

An Observation on Endocrine Glands with Low Secretions but High Effects

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ABSTRACT

The endocrine glands, the products which, are called hormones, located in parts of the body that are generally hidden from view. This system is closely related to the nervous system and the secretions are effective on top of each other and have direct interactions. Various secretions that are secreted in small amounts from cells, sacs and glands are able to affect large areas of membership in a short time. The endocrine glands, together with the nervous system, coordinate the actions and activities of different parts of the body. The endocrine glands are usually classified into three groups. The main endocrine glands, their role is to secrete hormones, including the epiphyseal, adrenal, thyroid, parathyroid, and pituitary glands. Mixed glands - where cells, sacs, and endocrine tissue are located within the exocrine tissue. Such as pancreas, ovaries, testicles, kidneys, thymus, and placenta. Diffuse endocrine system - in which hormone-producing cells are widely distributed in the digestive and respiratory systems.

In terms of effectiveness, its amount is related to the anatomical and physiological needs of the body. Internal disorders of the body and the external environment can cause changes in the number of secretions, which appear as a result of irregularities in the body, which can often be treated by timely diagnosis of the complication; Because the endocrine glands control the body's metabolic rate; Participates in the metabolism of organ materials.

Keywords- Gland, Endocrine, Tissue, Fetus, Hormone, Metabolism, Physiology.

I. INTRODUCTION

The human body continues to function as a complex machine full of secrets, inadequacy or change in one part of the system causes failure, reaction, sensitivity and heterogeneity in cells, tissues and other systems. If an endocrine gland with hormonal or nerve separation at the snap point with the secretion of certain secretory substances or neuroendocrine with neurohormone secretion in certain areas and areas of the body has its own effects. The effects of hormones, which are the product of the endocrine glands, have been largely understood by biologists and other scientific societies, but research is still ongoing on humans due to the importance and value of hormones and the high nervous system for physical development. And more

efforts are underway to produce various hormones through genetic engineering and to understand the deep connection of the glands of other devices.

The endocrine glands carry their products through the blood throughout the body, including the nervous system. Their effects may be local or general; the secreted hormones are secreted at a certain period of life and then stopped, but there are reasons that a number of hormones are secreted from the beginning of life (fetal development) to the last life and are considered necessary for life.

II. ENDOCRINE GLANDS

The term Endocrine is derived from the Greek word Endo meaning (in) and (separation). The endocrine glands are also called ductless glands. The endocrine system includes all endocrine glands, organs, and hormone-secreting tissues. Some members of the endocrine system perform other functions in addition to the secretion of hormones. For example, one part of the pancreas secretes hormones while the other part secretes enzymes. The science of studying the structure and function of the endocrine glands, the study of autocrine hormones, paracrine, neurohormones, the diagnosis and treatment of disorders of the endocrine system, is called endocrinology [8].

Professor Aminullah in 2007 defines the endocrine glands as follows. The endocrine glands are very small, located in different parts of the body. These glands, despite their small size due to the separation of chemicals, have a great impact on the activities of various organs of the body. Their secretions are called hormones. The endocrine glands have no aqueduct or tube, releasing hormones directly into the bloodstream [1].

Hormones work with the nervous system to regulate and balance many functions and physiology of the body.

The endocrine glands are composed of a number of main cells (parenchyma) of epithelial origin that are supported by connective skin, rich in blood vessels and lymph. The characteristic of the endocrine gland is that it is rich in blood vessels [6].

Important glands of the body are the pituitary, hypothalamus, pituitary, thyroid, parathyroid, adrenal, pancreas, testicles and ovaries, thymus and pineal gland.

III. PITUITARY GLAND AND HYPOTHALAMUS

The pituitary gland is a small pea-sized gland located below the cephenoid bone and connected to the hypothalamus by a base called a funnel. The pituitary gland is divided into two parts.

1- Anterior pituitary gland, which is made of epithelial cells and is derived from the oral cavity of the fetus.

2- The posterior pituitary gland, which is an extension of the brain and is made up of nerve cells. The functions of the pituitary gland are controlled by the hypothalamus in two ways.

- The secretion of anterior pituitary hormones is controlled by hormones secreted by the hypothalamic nerve cells.

- The posterior pituitary gland does not combine hormones. But it stores and releases two hormones. The release of these hormones is controlled by stimulation of nerve cells inside the hypothalamus. Inside the hypothalamus, the nervous system and the endocrine system are closely related. Stimuli such as joy, sadness, and severe stress affect the endocrine system through the hypothalamus, and endocrine hormones, in turn, affect the functions of the hypothalamus and other parts of the brain [8].

Pituitary gland secretions control body growth and regulate other activities of the endocrine glands [12]. Today, two methods are used to eliminate growth hormone deficiency in humans:

1- Extraction of hormone from the pituitary gland of a deceased person.

