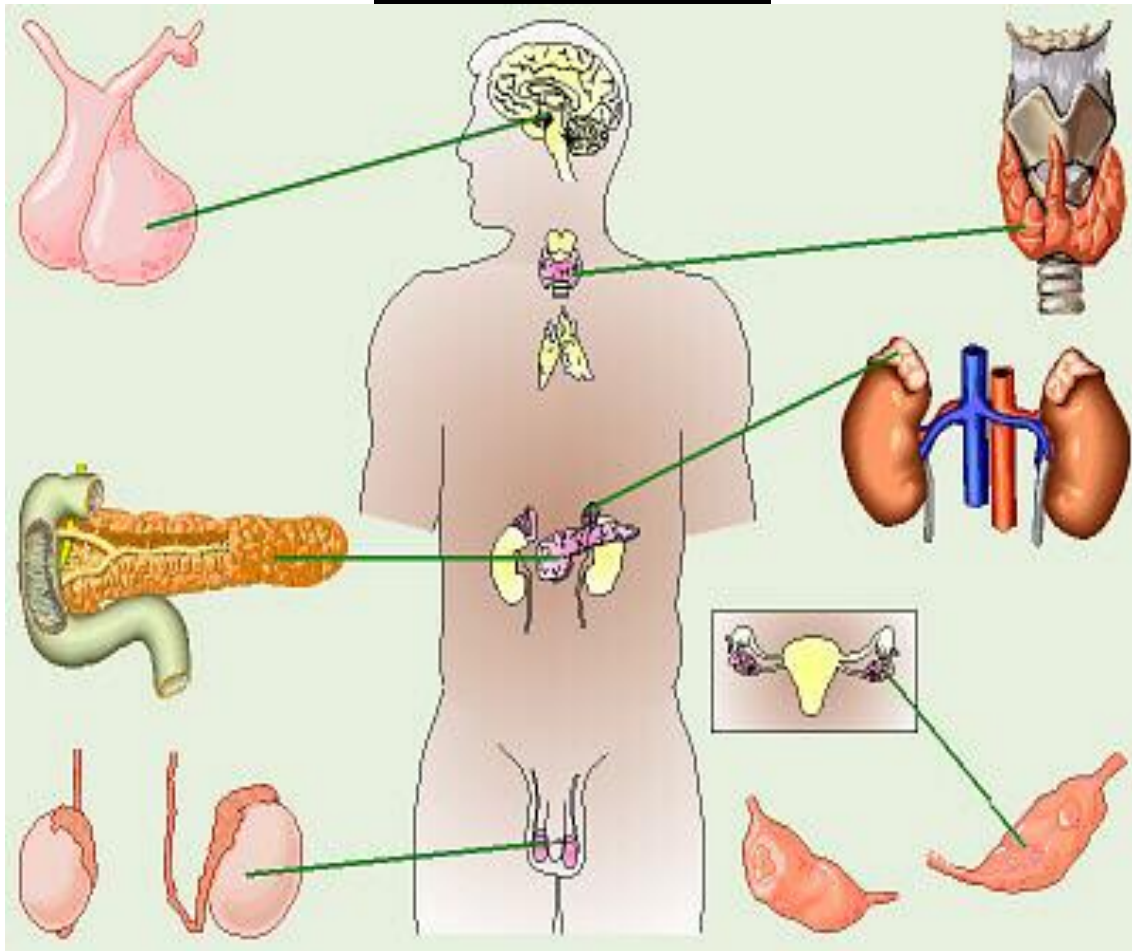


Unit N Notes #3 – Neural Control Of Endocrine System

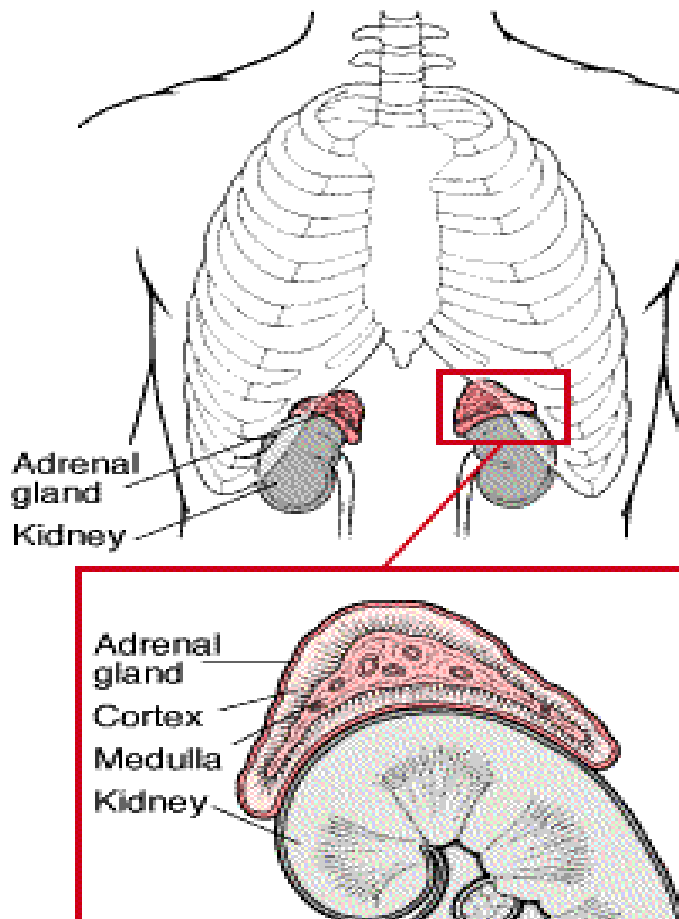
A) Role of Adrenalin (*Epinephrine*)

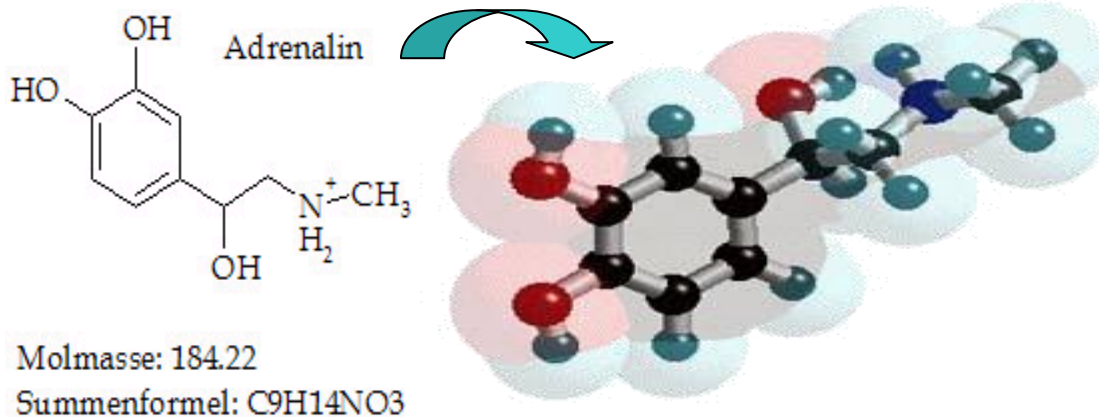
- Sudden simultaneous release of Noradrenalin/Norepinephrine (an excitatory **NEUROTRANSMITTER**) from all the sympathetic neurons (as in times of fright) has a critical effect on the endocrine system.

Endocrine System Below



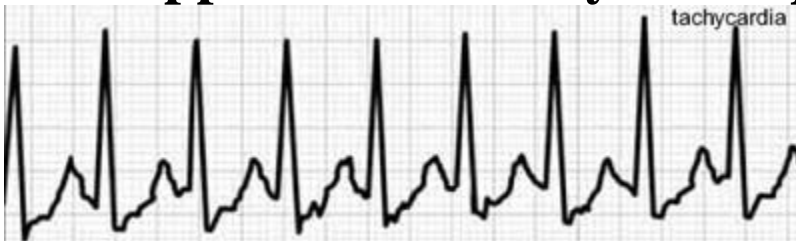
- It causes the release of the HORMONE Adrenalin/ Epinephrine from the interior (Adrenal Medulla) of the adrenal glands located on top of the kidneys. The Noradrenalin (neurotransmitter) and the Adrenalin (hormone) initiate and sustain what is known as the ‘Fight or Flight’ response.





- This hormone/neurotransmitter combo prepares the body to respond to danger in the following ways:

1. Increase heart rate so that more blood is supplied to the body more quickly.



2. Widen air passageways so that more air can be exchanged with each breath.

3. Sudden contraction of some muscles to tense the body up for action. Included in this is the contraction of the diaphragm. A scared person will gasp, inhaling suddenly.

