

Morphological and histological studies of the tongue and lingual papillae of the local rabbit

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Abstract

In the local domestic adult rabbit (*Oryctolagus cuniculus*) the gross anatomical and light microscope examination were conducted on the tongue and lingual papillae. The results of this study indicated that the lingual papillae include: filiform papillae (two subtypes), dom – like fungiform papillae, two vallate papillae and two oval shape foliate papillae. The collagen fiber layer was thin in apex and gradually thickened to word the root of tongue.

Introduction

The tongue is composed primarily of skeletal muscle .it occupies the greater part of the oral cavity proper and extends into the oropharynx. The tongue is responsible for lapping water prehension of food, manipulating the food within the mouth and swallowing.it possesses receptors for taste,temperature and pain (1). In mammals, the tongue usually carries taste buds on the fungiform , circumvallate and foliate papillae on the lingual dorsum (2, 3, 4 , 5, 6, 7, 8,9,10 and 11).

The tongue of several species of animals have been studied especially

Materials and methods

The tongue of (12) healthy adult domestic rabbits (*Oryctolagus cuniculus*) of both sex were used in this study six tongues (three males and three females) were fixed in 10% formalin solution for light microscopy in preparation for light microscopy

the structure of taste buds, form, a morphological and histological point of view the gustatory papillae have been studied by (4) in cat,(12) in hamster (13) in rat,(14) in mongoss,(15) in giant panda, (16) in raccon dog and fox, (17) in Japanes marten and (8 ,18 , 19 and 20) in ruminants.

Rabbit tongues have been useful for morphological studies, the morphology and lingual papillae in rabbits is provided by (2, 7, 9, 21, 22,23,24,25 and26).

The present study was designed to provide morphological and histological studies for the tongue and lingual papillae of the local rabbit.

paraffin embedded specimens were cut and stained with hematoxylin and eosin and trichrome staines (27).For general description and lingual papillae six tongues were obtained from six adult rabbits (three males and three females), then the tongues were rinsed by running water.

Results

General macroscopic description of the rabbit tongue and lingual papillae: the rabbit tongue was relatively narrow and long, can be divided into three parts: apex, the anterior part of the tongue and makes up almost half of the tongue, the middle part has a lingual prominences located at the intermolar region close to the posterior half area of the tongue .the posterior part is a narrow region located at the lingual root. The mean length of tongue in the rabbit was (4.7 cm) and height at the lingual prominence (1.44 cm). Four types of lingual papillae were observed: filiform papillae, fungiform, foliate and vallate papillae. Filiform papillae distributed on the entire length of the dorsal surface of the tongue, fungiform papillae were distributed on the anterior part of the rabbit tongue. Two foliate papillae were oval-shaped located at the postero-lateral part of the lingual prominence, two vallate papillae were located slightly lateral to midline of lingual prominence, (fig 1).

Light microscopic observations of the rabbit tongue: the epithelial layer of the body of the tongue consisted of a stratified keratinized squamous epithelium in the apex and body , connective tissue underneath and muscle fibers arranged in several directions: longitudinal, transverse and vertical and connective tissue in between.

Filiform papillae on the tongue in the rabbit were densely arranged on the entire dorsal surface and continued to the lateral borders their size and shape varied according to the location, in the anterior part ,from the apex to the anterior border of the lingual prominence there were conical filiform papillae while spear head –like filiform papillae were distributed on the anterior margin of the lingual

prominence, (fig 2).

Fungiform papillae were distributed among filiform papillae on the dorsal surface of the apex and body of the tongue, in the front of the lingual prominence and on the margins of the tongue, more over fungiform papillae are located laterally in relation to the torus of the tongue .They were circular in shape and filiform papillae was higher than fungiform papillae (fig3).

A pair of foliate papillae was found in the posterolateral part of the tongue ,each was oval in shape and had parallel ridges separated by grooves (fig 4).In the root part of the rabbit tongue, the dorsal epithelium was stratified, non-keratinized squamous epithelium and there was a pair of vallate papillae ,each papillae had acircular form with of depression around the center (fig 1).

