

The ENDOCRINE SYSTEM

Our bodies are marvels of self-regulation. There are behind-the-scenes mechanisms of coordination of our internal chemical environment. Our Endocrine System, a mechanism of coordination of our chemical environment, uses hormones and chemical messengers produced in specialized cell groups—the glands.

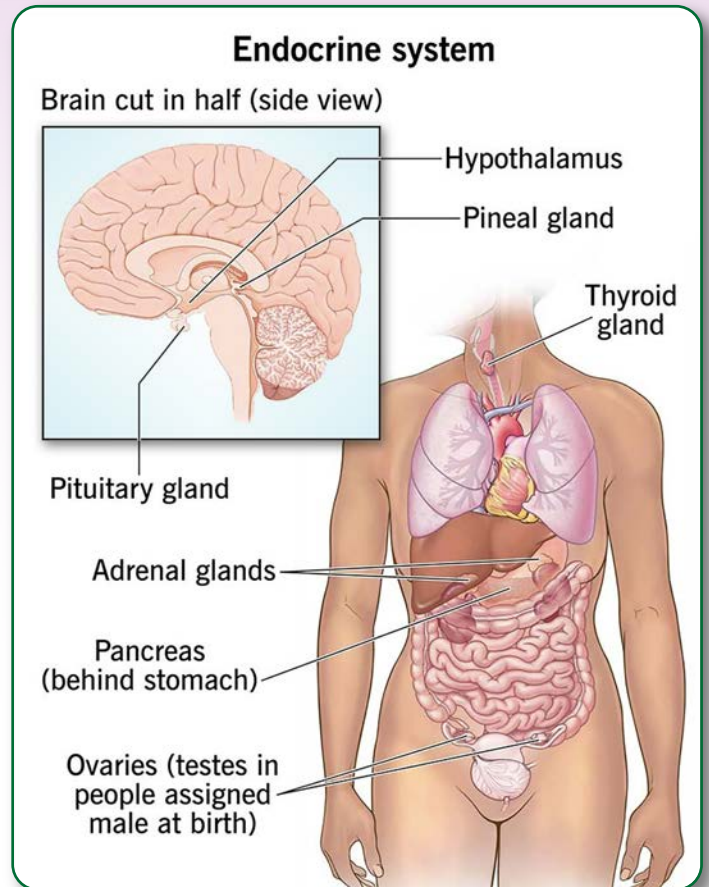
The hormones, when released, enter the bloodstream, and travel to all parts of the body. Hormones fit like lock-and-key into “target organs,” which respond in their specific ways. The overall result is internal balance, individual wellness, and species survival.

Our Endocrine System works together with our Nervous System for internal balance and coordination and successful interaction with the world. The Nervous System uses electrical signals and is a “moment-to-moment” control system. The Endocrine System uses chemical signals and is an hour-by-hour control system.

There is a meeting point in the body between the Brain/Nervous System and Endocrine System. It is the Hypothalamus-Pituitary Complex, located on the underside of the brain (see illustration). The Hypothalamus is an almond-sized extension of the brain that is a dense gathering of nerves, and functions in a chemical-analysis context. It responds to tiny changes in arriving blood, and makes computer-like adjustments to its own hormones. Hypothalamic hormones progress to the adjoining Pituitary Gland through an internal portal system.

The Pituitary is sometimes referred to as the “Master Endocrine Gland” because it has hormones and “releasing factors” that can “direct” all the other Endocrine glands. The other Endocrine glands are Thyroid, Adrenal, Pancreas, Ovaries, and Testes. They make specific hormones with specific effects.

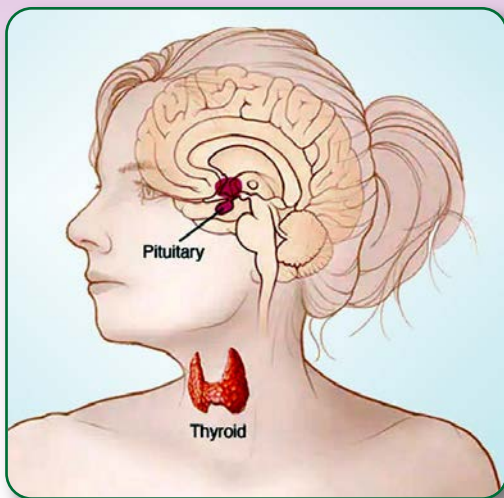
The Thyroid hormones, T3 and T4, affect metabolic rate: energy-related chemical reactions and consumption of cellular fuel (output of energy). Signs of overactive thyroid are: mildly elevated body temperature, rapid heart rate, sweatiness, weight loss.



The Pancreas is the largest Endocrine organ. It is about the size of a small banana. The main Pancreatic hormone is Insulin. The function of Insulin is to help cells use glucose (blood sugar) for energy. It stimulates glucose uptake into fat cells, muscle cells, and liver cells. The other function of the pancreas is to produce digestive enzymes and secrete them directly into the small intestine through a duct. Thus, it is a dual gland.



Ovarian hormones are strongly influenced by Follicle-Stimulating Hormone (FSH) and Luteinizing Hormone (LH), which are produced by the Pituitary gland. They control the Ovarian hormones, Estrogen and Progesterone, which preside over the menstrual cycle, ovulation, female sex characteristics, pregnancy, and lactation.



The same Pituitary hormones, FSH and LH, stimulate the production of testosterone and sperm in the testes to instigate male sexual characteristics (after puberty).

Adrenal hormones, like cortisol, affect the Stress Response, inflammation, injury repair, and blood pressure. Another Pituitary hormone is Growth Hormone, which affects the growth of bones, and is prominent in adolescence.

All of the Endocrine functions are crucial to our well-being and survival as a species. The Endocrine System works with the Autonomic Nervous System to keep our internal environment in the “Goldilocks Zone”—just right! If we feel well, we can thank these two remarkable systems.

How can we best take care of our Endocrine System?

- 1. Balanced Diet:** Eat a well-rounded diet rich in fruits, vegetables, whole grains, lean proteins, and healthy fats.
- 2. Regular Exercise:** Engage in regular physical activity: including both aerobic and strength-training exercise.
- 3. Stay Hydrated:** Drink plenty of water through-

out the day to maintain proper hydration: 6–8 glasses per day.

4. Manage Stress: Chronic stress can disrupt hormone levels. Practice stress-reducing techniques such as deep breathing, meditation, yoga, and spending time with Nature.

5. Get Enough Sleep: Aim for 7 to 9 hours of quality sleep per night. Poor sleep can negatively affect hormone production and regulation.

6. Regular Check-Ups:

Get annual medical and gynecologic exams.

7. Avoid Smoking, Excessive Alcohol, and Caffeine. These can have negative effects on hormone balance.

In summary, like the other bodily systems, the Endocrine System is doing a multi-decade dance, choreographed by DNA, to keep us well. It is a gift of Nature, through our ancestors and the Tree of Life. ■

Namaste!

Dr. Shapiro is a career clinic physician who has utilized relaxation techniques with many of his patients. Prior articles



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