

Histomorphological investigation of tongue of porcupine hystrix cristate

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Abstract:

Anatomical and histological explorations of the tongue in the five of the adult male Porcupine (*Hystrix cristata*) aggregating from AL-Diwanyha city by the hunter, After porcupine prepared the tongue illustrious after that the position, shape dimensions were enrol. The round shape of apex the tongue. The square-shape of body, thicken less steadily toward caudal part of tongue. Root was tends caudally in the direction of the epiglottis. Torus linguae found on the caudal part of the dorsal surface. In the end of lateral surface of tongue have foliate papilla osculate the premolar teeth. The length of the tongue (7.6 ± 0.66) cm. root were apex was (1.25 ± 0.23 cm), body was (4.95 ± 0.2 cm), and (1.4 ± 0.26 cm) in that order. The width of the tongue (1.80 ± 0.77) apex, body, and root were (0.35 ± 0.49) cm, (1 ± 0.22 cm) and (0.45 ± 0.14) respectively. In the dorsal and lateral surface have muscle fibers from skeletal type and loose connective tissue bounded by keratinized stratified squamous epithelium while in the ventral lingual surface were non-keratinized. In the dorsal surface of body found Filiform papillae, very little at the apex at the lateral surface of the body. Circumvallate papillae were round shape similar to furrow, taste buds on the both dorsal and lateral sides. Fungiform papillae had wide curved keratinized surface, with taste buds on the dorsal surface. Lamina propria and submucosa was loose connective tissue with more of collagen fiber.

Key words: porcupine Filiform, Circumvallate, Fungiform, Foliate

Introduction

Rodents include the largest and most varied group of mammals with over 1700 different types. The porcupine belongs to the Hystricidae family which form a small group of the order Rodentia (1,2). Although some morphologic studies on the organs of the porcupine (3,4,5). have been investigated, no work on the morphology of the tongue of the porcupine has been reported in the literature. In this study, the tongue structure of the porcupine (*Hystrix cristata*) was examined grossly and microscopically. green vegetation (1, 2, and 3). The tongue is muscular organ consist of two surfaces and two borders. The tongue regarded highly mobile muscular organ (4 and 1). The lingual surface was characterized by large number projection called the lingual papillae which different in shape and size such as (filiform, fungiform and circumvallate) which found in all animals (2 and 3). The tongue of rabbit has four types of lingual papillae which were dissemination on lingual surface :filiform, foliate, fungiform and circumvallate (5). Filiform papillae were conical in shape and show different heights and thicknesses at various levels. Fungiform papillae were rounded and surrounded by robust filiform papillae. They can also be observed on the tip of the ventral surface. They had taste pores on their surfaces. Circumvallate papillae were encircled by a primary groove and an annular pad. Their taste pores open into this groove (6). Fungiform circumvallate, and foliate papillae contain taste buds therefore called lingual gustatory papillae that

specialized peripheral sensory organs involved in perceiving chemical stimuli and in taste transduction. Fungiform papillae located on the anterior dorsal surface of the tongue and a single circumvallate papilla located in the midline at the posterior part of the tongue in rodents (7,8). **Histological Features:** The epithelium of the pig is stratified squamous type with varying degree of keratinization. It is thickest on the dorsal surface where it has thick stratum corneum and thinnest on the ventral surface where it may be non-keratinized. The filiform, conical and lenticular papillae facilitate the movement of ingesta within the oral cavity, while the fungiform vallate and foliate papillae contain taste buds which are responsible for mediation of sense of taste, and differ in shape and are named according to their morphologic characteristics (9).

Material and Method

Five healthy adult male *hystrix cristata*, all the animals were obtained from local hunters in diwanyah for this study anaesthetized with an intramuscular injection of ketamine (35 mg/kg) and xylazine (5 mg/kg) (10). The induction time recorded from the time of injection of Ketamine to the complete loss of consciousness then opened the thoracic cavity and well bleeding by puncture of the heart at the right atrium. Experimental design in the animals divided into two groups five of porcupine for anatomical study and other five for histological study. Anatomical depiction was done position, shape, and dimensions were recorded, then the target organ separated carefully and removal of the extrinsic muscles (styloglossal, hypoglossal and genioglossal) from the tongue were done and record the morphological features and biometrical parameters by using vernier callipers, threads and a centimeter scale. Subsequently listed the following data: 1-Measured mean length of the total tongue, apex, body, and root, 2-Measured mean width of the apex, body, and root at the widest part. Five specimens of tongue were dissected out and washed with normal saline solution (0.9% NaCl), after organ cleaned and segmented to four parts (apex, body, and root) put in the special cassette were fixed immediately in neutral buffer formalin (NBF10%) at room temperature for 24 hrs serially. The routine histological processing had been done: (11).

