Adrenocorticosteroids

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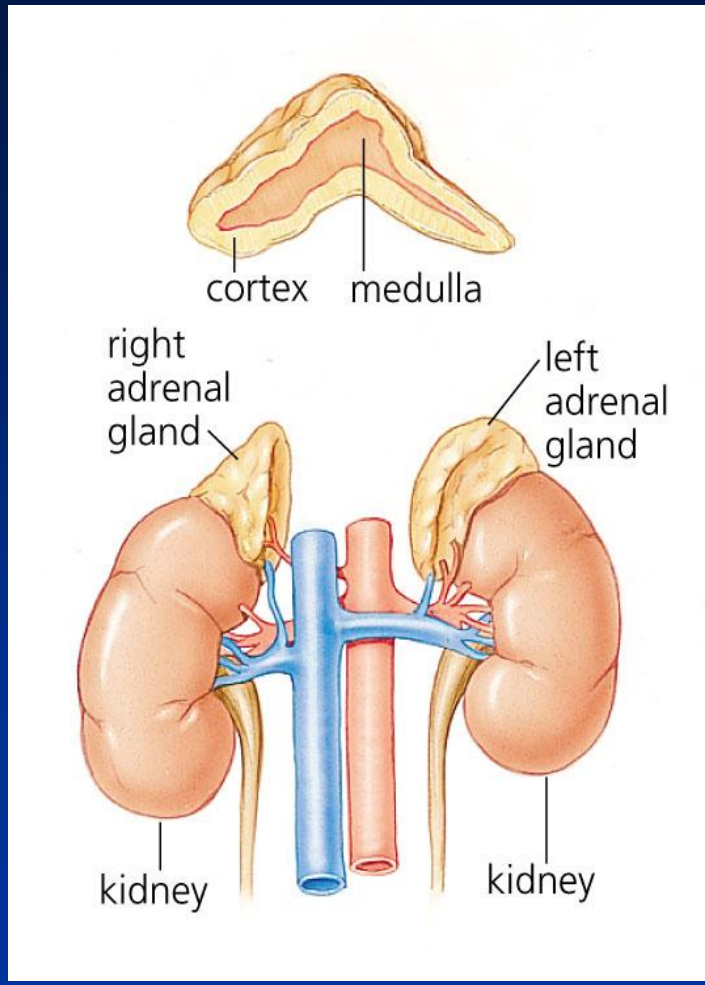
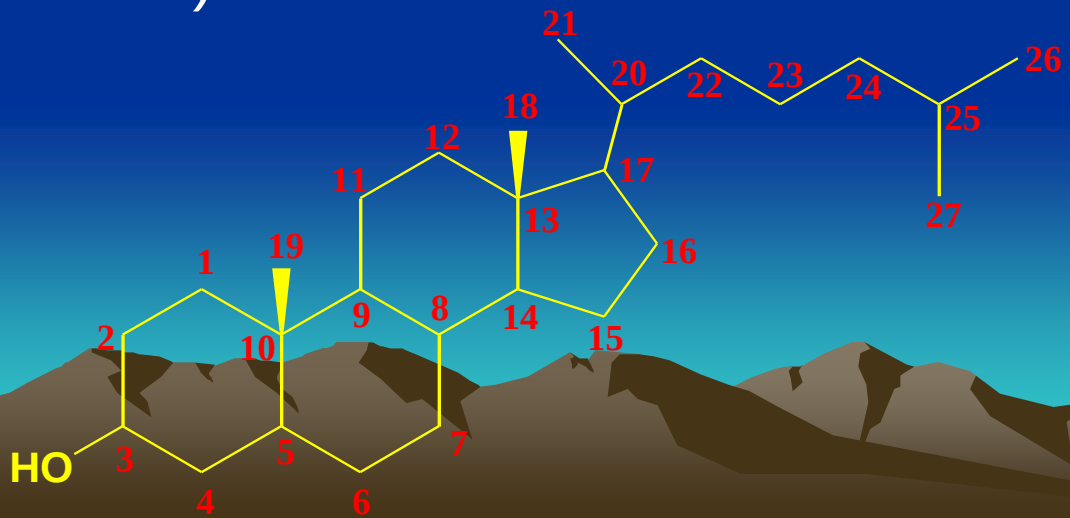
Adrenal cortex – mineralocorticoids, glucocorticoids, adrenal androgens (androstenedione and dehydroepiadrosterone)

Adrenal medulla – catecholamines



These are 21 C compounds, having cyclopentano-perhydro-phenanthrene (steroid) nucleus.



