



Light microscopy study of lingual papillae in rabbits (oryctolagus cuniculus)

**Methaq Abdul Razaq A-Alshemkhi / college of girls education/ kufa university
biology dept.**

Summary

Histologically the dorsal surface of rabbit tongue was Covered by stratified squamous epithelium , from lingual epithelium project me chanical papillae which represented by filiform papillae was similar to threads like and distributed on the entire dorsal surface of the tongue , and gustatory papillae were included , fungi – form like cone – shape or musbroow like , located at apex and dorso – lateral surface of tongue , contain few taste – buds in their walls while the circumrallate papillae wererounded in shapes and surrounded by trenches and their walls with numerous taste buds . the foliate papillae similar to ridges that separated by groove . the foliate papillae more developed in the rabbits tongue when compared with other mammalian tongue . the core of the tongue consist of skeletal muscle bundles , interlaced in many direction (longitudinal , oblique , vertical and transverse)

Introduction

The comparative and morphological studies of the vertebrates tongue have revealed how variations in the function and morphology of the organ might be related to evolution events, the tongue which plays a very important role in food intake by animals appear significant morphological variations that exhibit to represent adaptation to the current environmental condition of each respective habitat (1) The core of the mammal's tongue consist of largely of skeletal muscle , the dorsal surface of tongue covered by stratified squamous epithelium with numerous papillae , the epithelium varies from para keratinized stratified squamous epithelium posteriosly to fully keratinized epithelium over lying the filiform papillae more anteriorely (2) , Much researches has been conducted on the histological structure of the lingual surfaces of different animals such as rabbits (3) , ratsnacke (4) , rats (5) , and mouse (6) . Four kinds of mechanical and gustatory lingual papillae distributed on the dorsal surface of mammalian tongue , the mechanical papillae represented by filiform papillae devoided from taste buds, while the gustatory papillae include the fungi form, circumvallated and foliate papillae with taste-buds in their walls (7,8) . The aim of this study was to understand the histology of the dorsal lingual surface and pap illation of rabbit tongue

Materials and methods

Six tongues of adult male rabbits (oryctolagus cuniculus), the weight of animals was (1.5) kilogram , and the age six month old The rabbits were sacrificed by using the anesthetic administration of ketamine at dosage 3 ml/kg.b.w. the mouth of rabbits were opened wide and the tongues excised from the bases by using a sharp scissors. The tonyue specimens were dehydrated by graduated ethyl alcohol (50%,70%,80%,90%,100%) two hours for each concentration then three changes of xylol (1.5 hours for each). Embedding was carried out in paraffin wax for period (24) hours . after that the sectioning was done at six micrometers in thickness by using rotary microtome , then the histological sections stained with hematoxylim and eosin



, verhoeff-van Giessen and Masson trachoma's stain according to staining procedures (9)

