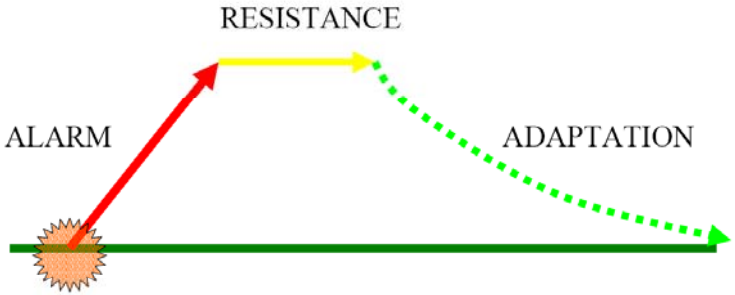
Chap. 8. Stress

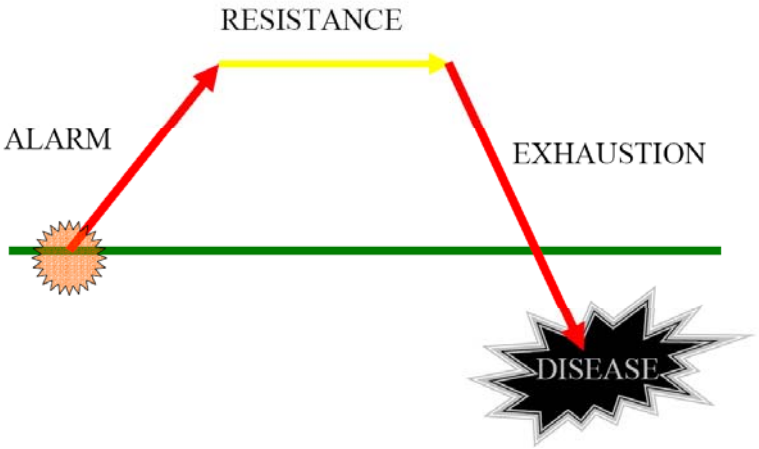
Any external stimulus that threatens homeostasis

Acute stress: enhances brain function and immune system
Chronic stress: harmful to body. stress-related disorders

Adaptation to stress

(Person's susceptibility)