Adrenocorticosteroids

Classification:

A. Mineralocorticoids

B. Glucocorticoids

C. Gonadal Androgens

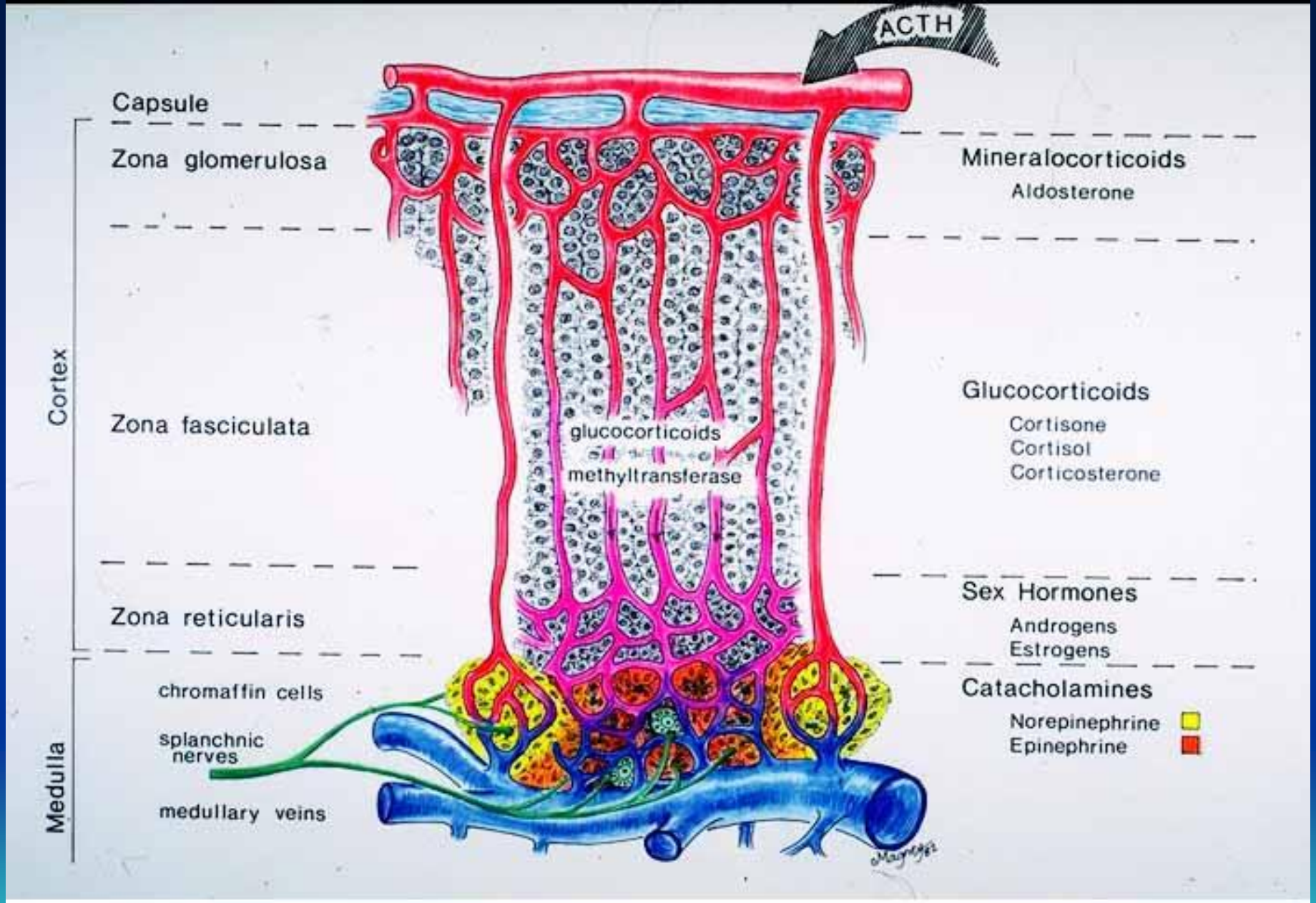
