

TOPOGRAPHY AND HISTOLOGY OF PAROTID
GLAND IN ONE HUMPED CAMEL

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SUMMARY

The parotid salivary gland in one humped camel (*Camelus dromedarius*) is located along the caudal edge of the ramus of mandible and on the masseter muscle. The gland has a long triangular outline and a red-brown color. The lateral surface is covered by parotid fascia and the cutaneous and parotido-auricularis muscles. It is bounded dorsally by zygomatico-auricularis muscle. The gland takes its blood supply from three branches which come from the facial artery that supply the middle and distal part of the gland, while the proximal part receives its blood supply from the superficial temporal and cranial temporal arteries. The parotid duct of the gland passes over the lateral surface of the masseter muscle, inferior to the orbital cavity and opens into the opposite 4th upper cheek tooth.

Histologically, the gland appears as compound tubulosaccular and with serous secretion. It has a lobular structure with a functional unit that resembles the acinus. The acini are lined by cells which are pyramidal in shape and contain zymogen granules with spherical, centrally located nuclei. The interlobular ducts are connected by straight ducts and took a straight course. The epithelial lining of the straight ducts are cuboidal to tall columnar cells.

INTRODUCTION

Several workers stated that salivary glands provide an excellent opportunity for investigation of cellular evolution (1,2,3). Others have postulated that there may be a relationship between diet and salivary gland structure and function (4,5). Studies on the gross and microscopic anatomy of the parotid gland in one humped camel are scanty. The purpose of this paper is to report the topographic and histological features of this gland.

MATERIAL AND METHODS

The parotid glands were obtained from eleven adult (5-7 years old) slaughtered camels of both sexes.

There were no pathological changes in the head and neck region. Both right and left side of the glands with their ducts were dissected carefully. Samples from the parenchyma of glands and ducts were fixed in 10% formalin and embedded in paraffin. Thin sections of 6 micrometers were prepared for light microscopic observation after being cut transversally and longitudinally and then stained with hematoxylin and eosin. Three heads of camels were prepared for latex injection into the common carotid artery for the purpose of nutrient blood supply study.

RESULTS

The parotid salivary gland in camel is characterized by its triangular shape (fig.1). The color of gland is red-brown and is in contact with mandibular salivary gland. It is situated on the masseter muscle along the caudal edge of the ramus of the mandible, from the zygomatic arch to an angle resulting from communication of linguofacial and maxillary veins. The gland has two surfaces, two borders, a base and apex. The lateral surface is covered by the parotid fascia and the cutaneous parotid auricularis and zygomaticoauricularis muscle which is located dorsal to the gland. The medial surface covers the stylohyoid bone, occipitohyoideus and

digastricus muscles. It also covers the external carotid artery and some of its branches, maxillary vein, facial nerve, transverse facial artery and facial artery. The rostral border which is concave in the dorsal aspect of the gland, shows a notch where the parotid lymph node is settled. This border is diverted frontally in the ventral aspect of the gland.



Fig.1: Parotid gland in Camel,
notice it's triangular shape.

The caudal border is convex. the base has a notch which womb the base of ear. The apex is small and situated cranially. The parotid duct on the lateral surface of the face, crosses the middle of the Masseter muscle immediately inferior to the orbital cavity and perforates the cheek obliquely opposite the 4th upper cheek tooth. The parotid duct is slightly dilated before piercing the cheek. It's termination is wide and is surrounded by a circular mucous fold resembling papilla. This salivary papilla has a number of elevations. Generally, the parotid gland is supplied by arteries which origenates from the external carotid artery .

It is supplied by the facial artery which origenates from a common trunk with the superficial temporal artery. The facial artery often gives three branches which supply the middle part and distal part of the gland. The superficial temporal artery gives rise to the transverse facial artery and the cranial auricular artery. Small branches from the transverse facial artery supply the proximal part of the gland. The cranial auricular artery shares nutrient of the proximal part of the gland with the caudal auricular artery which origenates from the external carotid artery. The blood supply of the parotid duct is uneven. The right side of duct is supplied by branches comming from the transverse facial artery which is considered as original artery to the duct together with branches of the facial artery. The left side of the duct receives its nutrient from the facial artery branches which is considered as principle artery in addition to the transverse facial artery branches.

