

Comparative Morphological and Histological Study of the Parotid Salivary Gland in Rabbit after Birth
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Abstract

This study was carried out on 24 healthy rabbits of both sexes, divided to four age groups 1 day, 15days, 30 days and 90 days to elucidate the normal morphology and histology during four age groups above. Parotid salivary gland observed relatively large and consists of two lobes right, and left separated entirely. The right lobe is oval while the left is irregular, both them were located on both sides of the two ramus of mandible. The color of the parotid gland is creamy pink; there was significant increase in absolute and relative weight as well as the length, width, thickness increase with age, the right lobes are longer, wider and thicker than right lobes in all age groups except at 90 days age. Histologically, the gland is surrounded by capsule send septi divided the parenchyma into lobules which composed of serous ; acinus units ; striated ducts and intercalated ducts. The histological picture of the gland developed with age in the four developed age groups.

Key words: Parotid, lobe, mandible, acinus

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دراسة مقارنه شكليائية ونسجية للغدة اللعابية النكفية في الارنب بعد الولادة

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الخلاصة

صممت هذه الدراسة على 24 ارنب بصحة جيدة ومن كلا الجنسين قسمت على اربع مجاميع عمرية (يوم واحد ،خمس عشر يوم ،ثلاثون وتسعون يوما) لمعرفة الاختلاف الشكليائي والنسجي بين هذه الاعمار الاربعة. الغدة اللعابية النكفية كبيرة نسبيا ومؤلفة من فصين ايمن وايسر مفصولان كليا.الفص الايمن بيضوي بينما الايسر غير منتظم الشكل وكلاهما يقع على جانبي عظم الفك السفلي.لون الغدة وردي كريمي.هناك زيادة معنوية في الوزن (المطلق والنسبي) والطول والعرض والسماك مع العمر. الفص الايمن اطول واعرض واسماك من الفص الايسر في جميع الاعمار عدى عمر تسعون يوما. نسجيا الغدة محاطة بمحفظة ليفية ترسل حويجزات صغيرة تقسم الغدة الى فصوص صغيرة مكونة من وحدات سنخية عنبية ومصلية ولوحظ وجود قنوات مخططة وبين الفصيصات

الكلمات المفتاحية : نكفي ،فص غدي ، فك سفلي ، سنخ غدي

Introduction

The salivary glands play an important role in the digestive system. The secretion (saliva) is mostly serous, containing various enzymes, water, mucopolysaccharides and lubricating glycoprotein [1]. Salivary gland is a paired organ which lies at the junction of the head and neck, ventral to the auricular cartilage in the retro mandibular fossa [2, 3]. Salivary glands in mammals consist of secretory end pieces (acinar cells that secrete the salivary fluid as well as most of the salivary proteins), and duct system (that secrete some protein and modify the ionic composition of the saliva as they convey it to the mouth that vary in structure among different types of salivary glands and also among various species [6, 7, 8, 18]. Salivary glands of rodents are important elements regarding their adaptations to different diets, environments and taxonomic studies. This study aimed to reach a delicate analysis between biology and ecology of rodents, therefore need to study salivary glands histology and anatomy [17].

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Material and Methods

Twenty four healthy rabbits of four different ages were used in this study; those are 1, 15, 30 and 90 day's age. All animals were examined before their euthanasia (Intramuscular injection of ketamine – xylazine anesthetic drug mixture) and after that the neck region was opened and both right and left parotid glands were exposed and removed for measuring weight, length, thickness and width. Before removing of the parotid gland, 10% buffer formalin was injected through common carotid artery and left for 48 hours for through fixation of the organ. The tissue processing in alcohol and xylene and paraffin then Hematoxilline and eosin staining procedure was made. The statistical Analysis System-SAS (2012) was used to effect of different factors in study parameters. Least significant difference-LSD test was used to significant compare between means in this study.

