

Histological Study of the Lingual Glands and Lingual Tonsil in Adult Awassi Rams (*Ovis ovis*).

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Abstract:

The present study included ten tongues specimens of adult awassi rams (*Ovis ovis*) collected from AL-Diwanyh abattoir immediately after slaughtering of the rams and make serial section to study the histological features of the tongue. In this study are present two types of glands in ram tongue are the first type von-Ebner's gland is serous compound tubuloalveolar glands, located under the circumvallate papillae, and seen mixed gland in the lamina propria of the circumvallate papillae which consist of mucus acini surrounded by serous acini. The second type Weber's glands were mucous compound branched acinar, located in the substance of the root region of the tongue. The secretion of lingual glands are discharge through the chain of duct system include intercalated duct, intralobular duct, interlobular duct and main excretory duct.

The lingual tonsils consist from a large aggregation of lymphoid tissue (large and small lymphocytes) which scattered within the connective tissue core of the circumvallate papillae not surrounded by capsule of connective tissue (uncapsulated).

Keyword: Lingual gland; lingual tonsil; tongue and ovis.

Introduction:

The Awassi breeds have wide spread throughout the Asia area and the greater numbers of Awassi is found in Iraq. It is numerically the most important sheep and concentrated in the middle of the country (1). The tongue of mammals has glandular accumulations called lingual glands. They were serous, mucous or seromucous types lying in the lamina propria, submucosa or between the muscle bundles of the tongue. In sheep and goat they were small lobules under the mucosa and embedded in the musculature on the ventral surface of the tongue near the frenulum (2). The caudal part of tongue in sheep has deep posterior lingual glands (von-Ebner's glands). They are small lingual salivary glands located under the circumvallate papillae (3). The Weber's glands are associated with the root of tongue which located under it in lamina propria as

well as between tunica muscularis (2). The lingual tonsils in mammals were accumulation of lymphoid tissue toward the root of the tongue on both sides (4; 5). They were diffuse lymphatic tissue in root of the tongue in sheep and goat (6).

The aim of study: Due to modicum's researches of histological characteristic features of Awassi ram tongue incite to design this study for providing basic histological data, to become available basis data for further studies of the pathological conditions in tongue.

Materials and methods:

Ten heads specimens of adult rams were collected from AL-Diwanyh abattoir immediately after slaughtering of the rams by separating of heads from the carcasses at the level of atlanto-occipital joint. The specimens were washed thoroughly with the (0.9 %) normal saline solution and then removed the skin, masseter muscle, all muscles attached with mandible and the mandible bone initially from one side. For its removal the mandible bone was saw at the level of mental foramen and disarticulated at the temporomandibular joint to facilitate the exposure of the tongue. After that ten specimens of complete tongues were dissected freshly and washed with (0.9 %) normal saline solution and then kept in 10% formalin approximately 48 hours at room temperature. From each tongue make serial section to study the histological features of the tongue.

Results

The histological study of the tongue in adult rams seen two types of lingual glands are the Von-Ebner's and Weber's glands and also seen lingual tonsil.

Von-Ebner's gland

The von-Ebner's gland is a serous compound tubuloalveolar gland, located under the circumvallate papillae in the lamina propria and extend deeply in the submucosa until reach to the muscular layers. These glands consist of variable numbers of lobules in different size and their ducts open at the bottom of the groove surrounding the circumvallate papillae. The lobules were seen separated from each other by muscles bundle, adipose tissue and little amount of loose connective tissue which rich in blood vessels and nerve fibers (Fig.1). The lobules consist of densely packed acini cells, lined by pyramidal cells. The serous acini cells have a rose shape with narrow lumen, stained darkly with (H&E) stain from pink to purple (Fig. 2). while appearing light with (PAS) stain and have round nuclei that lie toward the base of cell.

Seen mixed gland consist of mucus acini which surrounded by a serous acini from one or more sides (serous demilunes) which formed the lobules, it was seen in the lamina propria of the circumvallate papillae only, and do not extend to submucosa, it was supported by a connective tissue dividing the glands into lobules and form capsules around them. Elongated cells were (myoepithelial cells) present at the periphery of the acini surrounding mainly the secretory portion cells (Fig. 3).