4. The iris of the eye contracts thus widening the pupil to maximize visual alertness.

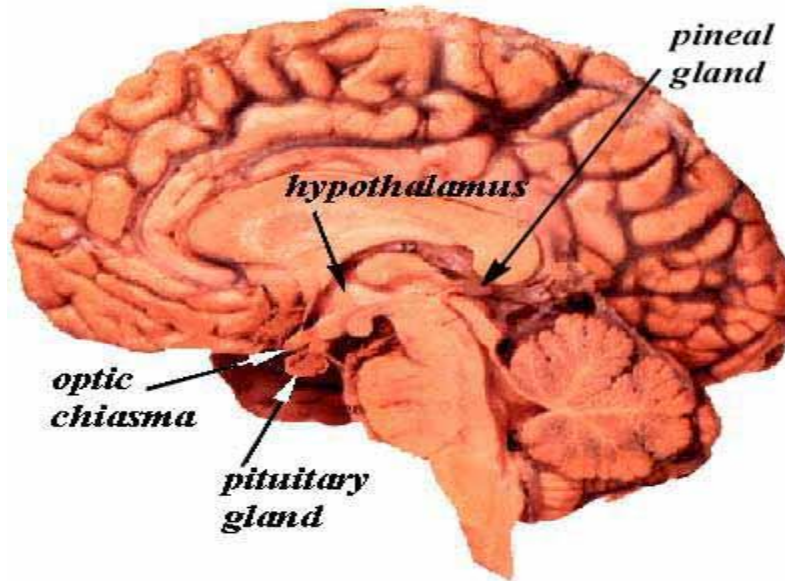


5. Increased blood flow to the skeletal muscles so they are more able to act.

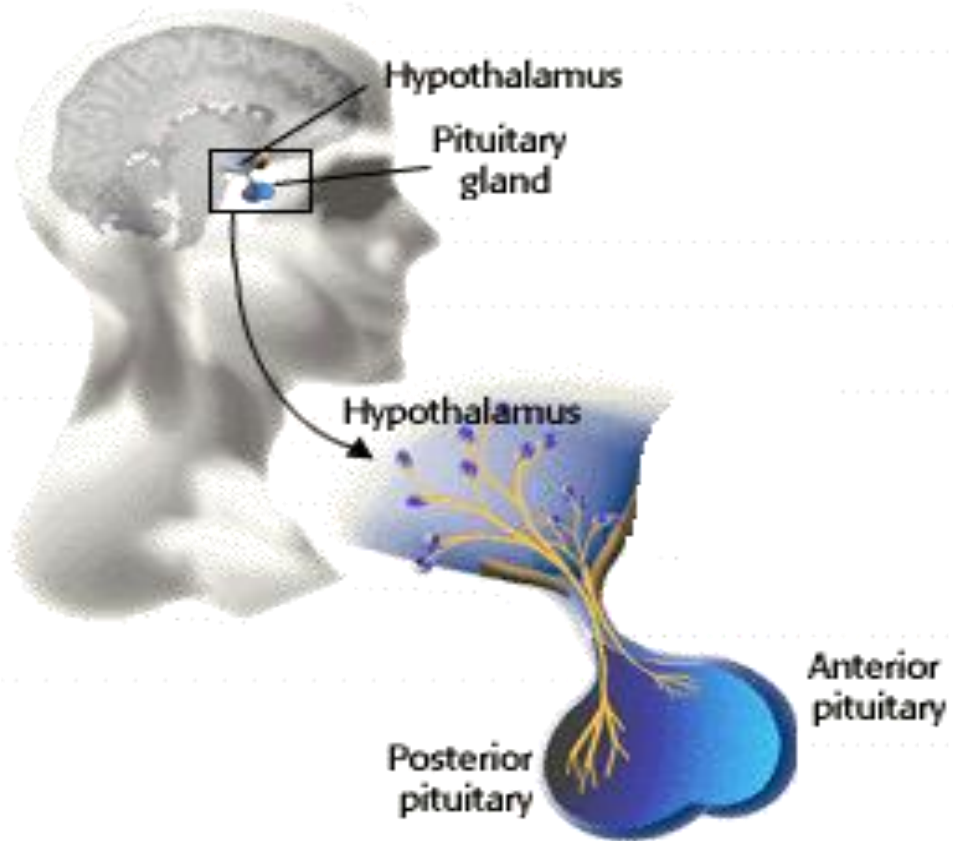
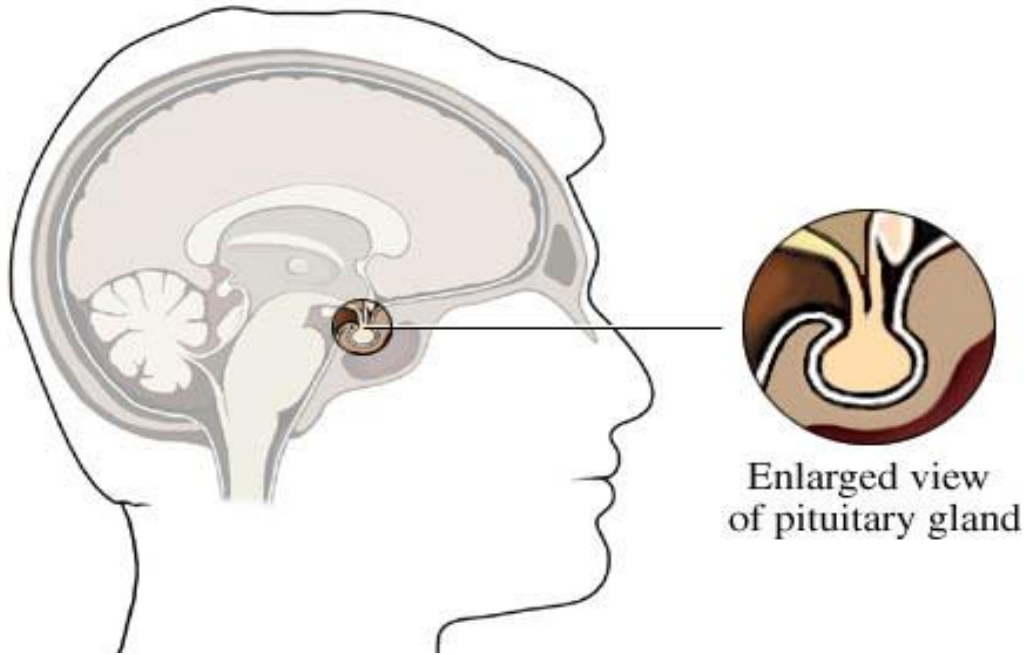
6. Decreased digestive activity, circulation and control.