Results and discussion

The present study was revealed, the dorsal surface of the rabbit tongue covered by stratified squamous epithelium, partially keratinized on the dorsum surface of the tongue, under the lingual epithelium the lamina propria present, in which contains numerous blood capillaries. Our findings were in agreement with previous studies on the most mammal tongue such as mice, rat, rabbit and monkey (10,11,12,13) they mentioned, the lingual epithelium type was keratinized stratified squamous, but the present study varied with recent study (14) conducted on the ferret tongue, they investigated the covering epithelium was surrounded by collagenous fibers with fibrocyte. The rabbit tongue had mechanical and gustatory papillae that involves: filiform, fungiform, circumvallate and foliate papillae, the mechanical was filiform papillae projected and distributed on the entire dorsum surface of rabbit the filiform papillae like bristles or thread in shapes the tips on filiform papillae were partially keratinized and the cores of these type consisted of connective tissue. The present study was revealed, some filiform papillae with secondary papillation (figure1). Our results were varied with previous worker (8) who studied on the ruminant tongue, he reported the large ruminant tongue had torus linguae which located at the base of tongue, the lenticular papillae (mechanical) present on the dorsum surface of ruminant tongue, from another hand the filiform papillae of ruminants and carnivores was covered with heavy stratum corneum. The fungiform papillae in the rabbit tongue was located on the apex and dorso-lateral surface similar to cone-shapes or mushroom and distributed among filiform papillae (figure1). Our observations about the histomorphology of rabbit fungiform papillae were differed with monkey and dog tongues (13,15) they observed, the filiform and fungiform papillae more elaborate structure especially in monkey tongue and these papillae were more developed in monkey than dog. The circumvallated papillae in the rabbit was circular shaped and surrounded by trenches (grooves), which located on the posterior part of tongue and embedded in the stratified squamous epithelium of dorsal surface (figure2) the wall of circumvallated papillae contains numerous taste-buds (figure3) the taste-bud consist of neuro epithelial cells situated in the center and the nerve fibrils exist from taste pores at the periphery of taste-bud there are sustentacular (supporting cells) columnar in shapes while at the bases of taste-buds found basal cells cuboidal in shapes and represented the stem cells for other cells in taste-buds. Our observation about circumvallated and foliate papillae in rabbit tongue were similar with previous studies in the rabbits and guinea pigs (16,17) the foliate papillae in the present study was appeared like ridges (figure4) and these papillae more developed in the rabbit tongue and located at the lateral surface while foliate papillae in human tongue are rudimentary papillae (18). The core of rabbit tongue composed of skeletal muscles bundles, interwoven in all direction and arranged, transverse, longitudinal, oblique and vertical (figure1,2,4) and these musculature tissue was surrounded by rings of collagenous fibers bundles. Our finding about lingual muscle in bundles was accord with (19) they noticed collagenous fibers bundles as rings around the skeletal muscle of lacerated lizard animal and suggested association of collagenous fibers with muscular tissue architecture seen in the tongue to allow the tongue extension, tensile, and needed for protraction and retraction.

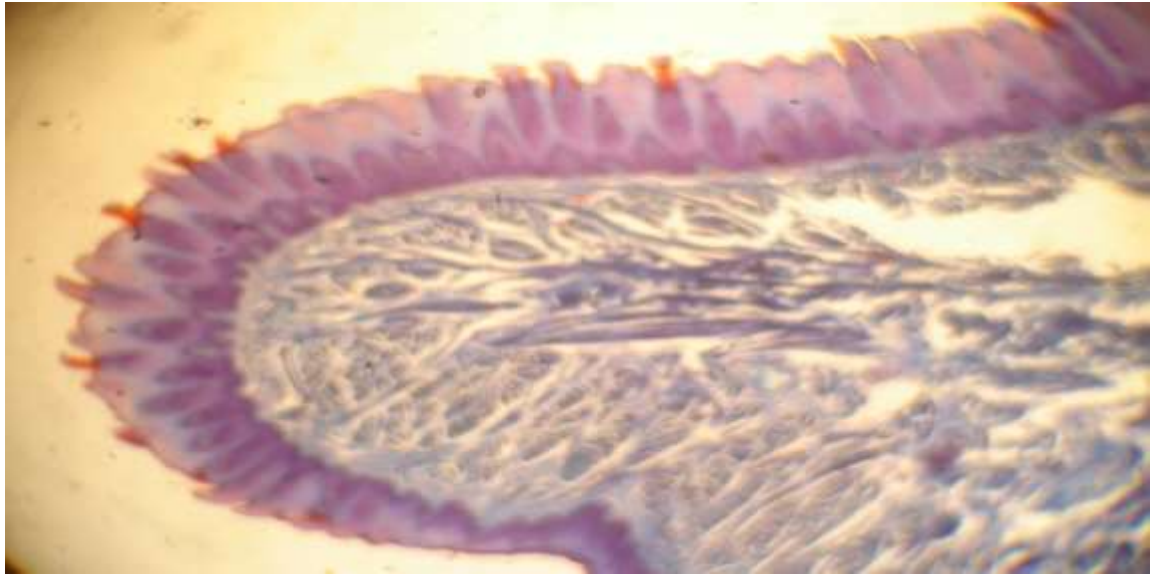


figure1: show the tongue of rabbit covered with stratified squamous epithelium partially keratinized (Ep) and filiform papillae (Fi) thread-like. Fungiform papillae (Fu) similar to cone-shapes the lamina properia (l.p) of lingual epithelium with secondary papillation and core of

tongue consist of skeletal muscles (m) (Sp) Masson Trichrom stain 250x



figure-2- The circumvallate papillae of rabbit tongue appear rounded shape that surrounded by circular trench (G). The papillae embedded in lingual epithelium (Ep) the wall of papillae contains taste-buds (t) Verhoeff-van gieson stain . 250x.