Weber's glands (Posterior lingual gland):

The Weber's gland is a mucous compound branched acinar, found in the root region. The glands have a variable number of lobules which present within lamina propria as well as extending to the muscular layer and open in the epithelial surface of the tongue in the root region, some of lobules located deeply to von-Ebner's glands in the muscular layer.

The lobules are different in size and shape, supported by a loose connective tissue which contains collagen fibers, blood vessels, nerve fibers, and adipose tissue separating between the lobules. Each lobule consist from densely packed of rose shape mucous acini lined by relatively large pyramidal cells, give positive reaction with (PAS) and has small round nuclei located at the base of cell near from the basement membrane. A small lumen seen in the center of acini and small spindle cell (myoepithelial cell), observed in the margin of acini between the epithelial cells and their basement membrane (Fig.4, 5, 6).

The duct system of lingual gland:

A. Intercalated duct

The ducts are appear clearer in the Weber's than the von-Ebner's glands. They are located among the acini's of lobule, where the lumens of acini open to the duct. They are lined by a simple cuboidal epithelium with large round to ovoid dark nuclei rested on the basement membrane (Fig. 2, 5).

B. Intralobular excretory duct

It is usually appear located inside of the lobules. These duct larger in mucus than serous acini and lined by a simple cuboidal epithelial tissue with round to ovoid nuclei found near the base of the cells (Fig.2, 5, 6).

C. Interlobular excretory duct

it is located among the lobules in the connective tissue, the duct is note lined by simple columnar cells with rounded to flat nuclei found near the base of the cells which convert to stratified cuboidal or squamous when extend toward the epithelial surface to form the main duct. (Fig. 2, 5, 6).

D. Main excretory duct

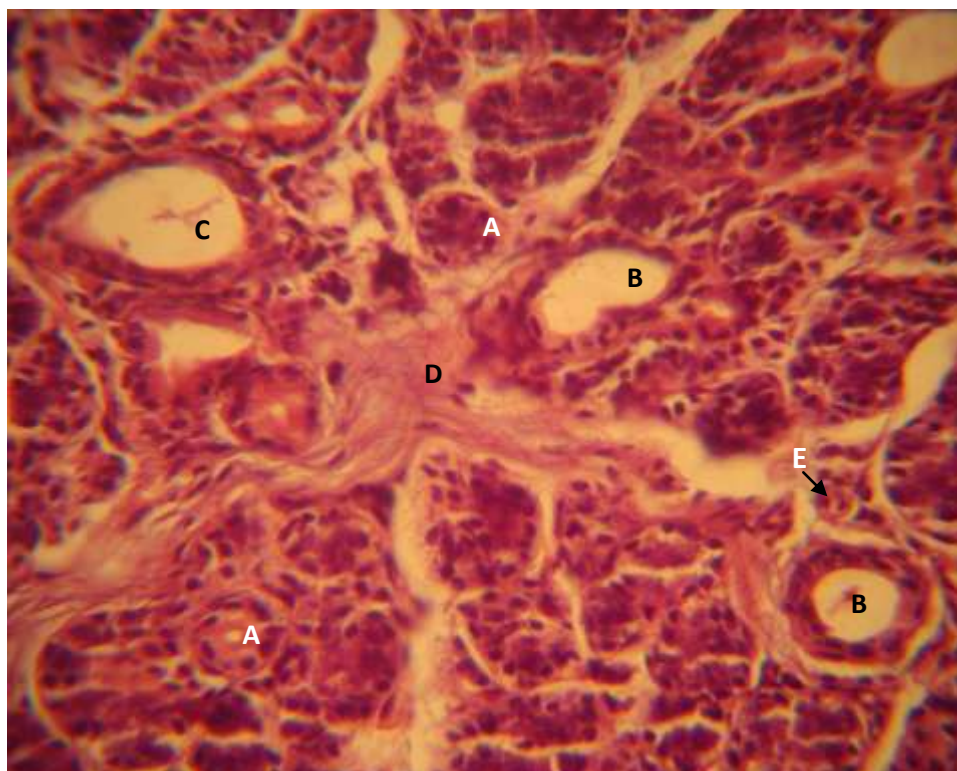
The duct is observe near the epithelial surface and open in the groove of the circumvallate papillae in the von-Ebner's glands, while it opened in the epithelial surface in the Weber's gland, it is lined by stratified cuboidal epithelium. The duct is seen lined by (2-3) layers of cells (Fig. 1, 4).