From the result of our study appear that the straighted skeletal muscle fiber with three direction: longitudinal ,transverse and vertical, the distribution of this muscle fiber differ in according to region of parts of the tongue : in the apex ,the transverse and vertical muscle fiber were more than the longitudinal muscle fiber ,while in the middle of the tongue ,the longitudinal muscle fiber was more than the others , (fig5). Several mucous and serous salivary gland appear underneath the muscular layer in the body of the tongue, (fig 6).

Collagen fibers arranged underneath the epithelium layer and in between the muscle fibers. The thickness collagen fiber layer differ from apex to the root, in apex the collagen fiber layer were thin, (fig 7) and thickened to word the root were appeared thicker than the apex , (fig 8).

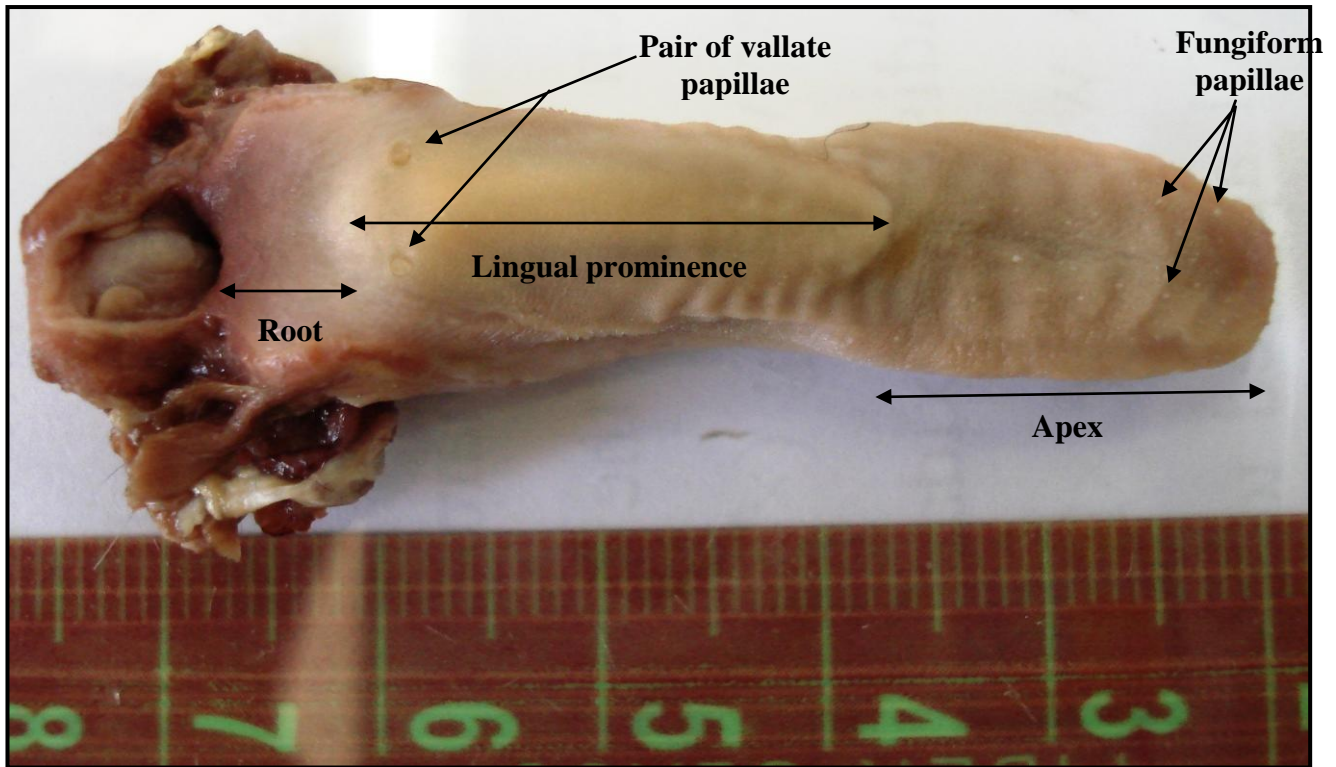


Fig 1: Tongue of rabbit. Notice the three parts of tongue and the position and distribution of fungiform and vallate papillae.