B) Neuro-endocrine Control:

- There is a link between nerve tissue and the body's hormones (endocrine = hormonal). This association is between the hypothalamus and the pituitary gland.



- It can be seen that there are two lobes of the pituitary gland: an anterior (up front) and a posterior (behind) lobe. Both of these extend down from the hypothalamus.



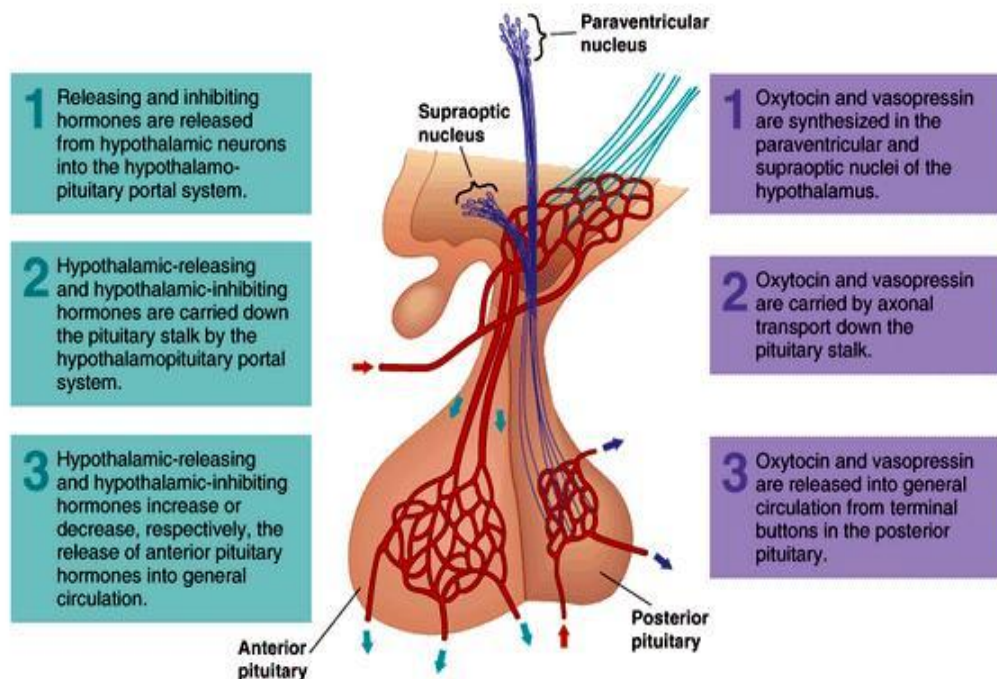
- As blood passes through the hypothalamus, the blood's composition and temperature is monitored and various homeostatic responses are stimulated. These responses involve the release of hormones from the pituitary gland. These hormones act as blood messengers to bind onto receptor sites at various organs/glands.

