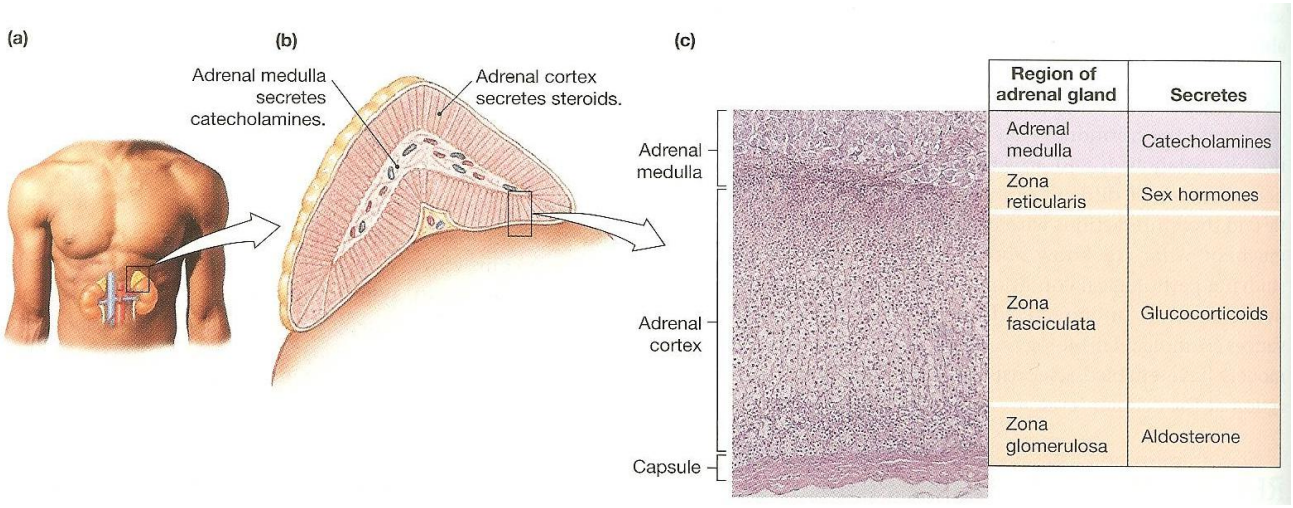
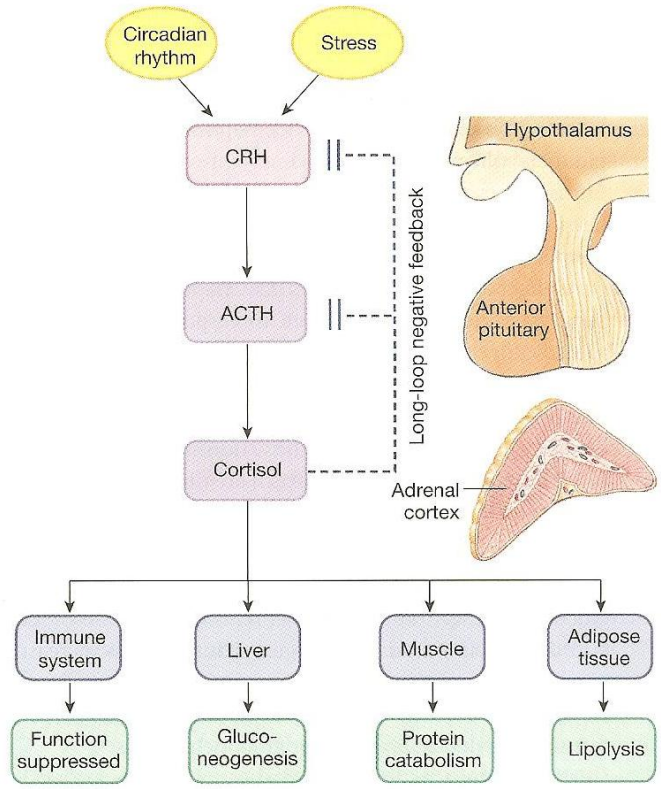
ADRENAL GLUCOCORTICOIDS (Cortisol)

I. Adrenal Gland Secretions
   a. Adrenal Medulla
      i. Secretes Catecholamine's (Epinephrine)
   b. Adrenal Cortex
      i. Secrets Steroid hormones
      ii. Cortisol is the main glucocorticoid secreted by the adrenal cortex