Lingual Tonsils

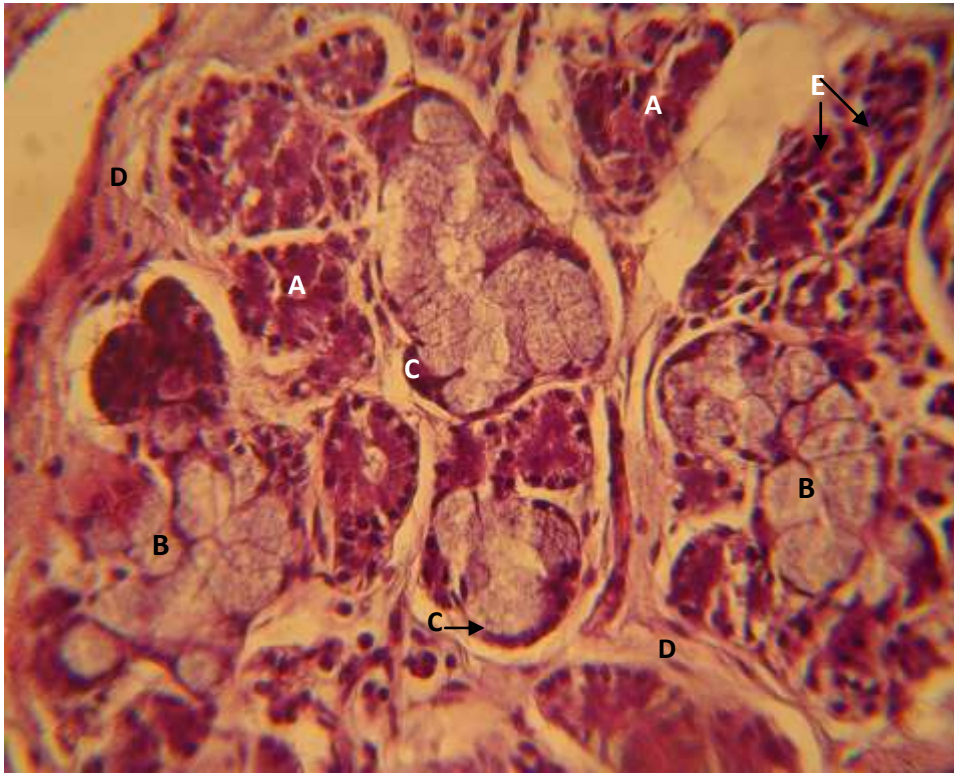
Observed as a large aggregation of lymphoid tissue consisting from large and small lymphocytes, scattered within the connective tissue core of the circumvallate papillae not surrounded by capsule of connective tissue (uncapsulated), especially in the posterior third. They were covered by a thin keratinized stratified squamous epithelium and no epithelial modifications associated with the underlying lymphoid tissue, but sometimes seen small aggregation of lymphoid tissue in epithelial layer of conical papillae region and diffuse of lymphocyte in the root region (Fig. 1, 7, 8).



(Fig. 1) Cross section of circumvallate papilla in dorsal surface of the tongue explain the Von-Ebner gland with main duct and lingual tonsil: A- Circumvallate papilla. B- Von Ebner gland. C- Excretory duct D-Lingual tonsil E- Taste buds. F-Muscle bundle. G-Connective tissue core. K-Mixed gland. M- Submucosa N-Capillary. O- Keratinized stratified squamous epithelium. (H&E), (40X).