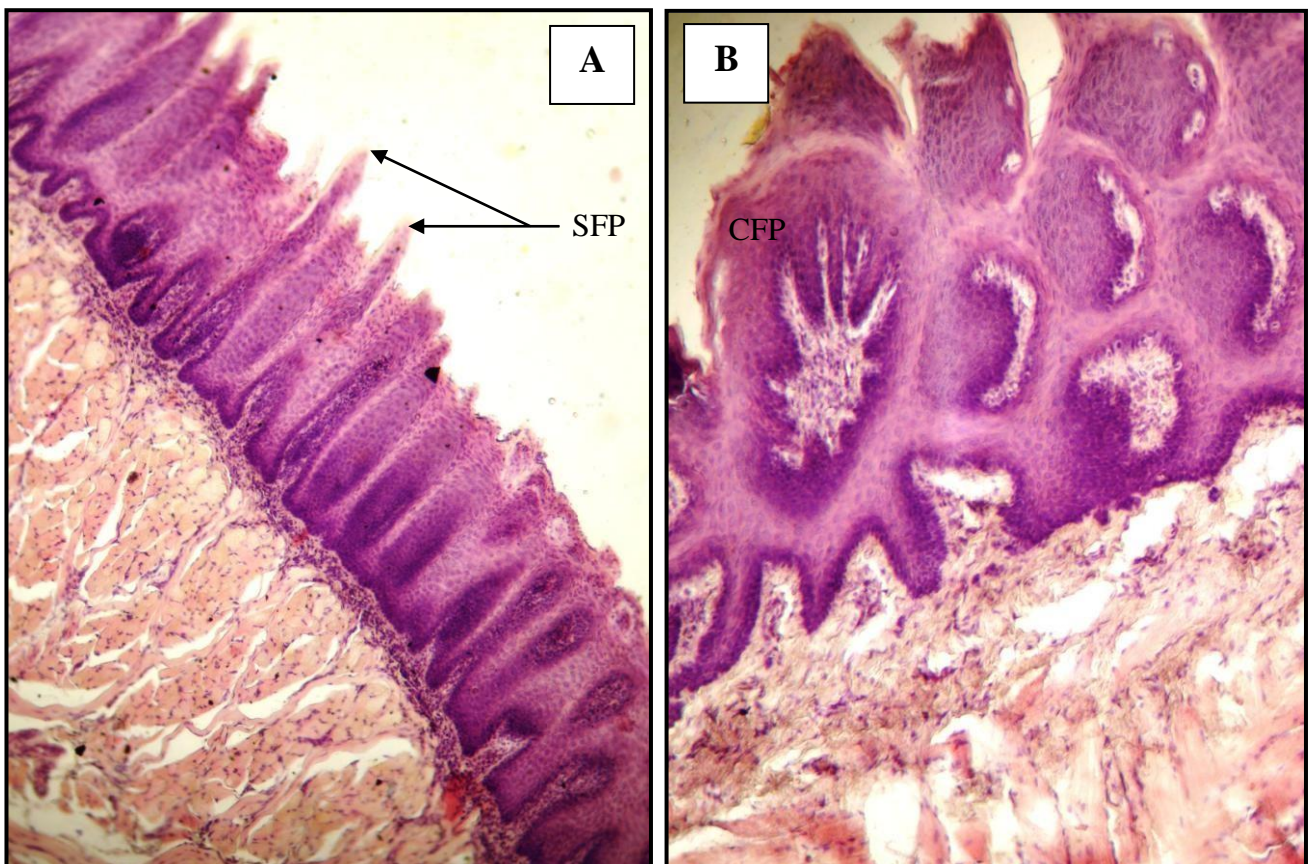


Fig2 (A&B): Apex of tongue of rabbit coloured with H & E .Notice the filiform papillae spear head – like (SFP), conical filiform papillae (CFP). (68 X).

