

mobilizing ho

and pro

- Effects of

gluca

uring exer

- Cducogion is a peptide 'lorry:me from the alpha cells of the partcrf,!ati,  
 • b's effect on carbolnedralc me-tabrAisn) is opposite that at.1%  
 hepatic glucos.e p.n.-Auction, and it iN th.erefore c ow  
 rmone.  
 sc.4-chicd inilspnse to hypoglycemia. prolonged fasting, viercise  
 n rich rnqikls  
 through binding tio and activaikm  
 111111Miligiantly expressed in the iivcr but also  
 :,-Nund iamb ar,,, rinio amounts in the kidney's, adrenal glands, 611 and pancreas.  
 atualison controls plasma glucose concentrations d.11 ri n g fasting, exercise and

hypertrophy, increasing hepatic glucose output circulation. This ability of glucagon is critical in the life saving response to severe hypoglycemia. This is especially important in glucose supply to brain and muscle cells

Major effects are

1. Glucagon stimulates breakdown of glycogen stored in the liver



2.



3. Glucagon



4.

Glucagon activates hepatic gluconeogenesis (a pathway by which non-carbohydrate substrates such as amino acids are converted to glucose) very important in other animals like sheep and cats which mainly use this mechanism. This comes to play especially during periods of prolonged fasting.

Glucagon stimulates the breakdown of fatty acids and inhibits Lipogenesis in the liver.

Glucagon reduces food intake and diminishes hunger (mainly due to cross reactivity of GLP-1 receptor)

Disorders

- Very rare cancer of the alpha cells (pancreatic) leading to wasting syndromes, rashes etc.
- Clinical: patients with type 2 diabetes (NIDDM) exhibit impaired regulation of glucagon secretion (higher glucagon levels in the blood) which contributes importantly to diabetic hyperglycemia.

Hypothalamus

5.

- The hypothalamus is considered to be the master regulator of the endocrine system

6. -11114611L,







- It is mainly responsible for maintaining body homeostasis by stimulating or inhibiting main body functions such as: the heart rate, blood pressure, body temperature, fluid and electrolyte balance, appetite, body weight, sleep cycle etc

- Regulating hormones that are secreted by the hypothalamic-portal system to the Anterior and posterior pituitary glands prompting the release of secondary hormones that can affect organ functions.

The hypothalamus secretes various hormones that are transported to the Anterior pituitary.

Corticotrophin Releasing Hormone CRH

Growth hormone releasing hormone GnHRH

Thyrotrophin Releasing hormone TRH

Gonadotrophin Releasing Hormone GnRH

Somatostatin (inhibits growth Hormone Secretion)



Prolactin Releasing and Prolactin inhibiting hormone (PHH)

- Disorders in the hypothalamus can result in appetite, temperature and sleep disorders e.g Tumours, Hypothalamic obesity etc.