Results and Discussion

Anatomical results

Tongue of grown male porcupine (*hystrix cristata*) occupies the bigger part of oral cavity and rolls over into oropharynx, root set in hyoid bone, palatoglossal arch tucks up the soft palate with the tongue and its backstop by extrinsic lingual and hyoid muscles (Fig.1). Type of food plays a very important role in all anatomical features of the tongue in this study, agreement with (8). The general colour of the tongue was homogenous pinky color, this outcome unaccordance with (8, 12), while agreement with (13) in rabbit, its averaged 7.6 cm in length and 1.8 cm width in the body region, this study is disagreement with (8). In *hystrix cristata*. Appearance of the tongue was appropriate with the anatomical structures of the oral cavity like porcupine in

this study different from tongue in other animals like donkey *Equus asinus* observed that the spatula-shaped tongue . The median sulcus was inmost in the anterior third than the middle third of the tongue, the posterior third had a scarce median sulcus. The dorsal surface of the tongue was mantled with non-keratinised stratified squamous epithelium underscoring by lamina propria and a muscular layer. The tongue of the porcupine had a curvaceous anterior protrusion and the cape of the tongue was twirled. There was a bottomless fossa in the middle of dorsal surface of the tongue . The tongue was also supported by coupled mylohyoideus muscles that hoist it between the lowermost jaws. The tongue can be alienated into a free apex, body and root. The apex of the tongue was almost rounded which formed by encounter of the dorsal and the ventral surfaces, has twirled lateral borders .Decreased the width and increased the breadth of the apex gradually in the direction of the body. The apex characteristics of the tongue of the hystrix cristate in this study corresponded with of the (12) in rat, but uncoincided with him in the shallow median longitudinal groove on the dorsal surface of apex, with (13,14) who mentioned that, the apex of the tongue was notched in the center and somewhat flattened in mice (15). Major part of tongue the body that square-shape, restricted between apex and root that starts tapered, then thickening increase gradually toward root. The last part of the tongue was the root which cliff ventrocaudally toward the bottom of the epiglottis. The dorsal surface of the tongue characterized by eminent triangular mass in the caudal part of the body cranial to the root called torus linguae and lingual fossa is present. The prominent torus linguae of the posterior area of the body of the tongue like other grass eating animals which have a well-developed torus linguae (14, 15,16, 17, 18, 19, 20). While incompatibility with the (21) . the base toward root and apex toward apex, calculation to that the median longitudinal groove which divided this surface to two equal halves which extend from apex of linguae fossa to the initial part of the apex of tongue.(Fig.1) .Found the four types of lingual papillae coordinated with (13) in the rabbits. But uncoordinated with (14, 20, and19) were allocation on the tongue surfaces filiform, circumvallate, foliate and fungiform . The filiform papillae were bent, together with this a large connective tissue core and were alienated by wide interpapillary zones covered by a thick epithelium. Most filiform papillae had a cylindrical shape, but the rostral and central parts of the tongue contained a number of flat, comb-shaped papillae with cornfield tips.(Fig.3). Density and shape of filiform papillae impart a velvety feel and gave the tongue a rough surface assist to grooming, movement of the food toward the pharynx to provide additional protection for the tongue this agreement with (17, 19, 20 and 21).The foliate papillae were located on the postero-lateral borders of the tongue . Taste buds were located intraepithelial in the basal half of the papilla grooves (sulcus papillae). Foliate papillae in rabbit they are well developed, whereas in the cats were rudimentary, and in ruminants were not present (13,23,24). The fungiform papillae were mushroom in form and enclosed squamous epithelium. They had surrounding or oval outlines. The fungiform papillae were scattered on the dorsal midline behind torus lingua, its absent in apex and lateral edges of the dorsal surface . However they were common on the posterior one-thirds of the tongue and its number 7-8.Circumvallate papillae, round and

