Endocrine System

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Introduction:

The endocrine system is a diverse group of ductless glands that plays a major role in maintaining the homeostasis of multiple physiological variables. The group works closely with the other system that maintains the homeostasis of multiple physiological variables-the nervous system. Although these two systems both work toward the same goal, you will notice that the methods by which they do so differ. The nervous system functions via action potentials (nerve impulses) and releases neurotransmitters that directly affect target cells. The effects are nearly immediate, but they are very short in duration. In contrast, the endocrine system brings about its effects via the secretion of hormones---chemicals released into the blood stream that typically act on distant targets. The effects of hormones are not immediate, but they are longer-lasting than those of the nervous system. In general, hormones regulate the processes of other cells, including inducing the production of enzymes or other hormones, changing the metabolic rate of a cell, and altering permeability of the plasma membrane. You might think of hormones as the "middle managers" of the body, because they communicate the messages from their "bosses" (the endocrine glands) and tell the "workers" (other cells) what to do. Some endocrine glands (e.g., the thyroid and anterior pituitary glands) secrete hormones as their primary function. Others, however, secrete hormones as a secondary function, examples of which are the heart (atrial natriuretic peptide), adipose tissue (leptin), the kidneys (erythropoietin), and the stomach (gastrin). This unit introduces you to the anatomy, histology, and physiology of the endocrine organs and hormones. To close out this unit, you will play "endocrine detective" and solve three "endocrine mysteries."

Objectives:

1. Identify endocrine organs and structures.

2. Identify microscopic structures of endocrine organs.

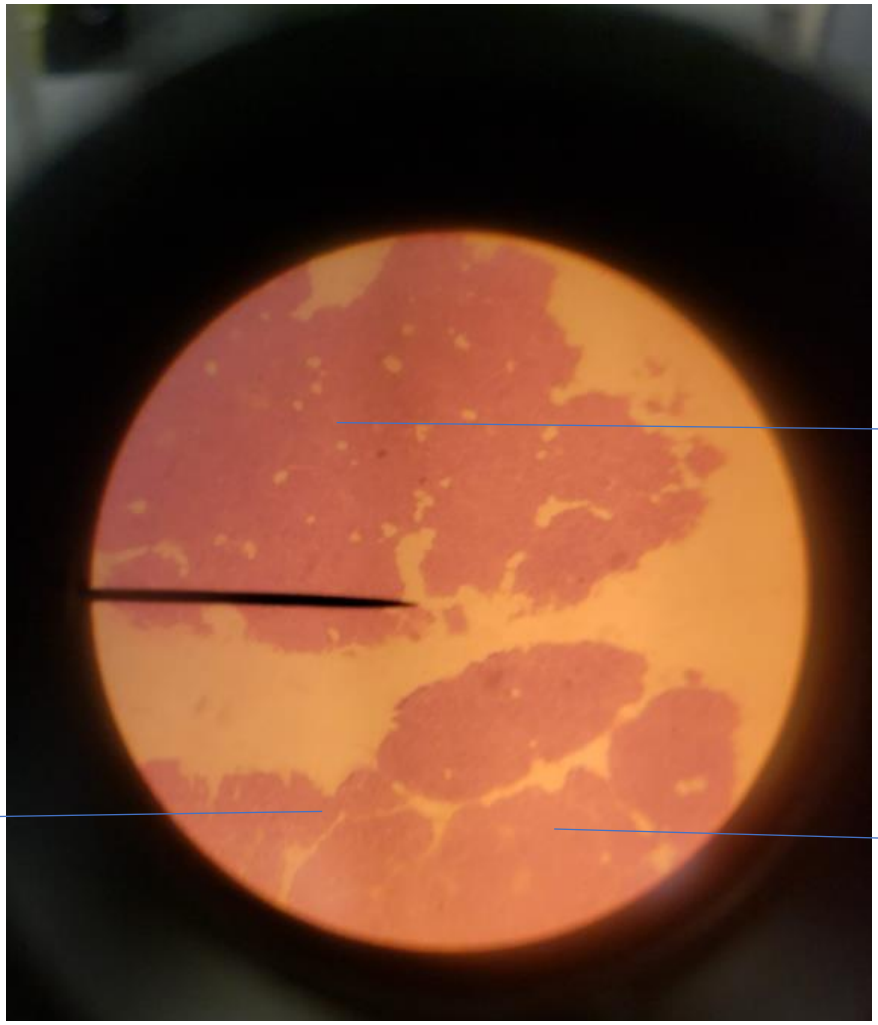
3. Trace the functions, stimulus for secretion, and target tissues of various hormones.

