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Histological and Immunohistochemistry Study of Submandibular Salivary Gland of Human

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Abstract

The salivary glands become the interesting of a high number of studies, and some exact points in the submandibular gland in humane. the myoepithelial become attention by investigator about their types shape, founded and numbers of cytoplasmic extension. In current study observed. The myoepithelial cells (MECs) are confidential the shape of the cell body also the number of primary processing from their cytoplasmic. We looked the different size of the MECs cell body from the smallest size which have only three primary processing cytoplasm, but the largest size of cell body of MECs which have six primary processing cytoplasm and the four and five primary processing cytoplasm are ranged in their size between them. The most abundant of MECs in submandibular gland that have four primary primary processing surround the serous acini. In other hand, observed when use general stain and examined under light microscope of submandibular gland that exposed in height number of serous acini than mucous tubules. these mucous tubules are caped by serous demilune on it

Introduction:

The first part of digestive tract its oral cavity, the major salivary glands drain in it by execratory duct for many function such as moistly supply, contain digestive enzyme. Also the oral cavity contain many numbers of minor salivary glands located in wall of oral cavity. one of the major salivary glands it is submandibular gland located out oral cavity which partially profound to the posterior half of the mandible[1]. (Hand A .R..2023). The submandibular gland contains two parts one of them are large and situation superficial to the mylohyoid muscle called superficial part and the small part located deep to the mylohyoid muscle called deep part. This two parts are connect together by posterior border of the mylohyoid muscle. [2]. (Lazaro R. et al 2023)

Histological of salivary glands composite of parenchymal component which secretory unit and stroma component its connective tissue for supporting glandular tissue. Dense irregular connective tisse are surround the glands for protecting and send septa to in side the gland divided in to lobes also their subdivided into lobules. Each lob contain serous and mucous acini and intralobular ducts[3]. (Andzelm MM, 2007).

Myoepithelial cells:

Myoepithelial cells are found surround secretory unit of exocrine glands between the basement lamella and glandular cell. Myoepithelial cells have collect characters between epithelial and muscular properties, such as

alpha- actin (α-SMA), calponin and S100 [4,5]. (Makarenkova,2015 Yasuhara, 2022)

Materials and Methods:

Sample collection morphological study:Have been used to conduct 40 adult humans from Al-Sadder hospital in Najaf.

Histological results by light microscope: Prepared the histological section in graduate laboratory, Faculty of dentistry, Kufa University. Routine Histological Processing[6] (Bancroft and Gamble, 2008). Then staining by general stain, Hematoxylin and eosin stain and Masson's trichrome staining for collagen fibers. And staining by Immunocytochemistry stains is Anti-Vimentin anti-vimentin for deduction of MECs. Primary antibody were provide from Dako Denmark.

Results:

The histological study of submandibular gland by general stain:

The submandibular glands of human are showed under the light microscope surround capsule and send from it a septum to isolated into lobules, showing in figure (1) and in figure (3). in figure (2) and (4) observed a large area of the lobules with thin threat of septa, the septa composite of denes irregular connective tissue extend from capsule and passing with septa inside glans man blood vessels and out pot many execratory ducts from lobules and united in main execratory duct drain in to oral cavity.

The serous and mucous secretory unite of submandibular gland is characterized. In lobules clarified the high number of serous acini while mucous tubules are aggregation in small group of which founded in one edge of each lobule, showing in figure (7). The secretory end piece of the mucous tubules are large secretory cells pall shape with flatted nuclease near the base and showed in terminal of mucous tubules found the serous demilune characterized by small, dark, with rounded nucleus than the mucous cells of serous acini caped of it, the serous demilune are drain inti lumen by canaliculi. however, and showed in the section the mucous tubules ranged approximately from two to five of mucous tubules drain in one collated duct, showing in figure (8).

