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RESEARCH ARTICLE

Biochemical and Histological Investigateons of Harderian Gland of Wild Adult Female Rabbits *(Oryctolagus cuniculus f. domestica)* in AL-Qadisiyah Province in Winter Season

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ABSTRACT

The samples used in the study (24) harderian glands (HG) obtained from a total number of (12) adult female rabbit was collected in winter season from a local commercial market of animals in qadisiyah.The histological studies of the gland revealed of parenchyma tissue of Harderian gland was surrounded by acapsule of collagenous connective tissue which divided the gland into lobules. It was made up blood vessels, elastic and reticularfibers, adipose tissue, nerve bundles, collagenous, and parasympathetic ganglia. The result of this study showed the parenchyma of gland consist of tubule alveolar secretory units which characterized by wide and irregular lumen, which were consistent from round nuclei and tall conical cells, these alveoli surrounded by basalcells myoepithelial. The histochemical analysis of the (HG) shows it is a mixed gland. The staining by PAS demonstrated reaction is observed in the basement membrane and the surrounding connective tissue gave positive reaction also the stratified cuboidal epithelial cell layerlinedthe interlobular duct with its apical part showed strong PAS positivegranules.

Key Words: histological, harderian gland, female rabbit

INTRODUCTION

The Harderiangland is external secretion glandin mammals, amphibians, reptiles, rodents, birds.It locatesin orbit ventral and posteromedial to the eyeball extend rostral from the region of the optic nerve,and its anterior extremity emerges its duct, which passes inferior to the origins of the superior and inferior oblique muscles. It is loosely attached to the periorbital fascia so that when the eye is removed, it usually remains in the cavity of the orbit (1).This gland is developed in rodents (guinea pig, golden hamster, mouse, rat, and Mongolian gerbil), lagomorphs (pika and rabbit) (2) some mammals like ahorse, and cows loss this gland (3).

In many mammals, this gland is big in size and consist of porphyrins and lipid that secreted by the duct that opens directlyinto the nictitating membrane (4). The functions of theglandaresurface of the eyeball lubrication and nictitating membrane, secretion of growth hormone, pheromones, photoprotection, osmoregulation and ermoregulation (5) and in some the species, it was work associated with functions of salivary, vomeronasal, nasal (6-12).The rabbit is common animal species that used for economic and laboratory purposes; it is a common model using in many of scientific experiments and teaching section (13). The anatomical location of HG, size, colour and histological stricture varied among different species (14).

In our investigation, histochemical and histological of the harderian gland in female rabbitduring the winter season to establish astandard against which be compared with the different seasons of the year also histochemical characterization of the harderian gland is very important to study the relationships between functions and histological of this glands and provide information about the comparative anatomy of harderian gland in domestic species.

MATERIALS AND METHODS

The Experimental Animals

Twenty-fours amples used in this our study the study. harderian glands (HG) obtained from a total number of (12) adult female rabbit was collected in winter season from a local commercial market of animals in qadisiyah city weight between (2000 -2500) gramat (5-6) month's age. Use Inhalation route for anaesthetised the animals.

Histologic study

Specimens for histology were collected immediately after slaughtered. The specimens were fixed in 10% formalin for about 24 hours. The samples keep at ethyl alcohol (70%) for dehydrated in thegraded series concentration of alcohol, then use xylene for cleared thenput in paraffin wax. Sections of (4– 6) μ as thickness were put on clean glass slides and stained byeosin and haematoxylin to verify general histological structure details by use light and fluorescent microscope. For ademonstration of the glycoprotein used (PAS) stain. Methods were adopted according to **(**16**)**.

RESULTS

Gross inspection of the HG of the female rabbit was bilobedformed of thesmall white lobe and large pink one. The histology and histochemistry of the white and pink lobes of (HG) was an exocrine gland formed of stroma and parenchyma. The stroma formed thin connective tissue capsule surrounding the gland Fig (1).Capsules of connective tissue consisting of blood vessels, adipose tissue, nerve bundles, and parasympathetic ganglia. And there are septa (connective tissue) divided the gland into the lobesand lobulessmall and big Fig (2).The septa were formed of both collagen, reticular fibers and sometimes adipose tissue. The reticular fibers were thick in the septa and formed a thin network between and around the acini. No elastic fiberswere detected in the connective tissue stroma.