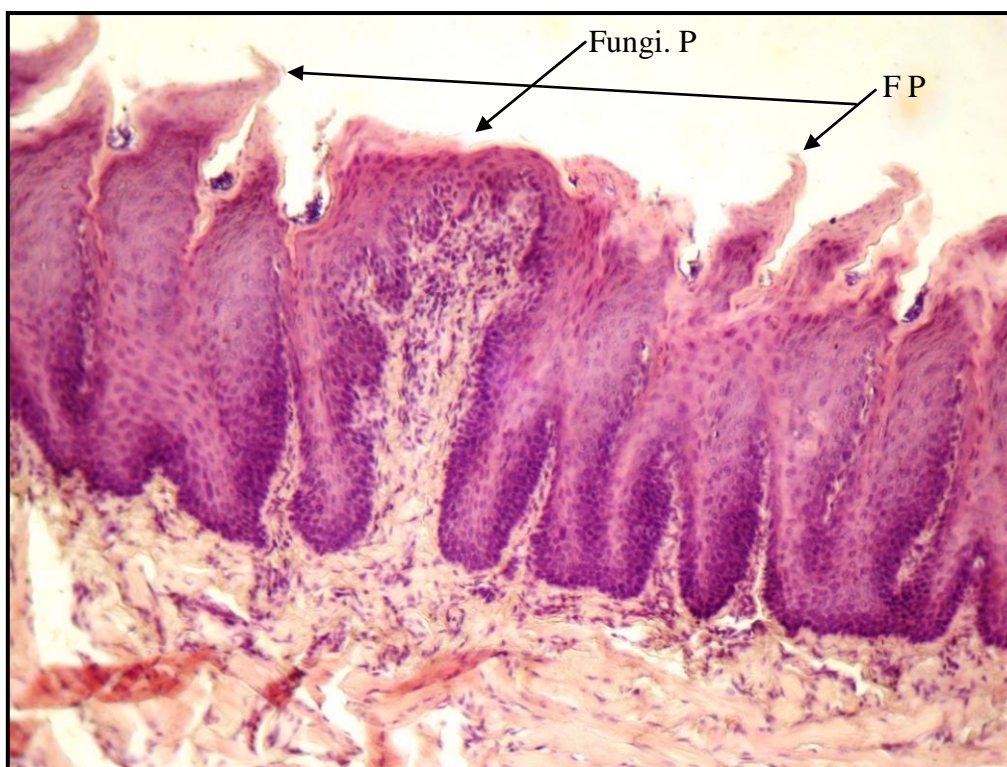


Fig 3: Apex of tongue of rabbit coloured with H & E .Notice the fungiform papillae (Fungi.P) between the filiform papillae (FP). (68 X).