Histologically, the parotid gland belongs to compound tubulosaccular glands of serous type, where their secretions pass to the epithelial surface of the oral cavity from an excretory duct into which a number of branches open. The functional units of the gland are the acini. They are enclosed by a basement membrane. The cells lining the acini, contain numerous zymogen granules and are pyramidal in shape with a spherical centric nuclei (Fig. 2). In some acini, mucous cells with peculiar crescentic bodies are present between the cells and the basement membrane. Myo-epithelial cells are abundant at the periphery of the acini (Fig. 3). A

cluster of 4-5 acini are drained into intra-lobular duct by means of an intercalated duct.

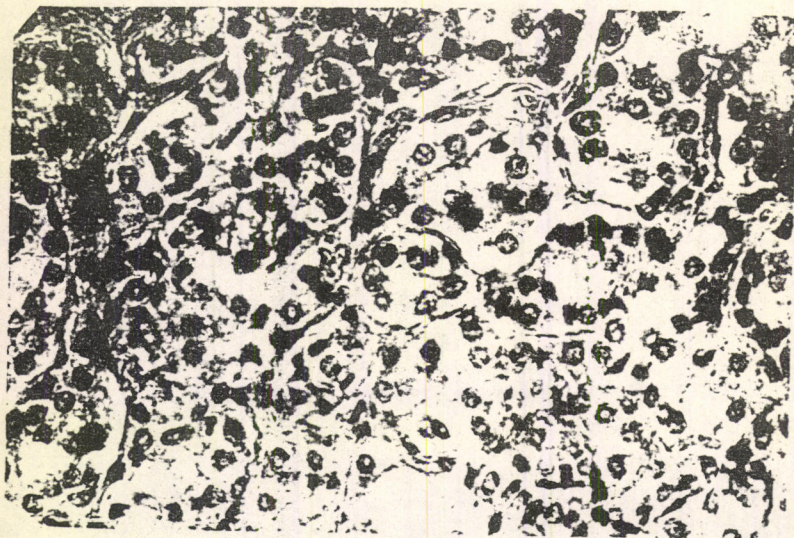


Fig.2: Acini of parotid gland showing pyramidal cells with spherical central nuclei. H&E X 250.

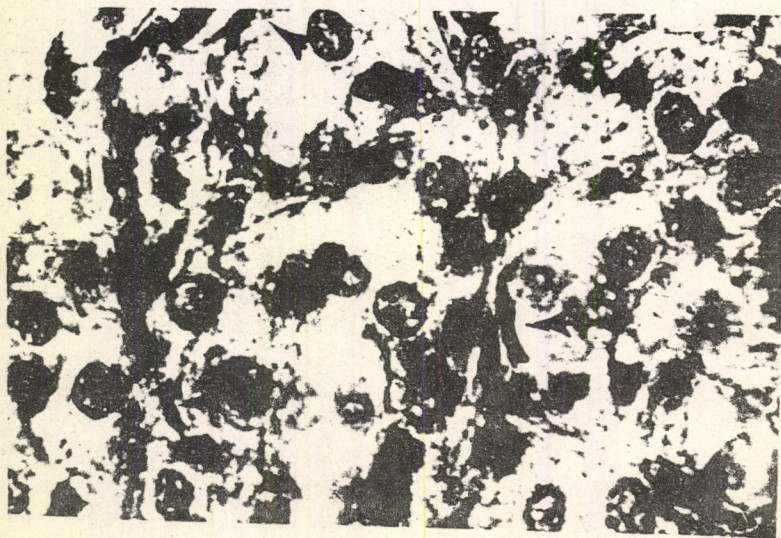


Fig.3: Arrows indicate myoepithelial cells, which surrounds cells of secretory portion of parotid gland. H&E X 1250.

The interlobular are richly supplied by a subepithelial network of capillaries. The interlobular duct is connected to the straight duct that took a rather straight course for some distance and is closely associated with blood vessels and nerve fibers. This duct is appropriate for its absorptive and secretory function. It is lined by epithelium which is comprised of up to two cell layers resting on the basement membrane and is surrounded by a connective tissue layer. The basal cell layer consists of cubical cells with large, centrally. located nuclei, whereas the innermost layer cells are tall columnar with large oval nuclei usually located in the basal half of the cytoplasm.

DISCUSSION

The parenchymal components and the blood supply of the parotid gland in camel were studied grossly and by light microscopy. The parotid gland of camel is larger and denser in texture than that of the horse and ox.