Histological examination shows the parenchyma of the harderian glandhad numerous blood vessels and appeared lighter in the staining affinity than the white one inthe winter season Fig (3and4).The parenchyma formed of compound tubuloalveolar secretory units. These secretory units varied in both size and shape. The white lobe was lined with columnar epithelial cells while the parenchyma of the pink lobe was lined with cuboidal epithelial cells with spherical basally situated nuclei Figs. (5 and 6).The duct system of the pink and white lobe consists of the intralobular duct which was lined with simple cuboidal epithelium Fig. (7).These interlobular ducts united to form large duct at the end of both the white and the pink lobes. These ducts drained into the main excretory duct.The latter the main excretory duct opened in the inner surface of the third eyelid. Histochemical studies of the harderian gland

of female rabbits, with PAS stain, revealed faint reaction in the epithelial cells cytoplasm, the basement membrane and the surrounding connective tissue gave strong positive reaction Fig. (8).

DISCUSSION

Gross inspection of the harderian glands of the female rabbit was bilobed organ formed of two lobes that can be distinguished grossly; this finding was in agreement with that of (17).The histological studies of the glandrevealed of parenchyma tissue wassurrounded with a collagenous connective tissue capsule which dividing the gland into lobules,this result confirmed the studies of (17) in rabbit,(18 and 19) in domestic geese, (20)in osprey and (12) in the local chickens**.** It consistedof blood vessels, elastic and reticular fibers, adipose tissue,nerve bundles, parasympathetic ganglia and collagenous (12) in localchickens. Inour report, the septa penetrate the connective tissue of the gland and dividing it for many of lobes and lobules withdifferent sizes thatagreement with (19 and 20). Our result showsthe gland parenchyma composed of units of tubuloalveolar secretory and wide and irregular lumen. Also, itcomposed of round nuclei and tall conical cells, and the alveoli surrounded by basal myoepithelial cells, thisresult similar to (17)in therabbit.

The histochemical analysis of the (HG) revealed is a mixed gland. The PAS staining demonstrated reaction is observed in the basement membrane and the surrounding connective tissue gave positive reaction alsothe interlobular duct was lined with stratified cuboidal epithelial cell layer with its apical part showed strong PAS-positive granules, similar observations are found (21).

REFERENCES

1. Dyce KM, Sack WO, Wensing CJG. Textbook of Veterinary Anatomy. 3rded. Saunders-Elsevier Science, Philadelphia2002; 840 pp.
2. Yousuke Seyama and YasunobuUchijima. Novel function of lipids as a pheromone from the Harderian gland of thegolden hamster. Proc. Jpn. Acad., Ser.2007; B 83
3. Payne, A. P. The Harderian gland: a trecentennial review. J. Anat.1994; 185, 1-49.
4. Sabry I, Al-GhaithL.TheHarderian gland of the Dhub lizard Uromastyxmicrolepis of the Kuwaiti desert: an ultrastructural approach. Tissue and Cell. 2000; 32,71–78.
5. Sabry I, Al Azemi M and Al Ghaith L. The Harderian gland of the heesman's gerbil (Gerbilluscheesmani) of the Kuwaiti desert. Eur.J.Morphol. Apr; 2000; 38(2):97-108.
6. Pradidarcheep W, Asavapongpatana S, Mingsakul T, Poonkhum R, Nilbu-Nga S, Somana R. Microscopic anatomy of the orbital Harderian gland in the Common Tree Shrew (Tupaiaglis). J. Morphol., 2003;255: 328-36.
7. Altunay H, Kozlu T .The fine structure of the Harderian gland in the ostrich (StruthioCamelus). Anat. Histol. Embryol. 2004; 33: 141-45.
8. Marcos HJA, Affanni JM. Anatomy, histology, histochemistry and fine structure of the Harderian gland in the South American armadillo Chaetophractusvillosus (Xenarthra, Mammalia). Anat. Embryol.2005;209: 409-24.
9. Munkeby BH, Smith HJ, Larssen EHW, Bjornerud A, Bjerkas I. Magnetic resonance imaging of the Harderian gland in piglets. J. Anat 2006; 209: 699-705.
10. Khan MZI, Jahan MR, Islam MN, Haque Z, Islam MR, Kon Y. Immunoglobulin (Ig)-containing plasma cells in the Harderian gland in broiler and native chickens of Bangladesh. Tiss. Cell.2007; 39: 141-49.
11. Ortiz GG, Feria-Velasco A, Tarpley RL, Bitzer-Quintero OK, Rosales-Corral SA, Velazquez-Brizuela IE, Lopez-Navarro OG, Reiter RJ. The orbital Harderian gland of the male Atlantic Bottlenose Dolphin (Tursiops truncates): A morphological study. Anat. Histol. Embryol.2007; 36: 209-14.
12. Mobini B. Histological and histochemical studies on the Harderian gland in native chickens. Vet. Med-Czech.2012; 57: 404-409.