Pituitary Gland



- Located in the Sella Turcica of the brain



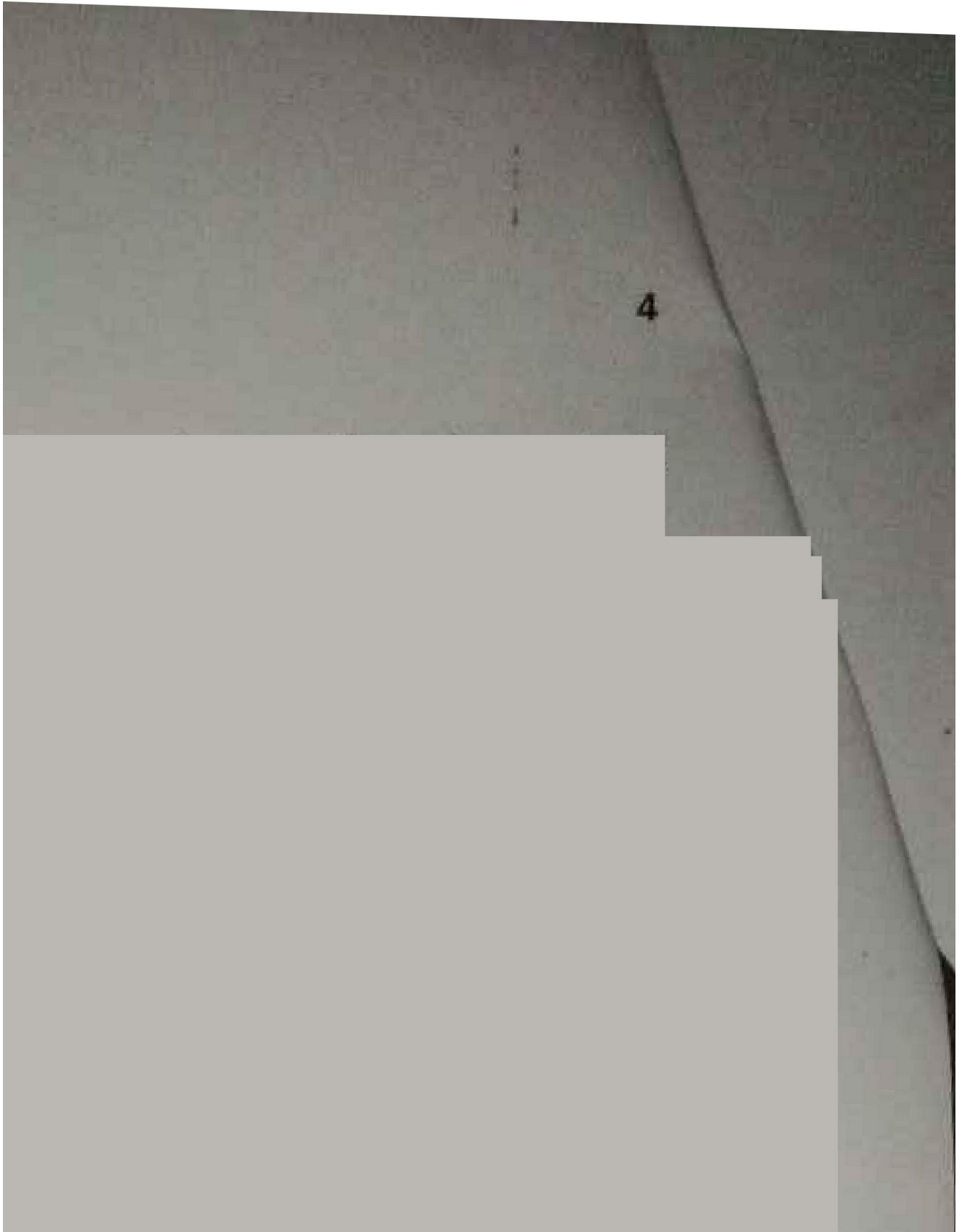




I

•

1



- Considered to be the

master gland Inca\* it regulates other important



endocrine glands, including the adrenal, thyroid and reproductive glands.

- In some cases of the hormones from the pituitary, they have direct regulatory effects in major tissues such as those of the musculoskeletal system eg GIL



- Anterior pituitary contains abundant hormone secreting epithelial cells

Posterior pituitary is composed largely of unmyelinated (lacking a sheath of fatty insulation) secretory neurons.

- Hormones of the Anterior Pituitary are proteins that consists of one of two long peptide chains e.g LH, TSH, FSH (glycoproteins).

- The hypothalamus controls the Anterior lobe by releasing hormones through connecting blood vessels. It controls the posterior lobe through nerve impulses.

