

The ENDOCRINE System

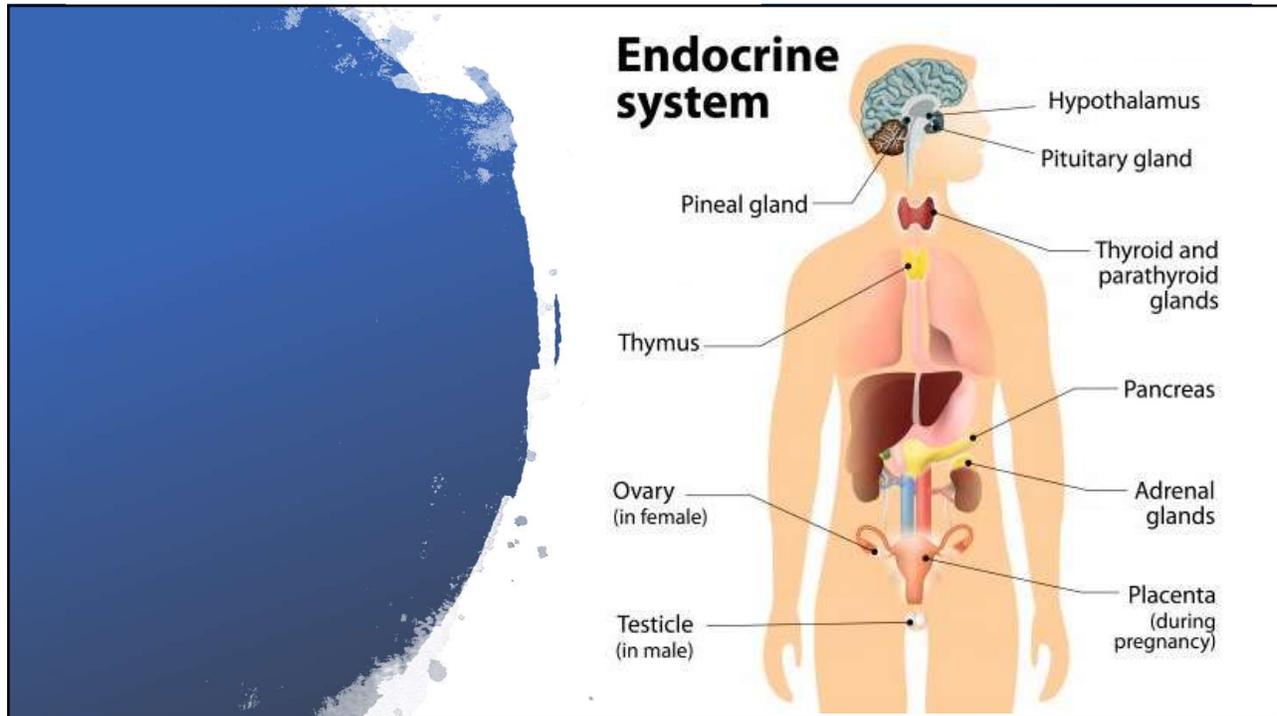
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The endocrine system is a series of glands that produce and secrete hormones that the body uses for a wide range of functions:

1. **Orchestration and Regulation** - hypothalamus, pituitary, pineal glands in brain
2. **Metabolic Rate** - thyroid, parathyroid, thymus - (skin and kidneys for Vit D activity)
3. **Energy Metabolism** - pancreas, liver, adrenal cortex, fat cells, stomach, intestines
4. **Adrenal function** - adrenal glands, kidneys
5. **Reproduction** - female ovaries and uterus, male testes and prostate, breast tissue

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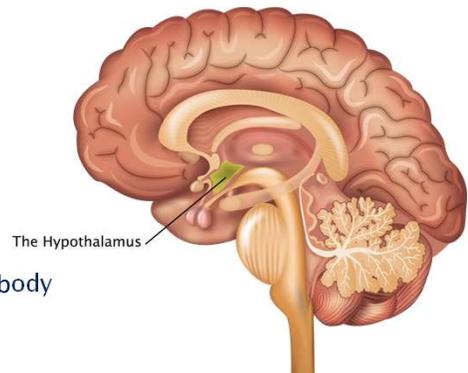


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1. Orchestration and Regulation

Hypothalamus

- Portion of the brain that maintains body's homeostasis
- Link between the endocrine and nervous systems
- produces releasing and inhibiting hormones, which stop and start the production of other hormones throughout the body
- Stimulates or inhibits key bodily processes:
 - Heart rate and blood pressure
 - Body temperature
 - Fluid and electrolyte balance, including thirst
 - Appetite and body weight
 - Glandular secretions of the stomach and intestines
 - Sleep cycles
 - Production of substances that influence the pituitary gland to release hormones



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Relationship between Hypothalamus releasing hormones and hormones they stimulate

Releasing Hormone	Stimulated Hormone
Thyrotrophin-releasing hormone (TRH)	Stimulates TSH and prolactin release from pituitary
Corticotrophin-releasing hormone (CRH)	Stimulates ACTH release from pituitary
Gonadotrophin-releasing hormone (GnRH)	Stimulates release of LH and FSH from pituitary
Growth hormone-releasing hormone (GHRH)	Stimulates secretion of growth hormone from pituitary
Somatostatin or somatotropin release inhibiting hormone	Inhibit secretion of growth hormone from anterior pituitary
Dopamine or prolactin-inhibiting factor (PIF)	Inhibits secretion of prolactin

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1. Orchestration and Regulation cont.

