A Histological and Histochemical Study of the Glands of von Ebner in the Human Tongue

Tai Sun Shin and Soo Yun Pak

Department of Anatomy, Yonsei University
College of Medicine

A group of serous glands located in the region of the vallate papillae and extending into the muscle layer whose ducts opened into the furrows surrounding the papillae was described by von Ebner in 1872.

His description of the physico-chemical characteristics of the gland cells have been confirmed by Cowdry(1928), Bailey(1958), and Jordan(1952).

Of late years, Bloom(1957) has stated that the glands of von Ebner are rarely of the mixed type (serous glands with mucous cells) and that these glands form a thin, serous secretion which is found only on the furrows of the vallate papillae.

Incidentally, the authors have observed some mucous cells in the glands of von Ebner in the human tongue.

The present investigation was made in an attempt to determine whether the histological characteristics of the glands of von Ebner are in accordance with the statements of Bloom and with the authors' findings.

MATERIAL AND METHODS

The human tongues studied were comprised of five adult tongues (four obtained from male and one female) and of one from a boy 3 years old, which were freshly obtained from autopsy rooms of Severance Hospital and of the National Medical Center in Seoul.

The 27 vallate papillae obtained from this material were fixed in Zenker-acetic fixative and then cut serially in vertical sections about 6 micra thick after embedding in paraffin.

The sections were stained with hematoxylin and eosin or by the periodic acid Schiff method of Hotchkiss. The staining by the periodic acid Schiff method was checked using preparations from the small intestine and the liver of the albino rat as a control.

RESULTS

In observing the glands of von Ebner, various-sized patches of mucous cells, which we might consider to be pure serous, were seen to occur in the glands.

In preparations stained with hematoxylin and eosin, the mucous cells did not show any droplets of mucigen; so that their cytoplasm appeared to be relatively clear and contained the cytoplasmic network of typical mucous cells, with elongated oval, fusiform and comma-shaped nuclei whose chromatin granules stained darkly and whose position was mostly shifted to the base by compression of the mucigen. With the periodic acid Schiff method, however, the cytoplasm of the mucous cells reacted positively so strongly that the nuclei were identified with much difficulty.

With the hematoxylin and eosin stain, the serous cells appeared to be typical and contained cytoplasm slightly positive to the Schiff periodic acid stain; in the distal or apical portions the zymogen granules reacted a little more positively.

The mucous cells formed the following kinds of patches: pure mucous alveoli, mixed-type alveoli...
HISTOLOGY OF THE GLANDS OF VON EBNER

which were predominantly mucous, and mixed-type
alveoli with a few mucous cells.
The openings of the excretory ducts of the
glands into the furrows were classified into three
types:
The first type opening into the bottom of the
furrows: 16 ducts.
The second type directed into the side wall near
the bottom: 4 ducts.
The third type draining through the base of the
papillae: 4 ducts.
The authors found mixed glands of von Ebner
in 14 out of 27 papillae.

DISCUSSION

The two controversial opinions concerning the
physico-chemical characteristics of gland cells in
the glands of von Ebner have already been des-
cribed by von Ebner, Schafer, Bensley and Bloom.
The view proposed by von Ebner, Schafer, Bailey
and Bensley was that the glands of von Ebner
consisted of only serous cells; the view proposed
by Bloom indicated that the glands were rarely of
the mixed type. Although the authors might agree
with the later opinion by Bloom on the basis of
our results, the incidence of the mixed type of
glands (14 out of 27 papillae were positive) appears
to be different from that described by Bloom (ac-
cording to whom occurrence was rare).

Maximow and Bloom stated that the secretory
granules in many serous cells gave a more or less
distinct staining reaction for mucus with mucicar-
mine; such cells were called "mucocellularous" or
"mucosorous". The authors found that among the
serous cells which contain a cytoplasm slightly
positive to the Schiff periodic acid staining, in the
distal portion of these the zymogen granules
reacted a little more positively in many cases. Both
kinds of serous cells in the glands of von Ebner
appear to be identical on the basis of the stain.

In addition to the kinds of gland cells in the
glands of von Ebner, Jordan described a special
serous cell and considered it to be the resting form
or precursor which might be identical with the
serous cell in our preparations whose cytoplasm
showed a slight periodic acid Schiff reaction with-
out any distinct zymogen granules.

SUMMARY

Twenty seven vallate papillae obtained from six
human tongues were examined to determine the
histological and histochemical characteristics of the
glands of von Ebner, using serial preparations
stained in hematoxylin and eosin and after the
periodic acid Schiff method of Hotchkiss.

Mixed glands of von Ebner were found in 14 out
of 27 papillae in the human tongues.

REFERENCES

Bensley, R.R.: Observations on the salivary glands of
Baltimore: The Williams & Wilkins Company,
1958.
Cowdry, E.V.: Special Cytology. New York: Paul B.
Hoeber, Inc., 1928.
von Ebner V.: Ueber die Anfaenge der Speicheldraenge
Anat., 8: 481, 1872.
Jordan, H.E.: A textbook of histology. New York:
Appleton-Century-Crofts, 1952.
Lillie, R.D.: Histopathologic technique & Practical
histochemistry. New York & Toronto: The Blakiston
Co., Inc., 1944.
Maximow, A.A. and Bloom, W.: A textbook of histo-
logy. Philadelphia & London: W.B. Saunders Co.,
1957.
Pearse, A.G.: Histochemistry. Theoretical and
Fig. 1. Demilune cells are indicated and clear mucous cells around the cells. Hematoxylin and Eosin stain. ×400.

Fig. 2. A good number of mucous cells in a lobule forming acini and mixed acini. H. & E. stain. ×100.

Fig. 3. Three mucous acini are indicated with arrows. H. & E. stain. ×100.

Fig. 4. An excretory duct occupied by mucous cells indicated arrows. H. & E. stain. ×400.

Fig. 5. Mucous cells with darkly-stained cytoplasm and serous cells with lightly-reacting cytoplasm. Periodic Acid Schiff method. ×400.