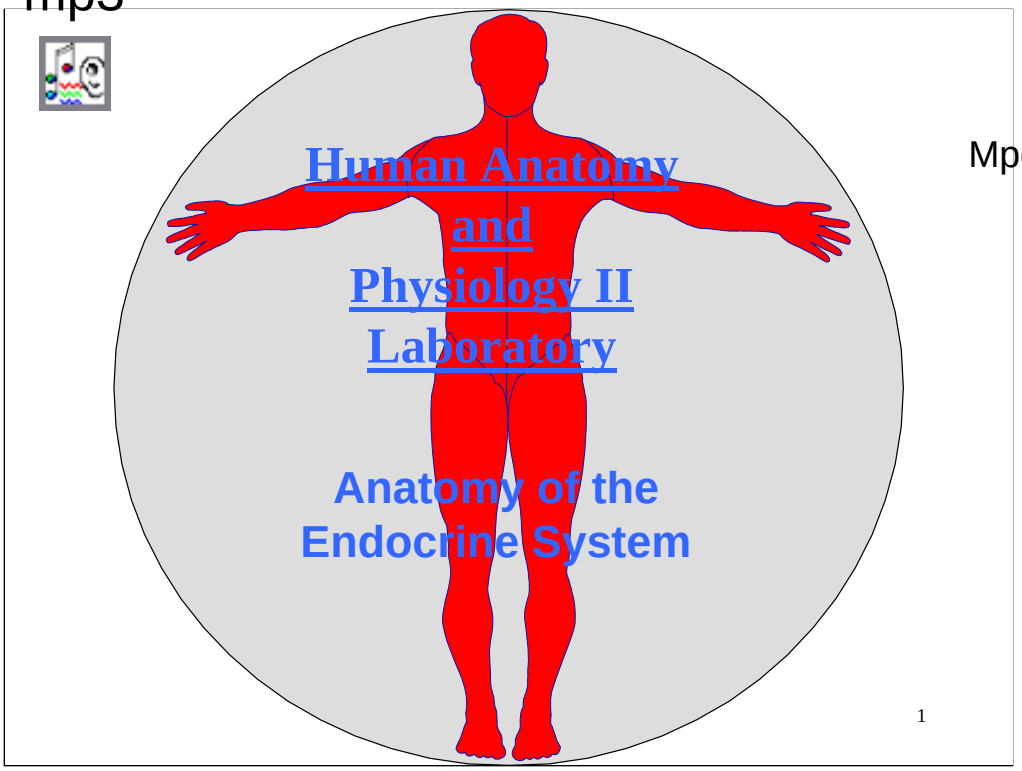
mp3



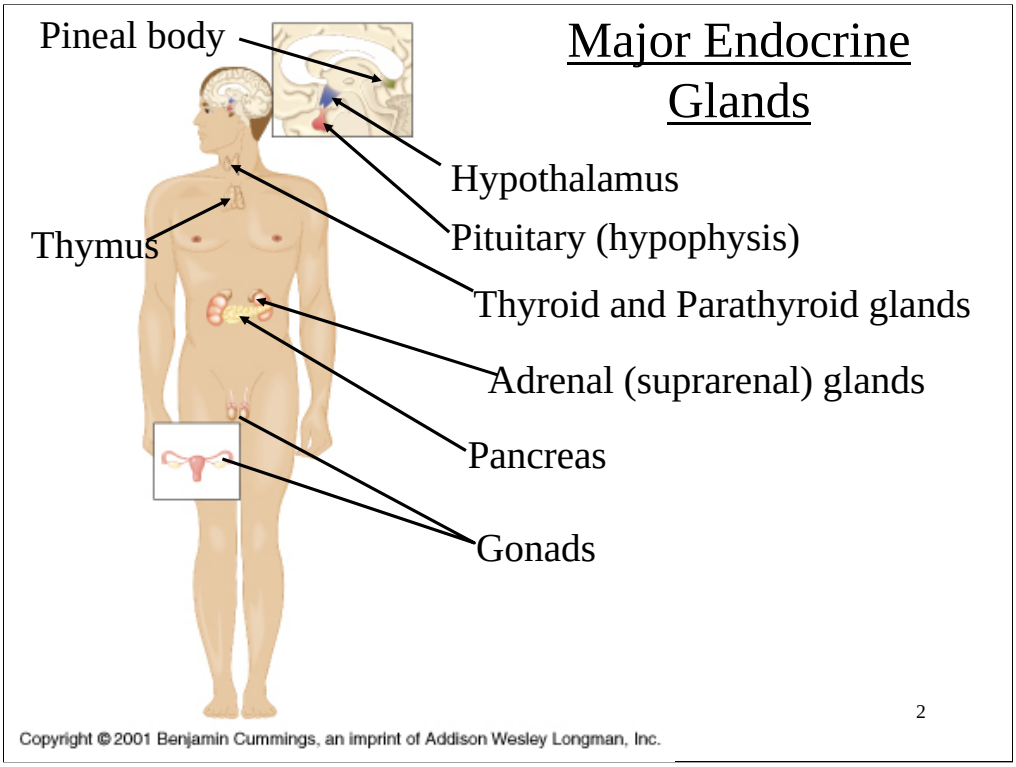
Mpeg 4 for iPod

This lab involves the exercise in the lab manual entitled "*Functional Anatomy of the Endocrine Glands*". In this lab you will look at endocrine system histology, and anatomy.

Complete the review sheet from the exercise and take the online quiz on the endocrine system, As an alternate your instructor may have you submit a drawing of endocrine glands from the Virtual Microscope or other histology site.

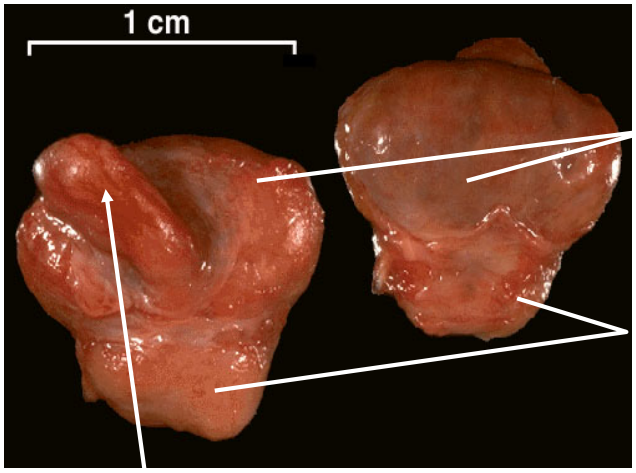
Click on the sound icon for the audio file (mp3 format) for each slide.

There is also a link to a dowloadable mp4 video which can be played on an iPod.