Pituitary Gland

- functions as directed by the Hypothalamus
- Endocrine system's "Master gland" – hormones help regulate the functions of other endocrine glands
- two parts:
 - Anterior lobe

The anterior lobe releases hormones upon receiving releasing or inhibiting hormones from the hypothalamus. These hypothalamic hormones tell the anterior lobe whether to release more of a specific hormone or stop production of the hormone.
 - Posterior lobe

The posterior lobe contains the ends of nerve cells coming from the hypothalamus. The hypothalamus sends hormones directly to the posterior lobe via these nerves, and then the pituitary gland releases them.

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Seven Stimulating Hormones of the Anterior Pituitary

Stimulating Hormone	Description
Thyroid stimulating hormone (TSH)	Stimulates the thyroid to produce and secrete thyroid hormones
Follicle-stimulating hormone (FSH)	Promotes follicular development and estrogen synthesis in ovaries; sperm maturation-testes
Luteinizing hormone (LH)	Stimulates ovulation, formation of corpus luteum, estrogen and progesterone synthesis in ovaries. Stimulates testosterone in testes.
Adrenocorticotropic hormone (ACTH)	Stimulates synthesis and secretion of adrenal cortical hormones (cortisol, androgens, aldosterone).
Melanocyte-stimulating hormone (MSH)	Stimulates melanin synthesis.
Growth hormone (GH)	Stimulates growth, cell reproduction, cell regeneration.
Prolactin	Stimulates milk production

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Two Pass-through Hormones of the Posterior Pituitary

Releasing Hormone	Stimulated Hormone
Oxytocin	Stimulates milk production and uterine contractions. Involved in pair bonding, arousal.
Vasopressin (ADH or antidiuretic hormone)	Stimulates water reabsorption in kidneys, constricts arterioles.

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Importance of Manganese on Pituitary Function

Manganese is required for normal thyroid function and is involved in the formation of thyroxin. Tissue mineral analysis (TMA) studies have revealed low manganese levels in hypothyroid patients. Due to the antagonistic effect of insulin, parathyroid hormone (PTH), and estrogen on thyroid function, absorption or utilization of manganese may be impaired when levels of these hormones are elevated.

The adrenal hormones are known to affect the tissue distribution of manganese as well as to alter its metabolism.

Reproductive function in manganese deficient patients is characterized by defective ovulation, ovarian and testicular degeneration, and increased infant mortality.

Mn-zyme

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 2. Watts DL: The nutritional relationships of the thyroid. / J. Orthomol. Med. 4,3, 1989.
 3. Falla ML: Hormonal regulation of manganese. In: Manganese in Metabolism and Enzyme Function. Schramm, V.L., Wedler, F.C., Eds. Academic Press, N.Y., 1986.

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1. Orchestration and Regulation cont.

Pineal Gland

- Of the endocrine organs, the function of the pineal gland was the last discovered.
- Located deep in the center of the brain, the pineal gland was once known as the “third eye.”
- The pineal gland produces a single hormone - melatonin, which helps maintain circadian rhythm and regulate reproductive hormones.
 - Melatonin blocks the secretion of gonadotropins (luteinizing hormone and follicle stimulating hormone) from the anterior pituitary gland. These hormones aid in the proper development and functioning of the ovaries and testes.

Cytozyme B (neonatal Brain glandular) can directly affect pineal gland. Consider Melatonin (derived from serotonin) and supplementation with 5-HTP / Neuro-5-HTP Plus.

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Foundations of Hormonal Balance

Address these questions first:

1. Diet
2. Digestion / Absorption / Elimination
3. Nutrient deficiencies
4. Parasites / candida / viruses
5. Toxins / heavy metals
6. Medications

Common EDCs	Used In
DDT, Chlorpyrifos, Atrazine, 2, 4-D, Glyphosate	Pesticides
Lead, Phthalates, Cadmium	Children's Products
Polychlorinated biphenyls (PCBs) and Dioxins	Industrial Solvents or Lubricants and their Byproducts
Bisphenol A (BPA), Phthalates, Phenol	Plastics and Food Storage Materials
Brominated Flame Retardants, PCBs	Electronics and Building Materials
Phthalates, Parabens, UV Filters	Personal Care Products, Medical Tubing, Sunscreen
Triclosan	Anti-Bacterial Soaps, Colgate Total
Perfluorochemicals	Textiles, Clothing, Non-Stick Food Wrappers, Microwave Popcorn Bags, Old Teflon Cookware

Common Endocrine Disruptors