Definition of Stress

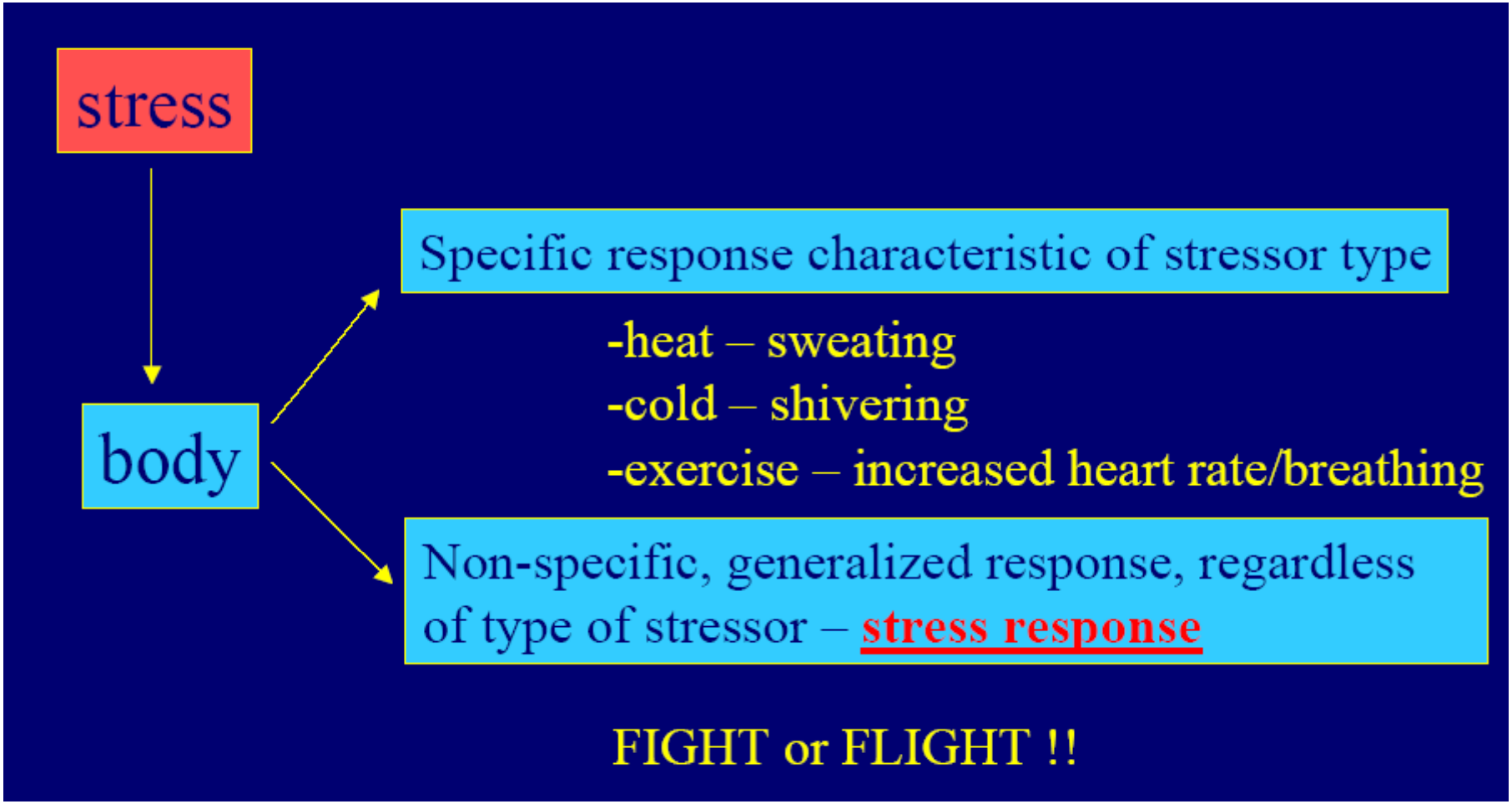
The generalized, non-specific response of the body to any factor that threatens to overwhelm the body's ability to maintain homeostasis

Stressors include:

-physical (heat, cold)
-chemical (no oxygen)
-physiological (exercise)
-psyochological, emotional (fear, anxiety)
-social (personal conflicts)

Physiological **reactions**:

-faster and shallower breathing
-increased heart rate
-shut-down of immune systems
-disrupted digestion
-FIGHT OR FLIGHT