We will discuss all the glands shown above except the pineal body and thymus. These glands have been discussed already in other contexts (the brain, and the immune system). The gonads will be discussed in the reproductive laboratories.

Pituitary Gland



Anterior pituitary
(adenohypophysis)

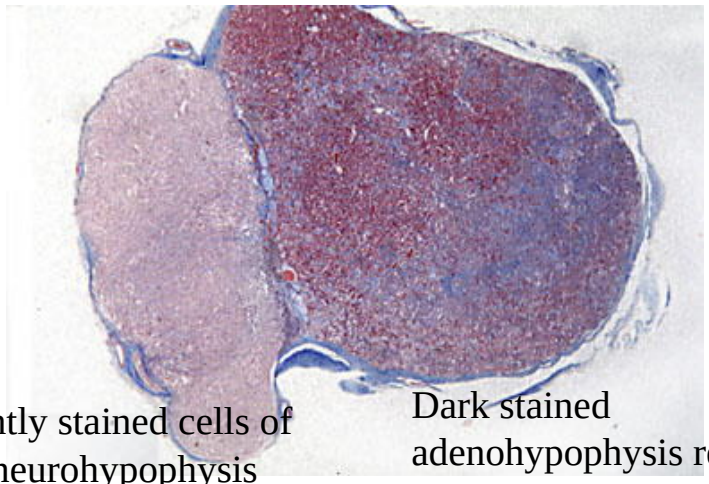
Posterior pituitary
(neurohypophysis)

Infundibulum (stalk connecting to hypothalamus)

3

The **pituitary** (**hypophysis**) is composed of two separate glands which are attached together as seen here. Blood vessels and neurons connect these glands with the hypothalamus through the **infundibulum**.