Mostly abundant of secretory unite in submandibular gland is serous acini, characterized by small cells with taken eosin color when staining general stain H&E stain with small centric nucleus taken purple color of hematoxylin stain. In the top of their cytoplasm contain granules, these granules contain their watery secretion. The serous cell considers dark comparative with mucous cell, the serous acini are small rounded than the mucous tubules, showing in figure (7). In figure (6) exposit the narrow ducts is intercalated ducts degning with ending secretory unit in other side bind with striated ducts. The intercalated cel charectrized by low cuboidal dark cells. The striated ducts are showed in the section wider duct than the intercalated ducts and clarified the striated portion that near the basolateral is very clearly in section. The most arranged of striated duct two or three ducts are clusters in section, showing in figure (5).

The result is reported when stained the submandibular gland by H&E stain the serous tubules have taken pink coloration that stained by eosin stain that indicate acidophilic cytoplasm of serous cell. While mucous acini stained pale purple foamy like appearance, indicate basophilic cytoplasm of mucous.

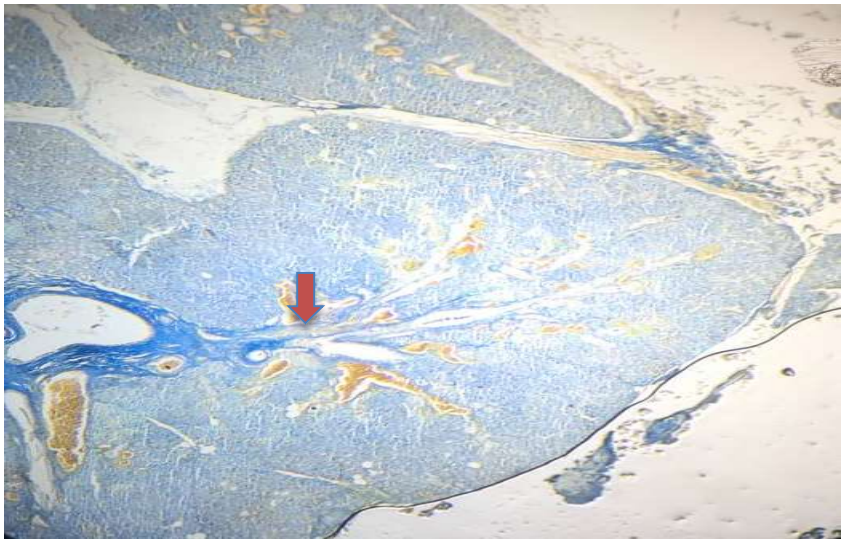

Figure (1): histological sections of humane submandibular gland. Inter-lobular connective tissue (arrow head). Masson's trichome stain. X40.

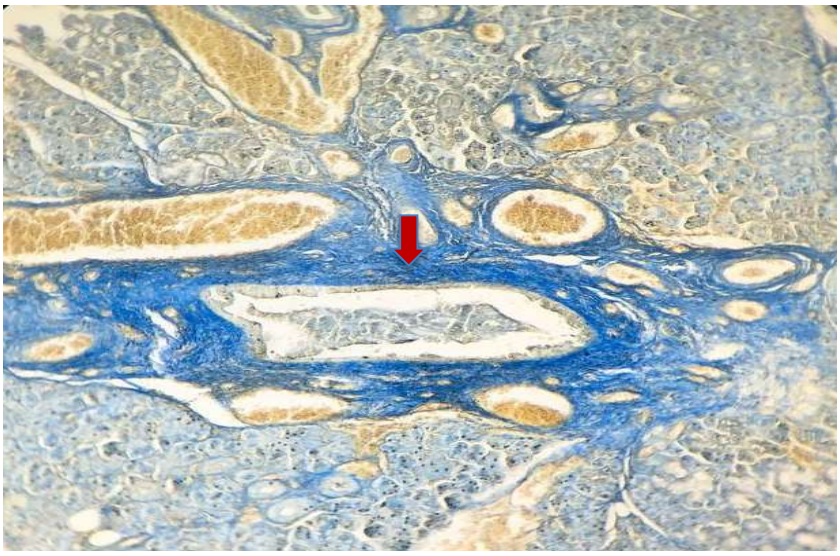

Figure (2): histological sections of humane submandibular gland. Excretory duct (arrow head). Masson's trichome stain. X40.