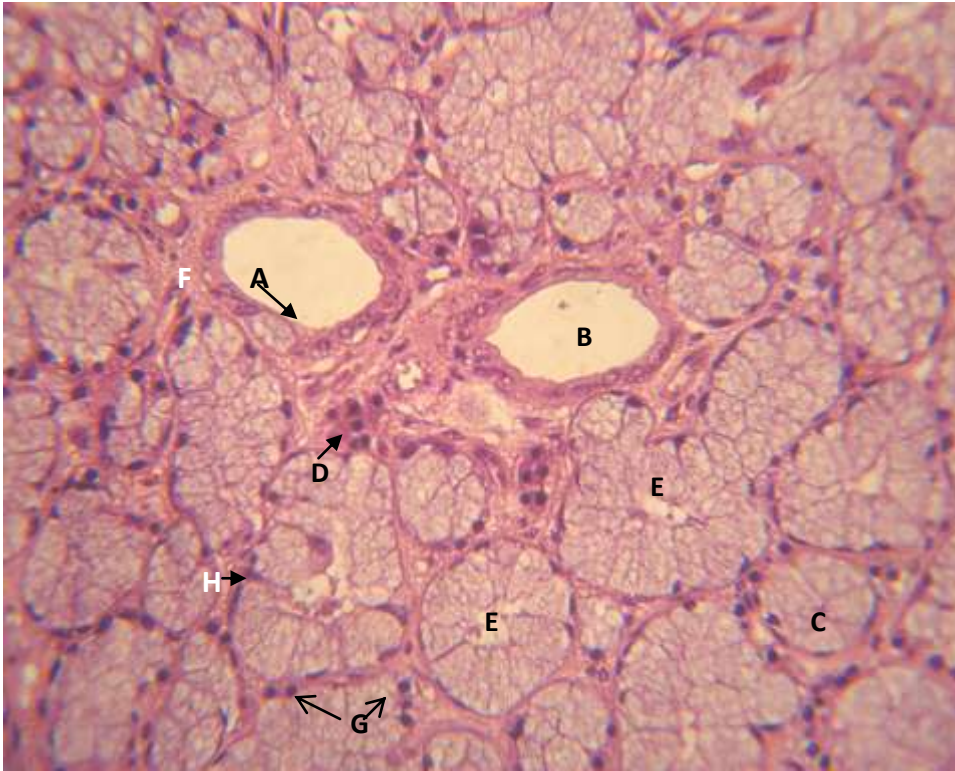
(Fig.2) Cross section of von Ebner's gland in the ventral surface of the circumvallate papillae: A-Serous acini. B-Intralobular duct. C-Interlobular duct. D-Connective tissue. E-Intercalated duct. (H&E), (400X).