2- Transfer of genes responsible for hormone production to bacteria through genetic engineering. The genie in question produces a hormone inside the bacterium that is later extracted from the bacterial body. The major hormones produced by the pituitary gland are:

Thyroid Stimulating Hormones (TSH): This hormone attaches to receptors attached to the membrane of the thyroid gland and causes it to secrete these cells. High TSH causes the thyroid to enlarge and low TSH causes the thyroid to shrink.

Adrenocorticotrophic hormone (ACTH): This hormone attaches to the cells of the adrenal cortex, causing an increase in the secretion of the hormone cortisol, and this hormone also acts on the skin's melanocytes, increasing the pigmentation of the skin.

Gonadotropin hormones: These hormones attach to receptors attached to the membranes of the gonads (testicles and ovaries).

Luteinizing hormone (LH): Causes ovulation in women and causes the secretion of the hormones estrogen and progesterone from the ovaries. In men, LH increases the hormone testosterone.

Prolactin: Sticks to the breast cells and helps the breast develop during pregnancy and stimulates milk production after birth.

Melanocyte hormones (MSH): This hormone is effective against melanin. Excess MSH secretion darkens the skin. Two hormones released from the hypothalamus, one stimulates the secretion of MSH and the other inhibits it.

Growth hormone (GH): It is effective in the process of protein production, the development of bones, muscles and other organs. It also protects proteins in times of food poverty and encourages the breakdown of fats. Due to the disorder in its secretion, the body of a small person remains. Increased secretion (GH) causes extremely strong bone growth, which results in a giant and the person will grow abnormally tall. Hormone secretion also increases during fasting and exercise. Inheritance, nutrition and sex hormones affect growth hormones [6].

The hormone oxytocin causes the uterus to contract during pregnancy, and the hormone also helps expel milk from the breasts [9].

Thyroid gland

Thyroid is the largest human endocrine gland and weighs 25-40 grams. The thyroid gland of the competitive area is located in the anterior part of the larynx and the upper part of the scapula. Thyroid originates from the endoderm and descends from the ground of the swallow to the neck, multiplies and forms a gland.

The building and functional unit of the thyroid is composed of follicles and closed sacs that have a spherical or multi-layered appearance. The total number of follicles in Thyroid is estimated at 20 million. The thickness of this gland does not exceed 0.05% of body weight. The amount of 5-6 liters of blood passes through the human thyroid within an hour. One of the important characteristics of thyroid is that the gland stores its afferent products in large quantities in the cell cavity in the middle of a sac, ie the follicle, and when necessary, takes it again and sends it to the public [2].



Figure 1: Thyroid gland

One of the secretions of the thyroid gland is thyroxine, which requires iodine (one milligram per week). Thyroxine and triiodothyronine are secreted from the thyroid gland. Thyroid hormones increase the transcription of a large number of genes. Most of the T₄ secreted by the thyroid is converted to T₃. All T₄ molecules lose an iodine and become T₃ before affecting the transcription of genes. Intracellular thyroid hormone receptors have a high affinity for T₃.

- Thyroid hormones activate nuclear receptors. Thyroid receptors are attached to or adjacent to DNA gene strands. These receptors are activated as soon as they bind to thyroid hormone.
- Thyroid hormones increase the metabolic activity of cells. While protein production increases, so does protein catabolism. Growth rate in young people increases dramatically, mental activity increases and more endocrine activity increases.
- Thyroid hormones increase the number and activity of mitochondria, which in turn increase ATP production to provide the energy needed by cells.
- Thyroid hormones increase the active transport of ions from cell membranes. Thyroid hormone makes the cell membrane more permeable to sodium ions, making the sodium pump more active and producing more heat.
- Thyroid hormone affects the growth of the body. One of the important effects is the increase in brain development during embryonic life and the first few years after birth. If the fetus does not secrete enough thyroid hormone. The growth and development of the brain before birth is severely slowed down and the size of the brain remains smaller than normal. Children with hypothyroidism are treated with thyroid hormone.
- Thyroid hormone stimulates the metabolism of carbohydrates and the metabolism of fats.
- Increase blood flow and cardiac output, increase heart rate, increase heart strength, regulate normal arterial pressure, increase digestive tract activity, stimulate effects on the central nervous system, effect on muscle activity, muscle tremor, effect on sleep, effect on other endocrine glands The effect on thyroid hormones is a small effect of thyroid hormones [11].