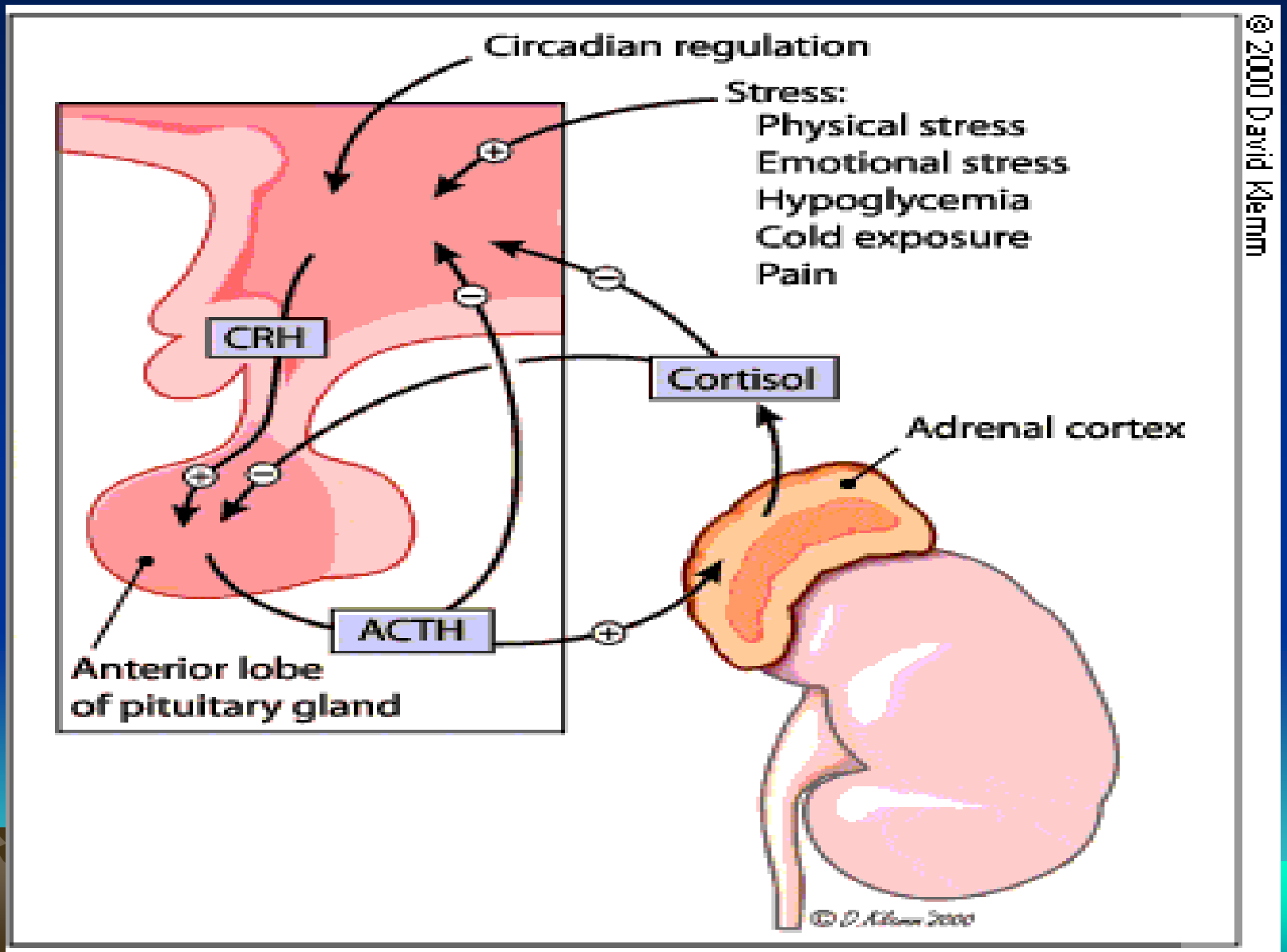
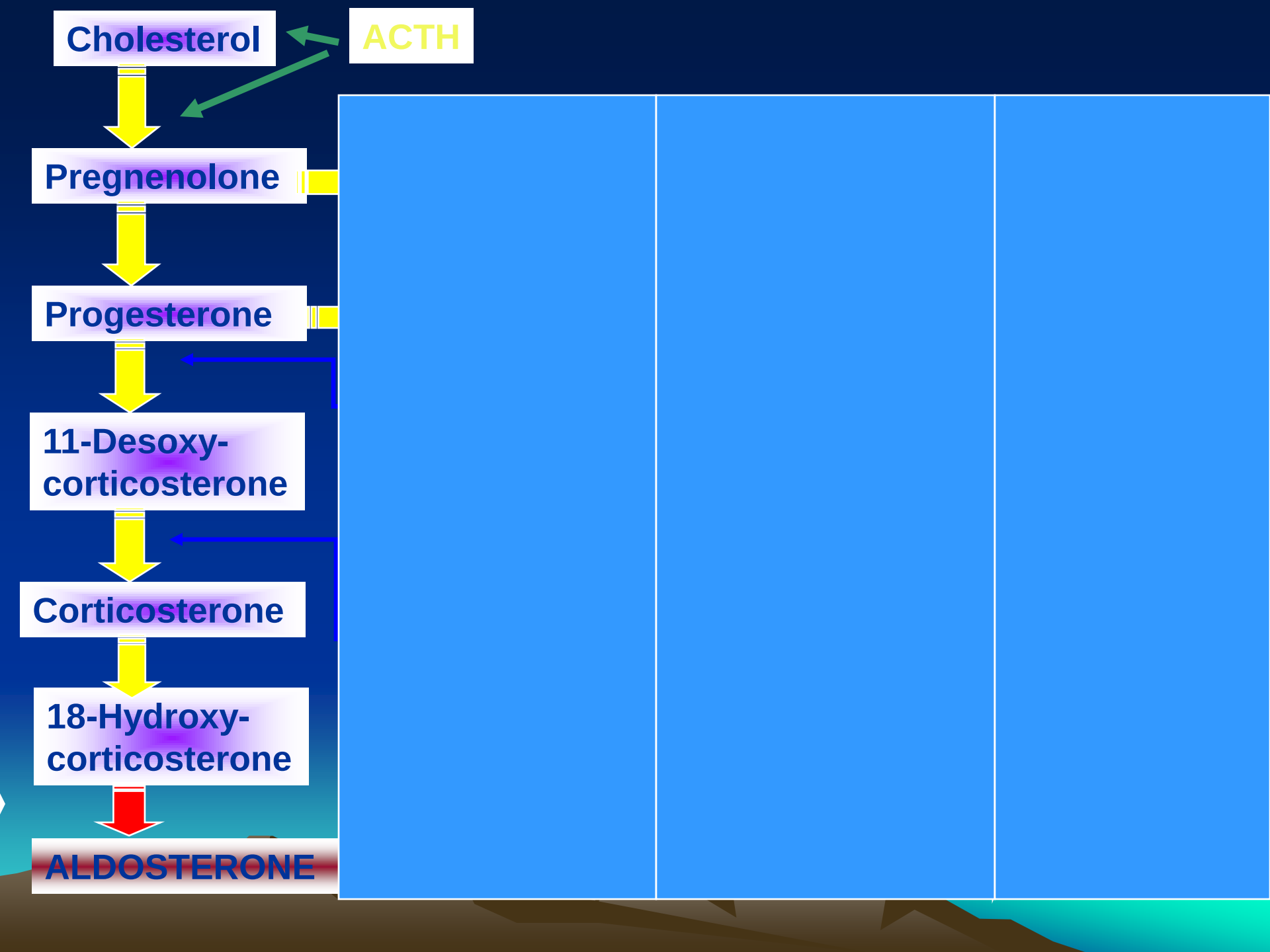


