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W. G. Venzke
Iowa State College

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THE HISTOLOGY OF THE THYROID GLANDS OF DOGS SIXTEEN WEEKS OF AGE

W. G. VENZKE

In order to possess an understanding of the diseased thyroid gland, it is highly necessary to have a knowledge of the variations which may occur in the normal gland from early foetal life to senility. Variations may be produced by age, diet, sexual cycle, locality and perhaps breed. Each of these factors present very interesting problems. In the Department of Veterinary Anatomy at Iowa State College we are interested in the variable changes which occur in the normal thyroid gland of dogs from early foetal life to senility. The results of some phases of this investigation are now in the process of publication.

It is the purpose of this paper to present the histological picture which was found to occur in the normal thyroid glands of dogs sixteen weeks of age. The thyroid of the dog of sixteen weeks appeared to represent what might be called an adult thyroid as the changes earlier, and as will be published later, would indicate.

MATERIAL AND METHOD OF INVESTIGATION

The thyroid glands of eight male and female Collie, German Shepherd and hound dogs were used in this investigation. The tissues were subjected to routine histological technic. Histologic sections were made from various areas of the glands. The follicles were measured with a micrometer. The size and shape of the follicular epithelium and nuclei were studied. Also the percentage of follicles showing colloid and vacuolation were determined.

RESULT OF INVESTIGATION

The thyroid glands are situated on the lateral surfaces of the trachea, extending along the first six or seven rings. They are long and narrow with a flattened, ellipsoidal form. They have a rich blood supply furnished by the thyroid arteries which are branches of the common carotids. The thyroid veins empty into the jugular vein. The lymphatic vessels drain into the cervical lymph nodes. The nerve supply is derived from the autonomic system.

Connective tissue forms a capsule which surrounds the entire

gland and also projects inward, dividing the gland into lobules. The lobules contain irregular, rounded, oval, elongated or tubular closed vesicles or follicles; each follicle being separated by a thin connective tissue septum. Within this interlobular or interfollicular stroma are found blood and lymphatic vessels and nerves.

The range of variability in the dimensions of the follicles may extend from 30 to 160 microns. Each follicle is lined by a single layer of columnar epithelium whose range of variability in height extended from 8 to 20 microns. As noted by Langendorff (1) in 1889 there is no true basement membrane, the cells rest on the interfollicular, reticular connective tissue. Each cell is provided with a single circular nucleus which contains a thin chromatin network.

Two types of cells can be demonstrated in the follicular epithelium. These two types of cells probably represent phases of cellular secretion. One type is a large, pale, foamy variety with a centrally located nucleus averaging 7.8 microns in diameter. The other type is more numerous and smaller. It has a homogeneous protoplasm and a vesicular nucleus averaging 6.2 microns in diameter, lying toward the base.

Some follicles do not contain a lumen. Approximately 95 per cent, however, contain colloid substance. In some follicles the colloid does not fill the lumen completely. Roundish indentations often occur in the colloid, producing a scalloped appearance about its edge and are known as peripheral colloid vacuoles. The follicles presenting peripheral colloid vacuoles varies from 20 to 95 per cent. Frequently vacuoles were found deeply in the colloid and according to Severinghaus (3) are of a different nature. Severinghaus believes the peripheral colloid vacuoles are primarily a phenomena of colloid absorption, and are the result of either sections through the apical regions of absorbing cells or spaces left by their retraction. The writer believes colloid vacuolation is an indication of follicular activity. This conclusion is based upon observations of thyroid glands stimulated with thyrotropic hormone wherein increased vacuolation of the colloid occurs.

Large and small groups of interfollicular epithelial cells without a distinct lumen are present. These cells are almost spherical, average 13 microns in diameter, possess a homogeneous protoplasm and vesicular nuclei which average 6.4 microns in diameter. These cells compare favorably with the common thyroid cell described above. This observation lends support to the view of Wilson (4) in which he indicates these cells are merely tangentially cut portions

of follicular walls. The work of Zechel (5) and Nonidez (2) would indicate they are a distinct cell type. Zechel used the term "macrothyrocyte" to designate this cell type, while Nonidez used the term "parafollicular" cell.

CONCLUSIONS

Microscopical examination of thyroid glands of dogs sixteen weeks of age presents follicular diameter variation from 30 to 160 microns.

The follicles are lined with a columnar type of epithelium varying in height from 8 to 20 microns.

Two types of cells are described in the follicular epithelium.

Colloid is present in 95 per cent of the follicles.

Varying degrees of colloid vacuolation exists in the follicles.

Large and small groups of interfollicular epithelial cells without a distinct lumen are present.

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DEPARTMENT OF VETERINARY ANATOMY,
IOWA STATE COLLEGE,
AMES, IOWA.