IV. PARATHYROID GLAND

The parathyroid glands are four glands located behind the thyroid. Parathyroid hormone is secreted from the parathyroid gland. The main function of parathyroid hormone is to maintain blood concentration. If blood calcium is reduced, increased secretion of parathyroid hormone increases the production of active vitamin D in the body. Vitamin D returns the amount of calcium in the blood to normal by absorbing calcium from the intestines. Second, parathyroid hormone itself reduces the excretion of calcium from the kidneys through the urine. Problems and Complications of Decreased Blood Calcium The expression of tingling and tingling in the body, especially around the mouth

and limbs, claspings of the hands and feet, in infants, seizure symptoms, shortness of breath, increased blood calcium as well as decreased calcium have their own problems. Increased calcium has several causes Sometimes the parathyroid gland becomes very active and raises blood calcium. Signs and effects of high blood calcium:

- 1- Feeling tired, lethargic and dizzy.
- 2- Increased urination and enuresis
- 3- The person is thirsty and drinks a lot of water
- 4- nausea and vomiting
- 5- Weak muscles - the person has difficulty sitting and standing.
- 6- Pollen formation intensifies in the individual.
- 7- In dangerous situations, an increase in blood calcium may even lead to a coma [4].

Adrenal glands: The adrenal glands are two small glands located at the top of each kidney. In humans and other mammals it is a pair. Each adrenal gland has a middle part called the medulla and the outer part called the cortex. The tasks of each of these sections are separate.

The middle part of mammals originates from neural tissue and is responsible for adrenal and noradrenaline secretion and their activity is controlled by the sympathetic system. The middle section seems to operate in an emergency (war or flight). The cortex is the outer part of the adrenal gland. It is responsible for many steroid hormones, including sex hormones, especially androgens in both mammals (males and females). Glucocorticoids, including cortisone and hydrocortisone, are secreted, and this secretion is controlled by ACTH. The amount of corticosteroids, especially aldosterone, which controls the water and salt balance of the body, is also one of the secretions of this part. Adrenaline and noradrenaline are secreted by the middle part of the adrenal gland. Both of these substances are secreted at the end of many sympathetic nerve fibers. (The amount of blood sugar, the opening of the arteries of the muscles, the heart, the brain, and the narrowing of the vessels of the skin and viscera, and the opening of the eyes and the straightening of the hair) [10].

Pancreas: The pancreas is one of the most important digestive glands that is derived from the primitive gut in the early stage of the fetus. The pancreas is a complex gland, a mixture of two exocrine and endocrine secretory glands; In febrile animals, it is located near the duodenum and secretes digestive enzymes into the duodenum through the pancreas duct. The secretion of these enzymes is under the hormone Secretin.

The pancreas also contains clusters of cells called Langerhans, which play a completely different role and secrete insulin and glucagon into a vein. The secretion of these hormones depends on the level of blood sugar [5].

The length of the pancreas, also called the pancreas, is 17 cm and has three parts: the head, the trunk and the tail. One of the vital hormones of the

pancreas is insulin, which plays an essential role in the metabolism of sugars. Insulin is the body's sugar store in the form of glycogen in the liver. It controls and regulates the concentration of glucose in the bloodstream of the human body, and the amount of blood sugar is usually constant. The amount of fasting blood sugar is 100-180-120 cm³. Half an hour after eating, blood sugar

levels rise rapidly and suddenly. In patients with diabetes mellitus, the islets of Langerhans are often damaged, so the regulation of sugar is impaired and sugar is not stored as glycogen in the liver, resulting in high blood sugar and some of it enters the urine. Be. By giving insulin to these people, the amount of sugar in the blood goes down [9].

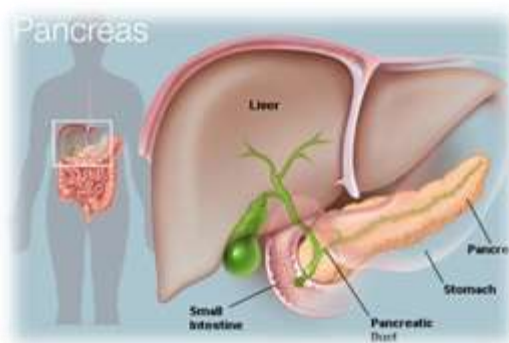


Figure 2: Pancreas

Glucagon is another hormone secreted by the alpha cells of the islets of Langerhans. This hormone raises blood sugar levels, is effective on various tissues, and its role is to make the resulting energy available to the cells in the space between meals [5].

Causes of diabetes are known to be genes, infection, environment, secondary diabetes and stress. Treatment of diabetes by diet, eating regular meals, weight control, maintaining a balanced diet, eating carbohydrates, proper proteins and medicinal herbs. Symptoms of insulin-dependent and non-insulin-dependent diabetes include thirst, dehydration, excessive urination, infection of the urinary tract or mouth, weight loss, fatigue and lethargy, and blurred vision. Cataracts, peripheral nerve damage in the arms, hands and feet, changes in large blood vessels, impotence, etc. [3].

