

## Unreported Microscopic Structure Of Mixed Salivary Gland

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In the mixed salivary glands three different types of acini are observed i.e., serous, mucous and mixed. Mixed acini contain both serous and mucous cells. In routine histological preparations, mucous acini have a cap of serous cells that secret between mucous cells. This cap of serous cells may present a half-moon appearance in some sections; hence is called as "serous demilune".

Serous demilunes are observed both under light and electron microscopes after the tissue is fixed by routine fixation method (usually where formaldehyde is used as fixative). However, when the same tissue is preserved by rapid freezing method and observed under transmission electron microscope, a different kind of histological structure of the mixed gland is observed. In this case the lumen of acinus is lined by both serous and mucous cells. Both types of cells are almost of same size. The serous cells are pyramidal in shape while the shape of mucous cells varies from short columnar to pyramidal. The mucous cells contain centrally located rounded nuclei and many mucinogen granules in the apical region. No serous demilune is seen by this method of preservation. The above findings indicate that serous demilune is an artefact of conventional method of fixation. This view is now well supported by many authors (Standaring, 2005; Ross and Pawlina, 2006 and Pal, 2008).

Why and how serous demilunes are formed? When sections of mixed salivary glands are prepared by conventional method using formaldehyde there occurs the swelling of mucinogen granules present in the apical part within the mucous cell. This increases the volume of mucous cells. The nucleus is now pushed towards basal lamina. With the increasing pressure of mucinogen granules nucleus becomes flattened. The increase volume of mucous cells displaces the serous cells towards the periphery of acinus, thus creating the serous demilune.

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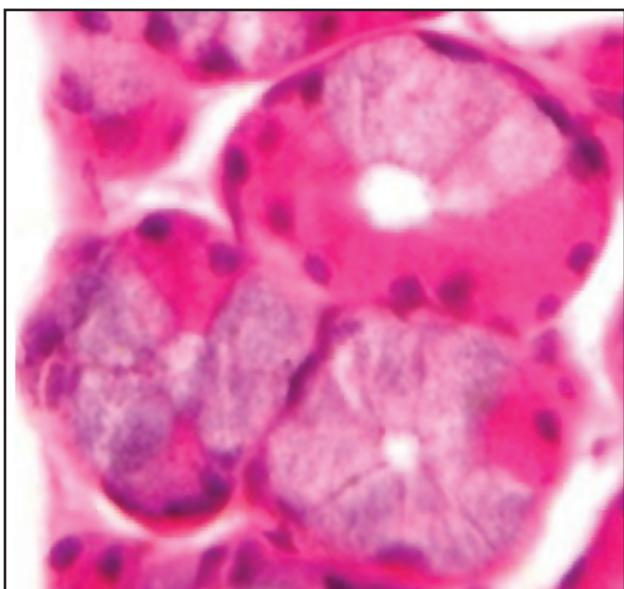
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In this short communication we intend to present an unreported observation on the histological structure of mixed salivary gland. The fresh tissue of mixed salivary gland was obtained from an adult goat for routine histological preparation of slides. Sections were prepared by using conventional preservative (formaldehyde) and stained with H&E. We observed various kinds of acini in this gland i.e., pure mucous, pure serous and mixed showing serous demilune. In addition to the above acini, we also observe the acini where both serous and mucous cells were aligned in same row, surrounding the lumen of secretory acinus (refer figure). The one end of both the type of secretory cells rested on basement membrane and other end projected in the lumen of acinus. Both kinds of cells were almost of same size. Though the nuclei of mucous cells were pushed towards basement membrane but were not totally flattened. These kinds of acini are not observed after routine fixation. To the best of our knowledge this finding is unreported in literature. As stated earlier, these kinds of acini (where lumen is lined by both serous and mucous cells) are observed only when tissue is preserved by rapid freezing method.



**Fig.:** Photomicrograph showing the presence of both serous and mucous cells aligned in the same row, surrounding the lumen of acinus.

We repeated the sectioning of mixed salivary glands in two more animals (goat) and found the same results.

Why we must have found these kinds of mixed acini after routine fixation? The possible explanation for this may be that goat is a ruminating animal as partially digested cud comes back in mouth at intervals. As these animals constantly chew, the saliva is also produced constantly in large quantity. This may be the reason for non-accumulation of large quantity of mucinogen granules in the mucous secreting cells in goat. During chemical preservation, though these granules swell but may not exert much pressure on the neighbouring serous cells. Thus in most of the mixed acini serous demilunes fail to form.

The present study, on the goat's salivary glands, strongly substantiate the belief that serous

demilune is an artefact of routine fixation. Similarly, this study also concludes that the appearance of mucous cells (as observed after routine fixation) is also not a true histological appearance. The swelling of mucinogen granules pushes the nucleus towards basal lamina and under compressive forces it becomes flattened.

#### References:

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3. Standring, S. "Grays Anatomy" 39<sup>th</sup> edition, Elsevier, Edinburgh, 2005, pp 604.