Region of adrenal gland	Secretes
Adrenal medulla	Catecholamines
Zona reticularis	Sex hormones
Zona fasciculata	Glucocorticoids
Zona glomerulosa	Aldosterone

II. Cortisol Secretion is Controlled by CRH ACTH
   a. Control Pathway of Cortisol secretion is known as Hypothalamic-pituitary-adrenal (HPA) pathway
   b. CRH: Corticotropin-releasing hormone
      i. Secreted into hypothalamic-hypophyseal portal system to be transported into anterior pituitary gland (tropic gland)
   c. ACTH: Adrenocorticotropic Hormone
      i. Activated by CRH presence in anterior pituitary
      ii. ACTH acts on the adrenal cortex to promote synthesis and release of Cortisol
   d. Cortisol
      i. Acts as a Long Loop Negative Feedback signal, inhibiting CRH and ACTH secretions when adequate Cortisol levels are achieved
      ii. Cortisol secretion peaks in the morning and diminishes at night
      iii. Cortisol secretion increases with stress



III. Cortisol effect's on Tissue

a. Most important metabolic effect of Cortisol is its protective effect against *hypoglycemia*
   i. In the absence of Cortisol, glucagon (peptide hormone that allows glucose secretion from glycogen) is unable to respond to low levels of glucose

b. Promotes Gluconeogenesis
   i. Gluconeogenesis of the liver
   ii. Increases systemic blood glucose concentrations by having the liver produce/release excess glucose

c. Cortisol Causes Breakdown of Skeletal Muscle Proteins
   i. Breaks down skeletal muscle proteins to provide substrates for Gluconeogenesis

d. Enhances Lipolysis
   i. Enhances adipose breakdown so free fatty acids are available to peripheral tissues for energy use

e. Suppresses the Immune System

f. Causes Negative Calcium Balance
   i. Decreases intestinal calcium absorption
   ii. Increases renal calcium excretion
   iii. Causing calcium loss from body
   iv. Catabolic in bone tissue; breaking down the calcified bone matrix

g. Brain Function
   i. Excess or deficiency causes mood swings or memory/learning altercations

Cortisol	
Organ/System	Effect
Immune system (including thymus)	Decreases
Plasma Glucose	Promotes/Increases
Muscle	Catabolism
Adipose	Catabolism

IV. Exogenous Stimulation of Glucocorticoid Pathway

a. Exogenous Cortisol
   i. Causes atrophy of
      1. Adrenal Cortex
      2. Anterior Pituitary

[Hypothalamus probably not effected]

b. Exogenous ACTH
   i. Causes atrophy of
      1. Anterior Pituitary

[Adrenal Cortex does not atrophy because it is still being stimulated by Cortisol, even though its exogenous; Hypothalamus probably not effected]

V. Hypercortisolism

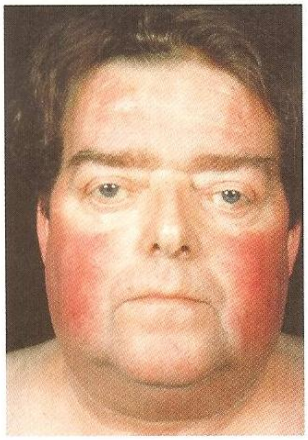
Definition: Ecess Cortisol in the body

Symptoms: Excess gluconeogensis causes hyperglycemia (diabetes like symptoms), tissue wasting, excess Cortisol deposits in trunk and face

Classic Symptoms: Thin arms and legs; obesity in the trunk, and a moon face with plum red cheeks

Cushing Disease: Hypercortisolism from any cause

a. Hyperadrenocorticism (Primary Disorder)
   i. Adrenal tumor that autonomously secretes Cortisol
   ii. Not under control of pituitary ACTH
   iii. Primary Hypercortisolism
      1. Causes long negative feedback loop to shut off CRH and ACTH



b. Cushing Syndrome
   i. Pituitary tumor that autonomously secretes ACTH
   ii. Excess ACTH thus causing over-secretion of Cortisol
   iii. Second Hypercortisolism

c. Ectopic ACTH Syndrome
   i. Non-pituitary ACTH producing tumor

VI. Hypocortisolism

Definition: Hyposecretion of Cortisol

a. Addison's Disease
   i. Hyposecretion of all adrenal steroid hormones
   ii. Usually induced by autoimmune destruction of adrenal cortex