- Anterior pituitary has cells that secrete the following hormones

1

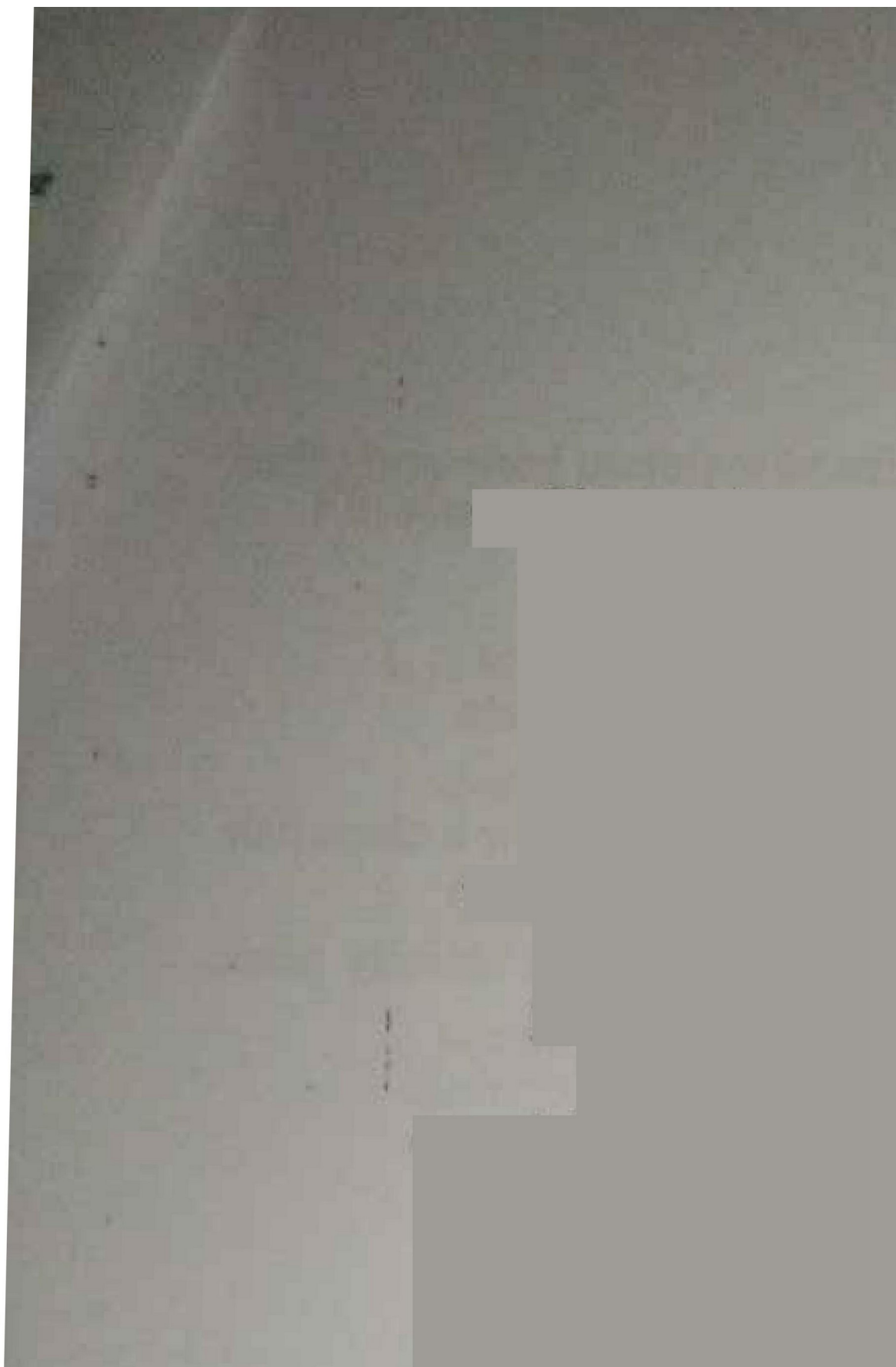
Thyrotrophs Thyrotropin stimulating Hormone (TSH)

Gonadotrophs Luteinizing Hormone (LH) Follicle Stimulating Hormone (FSH)

Corticotrophs Adrenocorticotrophic Hormone (ACTH)

Somatotrophs- Growth Hormone (GH) (Somatotropin)

