

Adrenal Glands (Human): Location, Structure, and Function

Location and structure

The adrenal glands (a) are situated above each kidney (b). Each adrenal gland is divided into an outer region called the adrenal cortex (c) and an inner region called the adrenal medulla (d). The cortex and medulla secrete different hormones.

Stimulation

- The adrenal cortex (c) is affected by ACTH from the anterior pituitary (e).
- The adrenal medulla (d) is stimulated by nerve impulses that originate in the hypothalamus (f) and travel through the brain stem, spinal cord (g), and sympathetic nerves (h).

Functions

The adrenal cortex

This releases several hormones.

- Mineralocorticoids are secreted by the outermost region of the cortex. They help regulate blood volume and the concentration of minerals in the blood. The main mineralocorticoid is aldosterone, which maintains sodium and potassium levels in the body.
- Glucocorticoids are produced by the middle and inner layers of the cortex. These promote normal cell function and promote the conversion of fats (and sometimes proteins) into glucose; for this reason they are sometimes called hyperglycemic hormones.
- Androgens and estrogens are sex hormones produced by the middle and innermost layers of the cortex. Androgens are male sex hormones and estrogens are female. The effect of these hormones is usually masked by hormones released from the ovaries and testes.

The adrenal medulla

This produces:

- epinephrine (adrenaline) and norepinephrine, both secreted in response to stress. Epinephrine stimulates the heart; norepinephrine constricts blood vessels. Together they increase blood pressure, and the rate and force of heart contractions.