13. Hristovl H, Kostoll D, and Vladova D. Topographical anatomy of some abdominal organs in rabbits. *Trakia J. of Sci.* 2006. 4 (3) pp: 7-10.
14. EL-Leithy E.; El-Sakhawy M.A.; Al-SabaaA.;El-Habak H. and Shaheen Y. Seasonal Immunohistochemical Expression of Androgen Receptor (AR) in The Harderian Gland (HG) of Male Rabbit. International Journal of Advanced Research Volume 2015;3, Issue 8, 479-489 .
15. Luna, L. G.Manul of histological staining methods of armed forces institute of pathology.threeedition .New York, U.S.A. 1968; 39-110
16. Drury, R. A. B. and Wallington, E.A. Histological technique. 4th Ed. New York, Toronto Oxford University Press.MMM1980.
17. Sohair A. M. Eltony. A Comparative Study of the Harderian Gland in the Female Rat and Female Rabbit (A Histological, Histochemical, Scanning Electron Microscopic and Morphometric study) Egypt. J. Histol. 2009;Vol. 32, No. 1, June, 46 – 65.
18. Murat Boydak, Mehmet F. Aydin.Histology of the Harderian Gland of Domestic Geese(*Anseranserdomesticus*) ACTA VET. BRNO2009; 78: 199–204.
19. Boydak M, Aydin MF: Histology of the Harderian gland of domestic geese (Anserdomesticus). Acta. Vet. Brno.2009; 78: 199-204.
20. Kozlu T, Bozkurt YA, Altunay H, Sari EK. Histological and Histochemical Studies on the Harderian Gland of the Osprey (Pandion haliaetus). J. Anim. Vet. Adv. 2010;9: 1875-79.
21. Pinard CL, Welss ML, Brighttman AH, Fenwick BW, Davidson HJ. Normal anatomical and histochemical characteristics of the lacrimal glands in the American bison and cattle. Anatomia Histologia Embryologia 2003 b;32(5): 257-262. doi: 10.1046/j.1439-0264.2003.00460.

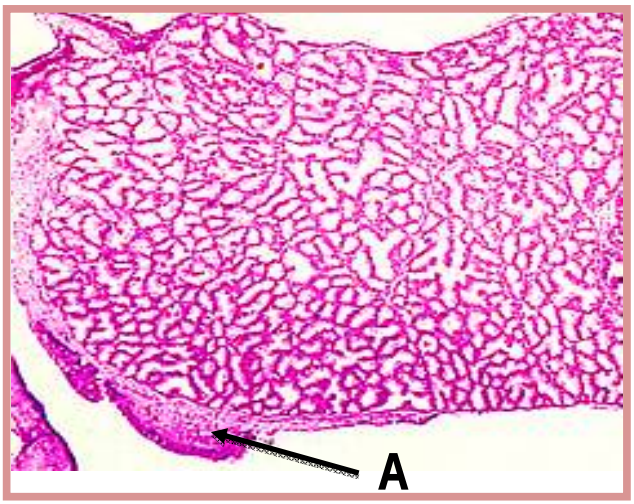


Figure (1): A photomicrograph of harderiangland section in the winter season showing the connective tissue capsule (A) H&E 100x

