

• **both statements are true**

The adrenal glands are small, yellowish organs that rest on the upper poles of the kidneys in the back of the abdomen. The right adrenal gland is pyramidal, whereas the left one is more crescentic, extending toward the hilum of the kidney.

Each adrenal gland is composed of 2 distinct parts: the adrenal **cortex** and the adrenal **medulla**. The **cortex** is divided into **3 zones**. From exterior to interior, these are the zona glomerulosa, the zona fasciculata, and the zona reticularis.

- **Zona Glomerulosa:** is the outer layer of the adrenal cortex. This layer is responsible for making **mineralocorticoids**. Mineralocorticoids help the body regulate salt and fluid levels, and maintain normal blood circulation. **Aldosterone** is the most important mineralocorticoid made by the adrenal glands.

- **Zona Fasciculata:** this middle layer of the adrenal cortex produces **glucocorticoids**. Glucocorticoids regulate sugar levels, maintain normal blood pressure, and help you respond to stress and illness. **Cortisol** is the most important glucocorticoid made by the adrenal glands.

- **Zona Reticularis:** is the innermost layer of the adrenal cortex. This layer is responsible for producing **androgens** (male hormones). Androgens play an important role in the development of the genitals and the development of sexual characteristics such as armpit hair, genital hair, and adult-type body odor. They also help to speed up growth. Both males and females normally produce androgens. The androgens produced in greatest quantity by the adrenal cortex are “dehydroepiandrosterone” (**DHEA**) and “androstenedione”. A portion of these hormones is then made into “testosterone”, which is the most potent androgen.

Remember: The **medulla** of the adrenal gland really is modified nervous tissue and functions in a manner similar to **postganglionic sympathetic** cells - stimulation of the **adrenal medulla** causes the release of large quantities of **epinephrine** and **norepinephrine**. The same effects are also caused by direct sympathetic stimulation, **except** the effects last longer when the medulla secretes the hormones. With or without one or the other (medulla or sympathetic nerves), the organs would still be stimulated.