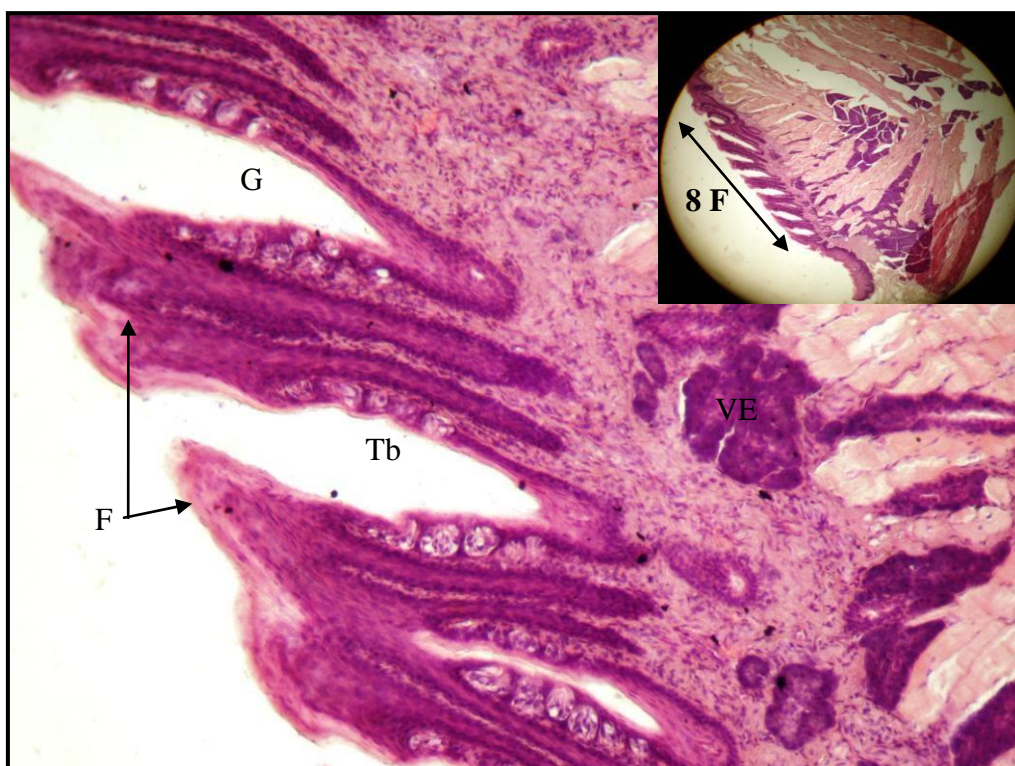


Fig 4: Root of tongue of rabbit coloured with H & E .Notice foliate papillae fold (F) and the grooves between folds (G) and taste buds (Tb) and underneath VonEbner's glands (VE). (115 X).



Fig 5: Apex of tongue of rabbit coloured with H & E. Notice the directions of muscle fibers, L : Longitudinal muscle fibers, T: transverse muscle fibers, V: vertical muscle fibers. (100 X).

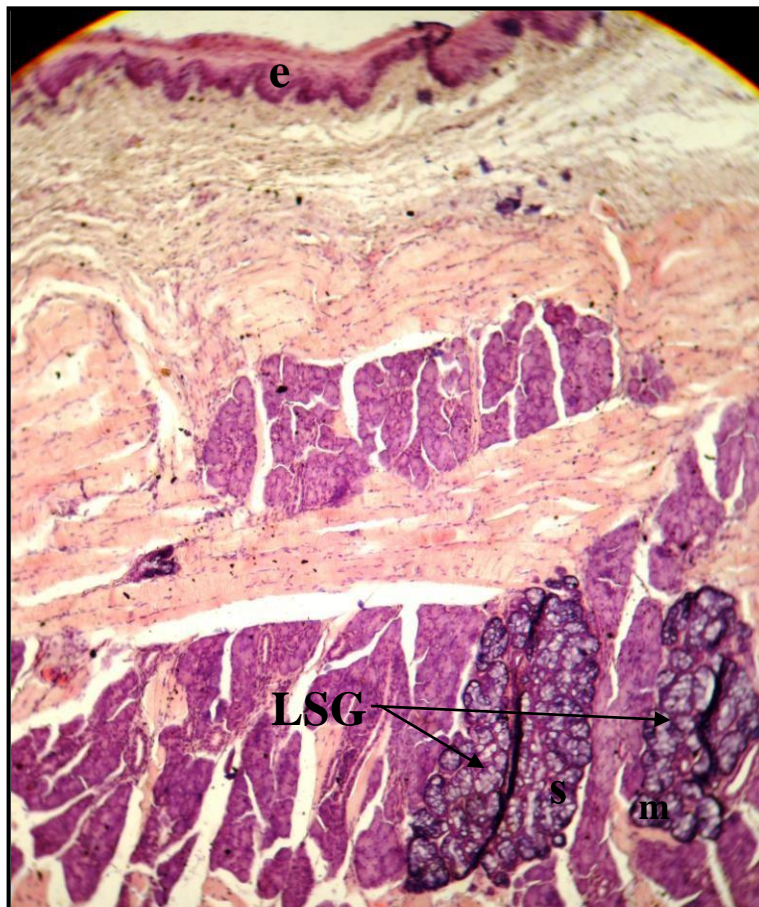


Fig 6: Root of tongue of rabbit coloured with H & E. Notice non – keratinized stratified squamous epithelium (e) and lingual salivary gland(LSG) ; serous (s) and mucous (m) , (90 X).