4. Describe the negative feedback mechanisms that control hormone secretion.

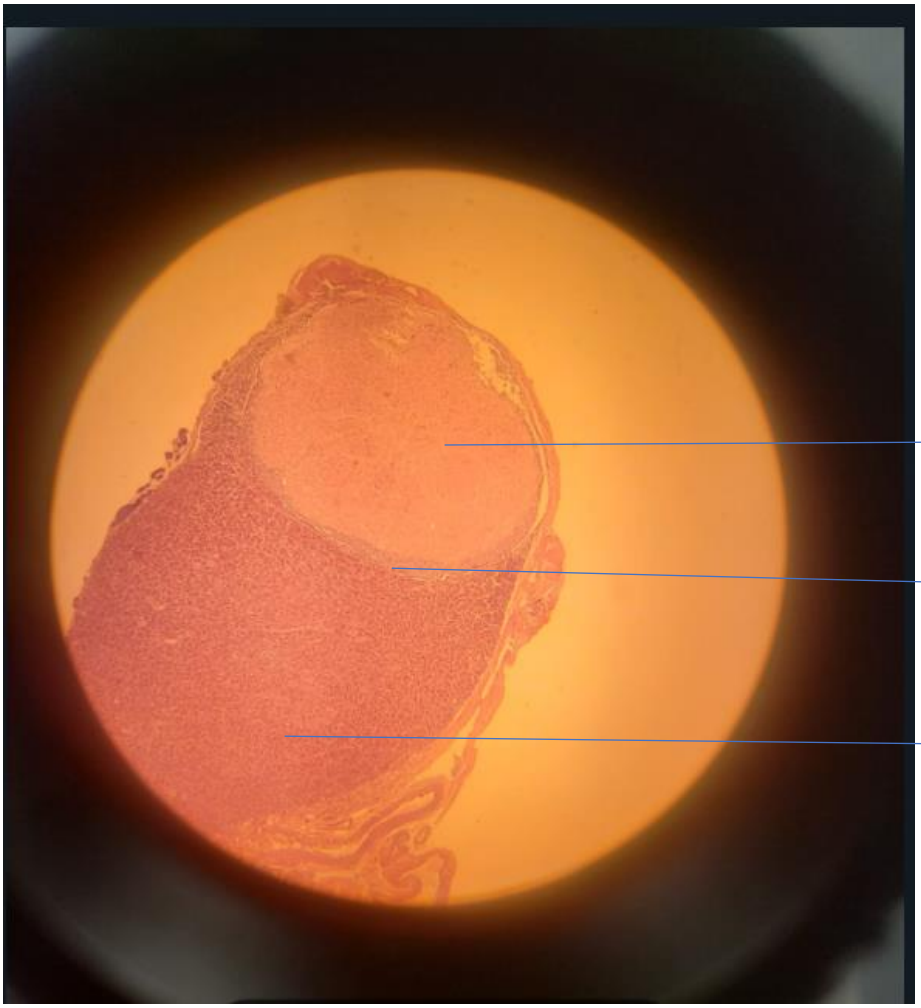
5. Apply principles of the endocrine system to clinical cases. determine the probability of passing a trait to offspring.