References

- 1- Iwasaki , s. (2002) evolution of the structure and function of vertebrate tongue. J. anat; 201:1-13.
- 2- Heath , J.(1993). Oral tissues . in :young , B. and heath,J. (ed) wheater's function histology, 3rd (ed) Edinburgh, Churchill Livingstone : 242-244.
- 3- Fujimoto , s ; yamamoto, k ; yoshizuka , m. and yokoyama , m. (1993) . pre and post- natal development of rabbit foliate papillae with refrence to foliate gutter formation and taste bud differentiation microsc.res. tech ; 26: 120-132.
- 4- Iwasaki, s. and kumakura ,m.(1994) an ultra-structure study of the dorsal lingual epithelium of rat snake . acta anat , 178:143-250.
- 5- Iwasaki , s; yoshizawa, h. and kawahara, N. (1997). Study by electron microscopy of three lingual papillae in the rat Anat . rec; 247; 528-541.
- 6- Watanabe , l; beagd,l. and tedexco , r.(1995) scanning electron microscopi study of the dorsal surface of the tongue of the mouce. Ann .anat , 177 :569-572.
- 7- Jung , h. ; oropeza , and thesleff , I.(1999). Shh ,Bmp-4 and pgf8 are associated with intiation and patterning of mouce tongue papillae. Mech. Dev ;18:179-182.
- 8- Dellmann ,h. (2006) textbook of veterinary history philadelphia lea and febiger. Pp:477-483
- 9- Vacca,l.(1985). Laboratory manual of histochemistry 1st ed . ravan press. Newyork.
- 10- Burhan , t . (2006). Light and electron microscopy structure of filiform papillae in mice veterinarski archive , 6:555-562.
- 11- Iwasaki,s.,yashizawa , h. and kawahara (1999) . ultrastructural study of relationship between the morphogenesis of filiform papillae and the keratinization of lingual epithelium in the rat .J.Anat 195:27-38.
- 12-Kobayashi , k.(1992). Stereo-architecture of the interface of the epithelium layer and connective tissue core of foliate papillae in the rabbit tongue acto anat ; 143;109-117.
- 13- Kobayashi,k. and Iwasaki , s.(1989). Comparative study on the sterio architecture of the connective tissue papillae in some mammalian tongue . cells and tissue , 43:305-308.
- 14- Mohammed, a; salih , k. and dalal, k.(2009) some microscopic and morphologic aspects of the lingual papillae in the tongue of ferret (mustela putrios furo). Conf .ll. Babylon university J.of science college . pp:131-140.
- 15- Kobayashi,k; miyata,k.and lino ,y.(1987). Three dimensional structures of the connective tissue papillae of the tongue in new born dogs . hist. arch.Jpn,50:347-357.



- 16- Hun-sung, J.keiichi , and jae-young, k. (2004) spacing pattern on tongue surface-gustatory papillae .int.J.dev.biol,48:157-161.
- 17- Koshey , s.; indrasingh , I. and verrvel ,s.(2003) dendrite cells in the tongue and esophagus of laboratory guinea pig, rat and rabbit . a light microscopic zinc iodide-osmium study . eur .j.anat ; 7:9-13.
- 18- Barbara,y. james , s.; alan ,s.and john, w. (2006) . wheater's functional histology 4th .ed.churvhill livingstone .pp:285
- 19- Herrel, a.; canbek , m.; ozelmas ,o; oyanoglu, m. and karakaya , m.(2005) comparative functional analysis of hyolingual anatomy in lacertid lizards. Anat . rec; 2: 561-573