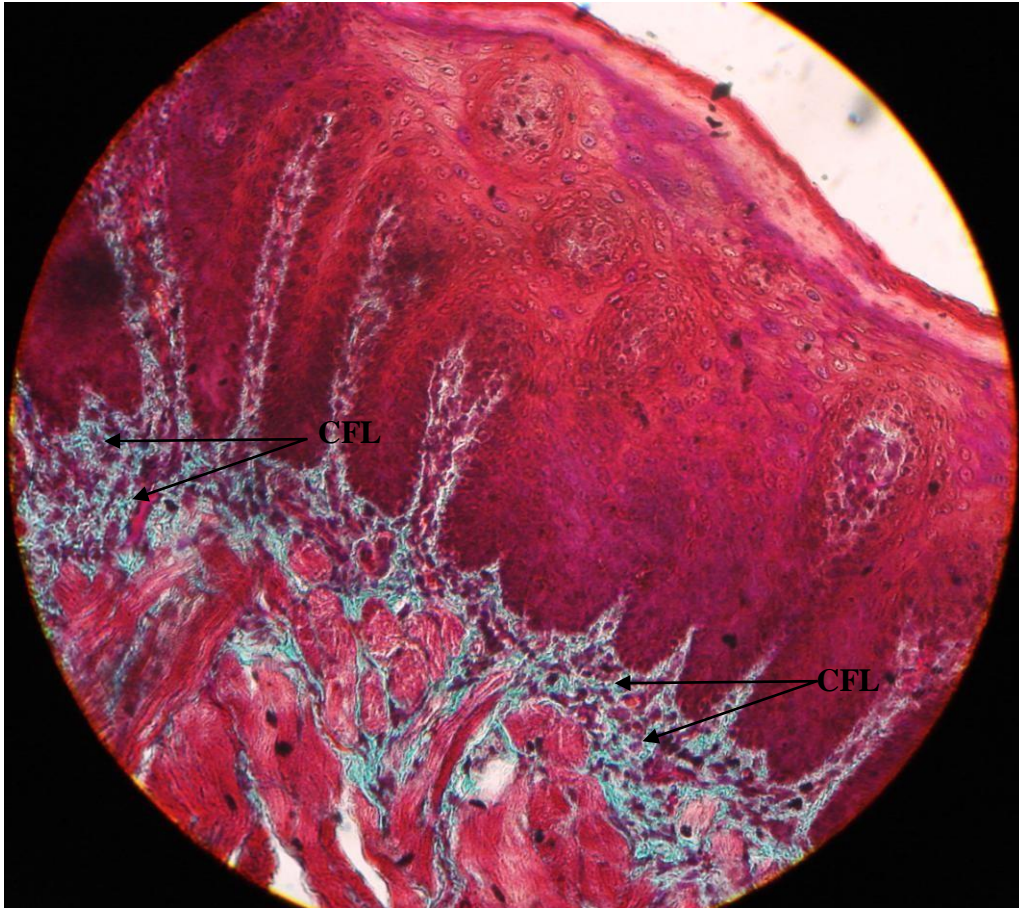


Fig 7: Apex of tongue of rabbit coloured with trichrome stain. Notice the collagen fibers layer (CFL). (280 X).