The Pituitary Gland



Lightly stained cells of the neurohypophysis reflects the neural nature of this gland.

Dark stained adenohypophysis reflects the epithelial secretory cells of this gland.

4

Note the distinct difference between the **anterior** and **posterior pituitary** glands, reflecting their different structure and functions.

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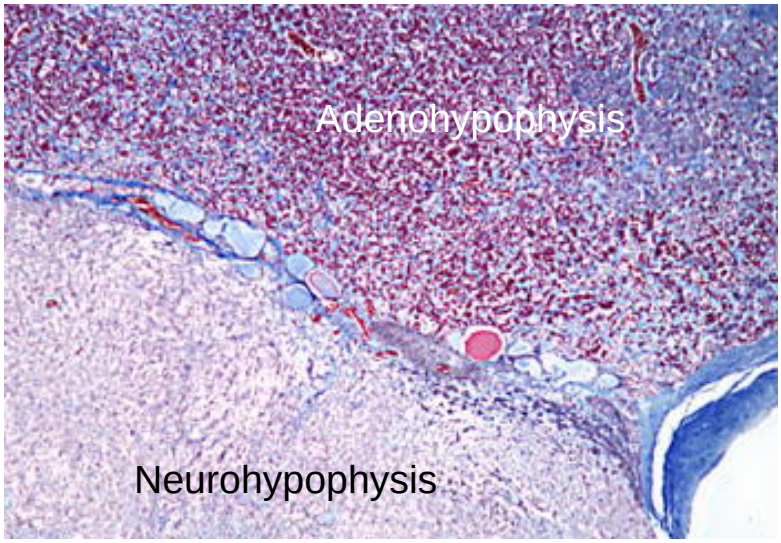
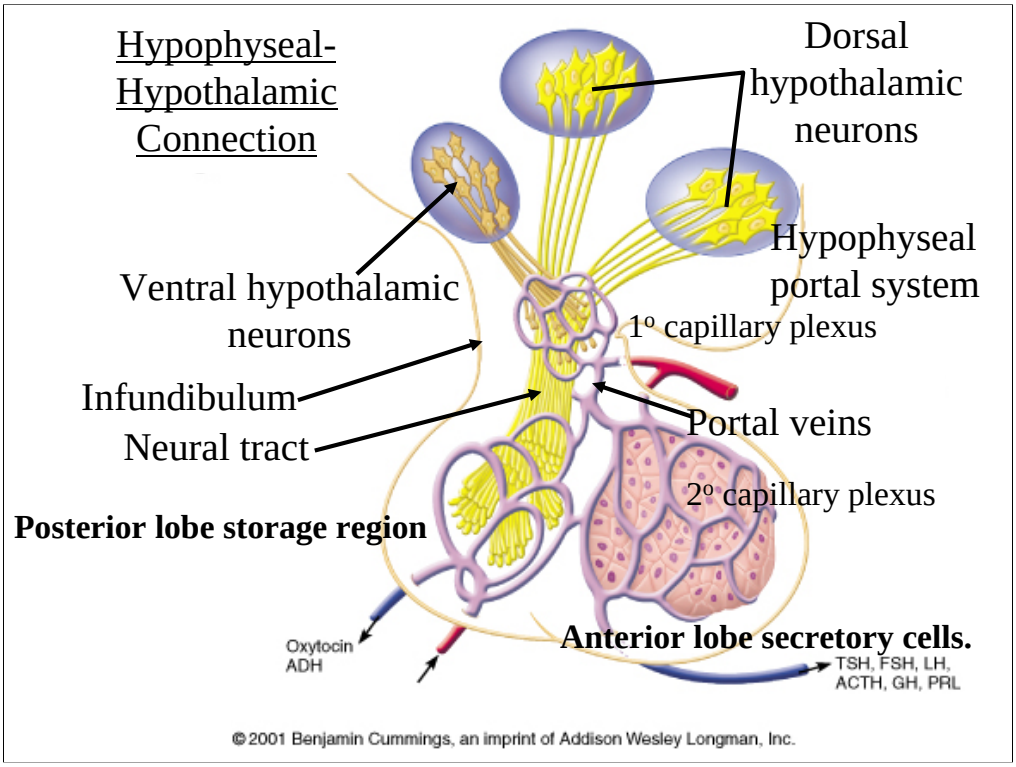
Hypophysis