Testes and ovaries: Each testis is approximately 4 cm long and 2.5 cm wide. The testicle consists of 900 fallopian tubes and seminal vesicles. The average length of each tube is more than 0.5 m and sperm is produced in this tube, these sperms then enter the epididymis where the tube is bent and screwed to a length of about 6 m. The epididymis leads to the vas deferens, where not only sperm are produced in the testicles, but also a number of hormones are secreted.

1- Testosterone: secreted by Leydig cells located in the interstitial space of the testis is essential for the growth and division of testicular germ cells (the first stage in sperm formation).

It should be noted that the testes produce a number of sex hormones, collectively referred to as androgens, which include testosterone, dihydrotestosterone, and androstenedione. The secretion of the latter two hormones is low. Leydig cells (located inside the testicles) are almost non-existent in the testicles in infancy, but are more common in male

infants up to a few months after birth and in adult males. In addition to testosterone, men produce small amounts of estrogen, which is about 1.5 percent in non-pregnant women.

Testosterone causes enlargement of the penis, scrotum, testicles, hair growth in most parts of the body, voice change (male bass), thickening of the skin all over the body, appearance of acne, thickening of the bones, funnel shape of the male pelvis, increased pelvic strength to withstand loads, etc. In general, testosterone is responsible for the development of masculine traits, even during pregnancy [1].

Hormone production by the ovaries: When the ovaries become active during puberty, they begin to produce ovum, and so do the ovarian hormones. Growing and mature follicle cells produce the hormone estrogen, which causes secondary sexual properties to appear in young women. The ovaries produce several different estrogen hormones, the most important of which are the expression estradiol, estrone, and estriol, of which estradiol is the most important hormone found in abundance to exhibit all estrogenic effects. These are the properties of the female secondary sex that appear due to the effect of ovarian hormones.

- Enlargement of her appendages of the female reproductive system
- Breast development
- Emergence of underarm hair
- Adipose tissue under the skin of the whole body, especially in the pelvis and breasts.
- Flattening and lightening of the pelvis
- The beginning of the menstrual cycle

The second ovarian hormone, progesterone, is secreted by the corpus luteum. The corpus luteum also produces small amounts of estrogen. This hormone is secreted by the corpus luteum as long as there is LH

hormone in the blood. The secretion of corpus luteum hormones stops about 10-14 days after ovulation. Another important effect of progesterone is the continuation of pregnancy and milk production by the mammary glands of the breast, although during pregnancy the source of progesterone is the placenta, not the ovaries [6].

Prostate: This gland is similar to an inverted and compact pyramid, the distance from the apex to the base is about 3 cm and the width of some is 3.5 cm. The prostate is almost flat. It is a type of gland located in the lower part of the bladder and is the product of the secretion of 30% semen. It exists in men, but women lack it [7].

The prostate gland secretes a thin milky fluid that contains ions of calcium, citrate phosphate, coagulation enzymes, and fibrolysin. The alkaline nature of the prostate fluid is considered essential for egg pregnancy.

The prostate gland is small in infancy and begins to grow in adulthood under the influence of testosterone. This gland reaches a steady state at the age of 20. It stays the same until about 50 years old. For several reasons, after the age of 50, it sometimes gets smaller and sometimes bigger [11].

The prostate gland has a great reputation for undermining human health. Enlargement of this gland that afflicts the majority of older men. It suffocates the bladder. This painful condition makes it difficult to urinate, leading to bladder infections, infections, and kidney damage. Inflammation of the prostate gland is a common reason for patients to see a doctor, as a result of which prostate cancer may also be diagnosed.

Thymus: The thymus is located in the upper part of the chest behind the sternum and between the lungs. The thymus is involved in performing immune functions. Whenever a baby is born without time, its immune system will not develop normally. Part of the thymus is responsible for secreting a hormone called thymosin, which helps develop some white blood cells called T cells.

T cells protect the body against infections. Other hormones include thymus humoral factor, thymus factor and thymoputin. The thymus is large and important in the first years of life and shrinks in size over time [8].

V. CONCLUSION

The endocrine glands have a tremendous impact on the body's metabolism, growth and development, water and electrolyte balance, reproduction and other physiological activities.

Specific glands secrete specific hormones, each of which performs a specific activity. such as growth hormone, which is responsible for height, thyroid hormones, which regulate chemical activity, and insulin, which are known to obtain energy from blood sugar, as

well as sex hormones. (Male and female) causes the growth and development of sexual organs, secondary sexual symptoms and sex-related activities.

In certain normal conditions, hormones are secreted by the endocrine glands. Any excess in the secretions causes noticeable disorders in humans, and no hormone can replace the activities of other hormones.

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