Figure 21. Schematic showing the cellular zonation of the adrenal cortex and blood flow through the cortex to the collecting veins in the medulla.

Regulation of ACTH secretion




Cholesterol
ACTH
Pregnenolone
Progesterone
11-Desoxy-
corticosterone
Corticosterone
18-Hydroxy-
corticosterone
ALDOSTERONE

Pharmacological Actions

Carbohydrates and Proteins Metabolism: (GC)

- Decrease peripheral utilization of glucose.
- Promote storage of glucose in the liver.
- Promote gluconeogenesis.
- Stimulate glucose formation in the brain

Lipids Metabolism: (GC)

- Enhance lipolyses of Triglycerides.
- Redistribution of body fat (Buffalo hump, Moon face, fish mouth).

Electrolyte and Water balance: (MC)

- Enhance reabsorption of Na^+ and water into plasma.
- Increase urinary excretion of K^+ and H^+.
- Increase secretion of renin.

Blood:

- Increase hemoglobin and Red blood cells.
- Decrease white blood cells.

Anti-inflammatory effects:

Suppress inflammations regardless to their cause.

Decrease TNF from phagocytic cells

Decrease IL1 from monocyte-macrophage

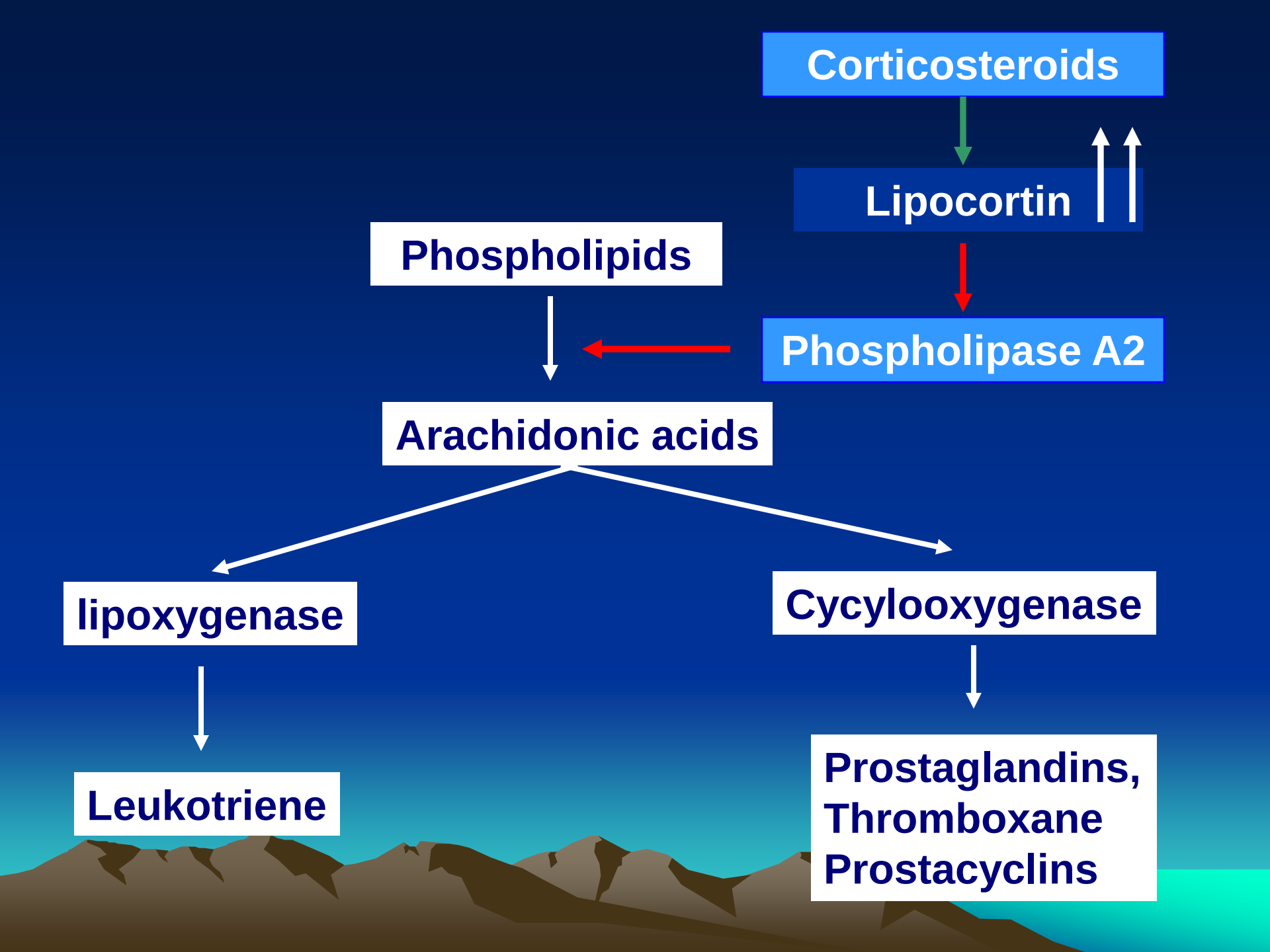
Decrease Expression of cyclooxygenase II