Experiment 1: Microscopy

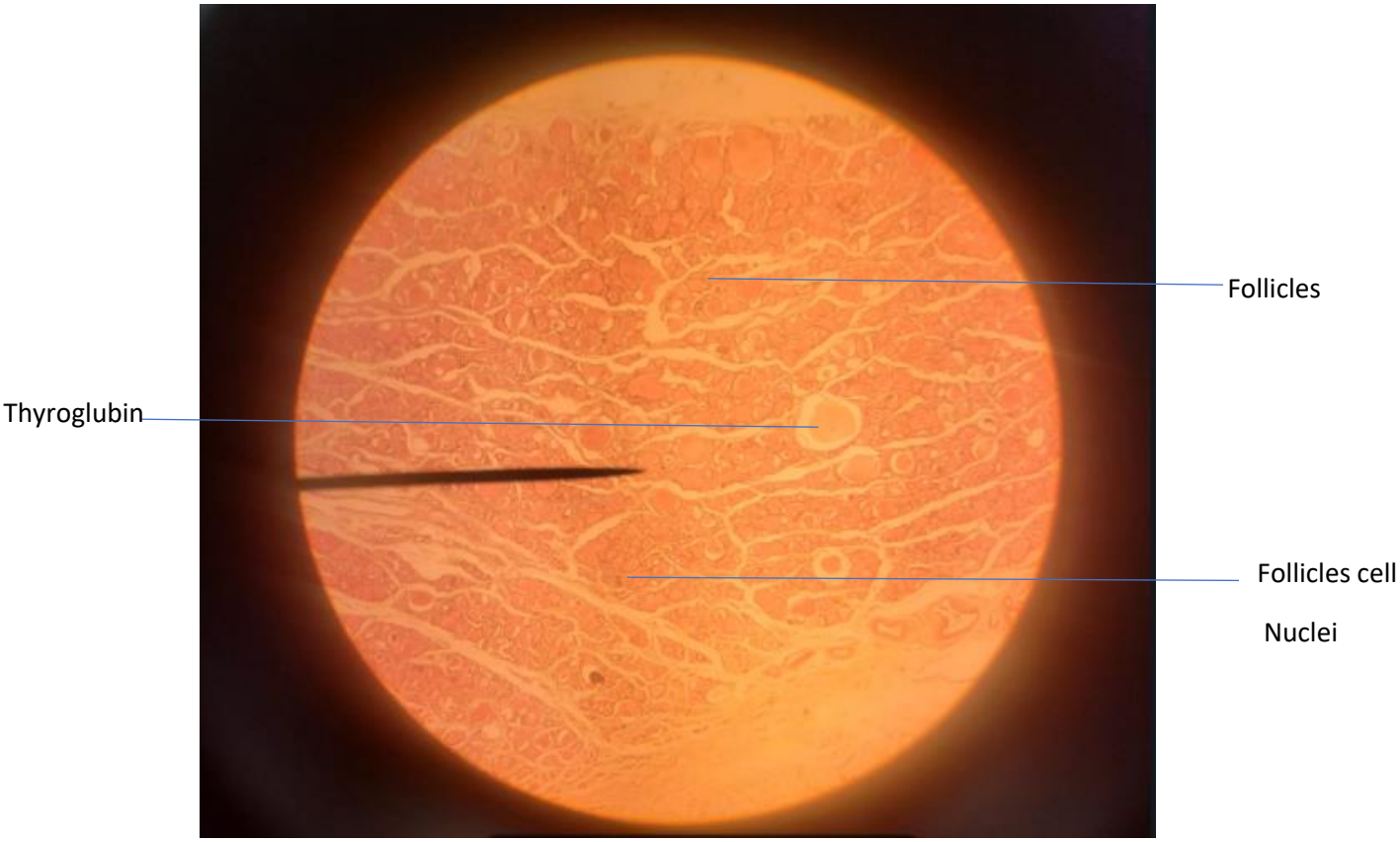
Obtain prepared slides of the thyroid gland, the adrenal gland, and the pancreas. Place each slide on the stage of the microscope, and scan it on low power. Advance to higher power to see the cells and associated structures, in greater detail.



