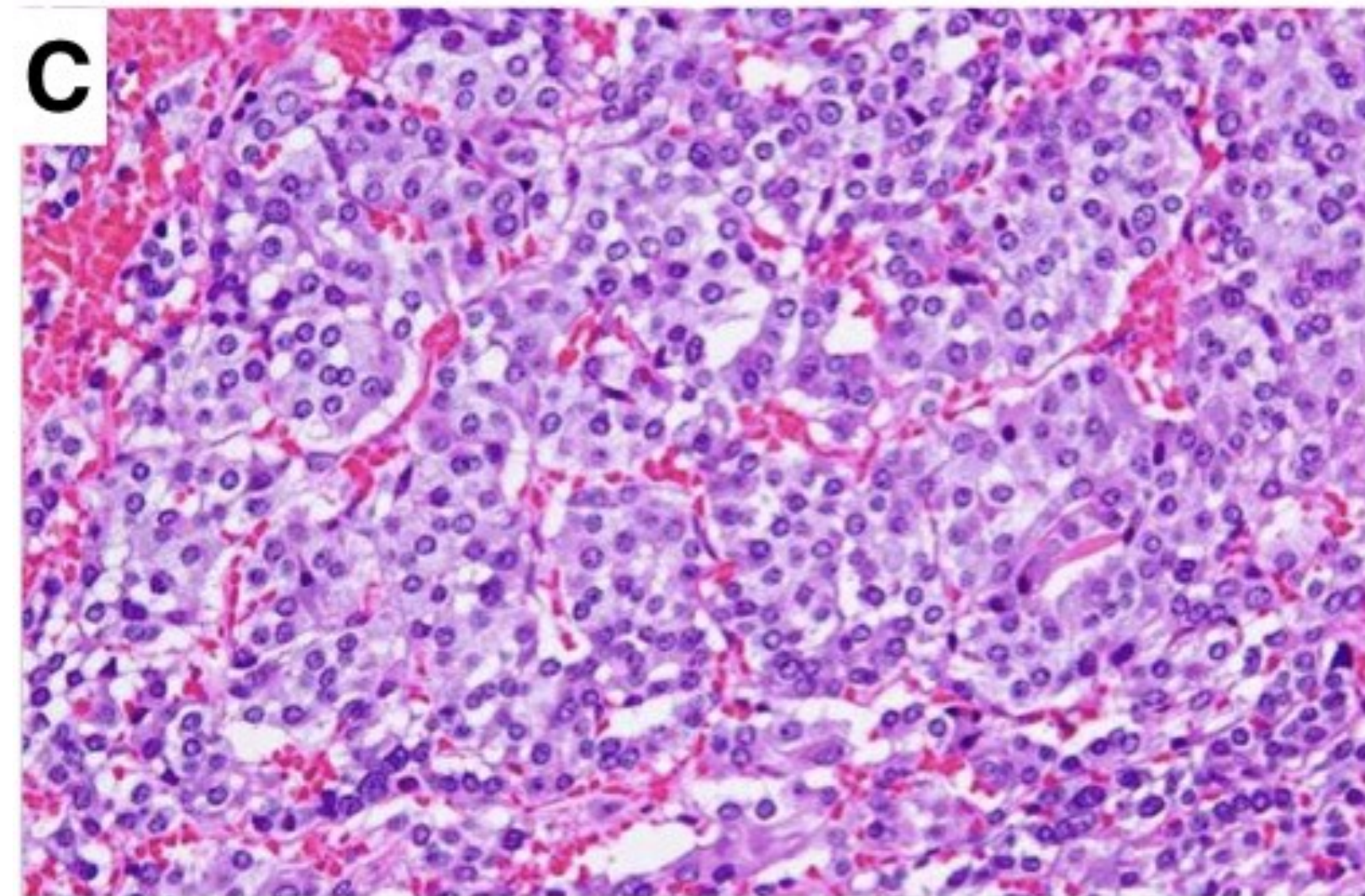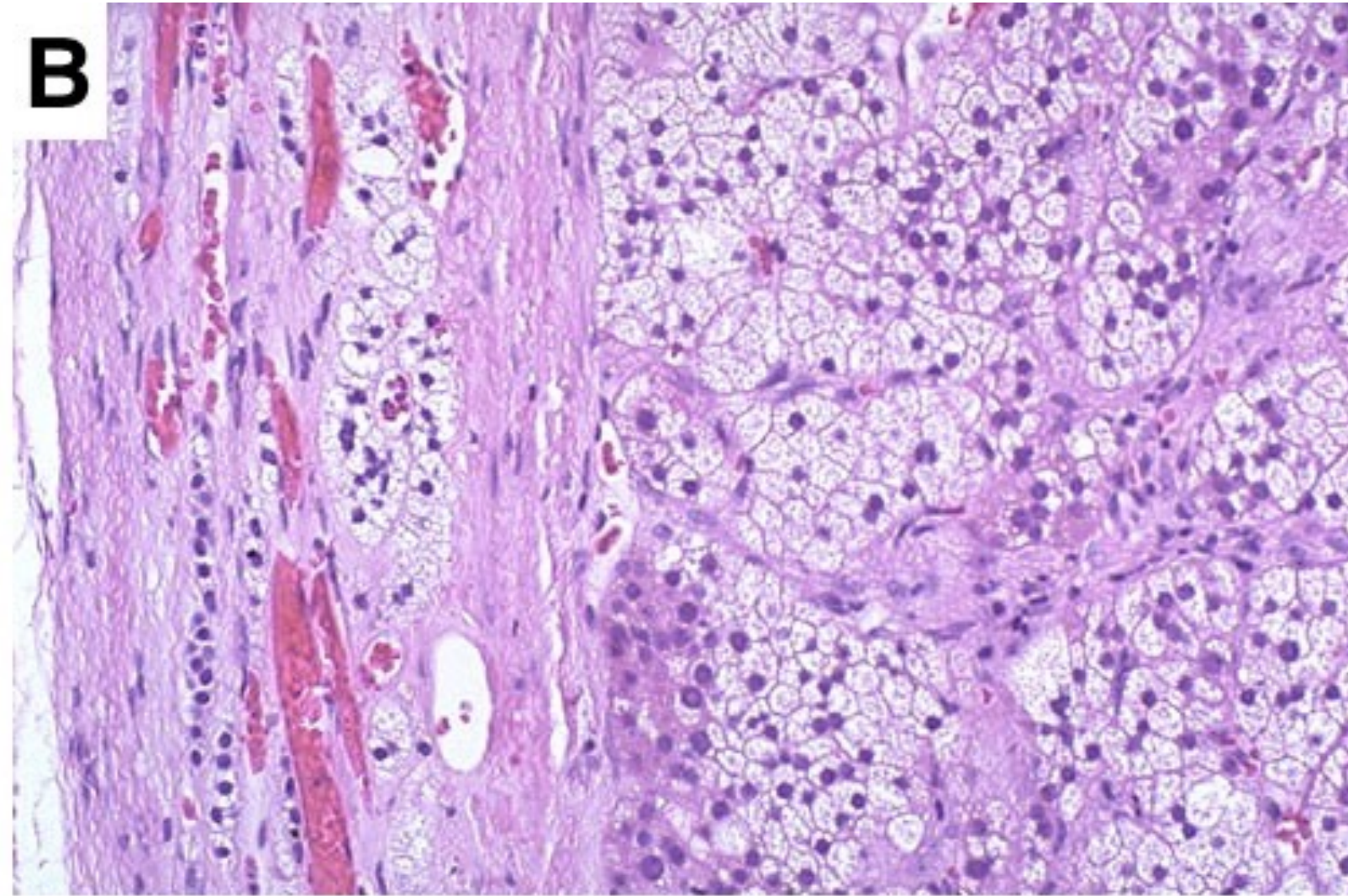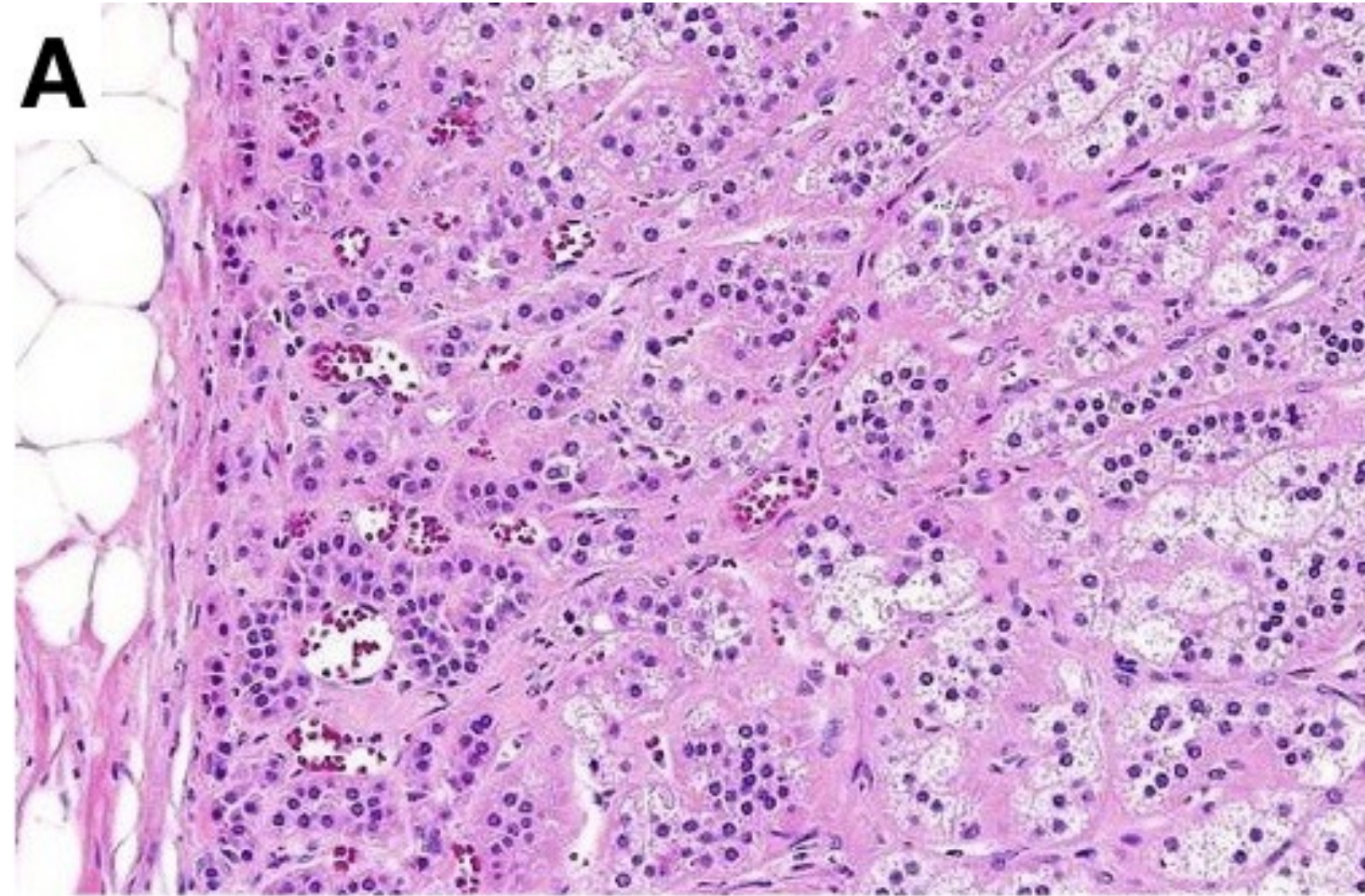

Anterior Pituitary
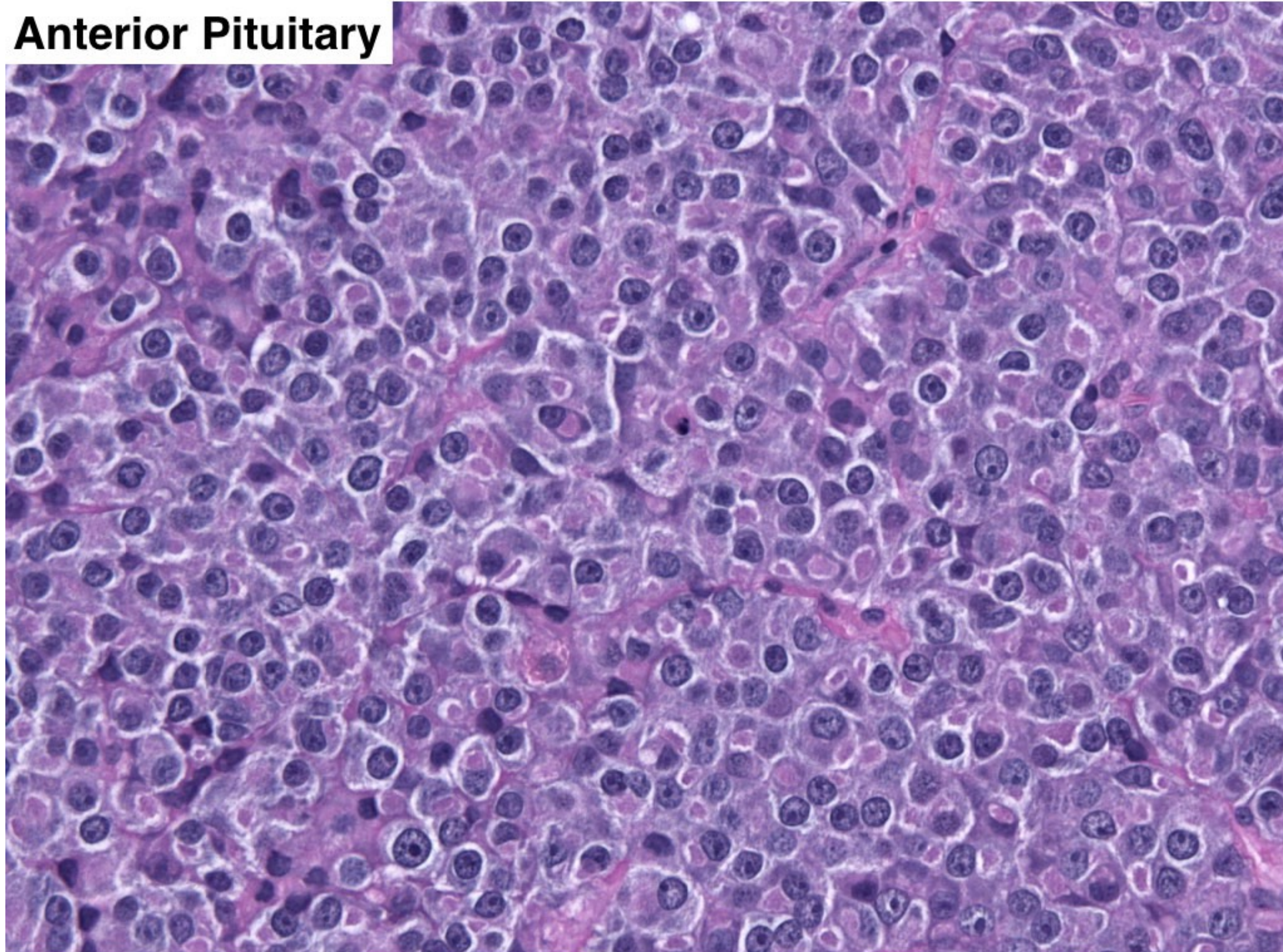
Which of the images below of the adrenal gland best matches the patient's symptoms and test results?

What is causing any observable structural change in the adrenal gland?

Do the images or test results suggest a cause for the patient's hypertension or hyperglycemia?

Are there other causes that could generate similar conditions?

A patient presents with progressive weight loss despite reporting an increase in appetite. During the interview, the patient reports perspiring more and feeling less tolerant of heat. The patient's heart rate is 115/min. A physical exam reveals palpitations. Blood test results measure TSH at 0.006 uIU/ml (normal: 0.45-4.5 uIU/ml) and T3 at 240 ng/dL (normal: 79 – 165 ng/dL).