have a depression around the center, with tiny elevation from lingual surface, surrounded by papillary furrow at the dorsal surface of the root caudal of the base of the torus linguae number of it 1-2 (Fig. 4) . Addition to that coarseness of the lingual surfaces depends on the type and degree of contact of food and cornified nature of these surfaces, this cornified because types and heavy distribution of the lingual papillae on the other hand. These were effectively increased on the surface areas and play the functional role of receiving the taste sense.

Histological results :

The tongue of porcupine in this study histologically made up of brads bundles of skeletal muscle fibers and loose connective tissue bounded by stratified squamous epithelium keratinized at the dorsal and lateral lingual surfaces, non-keratinized at the ventral lingual surface. Dermal papillae at the apex longer than other parts of the tongue (Fig. 5). frequent very limited lamina propria submucosa (Fig. 6), at the lateral surface connected with foliate papillae it was more than the later (Fig. 8), at the apex it was more than the later and at the corpse it was more than the later (Fig. 7). Submucosa very vascular, mucous salivary acini with excretory ducts which dotted at the body and root of tongue. The dorsal surface of the tongue. In this study appear bristlier than the other, and ventral surface non keratinized this fact irregularity with were had cornified epithelium, but the 23),24 , (22said all surfaces of the tongue dorsal epithelium was thicker than the lateral and lower ones in porcupine Variety of filiform papillae in this study incongruity with (25) who explained filiform papillae in the anterior part were numerous, conical shaped with vertical orientation, and a depression on the posterior part; but in front of the torus they were relatively tighter and taller than the papillae in the anterior part. These variations depend upon the degrees of food contact and animal used of the tongue in the daily uses.