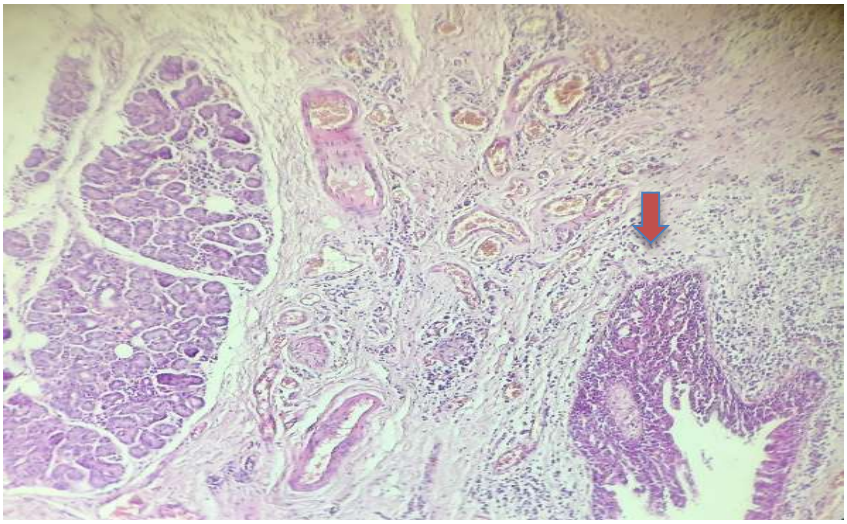

Figure (3): histological sections of humane submandibular gland. A) inter-lobular connective tissue (arrow head). H & E stain. X40.

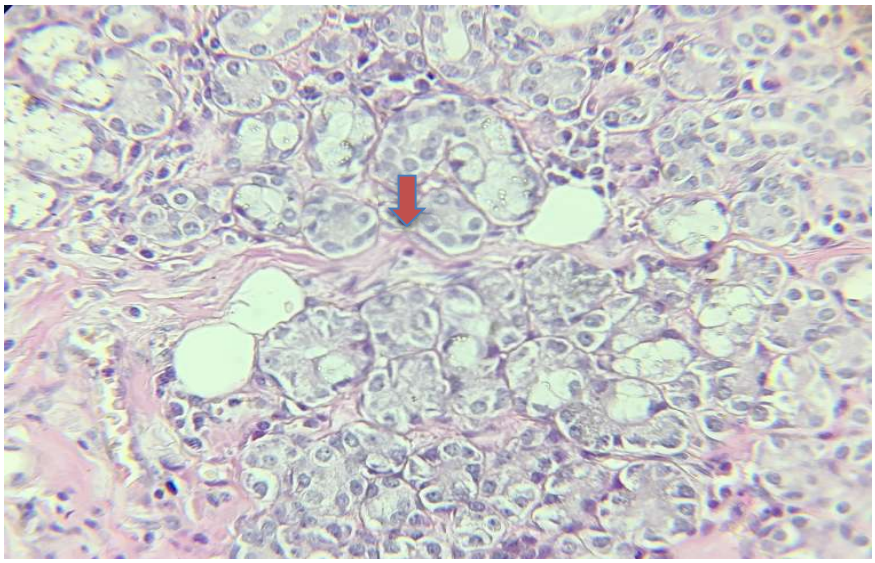

Figure (4): histological sections of humane submandibular gland. A) intra-lobular connective tissue (arrow head). H & E stain. X400.

