

## Histomorphological study of the Meibomian glands in local Iraqi breed goats (*Coprus hircus*)

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### Summary

The study was designed to investigate the histomorphology of Meibomian gland in local Iraqi breed goats (*Coprus hircus*). The research work included specimens of upper and lower eyelids of the eyes of 10 head of local breed black Iraqi goats aged 10-14 months (5 male and 5 female) and the routine histological technique was done from fixation till staining of histological sections. The study revealed that the Meibomian glands present in the sub palpebral conjunctiva arranged in parallel position along the upper and lower eyelids of the eye each gland opened besides the hair follicle (cilia) and its secretion are oily (lipid) called miebum. This material very important to spreading the tear on the cornea to prevent evaporation and reaching the nutrients and oxygen to the cornea of the eye. In conclusion this study revealed the importance of the miebomian gland in the healthy status of the eye, in local Iraqi goats.

**Keywords, Meibomian gland, Tarsal glands, Eyelid glands, Tarsal plate, Goats.**

### Introduction

The meibomian glands were the modified cutaneous glands located in the tarsal plate of the eyelids of the most domestic animals; its secretion is the most important for the health of the eyeball (1). The miebomian glands were greatly enlarged modified sebaceous glands without a hair follicle (2). These glands consisted of numerous branched acini each acinus consisted of basal layer of flattened cells, and vacuolated cytoplasm in each gland contained a single long central duct whose orifice was located at the lid margine (3 - 5). The type of miebomian gland secretion is halocline secretion (6 and 7). The secretion called miebomian an oily substance that prevent evaporation of the eyes tear film also miebomian prevents tear spillage on to the cheek (8 and 9). Well-developed stratum granulosum and stratum cornium are absent except at the very distal portion of the miebomian glands duct (10). The excretory duct of the miebomian glands generally had the same length of tarsal plate, along the length of the duct; acini were connected by means of short ductules (5, 11 - 13).

Shrew (*suncus murinus viridescens*) specialized integumentary glands such as miebomian glands, were seen on the edges of the upper and lower eyelids of the both sexes (13 and 14). Therefore, the aim of this study

was to investigate the histomorphologic miebomian glands in local Iraqi breed goats.

### Materials and Methods

The specimens collected from the goats age 10-14 months (5males and 5females) average weight (20-26 kgs) after slaughtering 15-20 mints. These specimens dissected from upper and lower eyelids and fixed in 10% buffered formalin for 72 hours. Routine histological techniques processes was done which includes (Washing, Dehydration, Clearing, Embedding, Blocking and Sectioned by rotary microtome in 5µm and stained with Haematoxyline and Eosin for general histological structure (13), PAS (periodic acid Schiff reagent) to distinguish basal membrane and mucopolysachride. All these stained section, examined by light microscope (Olympus).

### Results and Discussion

The results showed that the miebomian glands constructed from numerous branched acini leading to minor ducts which opened into along major collecting duct (Fig. 1). In goat the number of miebomian glands in upper left and right eyelids were (45.6±0.121), (44.1±0.711) respectively while (35.5± 0.232) and (34.1±0.152) in lower left and right eyelids respectively (Table, 1). These

results mean the incident of the meibomian glands were more in upper eyelids than lower eyelids, this is agreed with other workers (6). Anatomically the meibomian glands appearing as pale parallel lines passing vertically to the upper edge of the tarsal plate from the eyelids margin, the glands located beneath the palpebral conjunctive of upper and lower eyelid and appearing as a white or creamy color in adult goat (4).

The eyelids consist from outside to inside skin, fascia, musculo-fibrous layers (orbicularis oculi muscle fibers) (Fig. 2 and 3) and the inner layer lining by the palpebral conjunctiva which represent the mucous membrane layer. The meibomian gland (tarsal glands) arranged as a parallel modified sebaceous gland along the upper and lower eyelid these glands secrete sebaceous material (oily part of the tear film) which called meibum (lipid in nature) sharing in the composition of tear film.

The secretion of meibomian glands are very important in the tear film, its function lubricate the palpebral surface conjunctiva to facilitate the upper and lower eyelids movement and keep the cornea moisted always and distribution of nutrient materials and oxygen to the tissue of cornea that means prevent evaporation of watery materials and maintenance the eye ball. The main duct of each gland opened in the free margin of the upper and lower eyelids so these study investigate the layer of the upper and lower eyelids, as the following, skin, fascia, muscle fiber of the orbicular oculi, palpebral conjunctiva (mucous membrane and tear film which coated this palpebral layer of conjunctiva (Fig. 1 and 3). This study showing the meibomian glands opening in the free margin of upper and lower eyelid near the follicle of cilia of the eye in both eyelids. Also the study distinguished that the meibomian gland became shorter at nasal and temporal canthi but in the middle of upper and lower eyelids are longer (4).

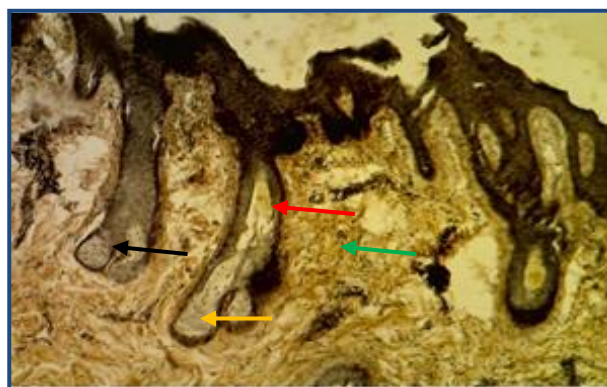
The histological study showing that the lipocytes of meibomian gland characterized by large lipid droplets (Fig. 2 and 4). This result revealed that the meibomian glands in goat also sharing in chemical composition of tear film, this fact agree with (14). The meibum

was secreted by holocrine mechanism from meibocytes and secreted as a lipid substance by other mean the meibum synthesis in the acini of meibomian glands, the ducts of meibomian glands open at the three margin of the eyelids (11). Furthermore, the study showing the external surfaces of eyelids were characterized by fully keratinized epithelia (Fig. 3). These results parallel with the results of other researchers (4).