(You Do NOT Need to Know The Role Of ALL Of These Hormones)



- The anterior pituitary releases six major hormones that range in effect from bringing about reproductive changes to skeletal growth. The anterior pituitary is often referred to as the “MASTER GLAND”**
- The posterior pituitary releases two hormones, ADH and Oxytocin.**
- The mechanism of action is slightly different for the release of the anterior pituitary hormones than it is for the posterior pituitary hormones.**

► Control of the Anterior and Posterior Pituitary by the Hypothalamus



Controlling Anterior Lobe:

- In the case where the hypothalamus detects that the effect of one of the hormones from the anterior pituitary is required, it releases a hormone-like substance called a **hypothalamic releasing hormone** that travels through the very short blood vessel that is connected with the anterior pituitary. The effect of this is to cause the release of the required hormone.

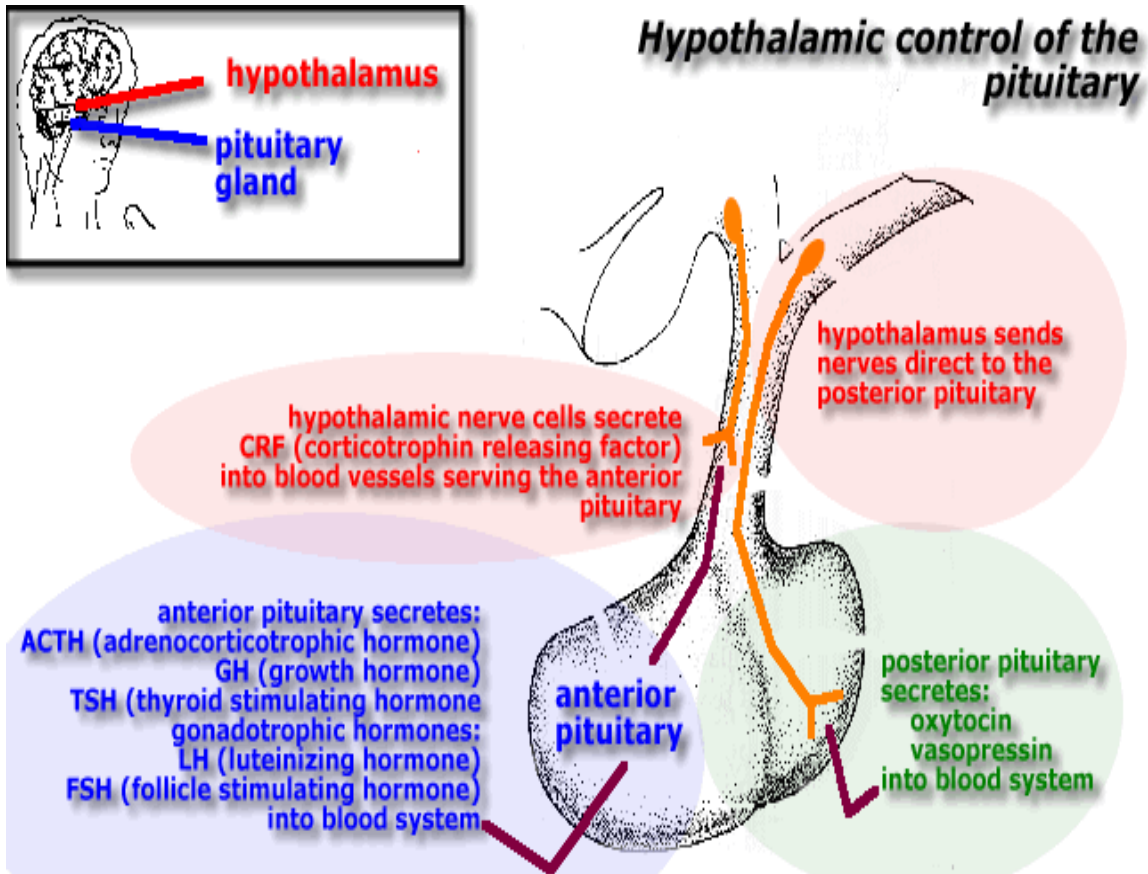
Ex. Thyroid Releasing Hormone (TRH)

- If a level of hormone is too high, the hypothalamus can put out **hypothalamic release-inhibiting hormone**. This will cease the release of that given hormone.

Ex. Thyroid Release-Inhibiting Hormone (TRIH)

Controlling The Posterior Lobe:

- In the case of the hormones released by the posterior pituitary, the **hypothalamus actually makes these hormones** which it releases into a **nerve tract** that conducts them to the posterior pituitary gland.



- Regardless of the mechanism, all the hormones are released into the circulatory system and they travel about the body affecting the specific target organs for which they were designed. This is “ENDOCRINE” action.