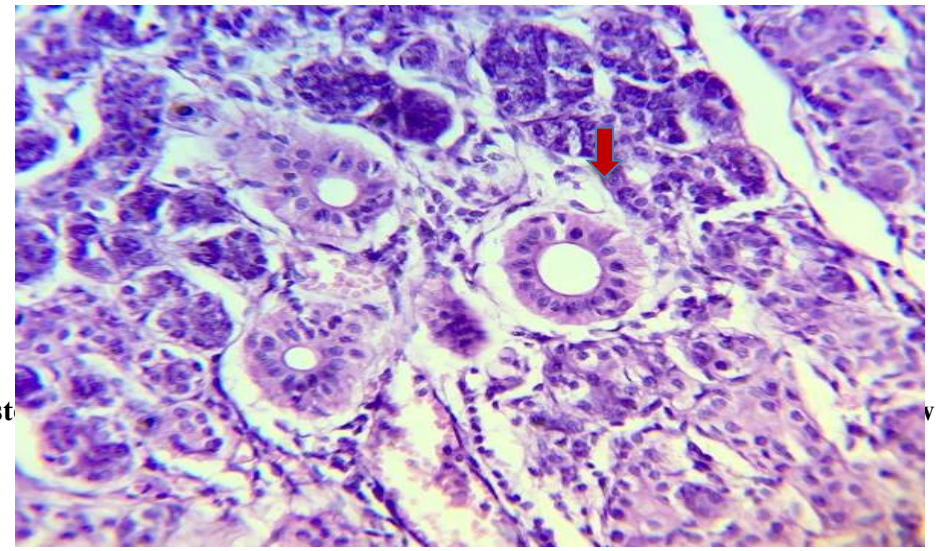

Figure (5): hist v head). H & E stain. X400.

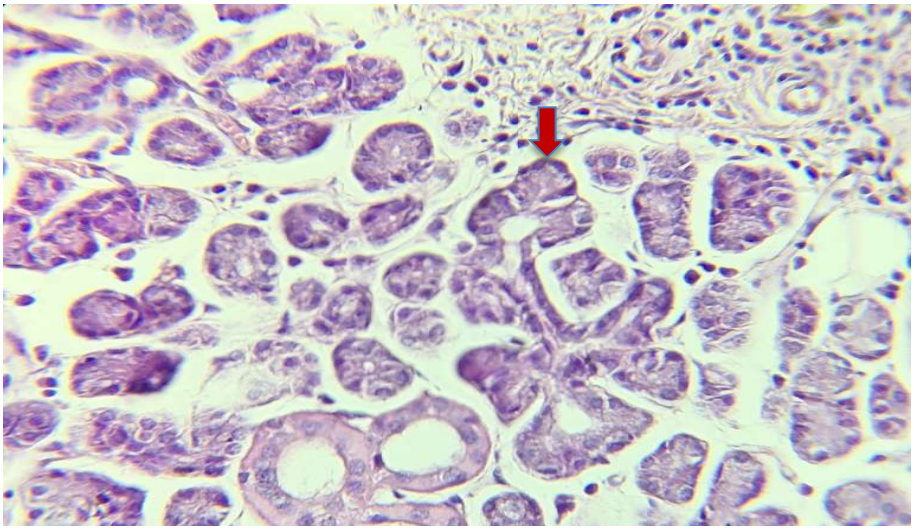

Figure (6): histological sections of humane submandibular gland. Intercalated ducts (arrow head). H & E stain. X400.