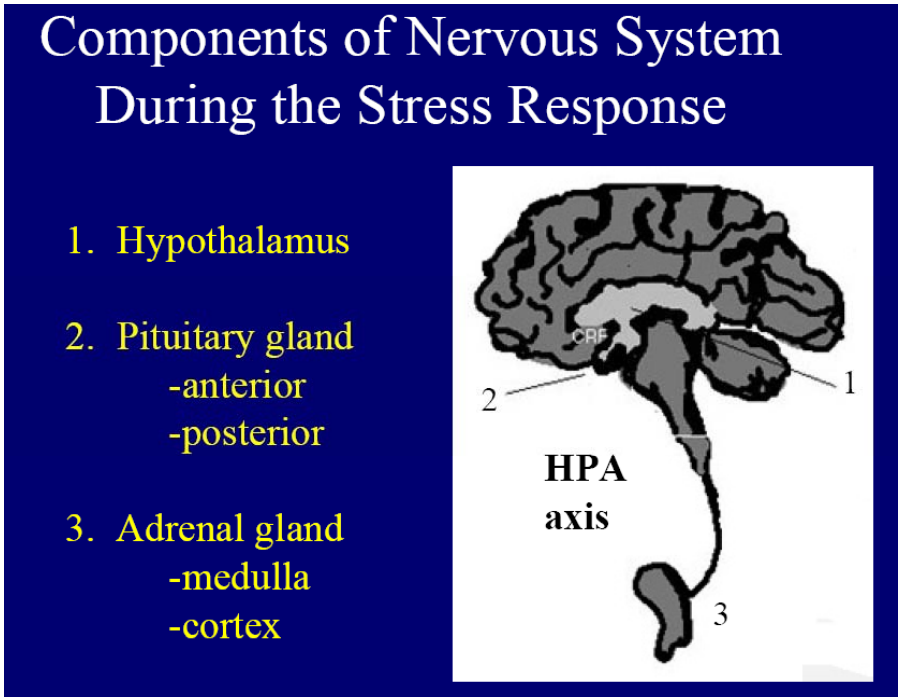

stress
body
Specific response characteristic of stressor type
-heat – sweating
-cold – shivering
-exercise – increased heart rate/breathing
Non-specific, generalized response, regardless of type of stressor – stress response
FIGHT or FLIGHT !!

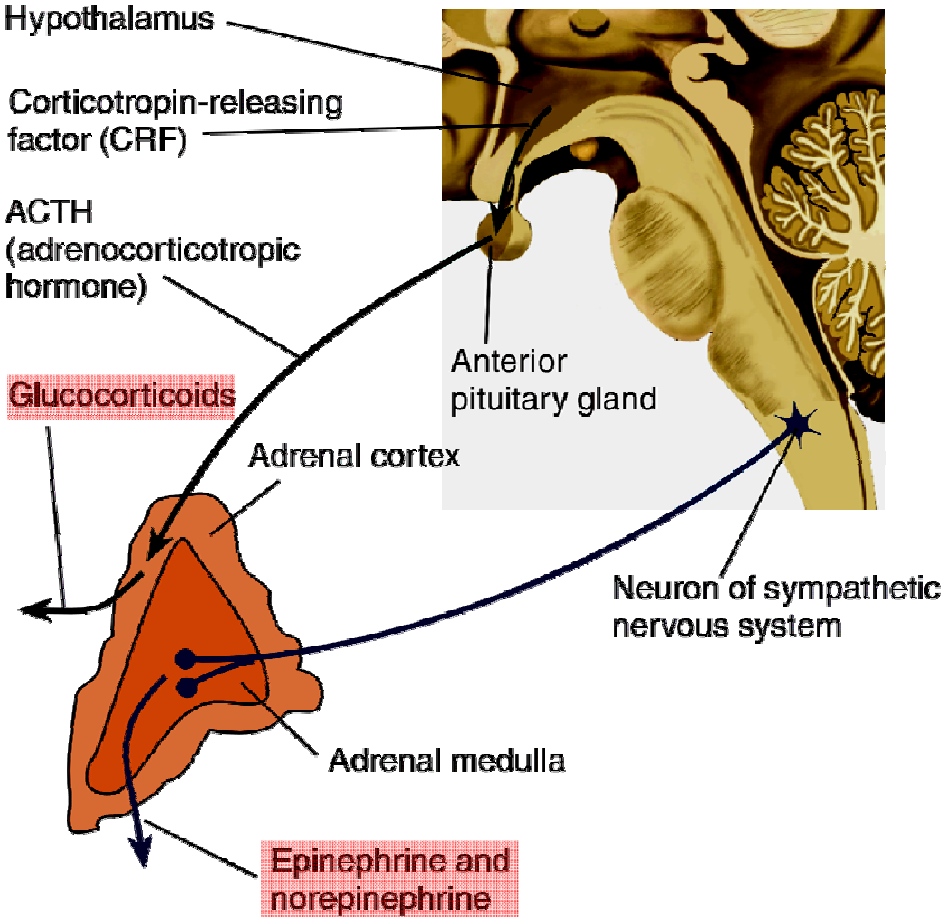
The immediate response to stress in brain