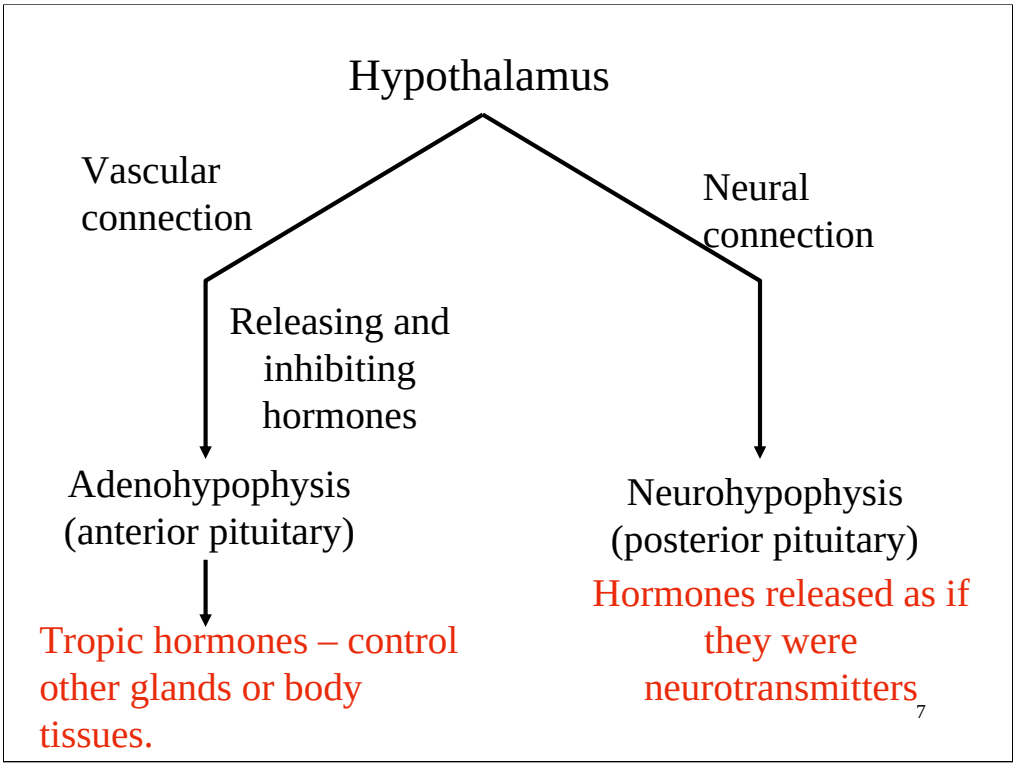
5

This slide shows the junction of the anterior and posterior pituitary, and demonstrates the difference in their composition. Note the density of the anterior pituitary, reflecting its concentration of secretory cells. The posterior gland, however, is very open reflecting its consistency, storage spaces and the terminals of neuron fibers.