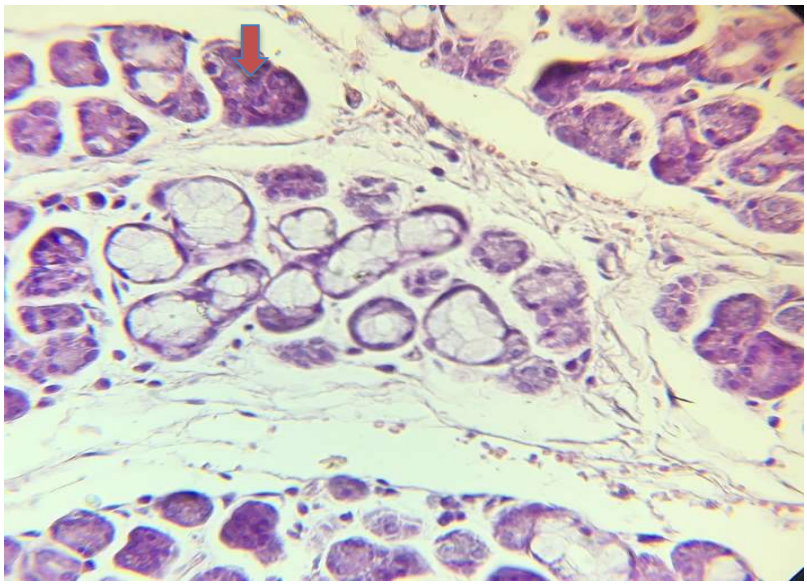

Figure (7): histological sections of humane submandibular gland. Serous acini (arrow head). H & E stain. X400.

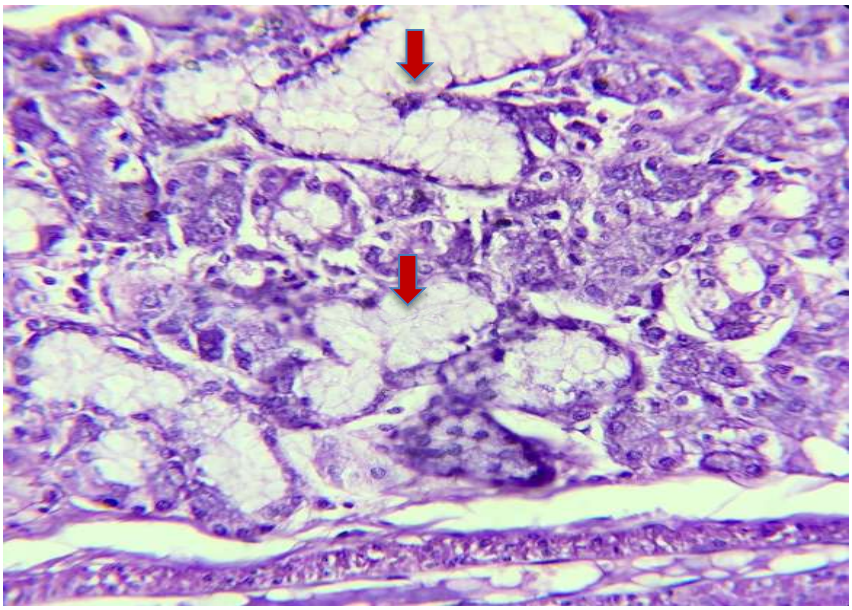

Figure (8): histological sections of humane submandibular gland. Mucous tubules (arrow head). H & E stain. X400.

Immunocytochemistry vimentin stain

Myoepithelial cell is collect between epithelial cells its origin and smooth muscle has actin-myosin filaments for function is contract. Myoepithelial cells in submandibular glands appeared in the many different shape and number of primary cytoplasmic process that extend from cell body, also showed secondary and triad cytoplasmic process.

Few myoepithelial cells were showed in small size and have the shape like triangle extended three primary cytoplasmic processes showed around the serous acini in the figure (9)

Under light microscope showed in the figure (10) the most myoepithelial cell espoused elongated perikaryon

with send four primary cytoplasmic processes, where showed around serous acini and few around mucous tubules.

In microscopic exam showed the myoepithelial cells have spindle shape of cell body and extended five primary cytoplasmic processes which showed around serous acini and around mucous tubules in the figure (11). The most myoepithelial cell around mucous acini have Epithelioid shape and extended six primary cytoplasmic processes which showed around mucous tubules in the figure (12). The results in current study the myoepithelial cell espoused elongated perikaryon with send four primary cytoplasmic processes is the abundant, where showed around serous acini and few around mucous tubules. in the figure (13). the MECs not observed around striated ducts.

