

# The Endocrine Glands

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A gland is an organ which takes something from the blood or other circulating medium and manufactures therefrom a secretion which it delivers to the body as needed. Roughly there are two kinds of glands: those which deliver their secretion through ducts or tubes and those whose secretion is picked up directly by the blood or lymph as it circulates through the gland. The latter are known as ductless or endocrine glands. There are about a dozen of these in the human body.

References to the endocrine glands and their disorders now appear in popular literature so frequently that it seems likely the well-informed person will shortly wish to have some accurate information regarding them. In the following paragraphs each of these glands is briefly discussed. They are arranged in the order of the frequency with which their disorders are encountered by the doctor.

The **PITUITARY** is located in a sort of bony bubble on the floor of the cranial cavity between the temples and just back of the root of the nose. It is roughly divided into three parts which have different embryological origins. The front part, or anterior lobe, is pushed upward from the part of the embryo which later becomes the pharynx. The posterior lobe, or hind part, pushes downward from the floor of the brain. There is a stem which connects it with the brain.

The anterior lobe has a wide influence in the body, being concerned particularly with growth in height, the development of the muscles, bones and reproductive system. It has also something to do

with the handling of various foodstuffs. The middle and posterior lobes have to do with blood pressure, the handling of water and sugar and the excretion of urine. The whole gland in some way has to do with sleep.

Deficiency of the pituitary in early years is associated with lack of stature, which may amount to dwarfism when it is severe, or merely to a less than average height when it is less severe. There may be lack of sexual development. It is thought that deficiency of the posterior lobe in such persons leads also to marked obesity.

Tumors of the pituitary are associated many times with overactivity of this gland. If this occurs in early years the stature is apt to be more than normal and may amount to that of a giant. If it occurs in later years after growth has been completed, a condition known as acromegaly results. The brows become beetling and overhanging, the soft tissues of the face are increased in amount, the lower jaw becomes undershot and the chin protrudes, and the hands and feet enlarge markedly.

The **THYROID** is located in the neck, sitting astride the windpipe much like a saddle. It has been likened to the draft of a furnace or the ignition system of an automobile. No cell in the body reaches a stage of physiological completeness without an adequate amount of thyroid secretion.

Goiter is enlargement of the thyroid. There are many varieties of goiter, which may not be associated with overactivity or hyperthyroidism. One variety known as exophthalmic goiter leads to a pop-

eyed appearance, marked nervousness, rapid heart action and loss of weight.

The opposite condition is associated with marked retardation of physical and mental processes. If it is present at or shortly after birth the condition of cretinism results. Such a youngster is short, swaybacked, potbellied with rough, dry skin and a large tongue which often protrudes from a mouth constantly drooling saliva. The hair is sparse, dry and brittle. Victims of this disorder are mentally deficient and unless treatment is begun promptly and carried out over a long period of years they never attain a normal mentality. Lesser degrees of hypothyroidism occur in adults. Its most severe form is known as myxedema. These people take on weight and become sluggish both mentally and physically. They also become very sensitive to cold. The skin is dry and chaps very badly in cold weather. The pulse rate is slow. These persons seldom perspire.

There are two ADRENALS. One is located on the upper pole of each kidney. Their combined weight is about one ounce. They are divided into two parts, an outer, cortex, and an inner, medulla, which differ embryologically and functionally. They have to do with blood pressure, with the metabolism of sugar, salt and water, with the clotting power of the blood and its distribution throughout the body.

At one time Dr. Cannon proposed the emergency or fright-flight-or-fight theory. That is, under ordinary quiet existence the adrenals put out very little secretion but under the influence of an emergency, large amounts of their secretion are thrown into the blood stream, so that the animal is put into the best possible condition to meet emergencies.

Destruction of the cortex is responsible for a condition called Addison's dis-

ease, after the English physician who described it nearly a century ago. It is characterized by extreme weakness, and a brownish discoloration of the skin; formerly Addison's disease terminated in death, which was shortly preceded by nausea, vomiting, extremely rapid loss of weight and profound weakness. In recent years we have had an extract of the cortex which maintains these sufferers in comparative comfort. Quite recently we have a synthetic compound, desoxycorticosterone acetate, which sometimes will maintain them in comparative comfort.

A tumor of the cortex occurring in a child leads to precocious sexual development. If it occurs in an adult woman, it causes obliteration of feminine characteristics and their replacement by masculine tendencies. That is, the woman may become bald, grow a beard, develop muscular strength and the bass voice of the male. After the surgeon removes this tumor she loses her beard and regains her hair and becomes once more quite ladylike.

The GONADS are the sex glands. In addition to their well known relation to reproduction, they have other influences. They have something to do with preventing an abnormal growth in height, with the quality of the skin and teeth, with the correct growth of hair and with the state of mind. That is, the male lacking gonadal function is apt to lack normal male characteristics such as aggressiveness. The woman lacking normal ovarian function is apt to be a rather sour, egocentric, cold-blooded, person whose complexion and disposition leave much to be desired.

The PANCREAS, or sweetbread, is a large organ lying across the upper part of the abdomen. It makes an external secretion, the pancreatic juice, and an inter-

nal secretion, insulin. The latter is very influential in the metabolism of sugar and starch. It is a shortage of the internal secretion which is associated with diabetes mellitus.

The PARATHYROIDS are usually four in number. Each is about the size of a grain of wheat. They are located just below and back of the thyroid and very close to it. In early years the surgeon sometimes removed one or more parathyroids when he took out a goiter.

Their most important function appears to be the control of calcium metabolism. If they fail to function adequately the calcium in the blood falls to a very low level, the person becomes very nervous, apprehensive, and may be troubled with frequent and painful muscular cramps. The condition is known as tetany. Not infrequently the development of cataracts leads to blindness.

If the parathyroids are overactive, the calcium in the blood rises to a high level, large amounts of it are excreted in the urine and too much of it is removed from the bones so that they become fragile and break easily. This condition is usually associated with a tumor of one or more of these glands and may be corrected wholly or in part by removal of the tumor.

The THYMUS lies in the lower part of the neck and upper part of the chest. It is usually largest in childhood. If it is abnormally large it is thought to be associated with croup, frequent colds and choking spells, and babies with large thymus glands may be liable to sudden death under any unusual strain such as the anesthetic necessary for the removal of tonsils or similar operations. Pediatricians are not all agreed that this is true and some of them feel that a large thymus may cause little or no

trouble. It can be reduced in size by appropriate x-ray therapy.

Dr. Hanson made an extract of thymus which Rowntree injected into succeeding generations of rats, thereby producing marked acceleration in growth and development.

The PINEAL is located in the upper and back part of the head. Originally it was thought to have something to do with the soul, and to bear some relation to the reptilian mid-eye of our ancestors. It does have something to do with the development of the body and its sexual apparatus.

With an extract of it prepared by Dr. Hanson, Rowntree was able to produce what are known as precocious dwarfs in animals. Development occurred early but growth was retarded.

Certain tumors occurring in children are associated with precocious development of the body and sex organs so that a youngster four years of age may have a development equal to that of a normal child of twelve.

The most obvious effects of disturbances of endocrine function are as follows: abnormalities of growth and development, obesity, mental retardation, failure of a student to maintain his or her previous level of scholarship, inability to get along well with other people.

Some endocrine disorders and their results can be largely overcome by proper treatment. This consists in the administration of glandular products. These are given by mouth or injected hypodermically.

Those who are interested in this subject will find it more fully discussed in the books,

*What We Are and Why*, by Mayers and Welton, and

*The Tides of Life*, by Hoskins.