Results

Anatomy: The parotid salivary gland in rabbit was relatively large in size and usually consists of two lobes separated entirely and embedded in fat tissue, the right lobe is oval and left one is irregular in shape and located on both sides of trachea under the level of larynx on the medial side of the two ramus of mandible and the two lobes moved slightly because there is no connection between them. figure (1) its duct is running rostrally along the lateral surface of masseter muscle close to the branches of facial nerve and finally enters the oral cavity opposite the last molar teeth.

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Figure 1. parotid salivary gland insitue, left parotid gland (A), right parotid gland (B).

The color of the parotid gland is creamy pink, the weight, length, width and thickness of the thyroid gland in 1day, 15, 30 and 90 days are represented in table (1 and 2).

Table 1. The animal weight and the weight of left and right lobe of four groups of rabbits

Age(days)	Animal weight(gm.)	Parotid gland weight(mg)	
		Right lobe	Left lobe
1day	39	0.052	0.055
15 days	79.0	0.123	0.131
30 days	148.1	0.290	0.295
90 days	247.6	0.324	0.325
LSD Value	58.91*	0.169*	0.153*
(P≤0.05).			

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Table 2. The anatomical parameters of the parotid salivary gland in rabbit.

Age(days)	Length(mm)		Width(mm)		Thickness(mm)	
	Right lobe	Left lobe	Right lobe	Left lobe	Right lobe	Left lobe
1	7.08	6.50	4.24	5.30	3.28	3.30
15	12.28	11.27	5.90	8.78	4.52	4.59
30	10.08	9.87	8.30	8.86	5.30	3.36
90	13.25	12.77	8.51	11.00	6.60	4.74
LSD Value	2.94*	3.05*	2.19*	2.63*	2.09*	1.86 NS

* ($P \leq 0.05$), NS: Non-significant.

There are significant variations in the animal's weight with age that the weight increases with increase of age. The gland weight has significant influence in the right lobe increase with age to be 0.169 as well as the age has significant influence in the left lobe increase with age to be 0.153. The gland length has significant influence in the right lobe increase with age to be 2.94 as well as the age has significant influence in the left lobe increase with age to be 3.05. The width has significant influence in the right lobe increase with age to be 2.19 as well as the age has significant influence in the left lobe increase with age to be 2.63. The thickness has significant influence in the right lobe increase with age to be 2.09 as well as the age has significant influence in the left lobe.

Histology

The Parotid salivary gland is surrounded by thin dense connective tissue capsule sends septi which separated the glandular parenchyma into lobules with different shapes and sizes. Parenchyma of gland composed of serous acini of small lumen and they are characterized by pyramidal –shaped lining cells with rounded basally located nuclei. figure (6, 7 and 8) also there's myoepithelial cells (basket cells) surrounded the secretory units. The interlobular duct

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system is initiated in the intercalated ducts which are lined by simple cuboidal epithelium, which in turn empties into larger striated ducts. The striated ducts are lined by simple columnar epithelium, and the later are converged to form the larger interlobular ducts which are lined by simple columnar epithelium and the large interlobular ducts are connected together to form the main excretory duct of the gland. figure (2, 3, 4, 5 and 6).



figure 2. Parotid salivary gland at 1day old age slows capsule and septa arrows. H&E, 40X

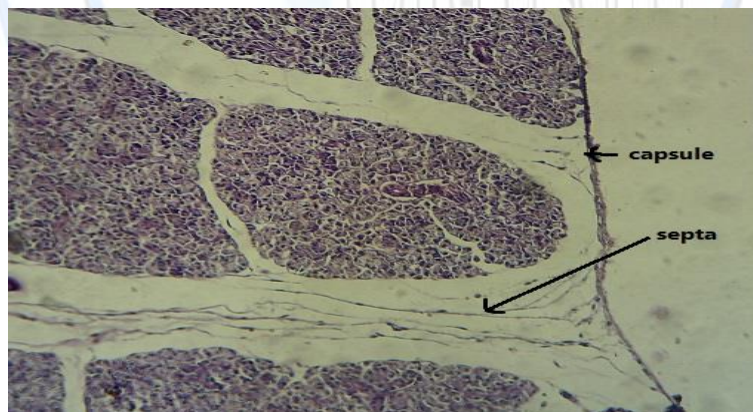


figure 3. Parotid salivary gland at 15days old age slows capsule and septa arrows. H&E, 40X