It is red-brown in colour and almost has the form of a long triangle, in contrast to the yellowish-gray and quadrilateral gland in the horse (6). It lies chiefly on the masseter muscle and is covered by the parotid fascia, cutaneous, parotido-auricularis and zygomatico-auricularis muscles. The dorsal ends has a notch where the base of the external ear fits, which is not seen in the ox (7,8).

The parotid duct crosses the middle of masseter muscle beneath the floor of the orbital orifice while in horse and ox it runs around ventral border of the mandible (6,7). The duct pierces the cheek obliquely opposite the 4th upper cheek tooth, whereas in the horse it opens in opposite the 3rd upper cheek tooth (6), and in the ox, opposite the 2nd upper cheek tooth (7). The blood supply to the gland comes from arteries arising from external carotid artery and thus the gland receives (A) the facial artery that gives three branches suppling the middle and distal part of the gland (B) The superficial temporal artery gives rise to the transverse facial artery from which small branches reach the proximal part of the gland

together with the caudal auricular artery and the cranial auricular artery. In contrast to horse and ox, where the blood supply comes from the external carotid artery and its branches (6,7).

Histologically, the gland is surrounded by abundant connective tissues which sends septa dividing the parenchyma into numerous lobular units. The lobule consists of acinar secretory units. The acini are of serous nature and they consist of pyramid-shaped cells, mostly with oval or spherical nuclei. The cytoplasm of the cell is prominent (9). The subepithelial connective tissue showed variable thickness and contained abundant amount of elastic and loose collagenous fibers and has many blood vessels, lymphatics and nerves. Stellate-shaped myoepithelial cells or basket cells were seen located between the secretory cells and the basal lamina. These cells have multiple processes (2,10). These cells are identical to myo-epithelial cells in salivary glands of many species (3,11). The microvasculature of the sub-epithelial stroma is made up of a plexus of capillaries closely related to the basal aspect of the epithelium (12,13).

The capillary network around the acini or ducts of the parotid salivary glands is well developed compared to that of liver (14), pancreas (15) and vas deferens (16). The only significant difference was in the density of capillaries especially in the subepithelial tissue of ducts which might be explained to an active role in trans formation of the secreted fluid into the saliva by a process of ion transport (17) but it seems reasonable to suppose that the sub epithelial vascular bed would be appropriate for its secretory and absorptive function (16). The ducts of salivary glands are designated as intercalary, secretory and excretory ducts. The smallest ducts are the intercalary ducts lined by low cuboidal or flattened cells.

They empty into larger ducts called secretory or striated ducts which follow a rather straight course. The surface of these duct is somewhat uniform. The latter are lined by columnar cells whose cytoplasm is eosinophilic and contains mitochondria which can be seen adjacent to the base of the cell and gives rise to basal striation (18).

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طوبوغرافية ونسجية الغدة الدرقية في الجمل ذي السنام الواحد

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الغلاة

تقع الغدة اللعابية النكفية في الجمل ذي السنام الواحد على طول الحافة الخلفية لفرع الفك السفلي وعلى العضلة الماضغة . تكون الغدة مثلثة الشكل وطويلة وذات لون احمر بني، كما تغطيها اللفافة النكفية والعضلية النكفية الصيوانية وتحيطها ظهريا العضلية الوجنية الصيوانية. تستمد الغدة النكفية مددها الدموي من ثلاثة فروع تنشأ من الشريان الوجهي الذي يغذي الجزء الاوسط والقاصي من الغدة .

يشارك الشريان الصدغي السطحي والشريان المدغي الامامي بتغذية الجزء الداني من الغدة. تمر القناة النكفية فوق الوجه الوحشي للعضلة الماضغة وتأخذ مسارا تحت الحجاج وتفتح عند حلمة مقابلة للطاحن الرابع العلوي . تتصف الغدة نسيجيا بانها غدة نبيبية عنبية مركبة ذات افراز مصلي. تتكون الغدة من فصيصات تحتوي على وحدات وظيفية تسمى العنبات حيث تبطن بخلايا ظهارية هرمية الشكل تحتوي على حبيبات مولدة للخمير وتكون نواة الخلية كروية ومركزية الموقع. تتصلب القنوات بين الفصيصات مع قناة مخططة والتي تأخذ مسارا مستقيما. تبطن القناة المخططة بنوعين من الخلايا الظهارية، الاولى خلايا قاعدية مكعبة والثانية خلايا عامودية طويلة .