

SCOP Endocrine

Overview and Organs

The endocrine system is the system of glands that produce chemical controllers, called **hormones**, and release them directly into the blood stream to be carried to the organ that will use them—the **target organ**. **Glands** with **ducts** that deliver their contents right to a particular site are called **exocrine glands**; these include the salivary and sweat glands. On the other hand, **endocrine glands** have no ducts; they introduce their substances directly into the bloodstream. The overall complexity of the endocrine system has only in the last forty years come under serious study, and thus new discoveries are being made constantly.

For years the **pituitary gland**, located at the base of the brain (but not part of the brain) was considered the “master” endocrine gland, but in recent years that has been found to not be so true. Many of the hormones once thought to be produced here are actually manufactured in a part of the brain called the **hypothalamus**, which is located just above the pituitary gland. The posterior part of the pituitary actually stores some of these hormones. One of the main jobs of the hypothalamus region of the brain is to control the anterior part of the pituitary gland.

The **thyroid gland** is located below and to either side of the larynx (voice box), in the throat, and is typically the largest endocrine gland. It is extremely susceptible to being damaged by radiation. Embedded in its tissue are four **parathyroid glands**.

The **pancreas** is shared between the digestive and endocrine systems. The **adrenal glands** are located above the kidneys.

Hormones

Most hormones are **proteins**, but some are a class of **lipids** called **steroids**.

oxytocin	produced in the posterior pituitary, via the hypothalamus promotes uterine contraction during childbirth promotes trust; is thus of interest regarding mind control
antidiuretic hormone (ADH)	produced in the posterior pituitary, via the hypothalamus; also known as vasopressin directs the kidneys to reabsorb more water
follicle stimulating hormone (FSH)	produced in the anterior pituitary starts the process of maturing sex cells in the gonads
lutening hormone (LH)	produced in the anterior pituitary in women, causes eggs to be released from the ovaries in men, causes testosterone to be produced
human growth hormone (HGH)	produced in the anterior pituitary affects the production of growth-responsible proteins
thyroxin	produced in the thyroid controls the rate of cell metabolism; contains iodine
parathyroid hormone (PTH)	produced in the parathyroid controls calcium levels in the bloodstream, which is crucial for muscle contraction
insulin	produced in the pancreas antagonist of glucagon promotes the uptake of glucose from the bloodstream by cells, especially in the liver
glucagon	affects protein and lipid metabolism produced in the pancreas antagonist of insulin
androgens	prevents the uptake of glucose from the bloodstream by cells produced in the adrenal glands in males basic male sex hormone
estrogens	produced in the adrenal glands in females basic female sex hormone
epinephrine (adrenaline)	produced in the adrenal glands stimulate heart rate increase the rate of glucose metabolism
norepinephrine (noradrenaline)	produced in the adrenal glands stimulate heart rate and increase the rate of glucose metabolism

Disorders

diabetes insipidus	results from a lack of ADH causes overproduction of urine, leading to dehydration if it is not replaced
pituitary dwarfism	caused by lack of HGH; this is exactly what it sounds like
gigantism	caused by excess HGH; this is exactly what it sounds like
goiter	caused by insufficient iodine, leading the thyroid to become enlarged
hypothyroid dwarfism	caused by a lack of thyroxin in newborns
cretinism	caused in newborns by insufficient iodine in the mother consists of very stunted brain growth
Graves' disease	caused by overproduction of thyroxin, leading to extreme thinness and irritability
diabetes mellitus	if genetic, called juvenile-onset and is treatable by insulin injections if beginning in adulthood due to environment and diet, called adult-onset and may be treatable by strict dieting if untreated, causes spiking blood glucose levels; the kidney cannot filter this, causing extreme dehydration lack of insulin causes increased protein and lipid metabolism, leading to severe weight loss fat breakdown causes acidic blood, severe loss of salt and other ion concentration issues
hyperglycemia	the condition of excess glucose; see above for effects
hypoglycemia	the condition of too little glucose being present
Addison's disease	a result of the failure of adrenal hormones other than adrenaline and noradrenaline results in low blood pressure, muscle weakness, and decreased ability to deal with stress; death is common John F. Kennedy had a mild case of Addison's disease