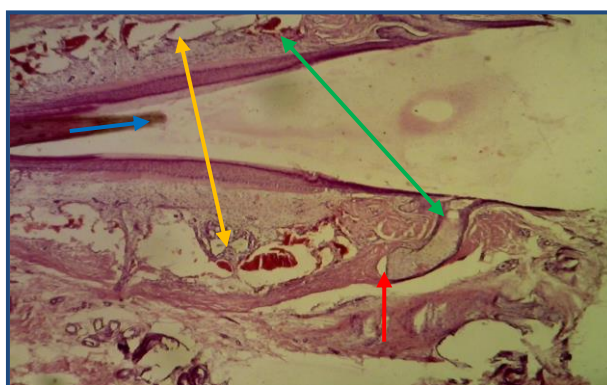
**Table, 1: Showing the numbers of meibomian glands in the left and right of upper and lower eyelids in goats.**

Site	Left Mean ± SE	Right Mean ± SE
Upper eyelids glands	45,6 ± 0.121	44,1 ± 0.711
Lower eyelids glands	35,5 ± 0.232	34,1 ± 0.152

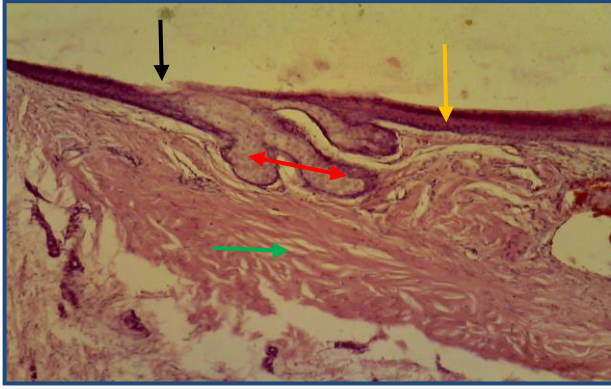
N=10 (5 left + 5 right)



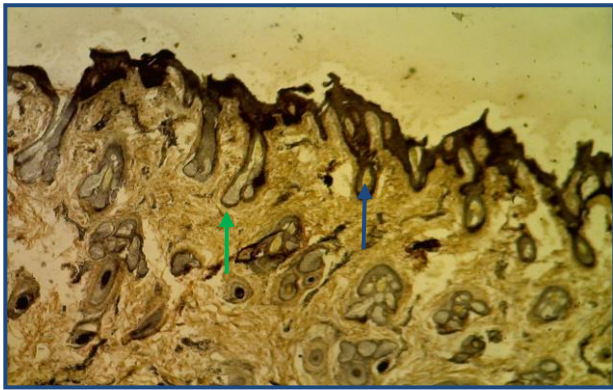
**Figure, 1: Histological section of upper eyelid of goat showing ( —▶) central duct ( —▶) deeper portion of meibomian gland ( —▶) Tarsal plate ( —▶) Branched acini of meibomian H and E X200.**



**Figure, 2: Histological section of tarsal plate showing: ( —) orbicularis oculi muscle fibers, ( —▶) meibomian glands, ( —▶) meibomian glands distended (filled) by meibum (lipid), ( —▶) central duct of meibomian glands, ( —▶) growing hair follicle, PAS X200.**



Figure, 3: Histological section of lower eyelid showing (→) Epidermis (→) dermis, (→) meibomian gland, (→) orbicularis oculi fibers. PAS X200.



Figure, 4: Histological section of upper eyelid showing (→) meibomian gland, (→) lipid droplets in the meibomian gland. H and E. X200.

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### دراسة نسيجية شكلية لغدد مايبوميان في المعز المحلي العراقي

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### الخلاصة

صممت هذه الدراسة لمعرفة النسيجية والشكلية لغدد مايبوميان في المعز العراقي المحلي. شملت الدراسة عينات من الجفون العلوية والسفلية مأخوذة من عشرة رؤوس معز عراقي محلي تراوحت اعمارها من 10-14 شهر (5 ذكور و 5 اناث) وأجريت عليها التقانات النسيجية الروتينية بدءاً من التثبيت ولحد التقطيع والتلوين وغفر المقاطع النسيجية الروتينية حيث تبين ان غدد مايبوميان موجودة تحت الملتحمة الجفنية بشكل متوازي وقنواتها تفتح بالحافة الحرة للجفن العلوي والسفلي بجانب كل شعرة من الاهداب وافرازها دهني يسمى (مايبوم) يشارك في مكونات الدمع ويساعد على ترطيب وتزييت الملتحمة الجفنية ليسهل حركة الجفن العلوي والسفلي ويحافظ على سلامة العين بنشر الدمع وايصال المواد الغذائية والاكسجين ومنع جفاف القرنية نستنتج من هذه الدراسة اهمية غدد مايبوميان لحيوية العين في المعز العراقي المحلي.

الكلمات المفتاحية: غدد مايبوميان، الغدد الصفحية، الغدد الجفنية، الصفحة الجفنية، المعز.