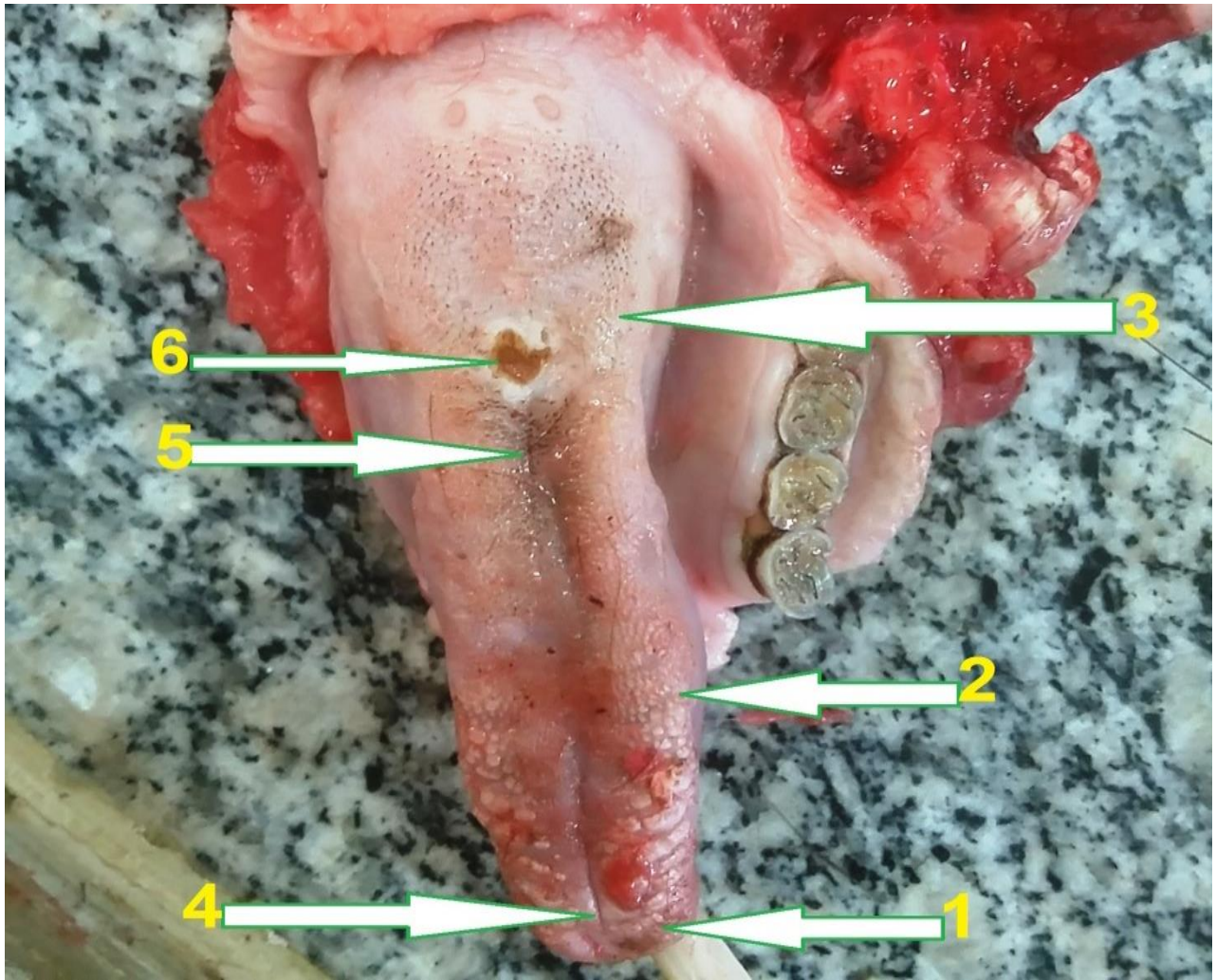


Fig.1:morphological of tongue show:1-apex 2- corpus 3-root 4-midline sulcus 5- lingual fossa
6- tourus lingue