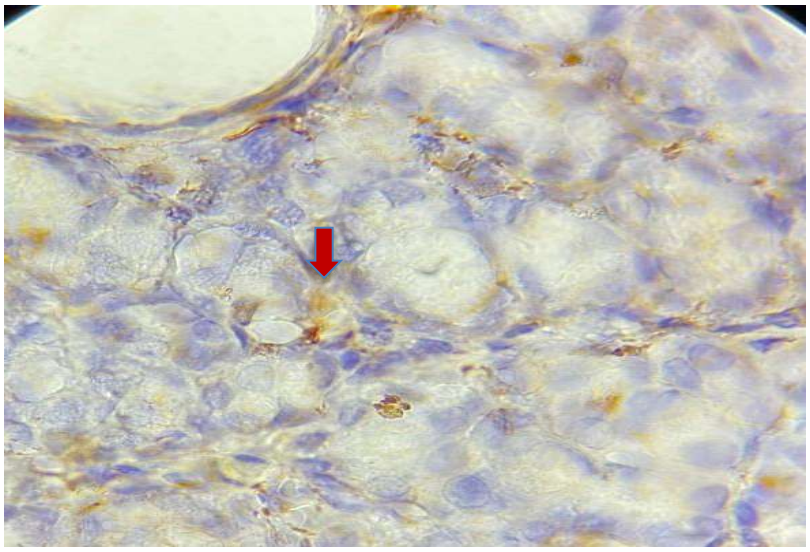

Figure (9) histological sections of humane submandibular gland see MECs that have three primary cytoplasmic processes (Red arrow head). The immunohistochemistry vimentin stain. X1000.

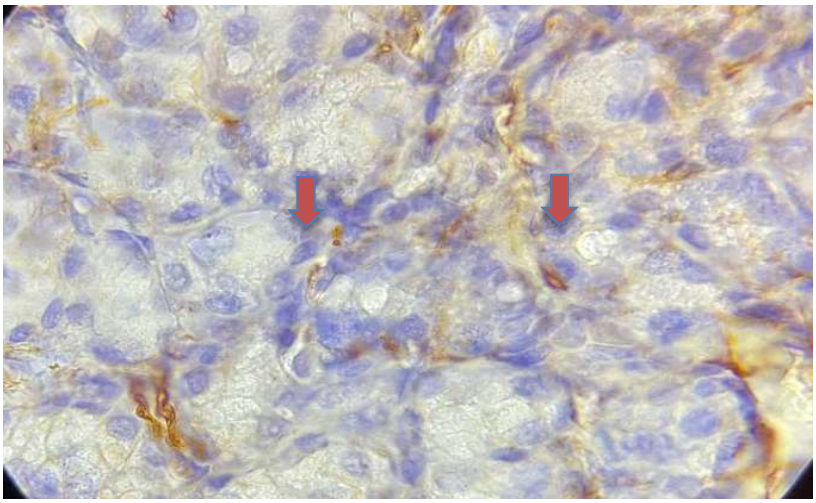

Figure (10) histological sections of humane submandibular gland see MECs that have four primary cytoplasmic processes (arrow head). The immunohistochemistry vimentin stain. X1000.

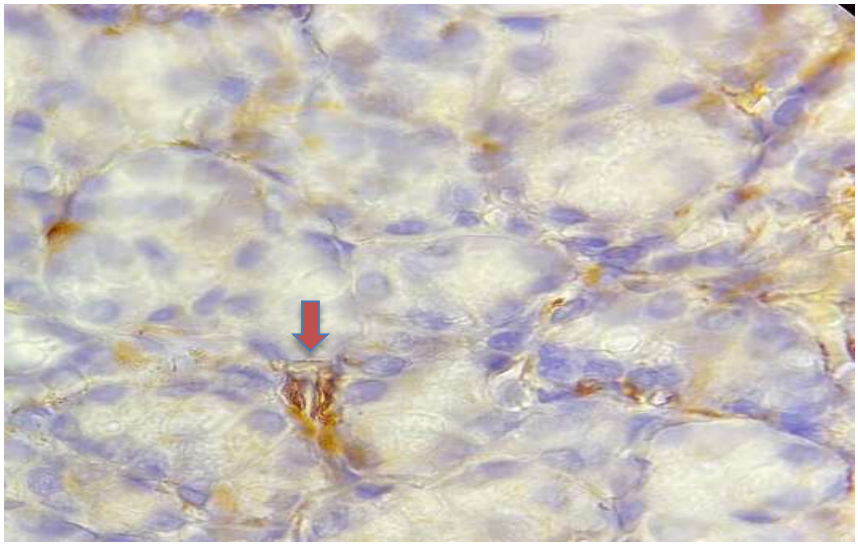

Figure (11) histological sections of humane submandibular gland see MECs that have five primary cytoplasmic processes (arrow head). The immunohistochemistry vimentin stain. X1000.