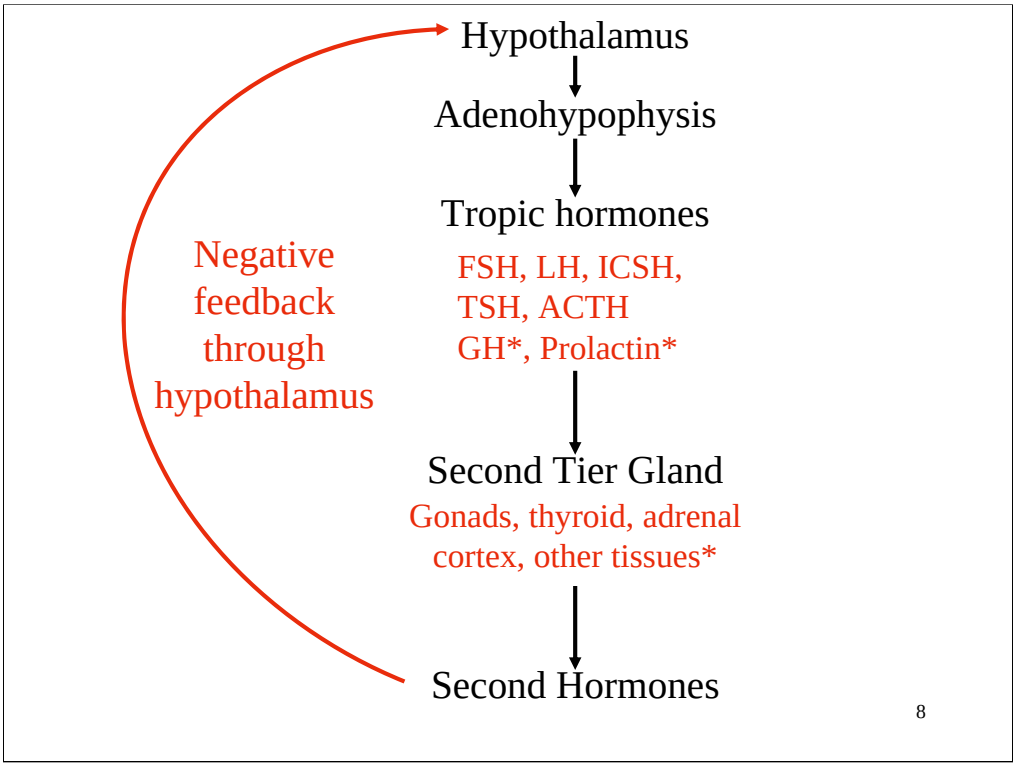


Neurons from the dorsal nucleus of the hypothalamus lead to the posterior pituitary. These neurons release **ADH** and **oxytocin** which are stored in the posterior pituitary.

Neurons from the ventral hypothalamic nucleus lead to the **primary capillary plexus** of the **hypophyseal portal system**. These neurons secrete **releasing and inhibiting hormones** which are carried by the portal veins to the **secondary capillary plexus** in the **anterior pituitary**. The releasing or inhibiting hormones then regulate the secretion of hormones by the **adenohypophysis**.

