
Lab.2

Hypothalamus

The Hypothalamus is a part of the brain that contains a number of small nuclei with a variety of functions. One of the most important functions is to link the nervous system to the endocrine system via the pituitary gland. The hypothalamus is located below the thalamus. All vertebrate brains contain a hypothalamus. In humans, it is the size of an almond.

The hypothalamus is responsible for regulating certain metabolic processes and other activities of the autonomic nervous system. It synthesizes and secretes certain neurohormones, called releasing hormones or hypothalamic hormones, and these in turn stimulate or inhibit the secretion of hormones from the pituitary gland.

Hypothalamus Functions

The important functions of the hypothalamus are:

- 1- Its main function is maintaining the body's internal balance- homeostasis by stimulates or inhibits many of the body's activities in order to maintain homeostasis, such as regulating body temperature, appetite and body weight, heart rate and blood pressure, etc.
- 2- It also connects the endocrine and the nervous system.
- 3- It is involved in many essential functions of the body, including:
Childbirth, Emotions, Sleep cycles, Balancing body fluids, Appetite and thirst control and Blood pressure and heart rate.

Hypothalamus Hormones:

Thyrotropin-releasing hormone (TRH, TRF): Stimulate thyroid-stimulating hormone (TSH) release from anterior pituitary.

Prolactin-releasing hormone (PRH): Stimulate prolactin release from anterior pituitary

Corticotropin-releasing hormone (CRH or CRF): Stimulate adrenocorticotrophic hormone (ACTH) release from anterior pituitary

Dopamine (Prolactin-inhibiting hormone) (DA or PIH): Inhibit prolactin release from anterior pituitary

Growth-hormone-releasing hormone (GHRH): Stimulate growth-hormone (GH) release from anterior pituitary

Gonadotropin-releasing hormone (GnRH): Stimulate follicle-stimulating hormone (FSH) release from anterior pituitary

Luteinizing hormone-releasing hormone (LHRH): Stimulate luteinizing hormone (LH) release from anterior pituitary

Somatostatin (growth-hormone-inhibiting hormone) (SS, GHIH): Inhibit growth-hormone (GH) release from anterior pituitary

somatotropin release-inhibiting factor (SRIF): Inhibit (moderately) thyroid-stimulating hormone (TSH) release from anterior pituitary

Pituitary Gland

pituitary gland (also known as hypophysis) is a small, pea-sized gland located at the base of the brain below the hypothalamus. It sits in its own little chamber under the brain known as the sella turcica. It's a part of the endocrine system and is in charge of making several essential hormones. The pituitary gland also tells other endocrine system glands to release hormones.

The pituitary gland is divided into two main sections: the anterior pituitary (front lobe) and the posterior pituitary (back lobe). The pituitary is connected to the hypothalamus through a stalk of blood vessels and nerves called the pituitary stalk (also known as infundibulum).

The pituitary gland makes many hormones

*The anterior lobe of the pituitary gland makes and releases the following hormones:

Adrenocorticotrophic hormone (ACTH or corticotrophin): ACTH plays a role in how the body responds to stress. It stimulates the adrenal glands to produce cortisol (the “stress hormone”), which has many functions, including regulating metabolism, maintaining blood pressure, regulating blood glucose (blood sugar) levels and reducing inflammation, among others.

Follicle-stimulating hormone (FSH): FSH stimulates sperm production in male. FSH stimulates the ovaries to produce estrogen and plays a role in egg development in female. This is known as a gonadotrophic hormone.

Growth hormone (GH): In children, growth hormone stimulates growth. In other words, it helps children grow taller. In adults, growth hormone helps maintain healthy muscles and bones and impacts fat distribution. GH also impacts the metabolism (how the body turns the food we eat into energy).

Luteinizing hormone (LH): LH stimulates ovulation in female and testosterone production in male. LH is also known as a gonadotrophic hormone because of the role it plays in controlling the function of the ovaries and testes, known as the gonads.

Prolactin: Prolactin stimulates breast milk production (lactation) after giving birth. It can affect fertility and sexual functions in adults.

Thyroid-stimulating hormone (TSH): TSH stimulates the thyroid to produce thyroid hormones that manage the metabolism, energy levels and the nervous system.

*The posterior lobe of the pituitary gland stores and releases the following hormones, but the hypothalamus makes them:

Antidiuretic hormone (ADH, or vasopressin): This hormone regulates the water balance and sodium levels in the body.

Oxytocin: The hypothalamus makes oxytocin, and the pituitary gland stores and releases it. In female, oxytocin helps labor to progress during childbirth by sending signals to the uterus to contract. It also causes breast milk to flow and influences the bonding between parent and baby. In male, oxytocin plays a role in moving sperm.