Lactotrophs- Prolactin

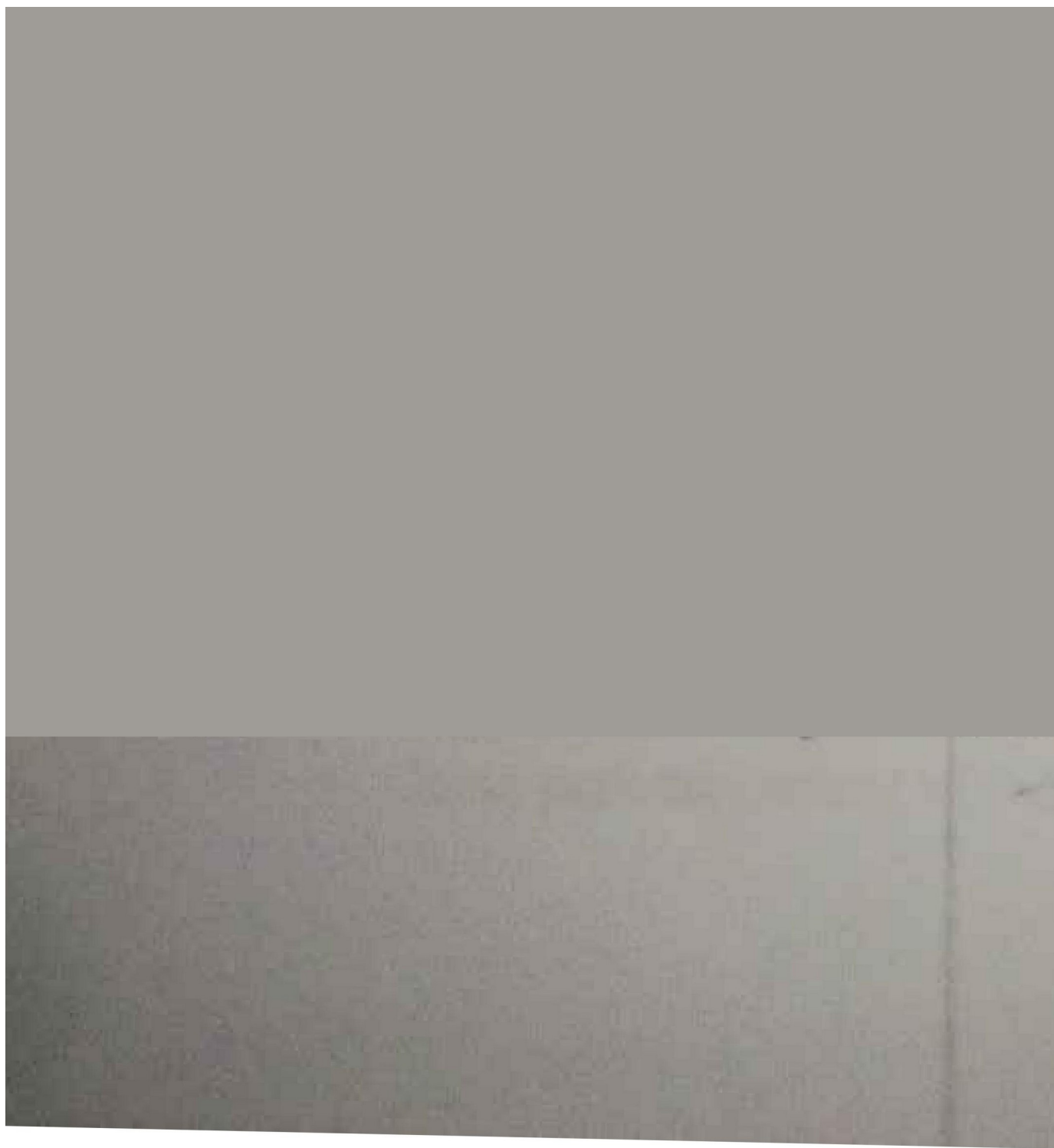



- The production and secretion of each of the major Anterior Pit hormones are regulated by peptides from the hypothalamus (TRH, CRH, GnRH,
- Feedback loops involving the pituitary hormones and their target glands

play an important role in pituitary hormone signaling e.g TRH secretion is

S








inhibited by Thyroid hormone which also inhibits the effect of TRH on Thyrotrophs.

- Such negative feedback loops help to maintain a stable balance between the secretion of pituitary hormones and the secretion of hormone product by pituitary target glands.

Physiological effects of anterior Pit Hormones

1. Thyrotropin Stimulating Hormone (TSH)- Stimulates the production of thyroid hormones eg. Thyroxine and Triiodothyronine





2. ACTH Stimulates the production of cortisol and androgenic hormones by the adrenal cortex.

3. FAH-Stimulates the production of estrogens and the growth of egg cells

---

4. LH-Stimulates the production of estrogens and progesterone by ovaries in



women

and the production of testosterone by the testis in men.