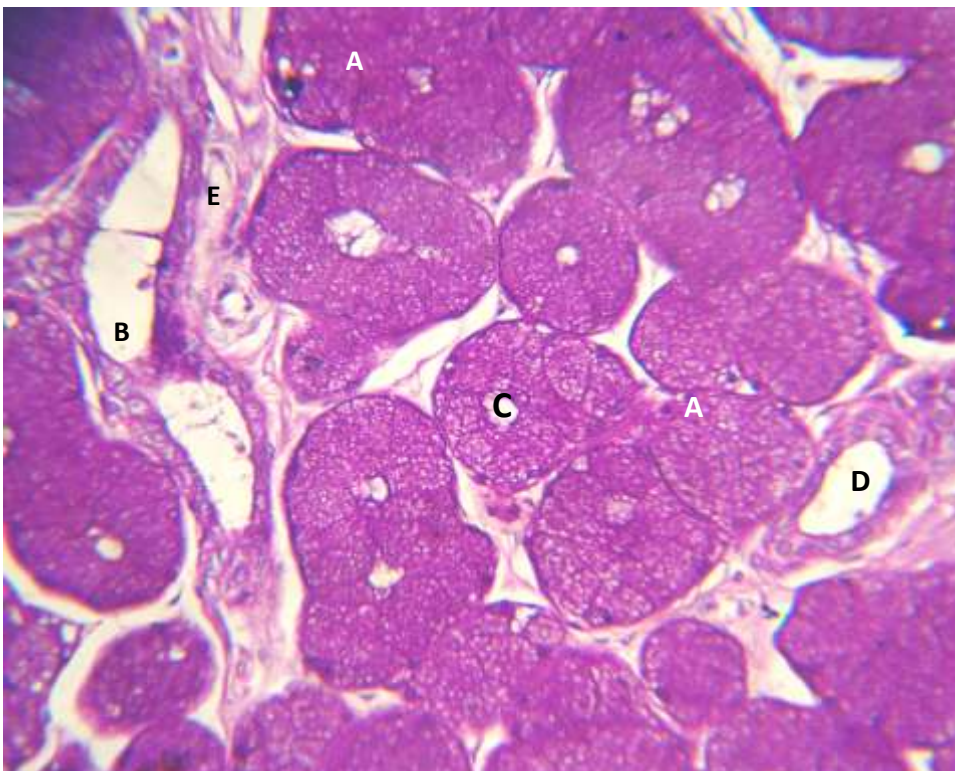
(Fig.3) Cross section of mixed gland under the circumvallate papillae: A- Serous acini. B- Mucous acini. C- Serous demilun. D-Connective tissue. E-Nuclei (H&E), (400X).



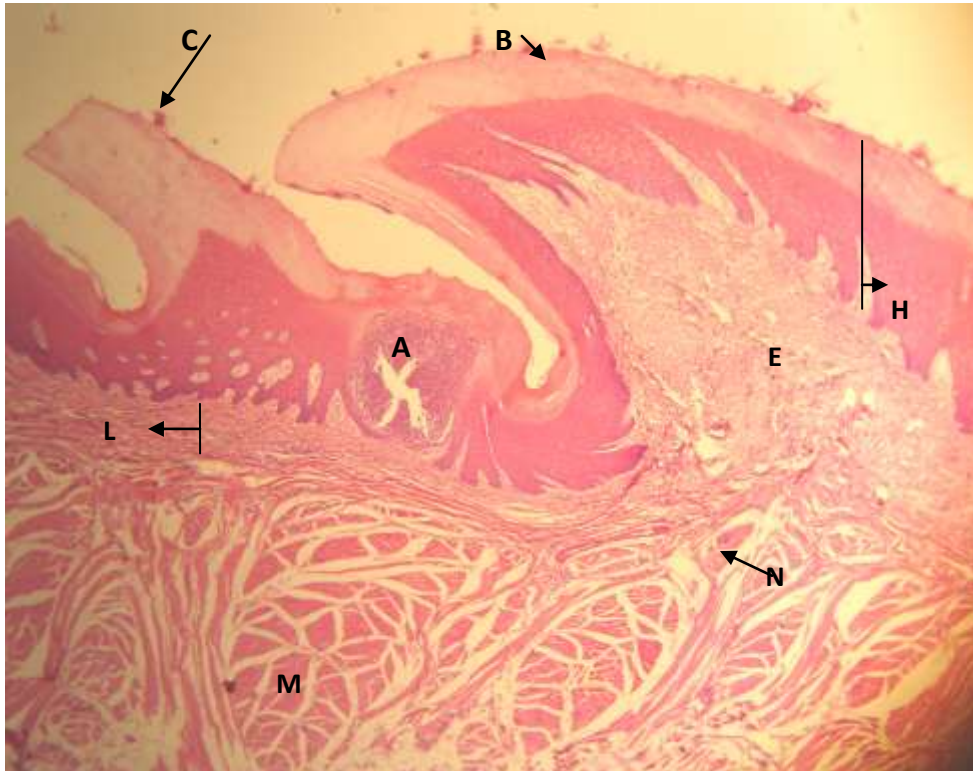
(Fig.4) Cross section of dorsal surface in the lingual root explain the Weber's gland with main duct : A- Weber's gland (Mucous gland). B- Excretory duct. C- Lumen of main duct. D-Lamina propria. E- Muscle bundles. F- Nonkeratinized stratified squamous epithelium. G- Adipose tissue. H- Arteriole. (H&E), (100X).



