CARBONIC ANHYDRASE III – A MARKER OF HUMAN SALIVARY GLAND MYOEPITHELIAL CELLS

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Myoepithelial cells (MEC) are components of the secretory divisions and certain efferent ducts of exocrine glands of ectodermal genesis. These cells, by contracting, expel secretion from the gland. Definite difficulties arise during the identification of MEC in different tissues, for classical morphological methods of studying these cells are not only laborious, but not always reliable, especially in altered tissues [1, 3, 5]. The interest of investigators in MEC is due to the presence of a considerable number of tumors in whose morphogenesis involves the transformation of these cells [2, 4].

Data have now been obtained to show that MEC contain myosin of smooth-muscle type, and because of that, antibodies (AB) to this protein can be used to identify MEC. However, smooth-muscle myosin cannot be regarded as a sufficiently reliable marker of these cells because, on the one hand, other cells containing this protein may also be present in the parenchyma of the gland and, on the other hand, it is not yet clear whether it is modified in MEC during a pathological process. It is known to be possible to use AB to carbonic anhydrase III (CAIII) to detect uterine smooth-muscle cells and MEC of the mammary gland and prostate [9]. CAIII is an enzyme which hydrates carbon dioxide to form the bicarbonate ion. Activity of this enzyme is high in cells with intensive oxidative metabolism. Three isozymes of carbonic anhydrase are distinguished in human tissues, and CAIII has been isolated from slow type I skeletal muscle fibers [6, 7, 8].

This paper describes the results of an immunohistochemical study of MEC from normal human salivary glands.

EXPERIMENTAL METHOD

Tissue of the normal salivary glands of 10 individuals was studied. The material was taken during operations. Part of the tissue was fixed in formalin for subsequent embedding in paraffin wax. Another part of the gland, after fixation in liquid nitrogen, was used to prepare frozen sections, followed by immunohistochemical staining by the indirect Coons' method with polyclonal monospecific AB to CAIII. (The AB to CAIII were kindly presented by Dr. H. K. Väänänen, Department of Pathology, University of Oulu, Finland). The secondary AB were goat immunoglobulins labeled with FITC (from "Hyland"). The SF cimens were examined in the Lyumam R2 luminescence microscope. In the control, the primary AB were replaced by normal rabbit serum.

EXPERIMENTAL RESULTS

The study of microscopic specimens stained with hematoxylin and eosin revealed in all cases a picture of unchanged salivary gland tissue. During the study of specimens stained with AB, intensive green fluorescence of the cytosol of MEC was found around the acini of the glands (Fig. 1). The gland cells of the terminal secretory portions remained insensitive to AB in all cases studied. Single cells reacting with AB were found both in the intralobular and interlobular efferent ducts of the glands (Fig. 2). Negative results were obtained after treatment of the preparations with normal rabbit serum.

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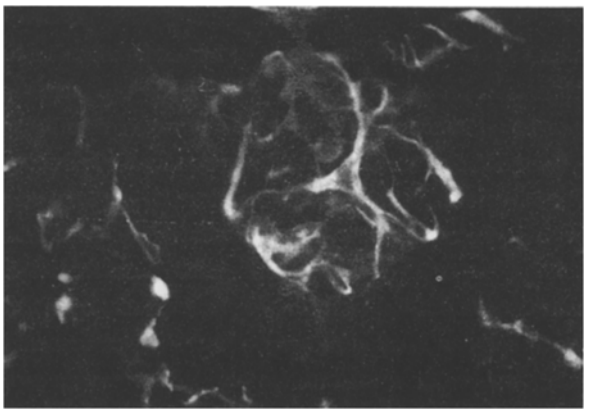

Fig. 1. Human submandibular salivary gland, acinus. Here and in Fig. 2: indirect immunofluorescence staining (FITC) with AB to CAIII.

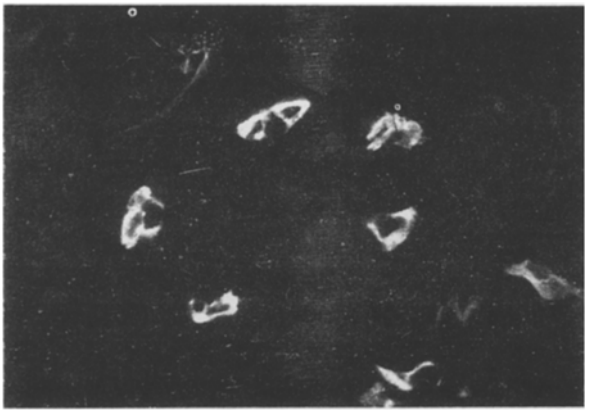

Fig. 2. Human submandibular salivary gland, intralobular efferent duct.

The results of this investigation thus showed that AB to CAIII can be successfully used to identify MEC of human salivary glands.

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