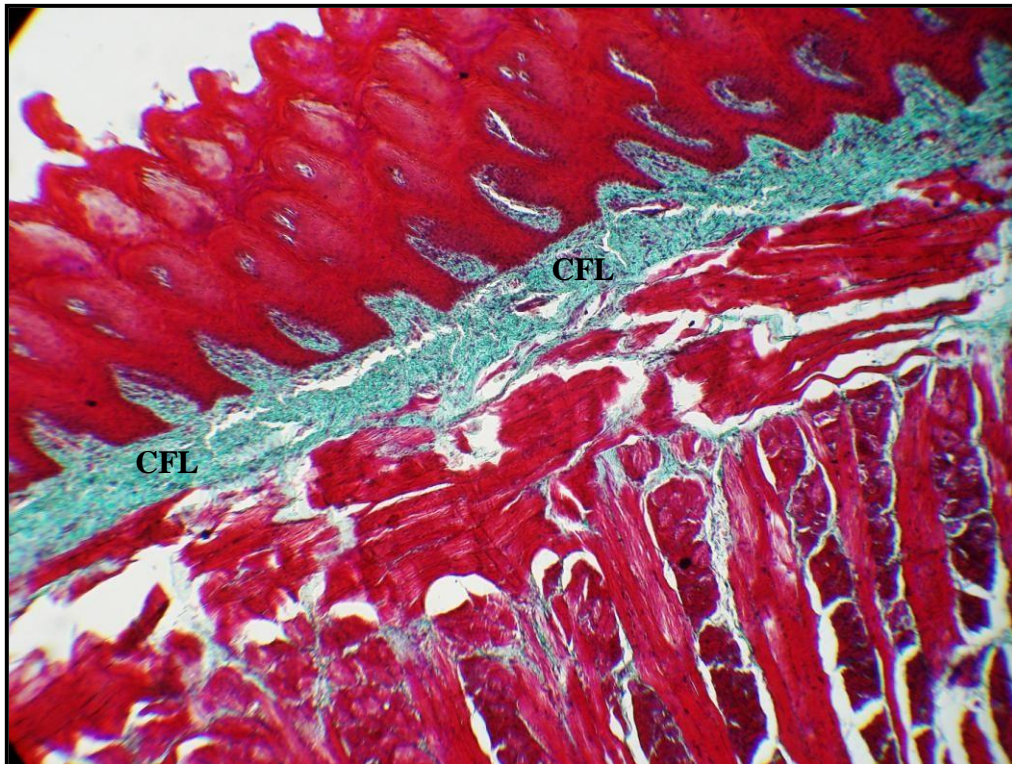


Fig8: Root of tongue of rabbit coloured with trichrome stain .Notice collagen fibers layer thickness (CFL).

Discussion

The dorsal surface of the tongue of the rabbit can be divided in to three parts: the anterior (apex), middle (body) which in the middle part has a lingual prominence located at the inter molar region close to the posterior half area of the tongue (26) agree with this result in rabbit, while (28) was not mention the presence of lingual prominence in the laboratory rabbit.

Four types of lingual papillae were recognized: filiform, fungiform, vallate and foliate papillae (15) reported in his study that the tongue of the rat also had four types of lingual papillae, (16) also observed four main types of lingual papillae in the tongue of giant panda .

In cow and horse (3) compared between the lingual papillae of two species and he mention that in the cow there was foliate papillae but without taste pores.(18) also mention that filiform , fungiform , vallate and foliate papillae were observed in the dorsal lingual surface of Japanese marten , (14) reported that four types of papillae were observed in the tongue of lesser mouse deer which showed some characteristic that differed from those reported for domestic ruminants .

The filiform papillae on the tongue in the rabbit were densely arranged on the entire dorsal surface and continued to the lateral borders, their size and shape varied according to the location: two subtypes filiform papillae were observed, conical filiform which distributed on the surface of the anterior part of the tongue from apex to the anterior border of the lingual prominence, spearhead like filiform papillae which were distributed on the

anterior margin of the lingual prominence, , this results was not agree with the results of (26)who study the morphology of the lingual papillae in rabbits,and(24) observations in rabbit confirmed with our results.

In the anterior part of the tongue there were dom- like fungiform papillae among conical filiform papillae , (9 and 26) were agree with our results about the shape and distribution of the fungiform papillae in the rabbit .

In the opossum tongue a small irregularly shaped fungiform papillae were scattered along the lateral margins of the tongue (29).The morphology of the fungiform papillae in the giant panda rounded and slightly convex and were distributed along the entire dorsal surface particularly on the anterior two third tongue,(4 and 11) described the fungiform papillae in Cape hyrax as dome like papillae.

Two vallate papillae were located lateral to the midline at the posterior part of the lingual prominence in the tongue of the rabbit .In giant panda the vallate papillae were arranged in a V-pattern on the posterior third of the tongue and were 11 vallate papillae as described by (16), (11) study the tongue of the Cape hyrax and he mention that no clearly distinguishable vallate papillae .

In our results the foliate papillae in the rabbit tongue were appeared as oval –shaped and located on each side of the postero-lateral margin of the lingual prominence , this result agree with results of (2, 26 and 30) in the rabbit.

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دراسة شكلية ونسجية للسان وحليمات اللسان في الارنب المحلي

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الخلاصة

اجريت هذه الدراسة على لسان وحليمات اللسان في الارنب المحلي, حيث تم فحص اللسان عيانيا ونسجيا بواسطة المجهر الضوئي واطهرت نتائج الدراسة بان لسان الارنب المحلي يحتوي على اربعة انواع من الحليمات: خيطية (نوعان ثانويان منها) وحليمات فطرية منتشرة على قمة وجانبي اللسان, واثنان من الحليمات الكاسية بالاضافة الى حليمتان ورقيتان ذات شكل ببيضاوي على جانبي اللسان في الجزء الخلفي منه. وتميز لسان الارنب المحلي باختلاف سمك الطبقة الغراوية, حيث كانت في قمة اللسان قليلة السمك ويزداد سمكها باتجاه جذر اللسان.