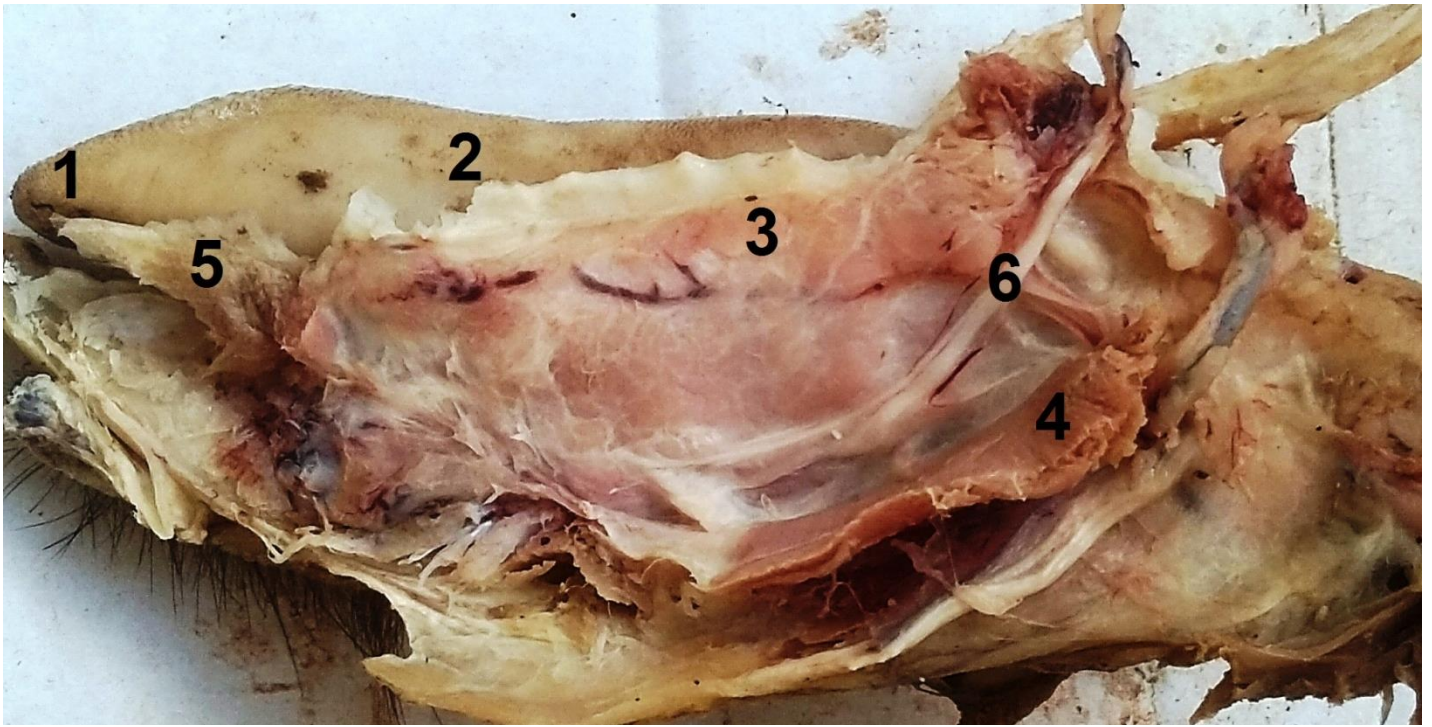


Fig.2.morphological view show:1-apex 2- body 3- lingual salivary gland 4- myohyoidus muscle 5- lingual frenulum 6-sublingual nerve .

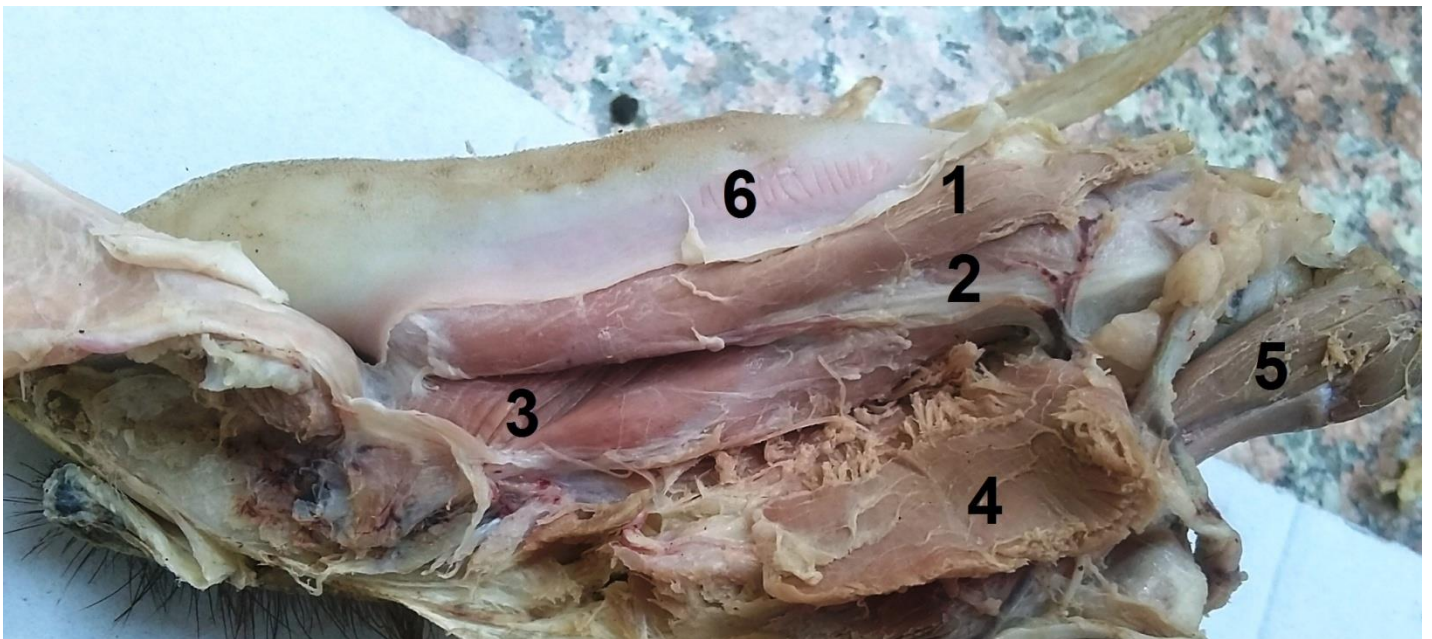


Fig.3.muscles of tongue 1-styloglosses 2-hyoglosses 3 – genioglosses 4- geniohyoidus 5- styloglosses 6- foliate papillae