The Human Pancreas

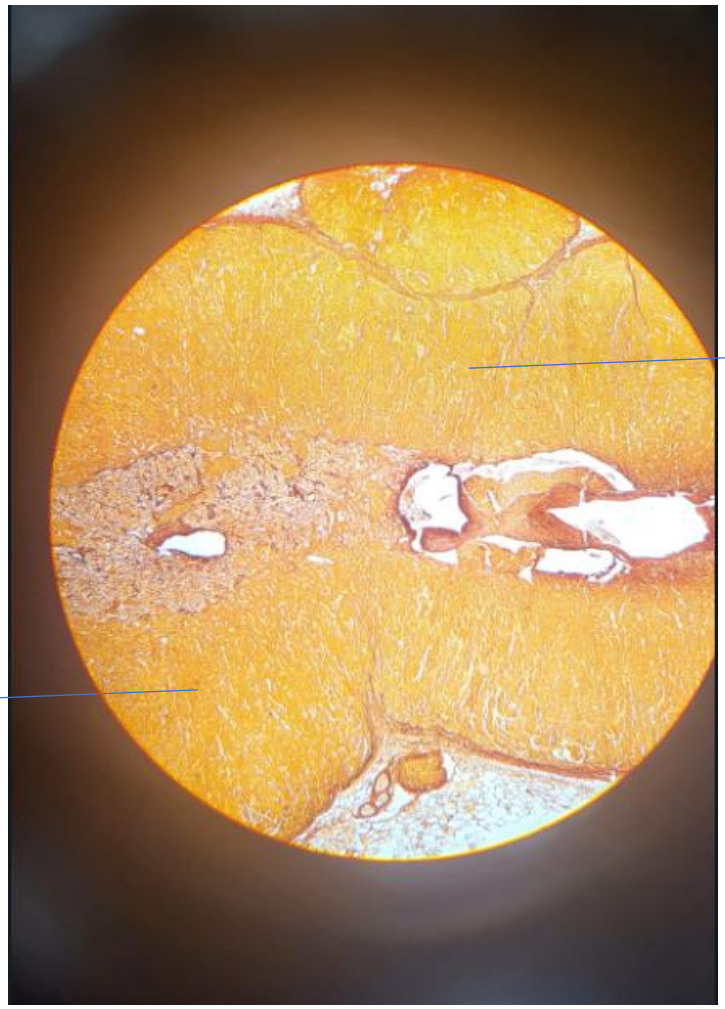


The Pituitary

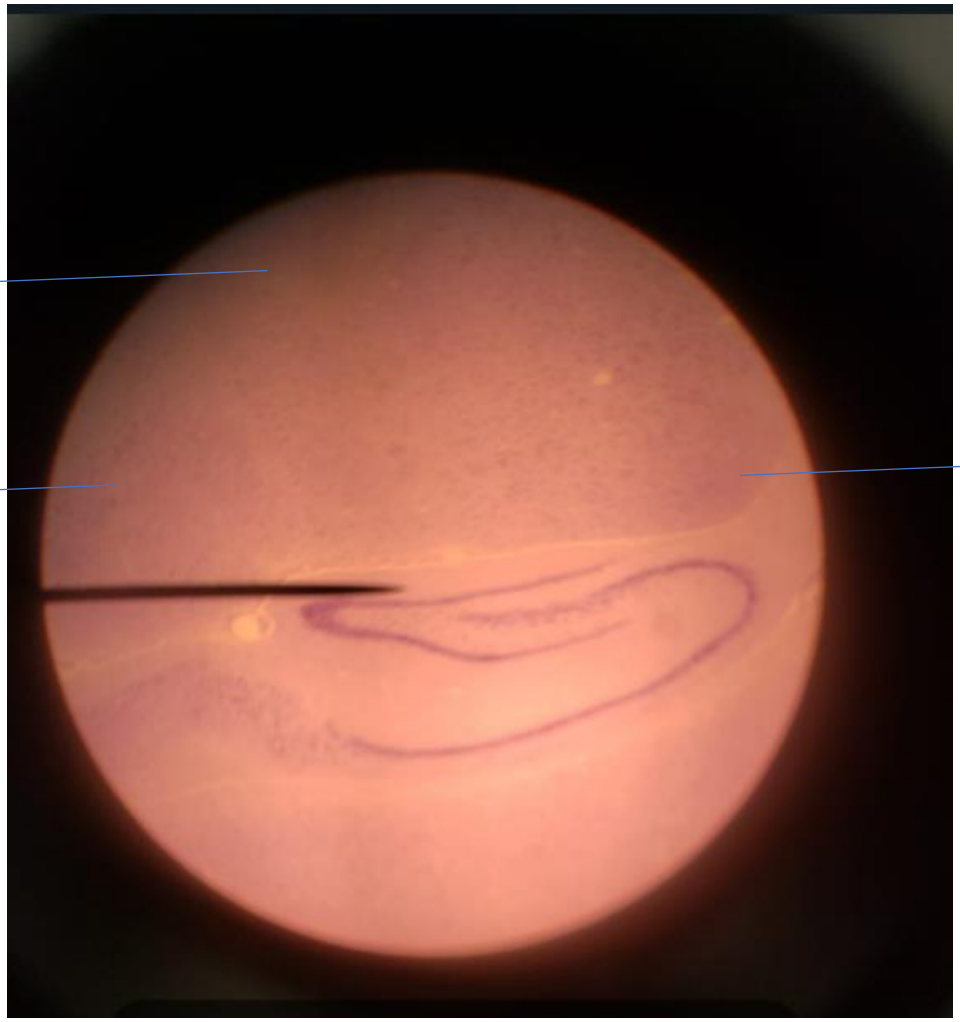


Thyroid Gland

The Parathyroid



The Adrenal



The Hypothalamus