

# Adrenal gland medullary and Zona reticularis

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## 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)

Preganglionic long and Moving through chain ganglion ( Exception for adrenal)

Ach, nicotinic receptors

tyrosine,

L- DOPA,

DOPAMINE,

20% Norepinephrine, 80% Epinephrine

# epinephrine

Liver

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

Glycogenolysis

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

Adipocyte

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

# HEART

Increase blood pressure

Beta adrenergic receptors on SA node

Increase heart rate

Increase contractility

Alpha adrenergic receptors

Vasoconstriction

Lung

Resp rate

dilate bronchioles Beta 2 adrenergic receptors

Constrict blood vessels of GIT ,kidneys, skin

Pheochromocytoma

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

# Gonadocorticoids

- Paraventricular nucleus CRH, ACTH, G – coupled receptors, G stimulatory protein, GDP OFF, GTP On , ADENYLATE CYCLASE ACTIVATES ATP → cAMP ACTIVATES PROTEIN KINASE A (P.K.A)
- P.K.A phosphorylate different enzymes

- Steroid hormones

Cholesterol

Pregnenolone

Progesterone and 17-OH pregnenolone

**17\_OH PREG,**

**DHEA( dehydroxyepiandrosterone)**

**and 17 –OH progesterone**

**Progesterone , 17 –OH**

**progesterone , 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)**

# androgens

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

**Increase libido in male and fascial hair in female**

- Very weak
- Acts as precursors

Male testosterone

Female estrogen

Secondary sex characteristics

## 11 beta hydroxylase deficiency

Deoxycorticosterone

Increase mineralocorticoids

Low renin

## 21 hydroxylase

Decrease mineralocorticoids Na , K ,Bp

Increase androgens

## 17 alpha hydroxylase

Increase mineral Na, K, Bp

Decrease androgens

Cholesterol

MINERALOCORTICOIDS

GLUCOCORTICOIDS

SEX HORMONES