Fig.4. Tongue papillae 1- filiform 2- fungiform 3- circumvallate

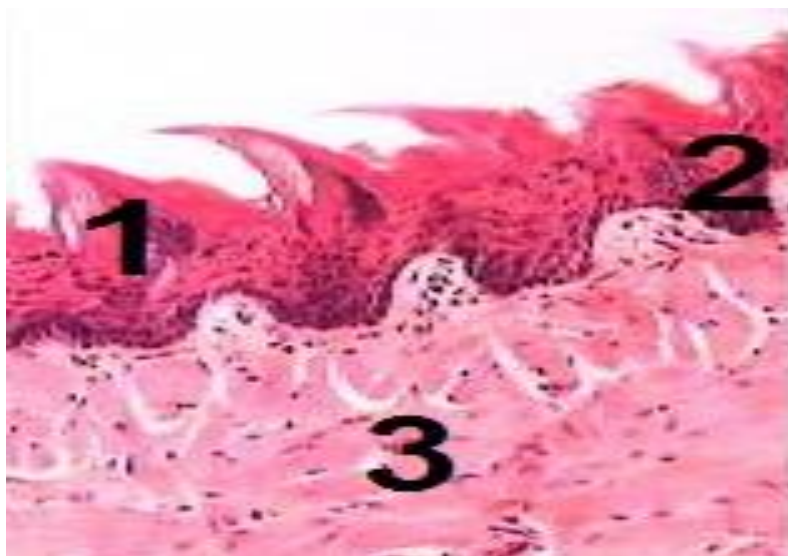


Fig.5. Filiform papillae 1- stratified squamous epithelial tissue 2- lamina propria 3- skeletal muscles H and E 10X

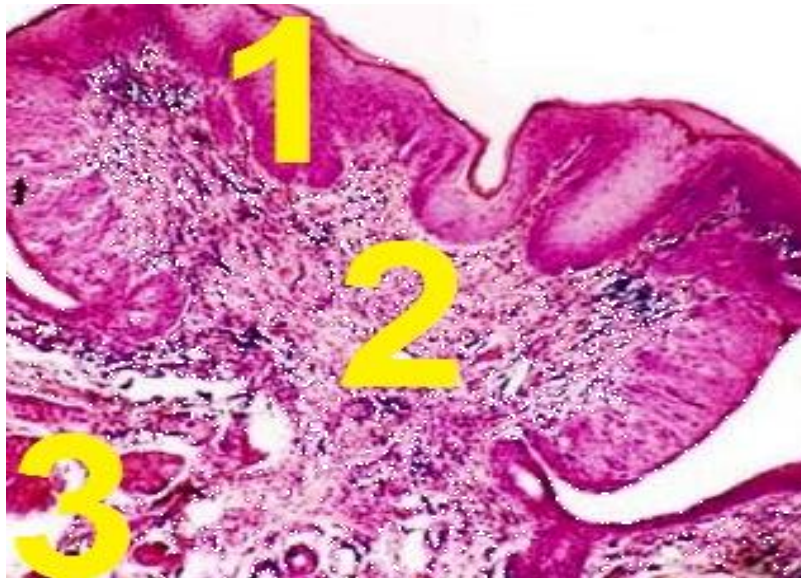


Fig.6.circumvallat papillae 1- stratified squamous epithelial tissue 2- lamina propria 3- skeletal muscles H and E 10X