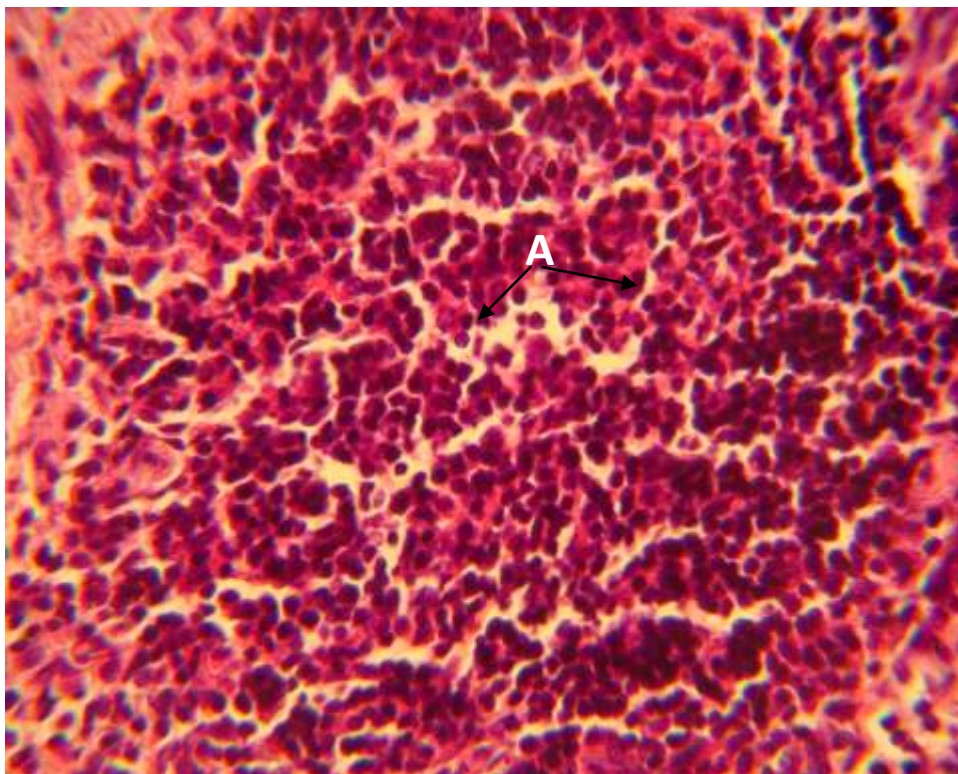
(Fig.5) Cross section of Weber's gland in lingual root region: A-Intralobular duct. B-Lumen of duct. C- Mucous acini. D- Intercalated duct. E- Lumen of acini. F- Connective tissue. G- Nuclei. H-Myoepithelial cell. (H&E), (400X).



(Fig.6) Cross section of Weber's gland in the lingual root region: A- Mucous acini. B-Interlobular duct. C-Lumen of acini. D-Intralobular duct. E-Connective tissue. (PAS), (400X).



(Fig. 7) Cross section of large and small conical papillae from dorsal surface of tongue explain the lingual tonsil: A- Lymphoid tissue. B- Large conical papilla. C- Small conical papilla. E- Connective tissue core. H-Keratinized stratified squamous epithelium. L-Lamina propria. M-Muscle bundles. N-Nerve fiber.(H&E), (40X).



(Fig.8) Cross section of lingual tonsils from circumvallate papilla:

A- Large and small lymphocytes. (H&E), (400X).