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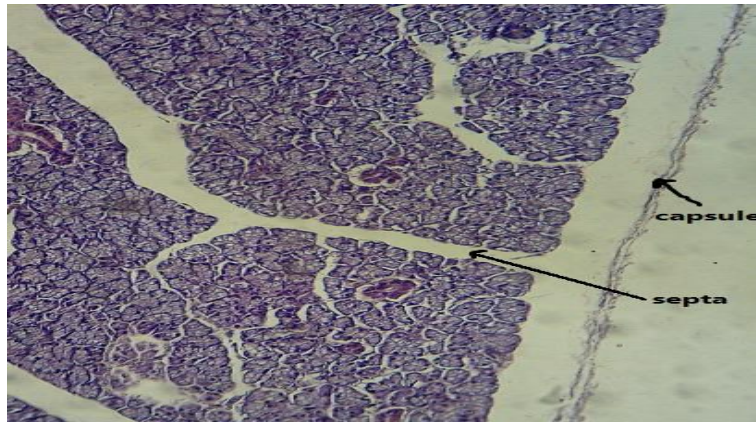


figure 4. parotid salivary gland at 30 days old age shows capsule and septa arrows. H&E, 40X

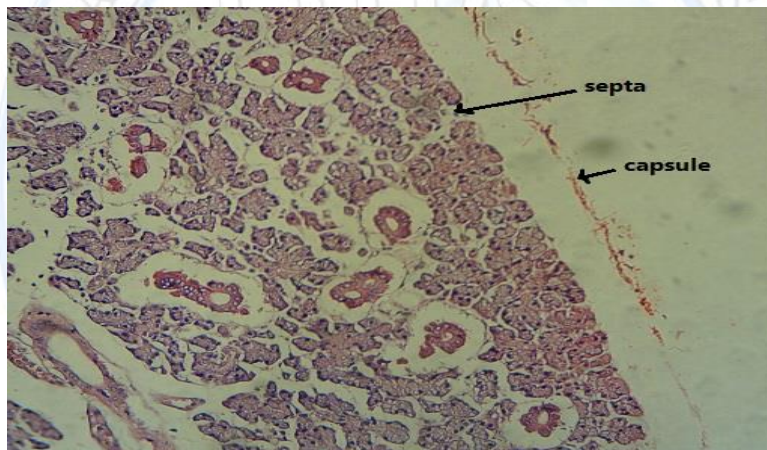


figure 5. Parotid salivary gland at 90 days old age shows capsule and septa arrows. H&E, 40X

In 15 days age there is increase number of striated ducts per lobe figure (6), While in day 30 the gland take a classic lobulation (adult style) also there's increase in number of striated duct per lobe figure 7.

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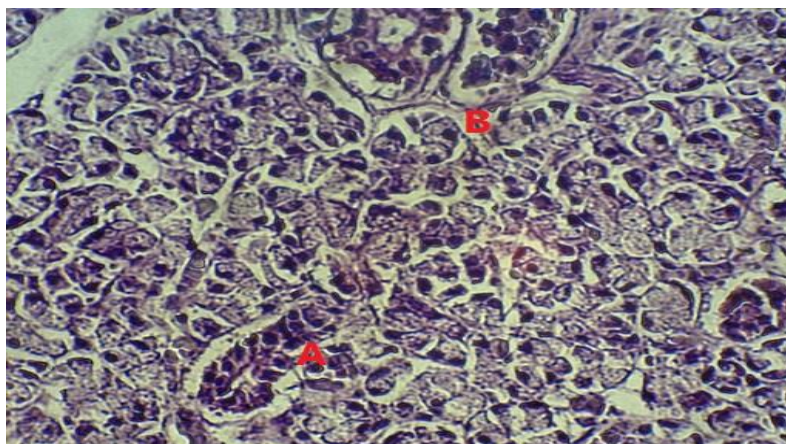


figure 6. Parotid salivary gland at 15 days old shows .striated duct (A), acinus part (B).H&E 40X