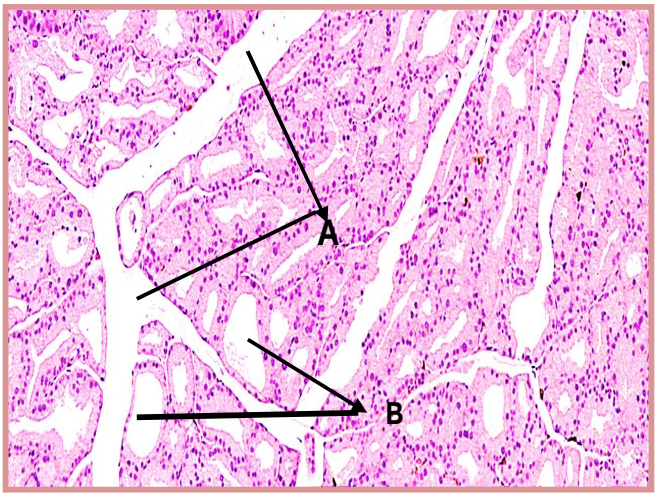
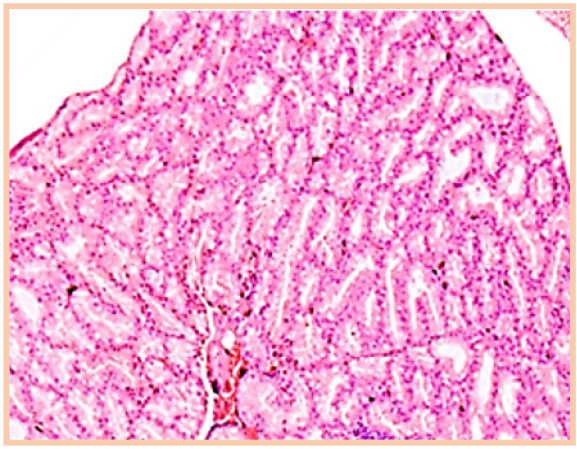


Figure (2): A photomicrograph of harderian gland (HG) section in the winter season showing the connective tissue septa (A) and the lobulation (B) of the gland. H & Estain. 100x



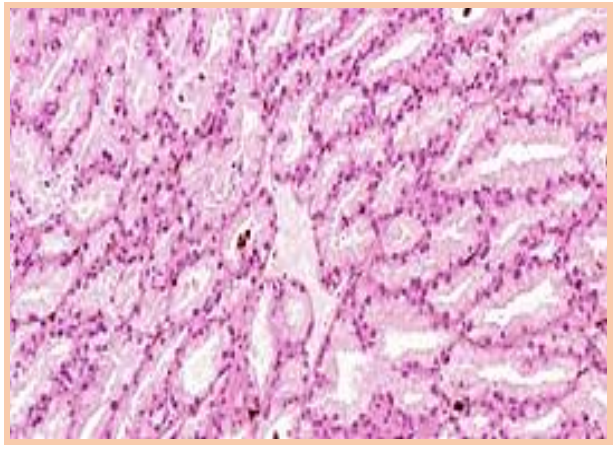
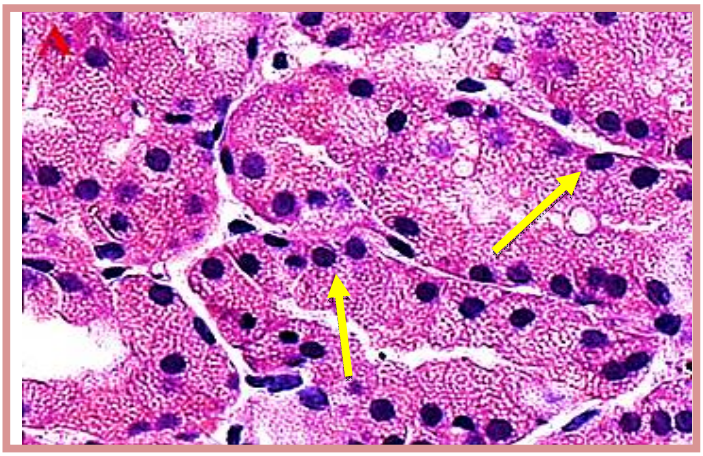


Fig. (3) (pink lobe) 100xFig. (4) (white lobe) 400x

Figure. (3,4): A photomicrograph of harderian gland (HG) in the winter season showing the large pink lobe (PL) and small white lobe (WL). H&E



