

Thyroid and Parathyroid glands :

- butterfly shaped gland wrapped around the trachea of the neck (**thyroid**)
- 4 lumps embedded in it (**parathyroid**)
- TSH (**thyroid stimulating hormone**) made by the pituitary controls it (TSH inhibited by **caffeine**)
- its main job is to make **thyroxine**...
 - non steroid, increases metabolism (heart, liver, muscles, kidneys) by increasing the rate of cell respiration and oxygen demand for increased use of Na / K pumps and increased heat production....
- high levels of thyroxine negatively impact its own production...diagram, page 432, - feedback loop

hyperactivity.....

Hyperthyroidism - or “**Graves Disease**”, thyroid remains “on” and “active”

Enlarged gland, weak muscles, really hot, vasodilation, increased appetite, bulging eyes

surgery, hormone injections to treat

hypoactivity.....

Hypothyroidism or myxedema, symptoms opposite of above, plus less mental activity, and sometimes underdevelopment of the body during adolescence.

Tested for at birth, 1 in 4000 got it. “**Congenital hypothyroidism**”...short, stocky, slow kids

Not enough dietary iodine....**goiter**

Parathyroid gland makes **calcitonin**, controls blood calcium levels, and its antagonist, PTH...**parathyroid hormone**.

Diagram control loop...page 434

Biofact...page 435

The Pancreas...

- small gland above the intestines & behind the stomach
- clusters of cells (**Islets of Langerhans**) scattered through the tissue makes **glucagon** and its antagonist...**insulin**

Insulin....removes blood sugar...places it as glycogen in the liver, or conversion to fat in fat (adipose) cells.

Hypoactivity....diabetes type 1 and 2, page 437-38

Diagram feedback loop

Describe diabetes test results, page 436-37

Banting and Best, page 439

The Pineal Gland....

Melatonin :

produced by brain's pineal gland, levels rise at "night"

- one hormone whose production follows day / night patterns of production, or seasonal production (circadian rhythms) Melatonin is high at night, drops during the day

(Cortisol, thyroxine seasonally linked)

- causes sleepiness, levels rise during fall months, may lead to seasonal affective disorder (S.A.D.)...symptoms may include depression and increased sleep
- light therapy to boost exposure and Vit D levels

The Adrenal Glands....controlled by ACTH from pituitary

- outer layer : "cortex", inner layer..."medulla", each makes different hormones in response to stress.

- makes adrenaline, noradrenaline, aldosterone, and cortisol

Adrenal cortex..... Long term stress response
cortisol and **aldosterone** (a sex hormone....androgens, also made in ovaries and testes)

cortisol....

levels rise and fall daily...circadian, rising at night, peaking as you awake)

the “**long term stress hormone**” ...a long term response to sustained stress...

big increase in blood sugars (6-10 times normal!), BP goes up, metabolism changes, making / using fats and proteins changes, abdominal fat deposits, arteriosclerosis, and reduced immune system effectiveness.

Also a powerful anti-inflammatory, used in creams, inhalers, arthritis treatments.

Aldosterone....

controls water and salt balance...fluid retention, hypersecretion results in “**Cushing’s Syndrome**”, page 443, hyopsecretion....low blood pressure and decreased sex drive, darker “tanned skin”...**Addison’s Disease**

Adrenal medulla...short term stress response

epinephrine (adrenaline...the stress hormone) and
norepinephrine (noradrenaline)

H ⇒ SNS ⇒ Adrenal Gland ⇒ epinephrine

results in vasodilation, increases heart rate and
BP, increases blood sugar supply

Anaphylactic shock :

Severe allergic response, body wide
histamine production, BP drop, organ's
supply decreased, death....treated with
epinephrine injection to mimic "fight or
flight response" to stress, BP restored.