Localization of IgA and secretory component in benign tumors of the human minor salivary glands

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Secretory immunoglobulin A (s-IgA) is a major immunoglobulin in external body fluids of mammals and participates in an important protective function in the fluids and on mucosal surface. In the oral cavity, s-IgA is secreted from the salivary glands and may act as an inhibitor of the growth of microorganisms and as a preventer of the infection as well as peroxidase, lysozyme and lactoferrin. Recent reports^{1,2)} defined the transport mechanism of s-IgA in exocrine glands. According to those studies, serum IgA is synthesized locally by plasma cells in the interstitial connective tissue of the salivary glands, and dimerized with J-chain in plasma cells before secretion. Secretory component (SC) is an additional important glycoprotein synthesized by the epithelial cells, and apparently functions as a glandular receptor for dimeric IgA. Immunohistochemical studies on localization of IgA and SC were made on the major salivary glands in human¹⁻⁵⁾ and animals⁶⁾, but little work has been done so far for normal tissues and tumors of the human minor salivary glands, although just one report⁷⁾ could be found in the literature. The purpose of the present study is to examine the localization of IgA and SC in normal tissues and benign tumors of the human minor salivary glands by using the peroxidase anti-peroxidase (PAP) method.

Materials and Methods

Materials: Thirty-one cases of benign tumors of the minor salivary glands were used as materials, which were dealt with our laboratory during the past twelve years. They

were 30 cases of pleomorphic adenoma and 1 case of monomorphic adenoma. The age and sex distribution of these pleomorphic adenoma were reported previously⁸⁾. The original sites of pleomorphic adenoma were as follows: 22 cases in palate, 4 cases in lip and 4 cases in cheek. One case of monomorphic adenoma was palatal origin. The normal minor salivary glands, included in the biopsy or operation materials in the cases of tumor or mucocele, were also studied. All of those specimens were prepared by a conventional method, namely they were fixed in 10% formalin and were embedded in paraffin.

Immunohistochemical procedure: Paraffin section were cut at 4 μ m at maximum surface of the specimens. The technique used for detection of IgA and SC was PAP method with PAP kit K 505 (DAKO, s-IgA: α chain and secretory component specific). Furthermore, IgA (Hoechst, α chain specific) and SC (DAKO) for primary antiserum were also used. After PAP method each specimen was visualized by Graham-Karnovsky solution and was counterstained by methylgreen solution.

The control tests for specificity were performed by the exclusion of primary antiserum and by using normal rabbit serum or Tris' buffer solution for primary antiserum. The negative results were obtained.

Results and Discussion

Normal minor salivary glands: IgA and SC were localized in some parts of duct cells such as intercalated, intralobular and

interlobular ducts of the lingual, labial and palatal minor salivary glands. Especially in some duct cells of the lingual and palatal glands, IgA and SC were distinctly positive with the granular pattern (Fig. 1). The mucous acinar cells were entirely negative for both IgA and SC. The staining intensity of SC was more strong than that of IgA, while their distribution patterns were similar.

The many scattering plasma cells within the interstitial connective tissue were also positive for IgA.

In the reports^{3,4)} on the major salivary glands (the parotid and submandibular glands), the different localization and the intensity of IgA and SC were obtained in each investigator. But recently Nakamura et al.¹⁾ reported that SC was present in the

Fig. 1 Normal palatal gland. Epithelial cells of intralobular ducts are positive for SC with the granular pattern. (PAP stain for SC $\times 452$)

Fig. 2 Pleomorphic adenoma of the buccal gland. Cuboidal tumor cells arranged in the tubular or duct-like structure and the secretory products in its lumen are positive for IgA. (PAP stain for IgA $\times 226$)

Insert: Some tumor cells located in the luminal side are positive for IgA and tumor cells located in the basal portion are negative. ($\times 452$)

Fig. 3 Pleomorphic adenoma of the palatal gland. Strongly positive for SC in part of solid cell clusters. (PAP stain for SC $\times 452$)

Fig. 4 Monomorphic adenoma of the palatal gland. Tumor cells are moderately positive for IgA without any localization. (PAP stain for IgA $\times 226$)

serous acinar cells, ductal epithelial cells and secretory products in the lumen, but not in mucous acinar cells in the human major salivary glands. Korsrud and Brandtzaeg²⁾ also reported that SC was present in the most acinar, intercalated, and striated duct cells of the human major salivary glands except for mucous elements, and that the distribution of IgA in epithelia was similar to that of SC. On the other hand, there has so far been little report on the immunohistochemical localization of IgA and SC in the minor salivary glands, except Mori's report⁷⁾. Mori has studied on the human lingual gland, and reported that SC was not present in the duct cells and the mucous acini. The present study showed that IgA and SC were detected only in the epithelial cells of small ducts in part of the normal minor salivary glands. It should be necessary to make further studies on the localization of IgA and SC in various sites of the normal minor salivary glands, because these glands may play an important role in the regulation of microorganisms in the oral cavity⁹⁾.

Benign tumors of the minor salivary glands: The localization of IgA and SC was clearly and intensely demonstrated in about one third cases of all pleomorphic adenomas. IgA and SC were positive with the granular pattern in neoplastic cells arranged in the tubular or duct-like structure, and in secretory products in its lumen. In each positive case, cuboidal cells which located in the luminal side of the tubular or duct-like structure were partially stained, whereas tumor cells located in basal portion and spindle-shaped peripheral cells (myoepithelial like cells) were generally negative (Fig. 2). Positive cells for IgA and SC were also seen in some solid cell clusters (Fig. 3). The distribution of IgA was similar to that of SC in each case. On the other hand, the scattering tumor cells and stroma in myxoid, chondroid and hyalineous areas were negative for IgA and SC in all cases. Thus, the localization of IgA and SC were different in each histological characteristic in the pleomorphic adenoma.

The tumor cells of a monomorphic adenoma were moderately positive for IgA and SC without any localization (Fig. 4).

The results of the present study on the benign tumors of the minor salivary glands suggest that IgA and SC could be good indicators for the functional differentiation in the tumor cells of the minor salivary glands.

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