Discussion:-

The von-Ebner's glands are seen as a serous compound tubulo alveolar gland located under the circumvallate papillae in the lamina propria and extended deeply in submucosa reaching to muscular layer. These findings coincide with (3) in sheep,(7) in mammals, (8) in domestic animals, (9; 10) in buffalo, (11) in ox, buffalo, and camel, (12) in deer, while in contrast with(3) in goat the von-Ebner's glands was mucous type and had strong PAS reaction.

In the present study seen mixed gland ventral to the circumvallate papillae, it was located only in lamina propria and did not extend to submucosa, it was consist of mucous acini which surrounded by serous acini and supported by connective tissue which divided the glands to lobules and forms capsules around them, and this agreement with (13) in camel mentioned that, the von-Ebner's glands was seromucous in type.

In peripheral of the acini present myoepithelial cells which was special cell surrounds mainly the cells of its secretory portion. These similar findings with, (10) in buffalo.

The Weber's gland was seen as mucous compound branched acinar gland located in the root region. It present within lamina propria as well as extending between the tunica muscularis and opened in the epithelium surface of the tongue in the root region. This is accordance with (2) in domestic animal, (14) in goat, (10) in buffalo, (15) in equine, but was disagreement with (13) in camel who mentioned fact that these glands are mixed in type.

These secretion of glands (Von-Ebner's and Weber's) act as protective coat to mucous membrane of dorsal surface of tongue, lubricate of food to assist the swallowing bolus and provide a neutral environment for taste buds to taste process (5; 8) in domestic animals.

The excretory system of the von-Ebner's and the Weber's glands of rams, pass a long system of ducts like that found in the major salivary glands is made up of intercalated ducts, intralobular excretory ducts, interlobular excretory ducts and main duct.

This result was disagreement with, (13) in camel, (10) in buffalo who mentioned that the excretory system of the von-Ebner's glands consist from intercalated ducts, excretory ducts and main duct, while the striated ducts are absent, while the excretory system of the Weber's glands formed by excretory and main ducts only.

The lingual tonsil was not macroscopically visible and microscopically consist from a large aggregation of lymphoid tissue scattered within connective tissue core of the circumvallate papillae and no epithelial modifications associated with the underlying lymphoid tissue. This result in accordance with (16) in sheep, but was disagreement with (4; 5; 6; 17; 18) in mammals, (10) in buffalo, (19) in sheep, (20; 21) in bovine (22) in equine, mentioned that, the lingual tonsils are accumulation of lymphoid tissue toward the root of the tongue on both sides.

In the present study seen diffuse of lymphocytes in the root region, and this was accordance with (6) in sheep and goat.

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دراسة نسيجية للغدد اللسانية واللوز اللسانية في الخراف العواسية البالغة (*Ovis ovis*)

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الخلاصة:

شملت الدراسة الحالية عشرة عينات من لسان الخراف العواسية البالغة (*Ovis ovis*) جمعت من مجزرة الديوانية بعد ذبح الخراف مباشرة، وتم عمل سلسلة من المقاطع النسيجية لدراسة المواصفات النسيجية للسان. في الدراسة الحالية وجد نوعين من الغدد اللسانية في لسان الخراف العواسية وهي النوع الأول غدة فون أبير وهي غدة مصلية مركبة نيبية نسيجية، تقع أسفل الحليمات الكأسية، وايضا يلاحظ وجود غدة مختلطة في الصفيحة الأساسية للحليمات الكأسية والتي تتكون من اسناخ مخاطية محاطة باسناخ مصلية. والنوع الثاني غدة ويبر وهي غدة مخاطية مركبة نسيجية متفرعة، تقع في منطقة جذر اللسان. إن إفراز الغدد اللسانية يطرح من خلال سلسلة من النظام القنوي يشمل القناة البينية والقناة داخل الفصيصة والقناة بين الفصيصات والقناة الإفرازية الرئيسية.

تتكون اللوز اللسانية من تجمع كبير للنسيج اللمفاوي (الخلايا اللمفاوية الكبيرة والصغيرة) المعزول داخل النسيج الضام للحليمات الكأسية وهي غير محاطة بمحفظة من النسيج الضام الرابط.

