

Adrenal gland medullary and Zona reticularis

Adrenal medulla is example of endocrine that doesn't obey the hypothalamus orders + from neural cells.

Mechanism of secretion Adrenal Medulla

• Chromaffin cells : cell bodies of postganglionic motor neurons of sympathetic nervous system.

= Thoracolumbar output (T1-L2) (intramural ganglion)

- short term stress (acute stress)
- Fight or flight

= Hypothalamus (hypothalamic spinal tract)

• Posterior hypothalamic nucleus to Preganglionic of sympathetic neurons (cell bodies in the lateral gray horn of spinal cord).

Adrenal medulla is considered a type of Nerves system.

= Preganglionic long and Moving through chain ganglion (Exception for adrenal) Not separated from parasympathetic

Nicotinic receptors secret Ach that synthesise tyrosine >> L- DOPA >> DOPAMINE. {20% Norepinephrine, 80% Epinephrine}.

Epinephrine

Liver

EPI to G protein ,P.K.A increasing the sensitivity of adrenergic receptor.

Glycogenolysis

Gluconeogenesis (hyperglycemia) odd chain F.A,
glycerol, A.A, Lactic Acid

Adipocyte

Lipolysis {Like a scissor to active the sensitivity of lipase and divided to glycerol & fatty acid}

G protein, hormone sensitive lipase, glycerol (Liver) , fatty acids (beta oxidation in muscle a lot of ATP)

~Cortisol function in amplifying without it there won't be epinephrine and NE.

Why medulla & cortex not divided although they have different function? Because of their hormones are linked together.



HEART

Increase blood pressure and **stroke volume**.

Beta adrenergic receptors on SA node

Increase heart rate

Increase contractility

Alpha adrenergic receptors (on smooth muscle)

Vasoconstriction (blood shunt to heart)

Cortisol steroid in intracellular signals. Considered with long stress.

Lung

Resp rate (**Increase oxygen amount for dilation**).

dilate bronchioles Beta 2 adrenergic receptors.

Constrict blood vessels of GIT ,kidneys, skin.

Pheochromocytoma

- Cancer of adrenal medulla
- Excessive amount of epinephrine and norepinephrine.

Steroid > lipid soluble & slow.

Adrenal medulla is with CNS for emergency and fast reaction.

~Short stress is for seconds.

Gonadocorticoids

Under the obey of hypothalamus.

• Paraventricular nucleus CRH, ACTH, G- coupled receptors, G stimulatory protein, GDP OFF, GTP On , ADENYLATE CYCLASE ACTIVATES.

ATP_ C AMP ACTIVATES PROTEIN KINASE A (P.K.A)

{Inc phosphorylation}

• P.K.A phosphorylate different enzymes

• Steroid hormones > Cholesterol >Pregnenolone >Progesterone and 17-OH pregnenolone
As step one 17_OH PREG,

Step one: DHEA(dehydroxyepiandrosterone) and 17 –OH progesterone

Step two: Progesterone, 17 –OHprogesterone, Androstenedione DHEA to

Androstenedione (Gonad corticoids)

Very weak sex hormones.



DHEA and Androstenedione
Male (testes) converted into testosterone (minimum)
Female estrogen (minimum)
Secondary sex characteristics
Hair growth
Facial (male)
Axillary
Pubic
Sebaceous secretion
Libido (sex drive)
Mamillary gland (female)
Clitoris (female)

If its increased there will be increased of the secondary characteristics.

androgens

Adrenal genital masculinization (**high level of DHEA and Androstenedione**)

Increase lipid in male and facial hair in female

- Very weak
- Acts as precursors

(major hormones)

Male testosterone

Female estrogen

Secondary sex characteristics

IMPORTANT

11 beta hydroxylase deficiency

Deoxycorticosterone

Increase mineralocorticoids

Low renin

~If there will be any difference there will be accumulation of deoxy corticosteroid.