- Which of the images below of the thyroid best matches the patient's symptoms?
- Why are the patient's TSH levels low?
- What explains the patient's weight loss and feeling hot?
- What are some potential causes that lead to the changes in the thyroid?
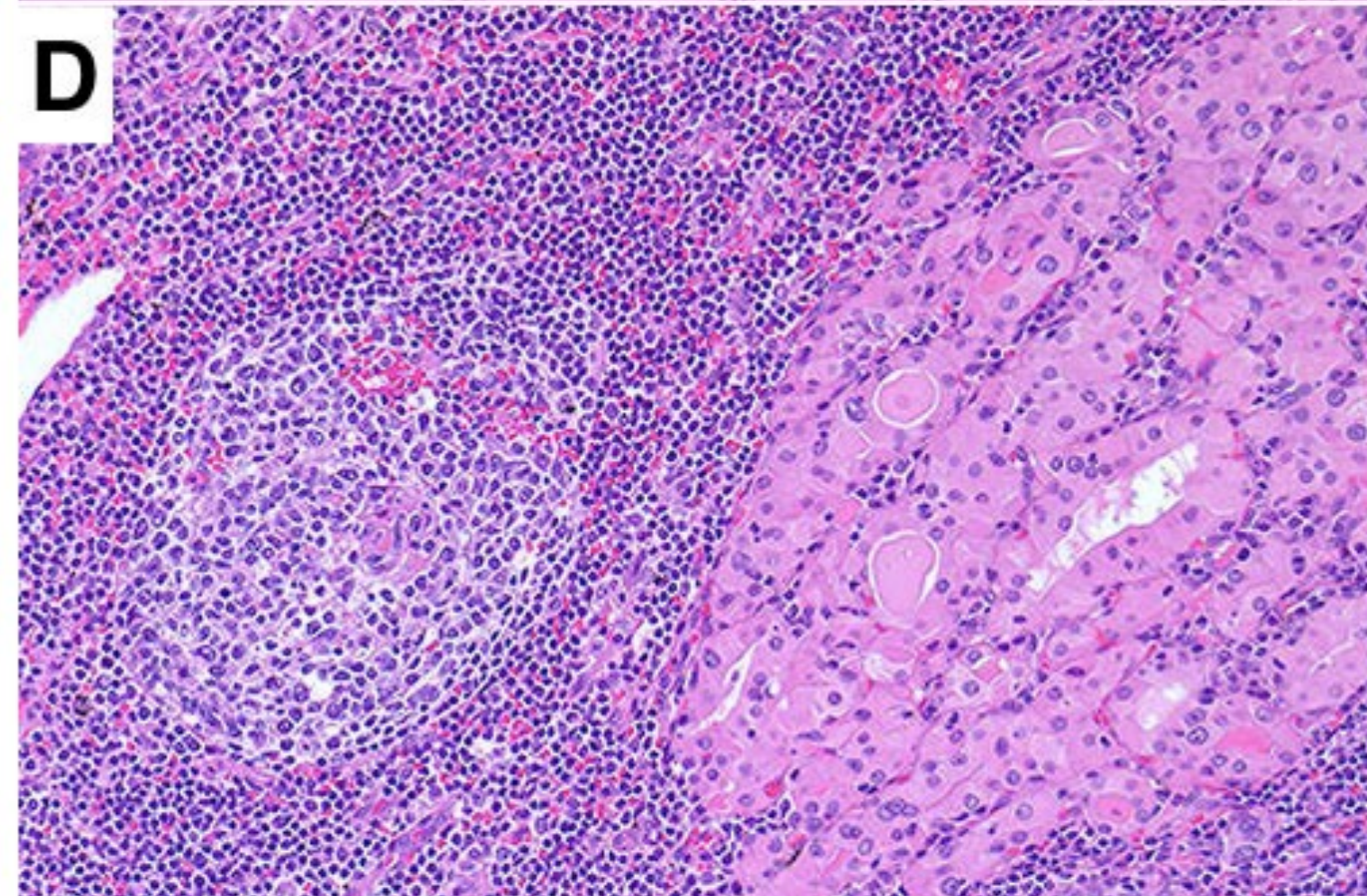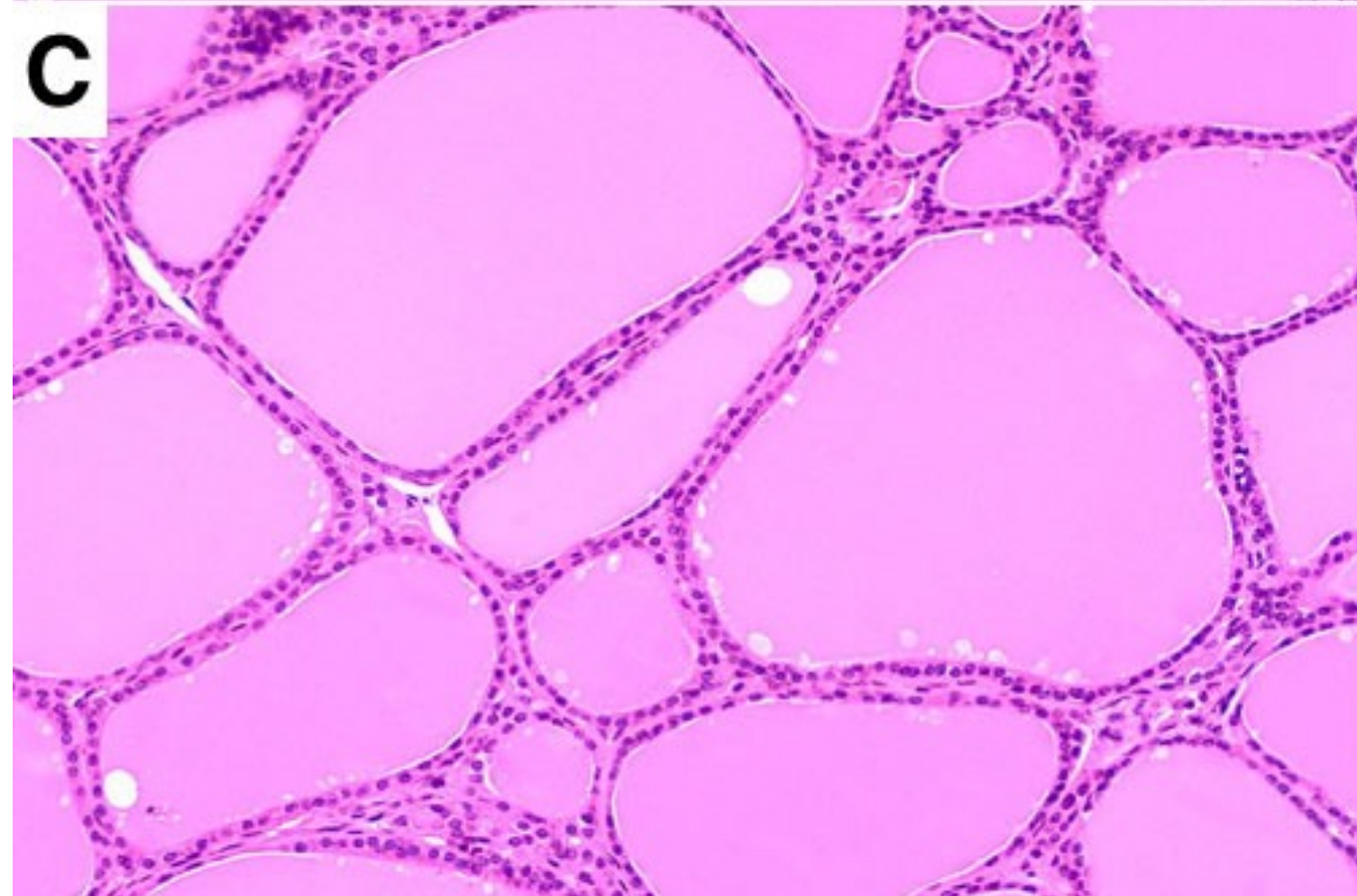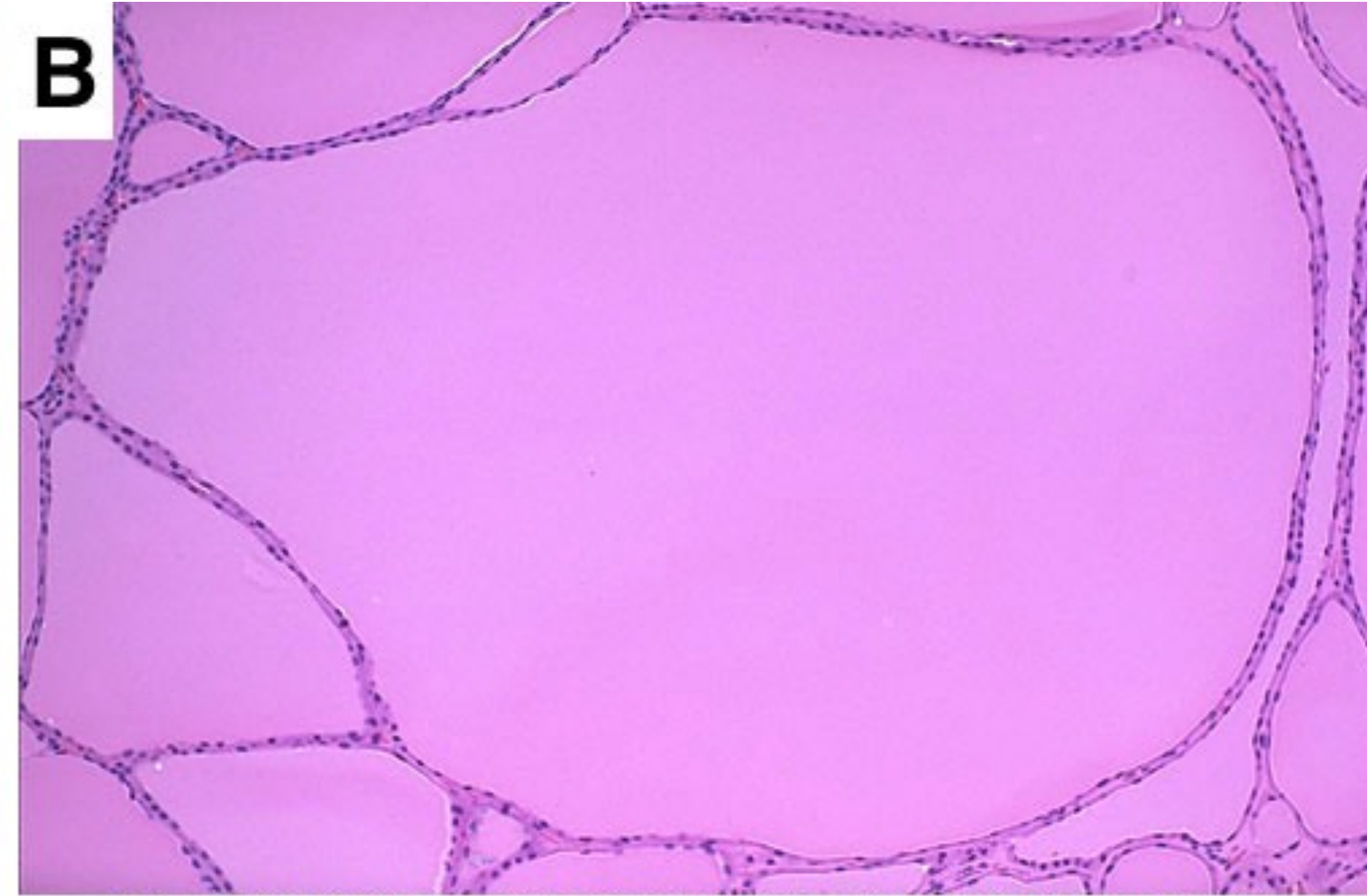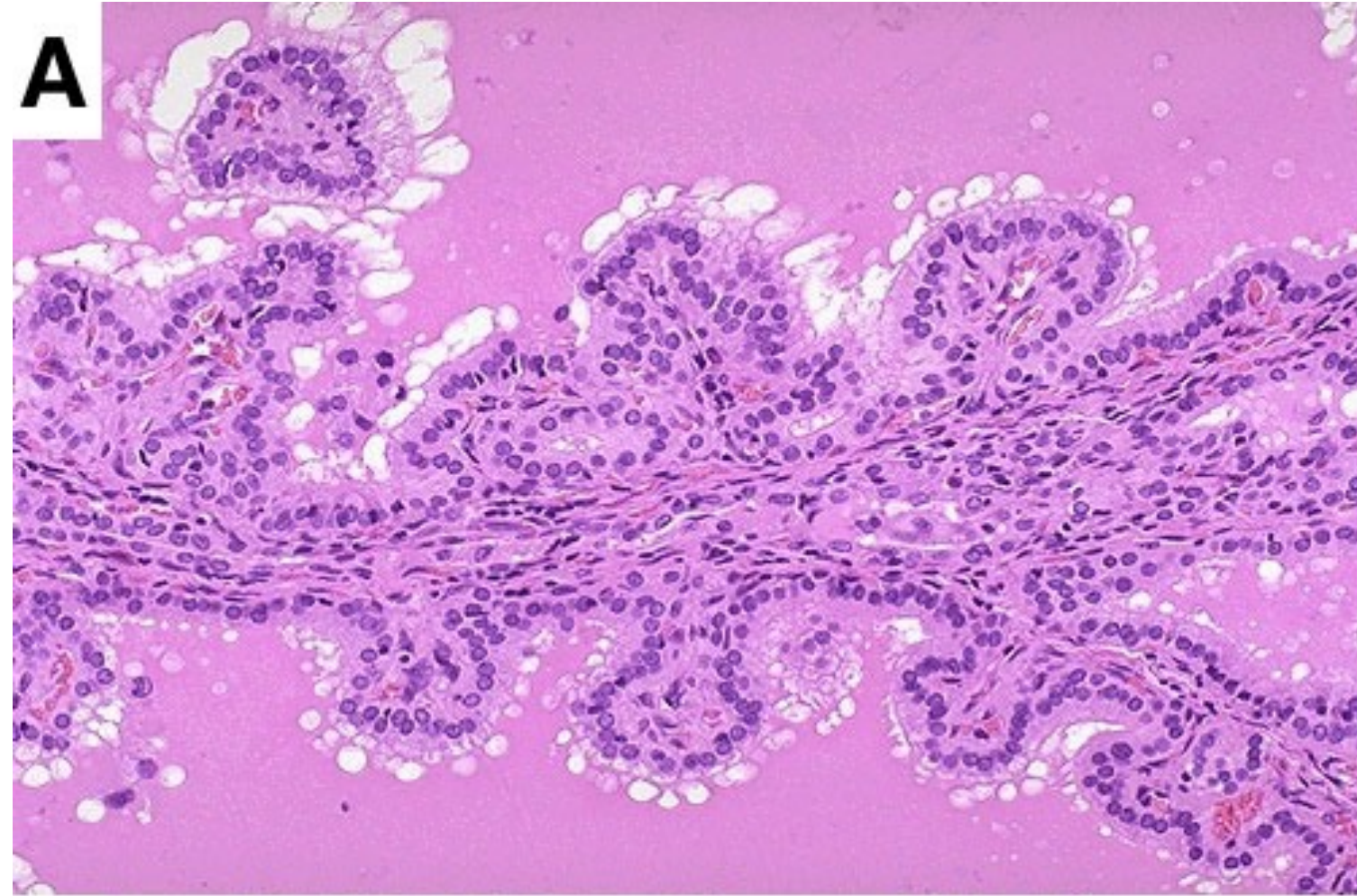
A patient presents with hoarseness and difficulty swallowing. A physical exam finds a lump in their neck. A biopsy of the thyroid gland is shown below at medium and high magnification. Genome sequencing reveals a mutation in the *RET* gene.

What biochemical test(s) would be helpful to diagnose the cause of the histological change?

What other condition might you find in the patient's history?