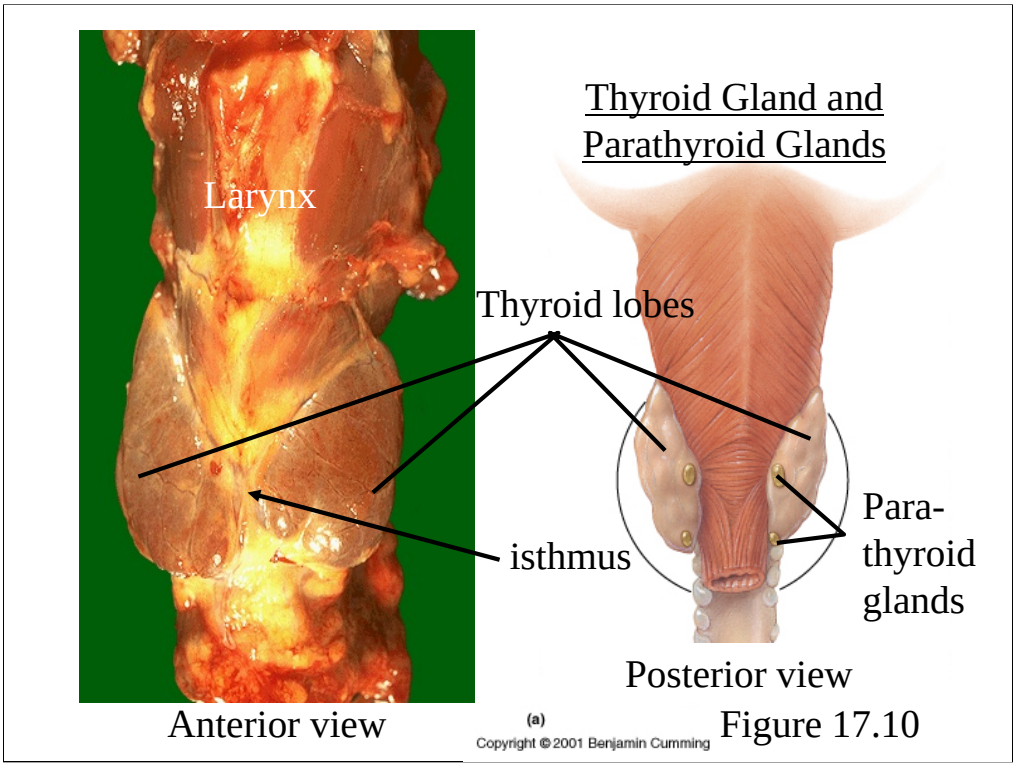


Here you see the connections between the **hypothalamus** and **hypophysis**. This connection is through the **infundibulum**.



The anterior pituitary is also called the **adenohypophysis**. ***Adeno*** means **gland** and is given to this organ because it actually secretes a group of hormones known as the **tropic** hormones. These hormones control other glands or act on other tissues. The glands controlled by the tropic hormones are also endocrine glands and represent a **second tier gland** in the control mechanism. They secrete a second hormone which has actions on specific body tissues or organs **and** has a feedback effect on the hypothalamus to control its secretion. The hypothalamus controls the adenohypophysis through releasing and/or inhibiting hormones. These hormones either stimulate release of the tropic hormone or inhibit it as part of feedback control.

Growth Hormone (GH) and Prolactin (PTH) are not considered tropic hormones proper because they do not stimulate second tier endocrine glands, but rather stimulate other types of body tissues.



Location of the **thyroid** and **parathyroid** glands. The major lobes of the thyroid lie at the lateral lower margin of the larynx, connected by an isthmus. The parathyroid glands are tiny, bean-shaped glands embedded in the posterior portion of the thyroid. They are often difficult to find on gross examination.

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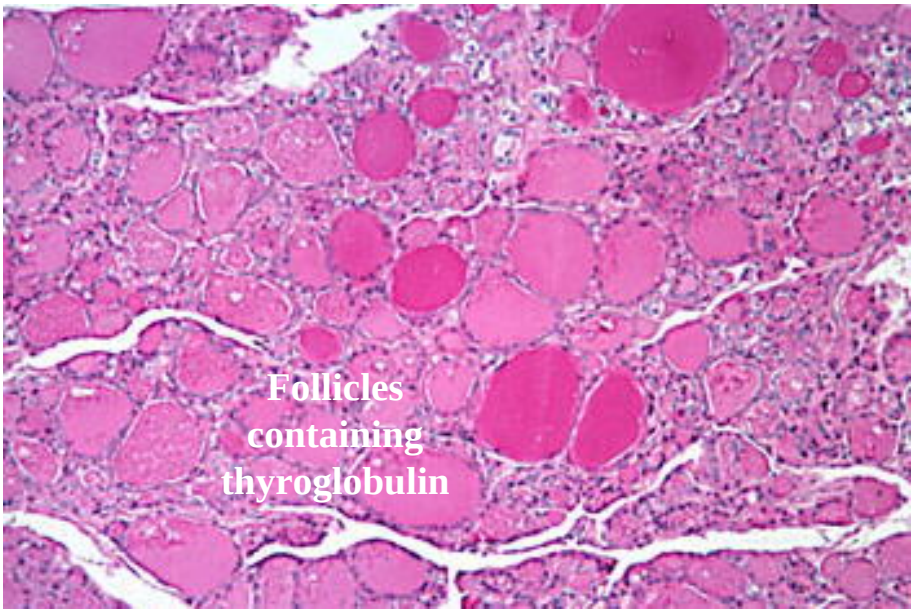
Thyroglobulin is Stored in the Follicles of the Thyroid



Each of the round structures seen in the thyroid gland is a follicle. The thyroid hormones T4 and T3 are stored as **thyroglobulin** in the follicles of the thyroid.

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Thyroid Follicles

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The follicular cells produce and regulate the storage of thyroglobulin, as well as its breakdown and the release of T4 and T3 into the bloodstream.