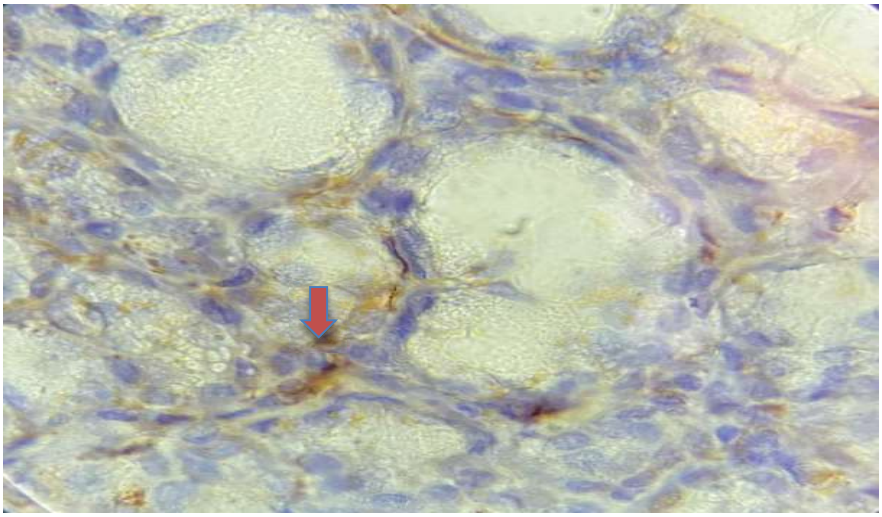

Figure (12) histological sections of humane submandibular gland see MECs that have six primary cytoplasmic processes (Red arrow head) around mucous tubules. The immunohistochemistry vimentin stain. X1000.

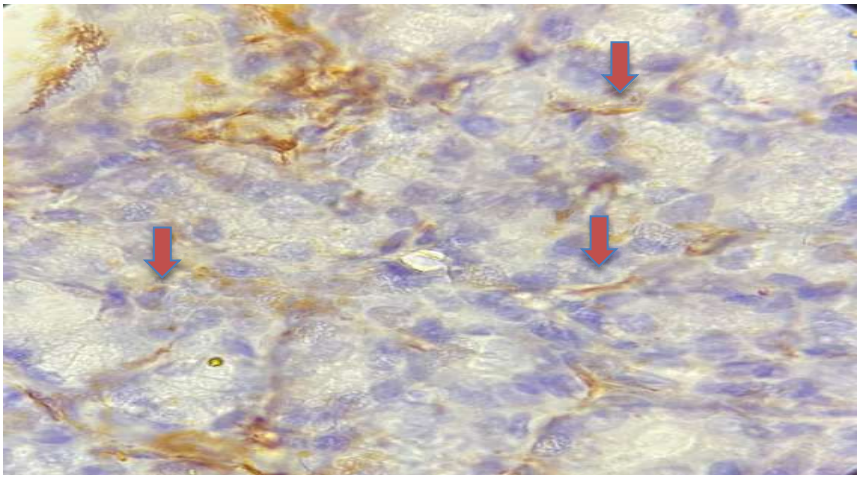

Figure (13) histological sections of humane submandibular gland see the most MECs that have four primary cytoplasmic processes (arrow head) around serous acini. The immunohistochemistry vimentin stain. X1000.