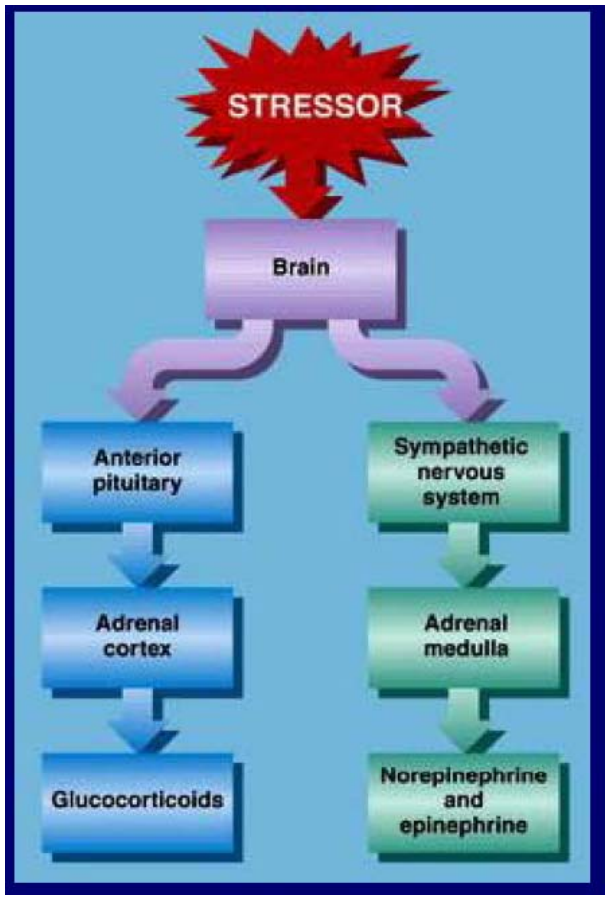
The voluntary nervous system,
which sends messages to muscles so that we may respond to sensory information.

The autonomic nervous system.
It combines the sympathetic or emergency branch, which gets us going in emergencies,
and the parasympathetic or calming branch, which keeps the body's maintenance systems, such as digestion, in order and calms the body's responses to the emergency branch.

The neuroendocrine system,
which affect bodily processes such as metabolic rate and sexual functions

