

## Metabolic & Endocrine Health

The endocrine system is the collection of glands, each of which secretes different types of hormones that regulate metabolism, growth and development, tissue function, sexual function, reproduction, sleep and mood, among other things.

The endocrine system is made of eight major glands, which are groups of cells that produce and secrete chemicals. A gland selects and removes materials from the blood, processes them, and secretes the finished chemical product for use somewhere in the body. Almost every organ and cell in the body is affected by the endocrine system.

A group of glands that signal each other in sequence are usually referred to as an axis. One example is the hypothalamic-pituitary-adrenal axis, which coordinates interactions among the hypothalamus, the pituitary gland and the adrenal, also called "suprarenal" glands, which are small, conical organs on top of the kidneys.

The endocrine system sends signals throughout the body, much like the nervous system, but unlike the immediate responses triggered by the nervous system, the effects can take a few hours or weeks. Hormones released from endocrine tissue into the bloodstream where they travel to target tissue to elicit a response.

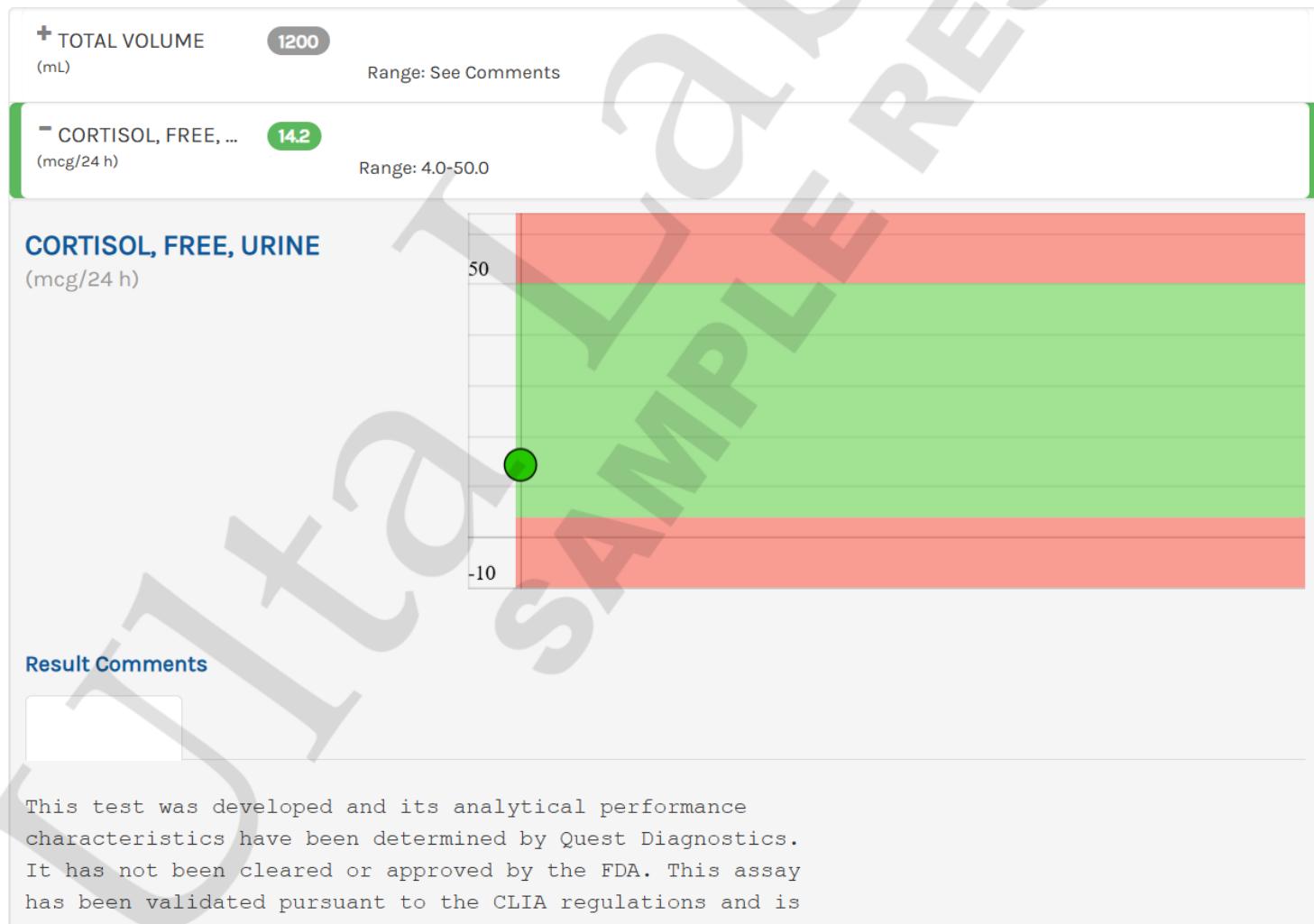
Endocrine glands are vascular and generally do not have ducts, using intracellular vacuoles, or granules, to store hormones. They differ from, exocrine glands – salivary glands, sweat glands and glands within the gastrointestinal tract – which have ducts or a hollow lumen.

The endocrine system gets some help from organs such as the kidney, liver, heart and gonads, which have secondary endocrine functions. The kidney, for example, secretes hormones such as erythropoietin and renin.

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### Metabolic Hormones

Hormones formed in the endocrine system that are involved in controlling the rate and direction of metabolism.



used for clinical purposes.

## — Kidney & Urinary Health

The kidney and urinary tract make up the urinary / renal system that cleanses the blood and rids the body of excess water and waste in the form of urine. The urinary tract consists of two kidneys, two ureters (one from each kidney), tubes that drain urine from the kidneys into the bladder (a storage sac), and the urethra. Muscles help control the release of urine from the bladder.

The kidneys receive blood from the aorta, filter it, and send it back to the heart with the right balance of chemicals and fluid for use throughout the body. The urine created by the kidneys is moved out of the body via the urinary tract.

The kidneys control the quantity and quality of fluids within the body. They also produce hormones and vitamins that direct cell activities in many organs; the hormone renin, for example, helps control blood pressure. When the kidneys are not working properly, waste products and fluid can build up to dangerous levels, creating a life-threatening situation. Among the important substances the kidneys help to control are sodium, potassium, chloride, bicarbonate ( $\text{HCO}_3^-$ ), pH, calcium, phosphorus, and magnesium.

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## Kidney Function Metabolic