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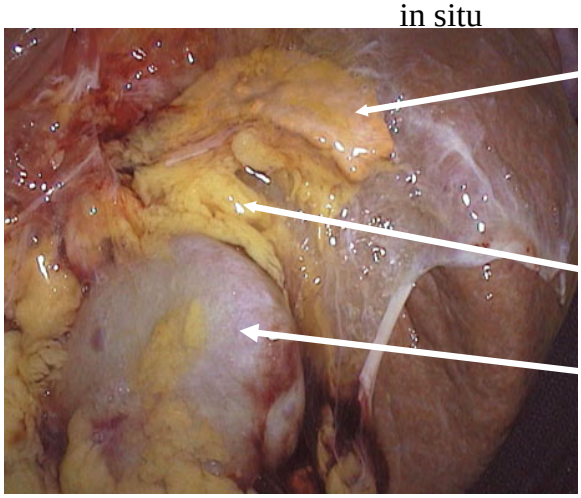
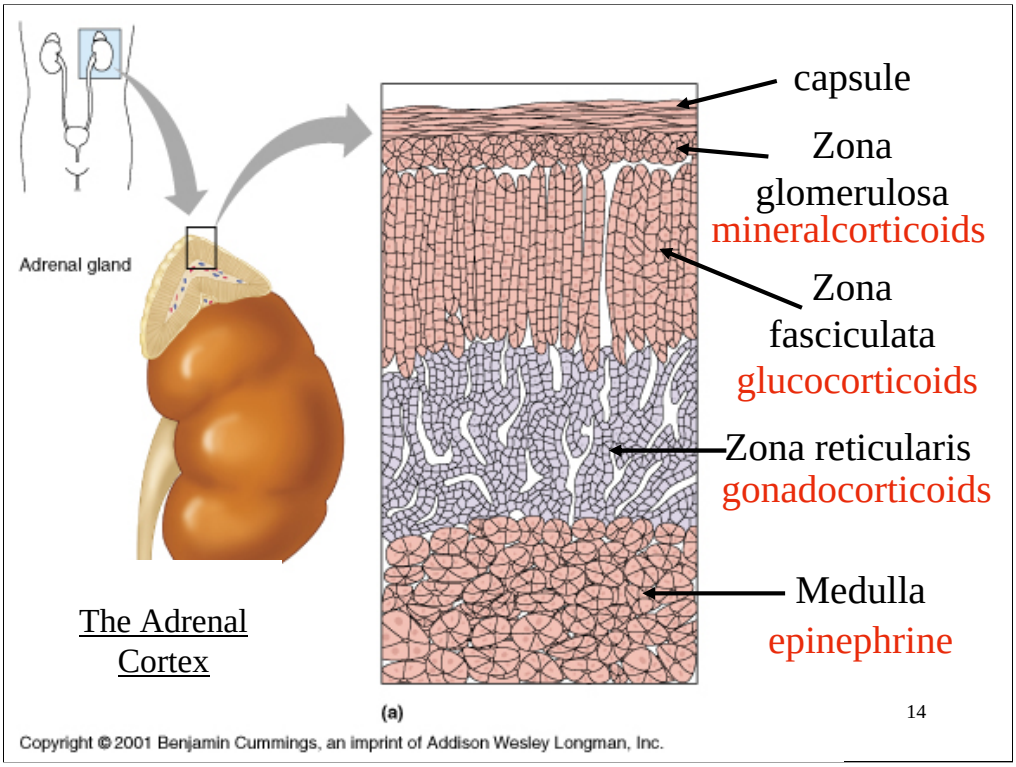
Adrenal Gland,
in situ



12

The normal adrenal gland is a “cap shaped” structure lying atop the kidney (*adrenal* means *next to the kidney*).



Location of the **adrenal** (a.k.a. **suprarenal gland**) and its **cortex** and **medulla**, as well as the hormones each produces.

There is no audio file for this slide.

Adrenal Gland,
gross specimen

Here are normal adrenal glands. Each adult adrenal gland weighs from 4 to 6 grams

15

Here you can see the cap shape which allows the gland to articulate with the top of the kidney.