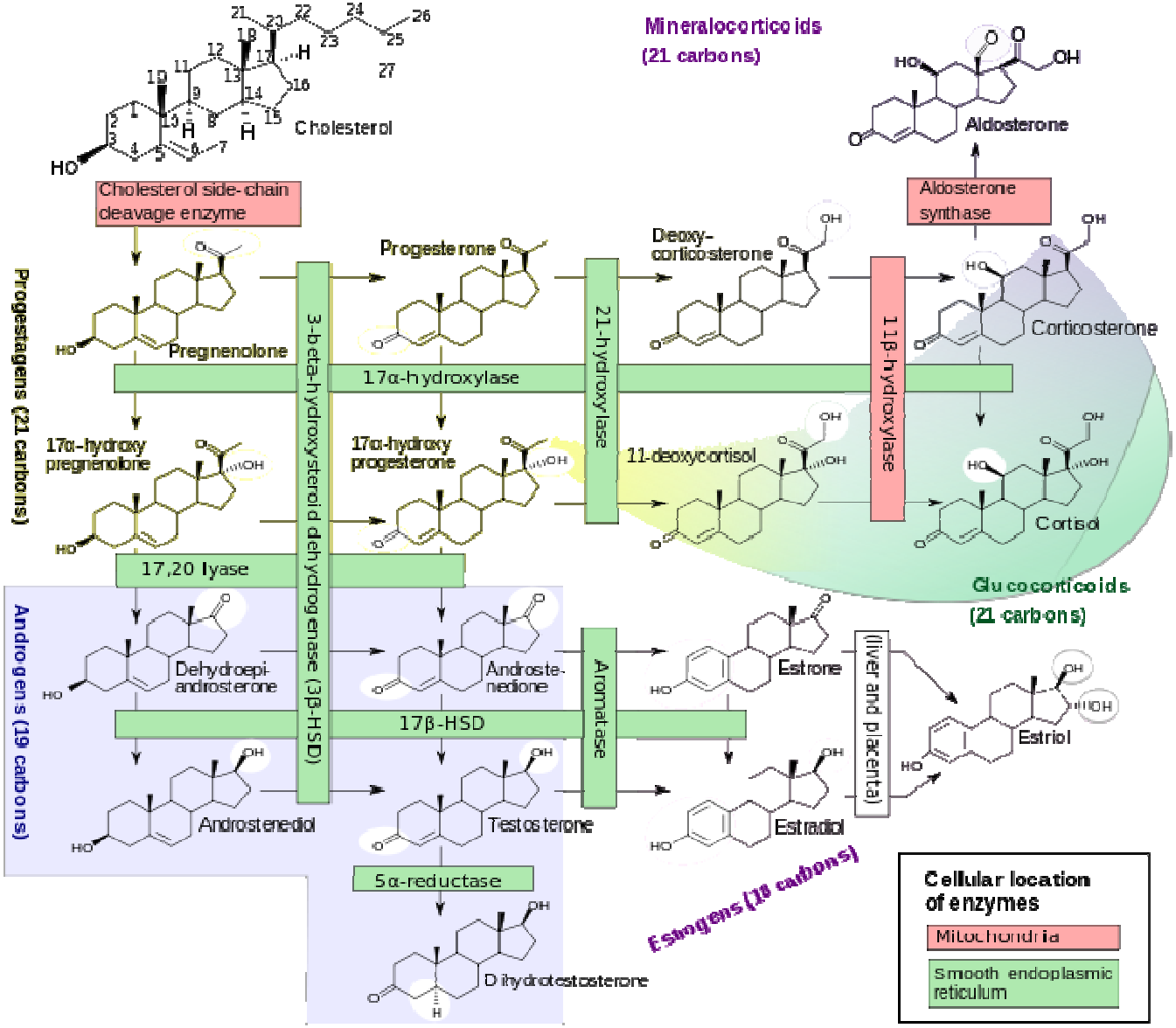


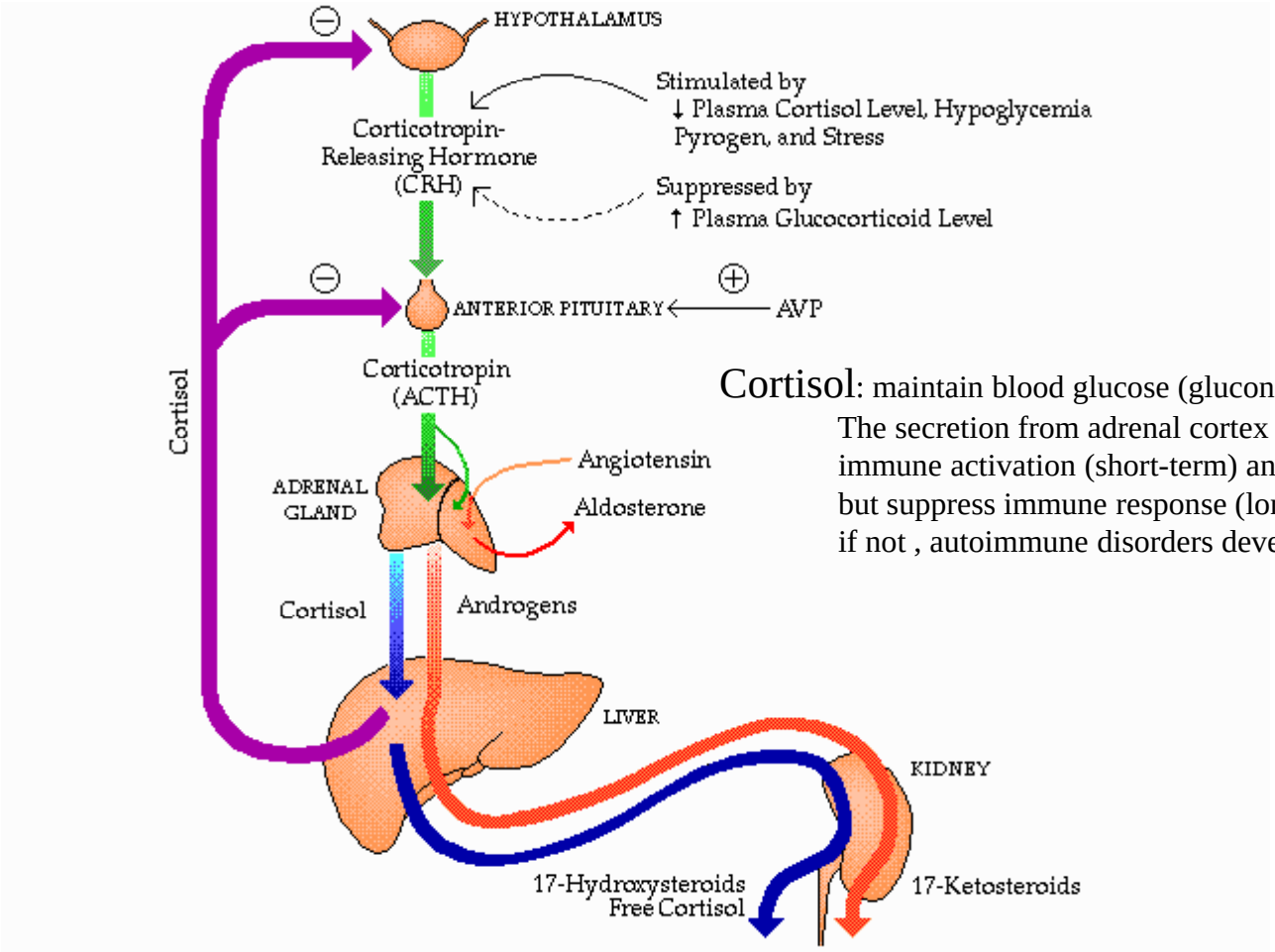

Hypothalamus
Corticotropin-releasing factor (CRF)
ACTH (adrenocorticotropic hormone)
Glucocorticoids
Anterior pituitary gland
Adrenal cortex
Neuron of sympathetic nervous system
Adrenal medulla
Epinephrine and norepinephrine


STRESSOR
Brain
Anterior pituitary
Sympathetic nervous system
Adrenal cortex
Adrenal medulla
Glucocorticoids
Norepinephrine and epinephrine

Steroid hormones: 5 groups by the receptors to which they bind

Glucocorticoids
Mineralocorticoids
Androgens
Estrogens
Progesterons
(vitamin D, a steroid alcohol)





Cortisol: maintain blood glucose (gluconeogenesis in liver, fat breakdown in adipose)

The secretion from adrenal cortex to blood is regulated by CRH and ACTH

immune activation (short-term) and antiinflammatory

but suppress immune response (long-term)

if not , autoimmune disorders develop

Mineralocorticoid: The primary endogenous mineralocorticoid is aldosterone, although a number of other endogenous hormones (including progesterone and deoxycorticosterone) have mineralocorticoid function.

Aldosterone acts on the kidneys to provide active reabsorption of sodium and an associated passive reabsorption of water, as well as the active secretion of potassium in the principal cells of the cortical collecting tubule and active secretion of protons via proton ATPases in the lumenal membrane of the intercalated cells of the collecting tubule. This in turn results in an increase of blood pressure and blood volume.

Stress-related disorders

Immune system's resistance or susceptibility to disease.

Cardiovascular damage

Gastrointestinal problems.

Stress can also contribute to some respiratory disorders such as asthma

In addition, emotional stress can cause or aggravate many skin disorders.

Major traumatic events such as accidents, catastrophes, or battle experiences may bring on a condition called **post-traumatic stress disorder**. Once known under war conditions as *shell shock* or *battle fatigue*, post-traumatic stress disorder gained its current name after it appeared in many veterans returning from the Vietnam War (1959-1975) as they tried to readjust to civilian life. Symptoms may appear long after the initial trauma. These include reexperiencing the trauma through disturbing nightmares and memories, emotional numbness, nervous irritability, depression, and sleep difficulties.

http://en.wikipedia.org/wiki/Stress-related_disorders

Cushing’s syndrome

caused by prolonged exposure of the body's tissues to high levels of the cortisol.
Sometimes called "hypercortisolism,"

relatively rare and most commonly affects adults aged 20 -50. An estimated 10-15 of every million people are affected each year.

Symptoms vary
most people have upper body obesity, rounded face, increased fat around the neck, and thinning arms and legs.

Children tend to be obese with slowed growth rates.