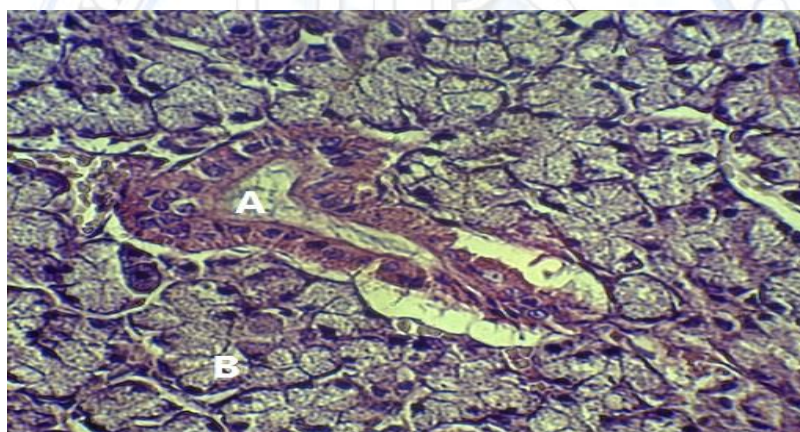


figure 7. Parotid salivary gland at 30 days old shows. Striated duct (A), acinus part (B).H&E 40X

In 90 days age the gland take an adult style like adult ages and no increase in number of striated ducts per lobe. figure 8.

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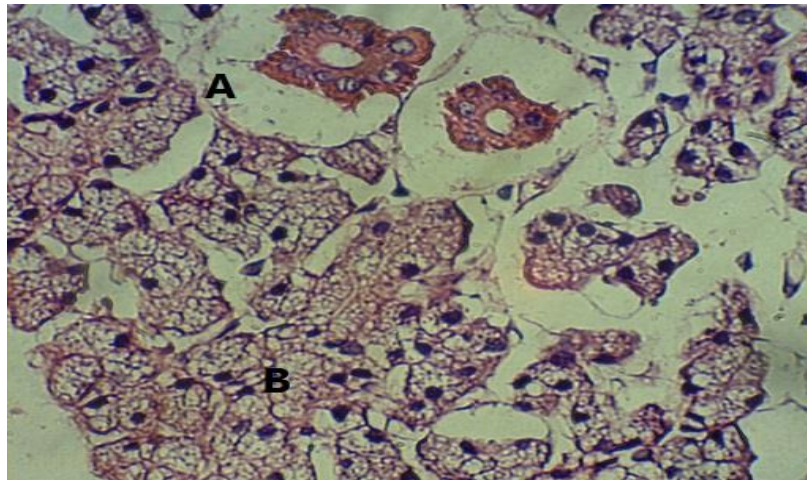


figure 8. Parotid salivary gland at 90 days old shows. Striated duct (A), acinus part (B).

H&E 40X

Discussion

The parotid salivary gland in rabbit was relatively large in size and usually consist of two lobes separated entirely, the right lobe is oval and left lobe is irregular in shape and located on both sides of trachea under the level of larynx on the medial side of the two ramus of mandible [2, 3,5,10 and12] and the two lobes moved slightly because no connection between them. The color of the parotid gland is creamy pink [3, 11].Histology Parotid salivary gland surrounded by collagenous capsule sends septi which separated the glandular parenchyma into lobules [10, 11, and 13]. Parenchyma of gland composed of serous and mucous acini [3, 13, 5 and 14]. There's myoepithelial cells (basket cells) surrounded the secretory units [13, 15]. There is interlobular connective tissue separate the lobules, saliva conduct through intercalated duct into striated duct [3]. In 30 and 90 days age the gland take an adult style like adult ages and no increase in number of striated ducts per lobe [4, 9].

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