Discussion:

Submandibular gland by general stain:

In lobules clarified the high number of serous acini while mucous tubules are aggregation in small group of which founded in one edge of each lobule, showing in figure (7). incontrast in dog the mucous acini is predominant that is a mainly mucous secretion Wistar rats [7], minipigs [8], bovine and deer [9] and European hamster [10].

The secretory end piece of the mucous tubules are large secretory cells pall shape with flatted nuclease near the base and showed in terminal of mucous tubules found the serous demilune characterized by small, dark, with rounded nucleus than the mucous cells of serous acini caped of it, the serous demilune are drain inti lumen by canaliculi. however, and showed in the section the mucous tubules ranged approximately from two to five of mucous tubules drain in one collated duct, showing in figure (8). that agree with other researchers [2] (Lazaro R. et al 2023)

The most acini in each lobule are serous acini, which dark, small rounded nuclei near the base with secretory granules in apex, they take purple color when staining with H&E stain showing in figure (7). The serous acini are small rounded than the mucous tubules.

In other study the secretory end- pieces of the rabbit submandibular gland were unordinary whereas they comprise of seromucous acini (not demilunes) that void into serous tubules that thusly deplete into intercalated conduits [11]. (AL-Hashemi, et al, 2019a).

Special stain for Structure of the myoepithelial cells:

In the current study MECs in major salivary gland were stewer shape have perikayon and extended primary cytoplasmic processes. These processes were different in number, were length and thickness of processes of MECs have three to six primary cytoplasmic processes each showing two or more secondary branching processes.

Myoepithelial cells in submandibular glands appeared in the many different shape and number of primary cytoplasmic process that extend from cell body, also showed secondary and triad cytoplasmic process. Few myoepithelial cells were showed in small size and have the shape like triangle extended three primary cytoplasmic processes showed around the serous acini in the figure (9)

In study exposed the MEC are unique population of epithelial cells with contractile properties similar to smooth

muscle cells. Its contractile function for forced acini to squeeze saliva to duct from the acini and ultimately in to oral cavity [12, 13] (Joes, 2021;Mauduit O., 2023).

In recent study MECs have three primary cytoplasmic processes, these primary cytoplasmic processes were longest compare with the other branches of the EMC and their perikaryon diameter (length and width) were smallest that other MECs .[14] (AL-Hashemi and Mansur, 2019b)

Under light microscope showed in the figure (10) the most myoepithelial cell espoused elongated perikaryon with send four primary cytoplasmic processes, where showed around serous acini and few around mucous tubules. These results lined with.[14] (AL-Hashemi and Mansur, 2019b)

In microscopic exam showed the myoepithelial cells have spindle shape of cell body and extended five primary cytoplasmic processes which showed around serous acini and around mucous tubules in the figure (11). The most myoepithelial cell around mucous acini have eliptoid shape and extended six primary cytoplasmic processes which showed around mucous tubules in the figure (12).

The Kawabe *et al*. (2016) [15], performed when study for rat major salivary gland shown MEC around mucous acini were thickest and shortest and simply ramified estimated its by using immunocytochemistry florescent of MECs using αSMA antibody (the anti-α-smooth muscle actin) [16].

Tandler (1993b) [17], performed in transmission electron microscope when looked at between serous and mucous cells in the major salivary glands: mucous granules can be promptly contrasted with serous granules. mucous granules were little different in structure comparative with their serous or seromucous partners, Typical mucous granules a tendency to be 50% larger in measurement diameter comparative with serous granules.

The results in current study the myoepithelial cell espoused elongated perikaryon with send four primary cytoplasmic processes is the abundant, where showed around serous acini and few around mucous tubules. in the figure (13).

In current study observed the MECs not found around striated ducts. Lined with study Tandler (1993) [18], the striated ducts cells were tall cells contain myofilaments in the base of these cells. May be atterbuted to MECs were absent around striated ducts in domestic rabbit, because the striated ducts were not secretory duct, additionally comparative with intercalated ducts, that contain myofilament and mitochondria in base of cells as well as the striated ducts have wider lumen than intercalated ducts.

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