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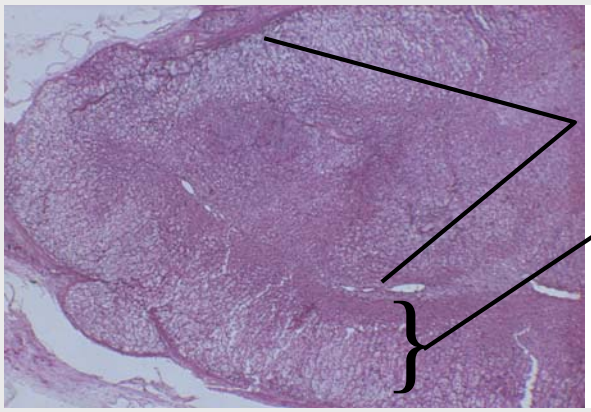
The Adrenal Gland



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The medulla is the large inner portion of the gland (*medulla* means *middle*). The cortex is the outer layer, which is in turn composed of several sub-layers.

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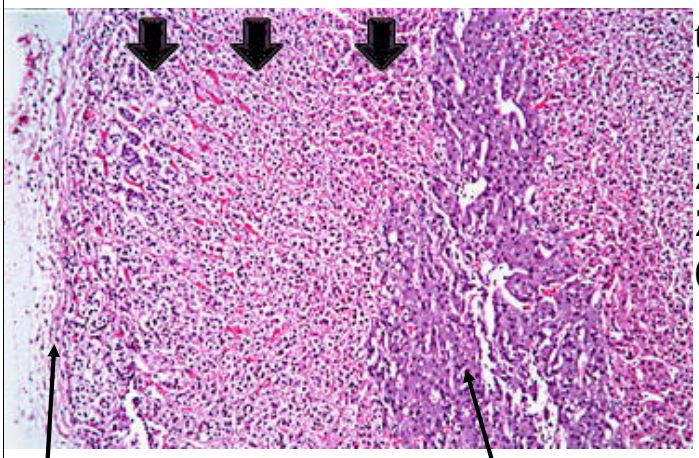
Layers of the Adrenal Cortex



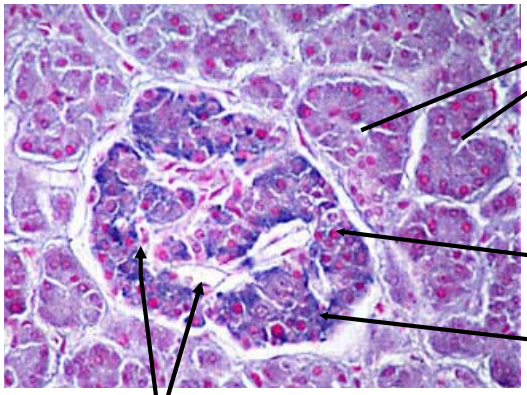
The three layers of the adrenal cortex from left to right: Zona Glomerulus, Zona Fasiculata, Zona Reticularis (mnemonic - GFR)

17

These layers subtle and are often difficult to distinguish in microscopic examination.

Pancreatic Islets

(Islets of Langerhans)



Exocrine acini

Endocrine cells:
Glucagon-secreting alpha cells stain red
insulin-secreting beta cells stain blue

capillaries

18

The pancreatic islets are groups of cells which are islands within the exocrine portions of the pancreas.

There is no audio file for this slide.

Lab Protocol

1.Complete the Review Sheet for the endocrine exercise.

2.As an alternative your instructor may want you to submit drawings from the Virtual Microscope or other histology site.

3.Take the online quiz on the endocrine system.

ADAM Interactive Anatomy

Dissectible Anatomy, Male, Lateral View, Window centered on head, Layer indicator 288, hypothalamus, pituitary gland, pineal gland.

Dissectible Anatomy, Male, Anterior View, Window centered on neck, Layer indicator 77, thyroid gland.

Dissectible Anatomy, Male, Anterior View, Window centered on neck, Layer indicator 164, thymus gland
Atlas Anatomy, System, Endocrine, Glands of the Head and Neck (Ant)

Dissectible Anatomy, Male, Anterior View, Window centered on upper abdomen, Layer indicator 232, adrenal gland; Change Layer Indicator to 214, pancreas