Inhibit Arachidonic acid and metabolites (Prostaglandins and interleukins)

Immunosuppressive Effects:

Decrease immunity as a result of decrease the WBC's.

Suppresses all types of hypersensitivity & allergic phenomenon


Corticosteroids
Lipocortin
Phospholipids
Phospholipase A2
Arachidonic acids
lipoxygenase
Cycylooxygenase
Leukotriene
Prostaglandins,
Thromboxane
Prostacyclins

Stomach:

Aggravate peptic ulcer. May be due to
increase Acid & pepsin secretion
decrease immune response to *H.Pylori*

Calcium metabolism :

Decrease Intestinal absorption
Increase Renal excretion
Excessive loss of calcium from spongy bones (*e.g., vertebrae, ribs etc*)

Mechanism of action at cellular level

Corticosteroids ---→ bind to cytoplasmic receptor --→ complex migrated into nucleus and bind with nucleus--→ transcription of specific m-RNA --→ regulation of protein synthesis.

Classification of Adrenocorticosteroids

I. **Short acting glucocorticoids**

Hydrocortisone (cortisol), Cortisone

II. **Intermediate-acting glucocorticoids**

Prednisolone, Methylprednisolone, Triamcinolone

III. Long-acting glucocorticoids

Betamethasone, Dexamathasone

IV. Mineralocorticoids

Aldosterone, Fludrocortisone, desoxycorticosterone acetate

Therapeutic Uses:

A. Replacement Therapy

1. Acute adrenal insufficiency
disorder of the adrenal gland, abrupt withdrawal of glucocorticoids at high doses or prolonged use.

2. **Chronic Adrenal Insufficiency (Addison's disease)**
hyperpigmentation, wt. loss, inability to maintain fasting blood sugar, weakness, fatigue, hypotension.

3. Congenital Adrenal Hyperplasia
Genetic disorder due to deficiency of enzymes required for the biosynthesis of corticosteroid (21 β hydroxylase)

B. Non endocrine disease

1. Arthritides:

Rheumatoid arthritis, osteoarthritis – suppress the disease and minimize resultant tissue damage.

2. Allergic reaction: anaphylaxis, edema, urticaria.

3. Bronchial Asthma: status asthmaticus

4. Infectious Disease

5. Inflammatory ocular disease: allergic conjunctivitis, iritis, keratitis.

6. Skin diseases – inflammatory dermatitis

7. Cerebral edema

9. Organ transplantation: Combined with other immunosuppressants

Adverse effects

- Due to Prolonged use:
  - Fluid and electrolyte retention, edema, hypokalemia acidosis and hypertension.
  - Hyperglycemia and glucosuria.
  - Peptic ulcer
  - Muscular weakness - Myopathy
  - Increased susceptibility to infections-Immune response suppression
  - Osteoporoses
  - Psychiatric disturbances

Contraindications

- peptic ulcer,
- heart disease,
- infections,
- psychoses,
- diabetes,
- osteoporosis


THANK YOU