21 hydroxylase

Decrease mineralocorticoids Na , K ,Bp

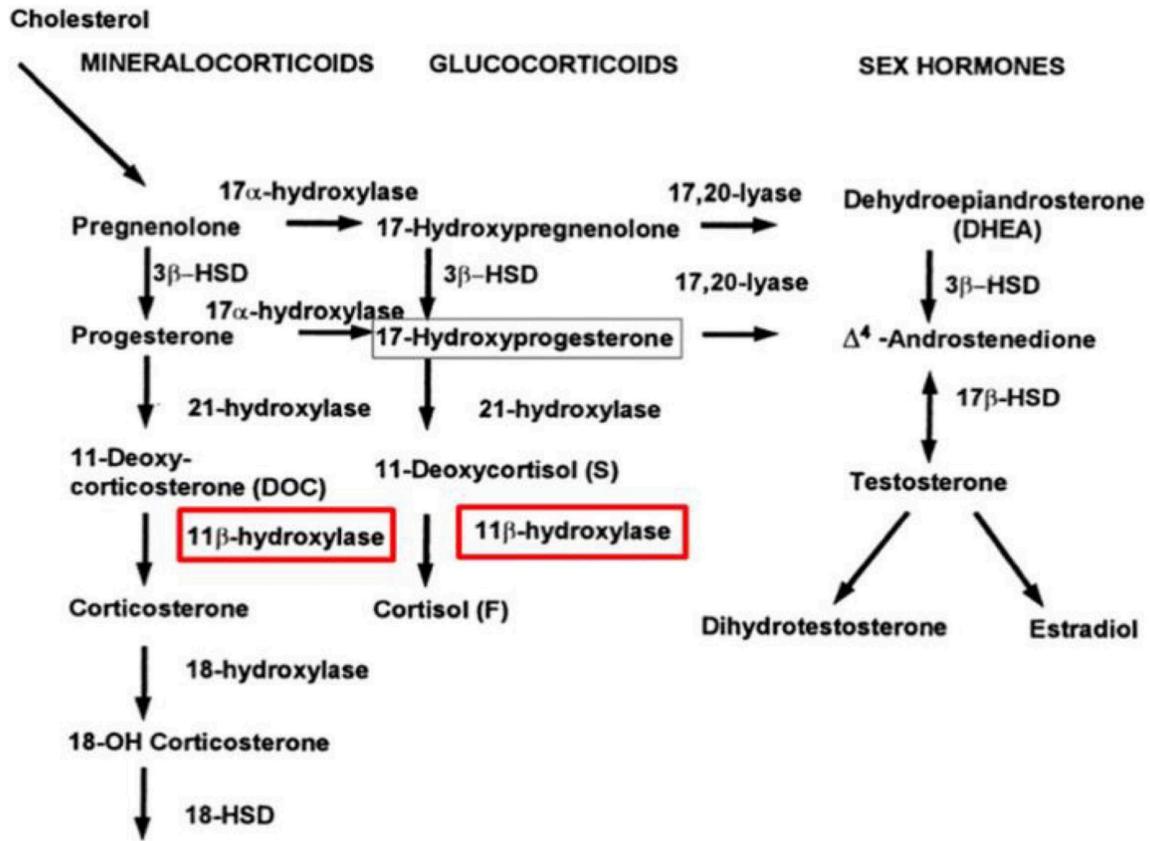
Increase androgens

17 alpha hydroxylase

Increase mineral Na, K, Bp

Decrease androgens





GROWTH HORMONE

- Growth factor is catabolic.

Receptors on the liver that synthesise the middle man that is an insulin growth factor that is like the insulin. Is protein anabolic that decreases the glucose levels.

The insulin growth factor works on the same receptor of insulin in tyrosine kinase receptor.

Insulin Growth hormone part of the liver and part in the blood tissue. The special thing is that when it binds to blood protein it will be very strong with prolonged activity.

If we compare the insulin growth factor >> 20 hour with growth hormone the effect >> 20 min because it's too loose.

Injection of GH in the human body there will be building up to the muscle because it will enhance protein synthesis which is anabolic and also called somatotropin in building the body.

Insulin growth hormone is the middle men and a condition of GH. But GH if outside the body it won't work because there is no liver for the insulin like growth hormone.

«سَنْظَلُ فِي جَبَلِ الرَّمَاةِ وَخَلْفَنَا
صَوْتُ النَّبِيِّ يَهْزُنَانَا لَا تَبْرَحُوا»