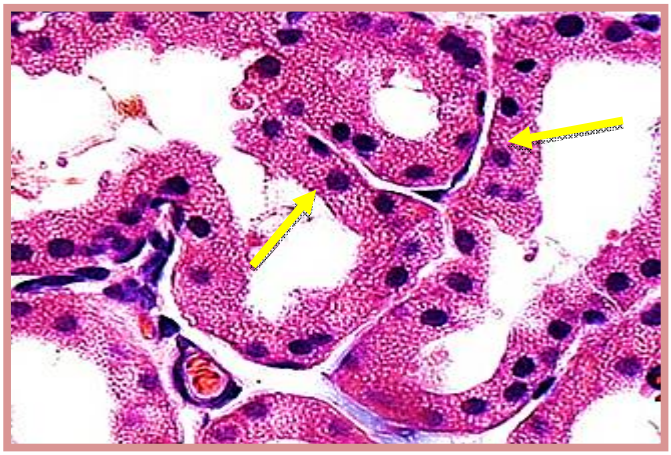


Figure. (5): A photomicrograph of the pink lobe of harderian gland (HG) in the winter season showing the secretory unites lined with a single layer of epithelium variation in both size and shape and presence of buddings (arrow) H&E stain, X 400

Figure (6): A photomicrograph of the white lobe of an adult male rabbitharderian gland (HG) in the winter season showing the secretory unites lined with a singlelayer of epithelium variation in both size and shape and presence of buddings(arrow).H&E stain,400x X 400

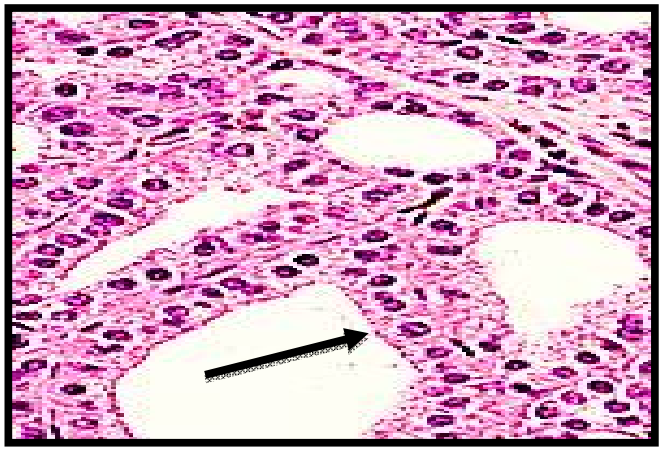


Figure (7): A photomicrograph of the white lobe of an adult female rabbitharderian gland (HG) in the autumn season showing interlobular duct lined withsimple cuboidal epithelium (arrow).H&E stain, X 400

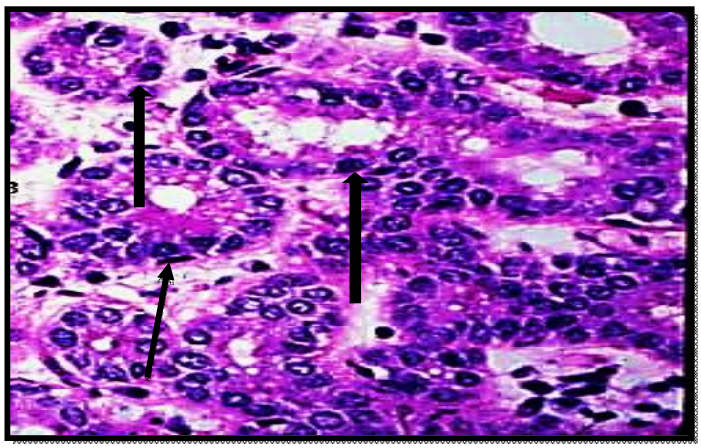


Figure (8): A photomicrograph of the white lobe harderian gland (HG) in the winter season showing strong PAS positive reaction in the basement membrane PAS stain, X 400

RESEARCH ARTICLE

Detail Survey of Water Bodies and Study of pH and Conductivity of Water at Vidavalur Mandalam, Nellore District, Andra Pradesh, India.

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