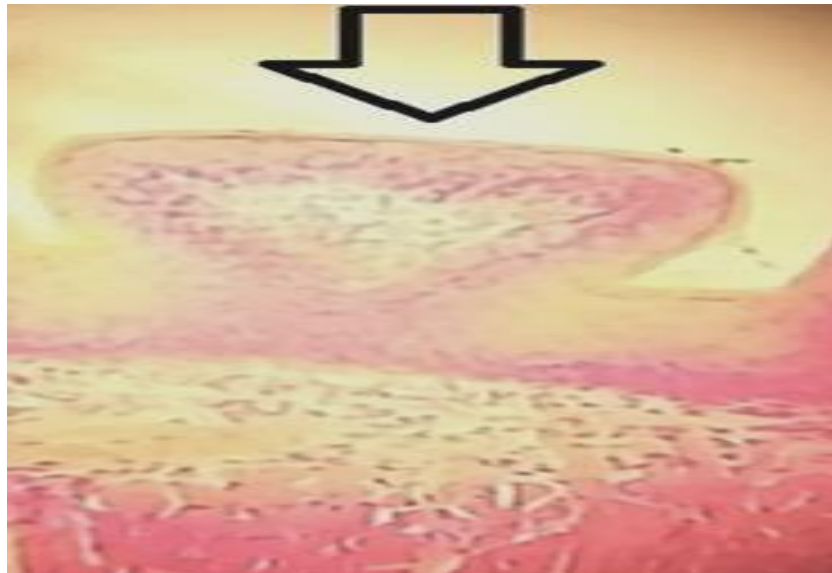


Fig.7.Fungiform papillae H and E 10X

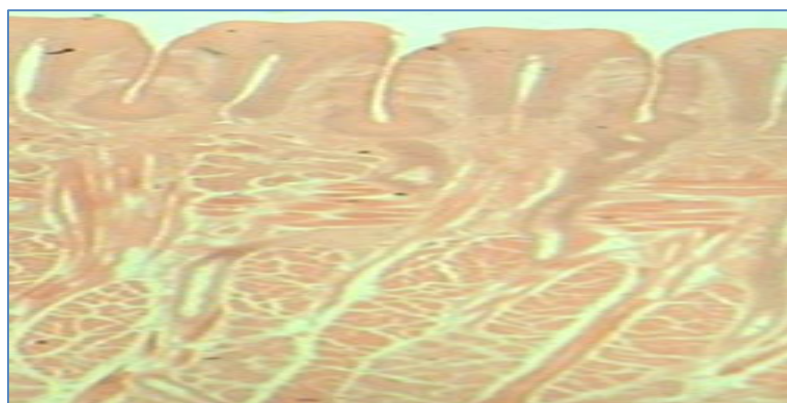


Fig.8.folliat papillae H and E 10 X

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دراسة شكلية ونسجية للسان الدعلج

hystrix cristate

الخلاصة :

الوصف العياني والمجهري للسان خمسة من ذكور الدعلج البالغة والتي جمعت من محافظة الديوانية من قبل الصيادين .بعد تحضير الدعلج ميز اللسان ثم سجلت قياسات ابعاد الشكل والموقع .قمة اللسان مدورة الشكل تقريبا الجسم مربع الشكل وسمكة يقل تدريجيا كلما اتجهنا خلفيا . جذر اللسان ينحدر بطنيا خلفيا باتجاه لسان المزمار. المرتفع اللساني في الجزء الخلفي للسطح الظهري .يحتوي السطح الجانبي على الحليمات الورقية والتي تقابل الطواحن معدل طول اللسان الكلي و القمة والجسم والجذر كانت (7.6 ± 0.66) سم (1.25 ± 0.23 سم)، (0.2 ± 4.95 سم)، و (0.26 ± 1.4 سم) بالترتيب . كان عرض اللسان الكلي والقمة والجسم والجذر (0.77 ± 1.80) (0.49 ± 0.35) سم، (0.22 ± 1 سم) و (0.14 ± 0.45) على التوالي . السطح الظهري والجانبي لها ألياف العضلات من نوع الهيكل العظمي والنسيج الضام فضفاضة تحدها الظهارة الحرشفية الطبقة الكيراتينية ينما في السطح البطني لينغوال كانت غير كيراتينيزد. في السطح الظهري من الجسم وجدت الحليمات فيوريفورم، القليل جدا في قمة في السطح الجانبي للجسم .وكانت الحليمات سيركومفالات شكل دائري على غرار ثلم، براعم الذوق على كلا الجانبين الظهرية والجانبية . الحليمات الفطرية لها سطح كيراتيني مقوس واسع، مع براعم الذوق على السطح الظهري .الصفحة بروبريا والطبقة تحت المخاطية كانت النسيج الضام وفير من ألياف الكولاجين.