SHORT COMMUNICATION

Immunohistochemical evidence for Langerhans cell origin of histiocytosis X cells
—A preliminary study by the use of S-100 protein—

Fumio Ide, Hideki Tsuchiya, Satoshi Fujiki, Masashi Takebe and Takashi Nakajima*

Department of Pathology (Chief: Prof. Shinichiro Umemura), Nihon University School of Dentistry, 1–8–13 Surugadai, Kanda, Chiyoda-ku, Tokyo 101, Japan
*Pathology Division, National Cancer Center Research Institute, Tsukiji 5-chome, Chuo-ku, Tokyo, Japan

[Accepted for publication: December 4, 1982]

Key words: S-100 protein/histiocytosis X cells/immunohistochemistry/Langerhans cells

Histiocytosis X is a disease complex of unknown etiology characterized histologically by the proliferation of well-differentiated histiocytes containing Langerhans cell granules1). Besides the ultrastructural distinctiveness of Langerhans cell granules as a specific marker, recent immunohistochemical methods for identification of Langerhans cells have relied on demonstration with S-100 protein2-4). Applying this new immunohistochemical marker for Langerhans cells, preliminary investigation was performed on jaw lesions of histiocytosis X in the present study.

Materials and Methods

Jaw lesions in 6 cases of histiocytosis X were investigated. In addition, normal human oral mucosae were used for identification of Langerhans cells.

For localization of S-100 protein in 5-μm sections of formalin-fixed and paraffin-embedded tissue, an immunohistochemical technique using the peroxidase-antiperoxidase (PAP) method was applied5,6). Antibovine S-100 protein rabbit serum was prepared as described previously5), and used at dilutions of 1:300 for 30 min at room temperature. Swine antirabbit Ig G antiserum and the PAP reagent purchased from Dakopatts (Denmark) were used at dilutions of 1:40 and 1:100, respectively. Anti-S-100 protein rabbit serum absorbed with purified bovine S-100 protein served as controls. After diaminobenzidine reaction, the sections were lightly counterstained with diluted Giemsa solution for tissue orientation.

Results

In all cases of histiocytosis X, only histiocytes X cells with characteristic indented nuclei displayed positive immunostaining of S-100 protein. Both the cytoplasm and nuclei of these cells showed positive results (Fig. 1). S-100 protein did not appear in the stains of other cells involved in the lesions6).

In normal oral mucosa, S-100 protein was demonstrated in the dendritic cells located in the upper spinous layer of the epithelium (Fig. 2). Their morphology and distribution were identical to those of Langerhans cells as described elsewhere3). Aside from Langerhans cells, S-100 protein can be detected in Schwann cells of the peripheral nerves and in myoepithelial cells of the salivary glands. Details of the positivity for myoepithelial cells are being investigated. No cells positive for S-100 protein were observed in the control sections.

Discussion

The presence and distribution of S-100
protein in histiocytosis X were studied immunohistochemically. We observed the ubiquitous presence of S-100 protein in histiocytosis X cells as well as Langerhans cells in the normal oral mucosa. Thus, the hypothesis that histiocytosis X cells may be functionally closer to Langerhans cells than traditionally thought is further supported6).

Immunohistochemical studies using monoclonal antibodies showed a higher degree of OKT6 specificity for identification of Langerhans cells7,8), and histiocytosis X cells9), but these techniques have traditionally required a fresh or frozen tissue. It is important to develop a new convenient and reliable marker for these cells on routine formalin-fixed and paraffin-embedded tissue.

Since the first discovery of S-100 protein, this protein has been considered to be a strictly nervous tissue specific. This protein was also found in several tumors derived from Schwann cells and melanocytes5). Outside of the neuroectodermal tissue, recent studies have found S-100 protein in Langerhans cells of the epidermis2-4), interdigitating reticulum cells of lymphnode4) and in chondrocytes10). However, the true function of this unique protein is still debatable at present.

In conclusion, the immunohistochemical demonstration of S-100 protein in routine histologic sections is of great value in the identification of Langerhans cells and histiocytosis X cells.

Addendum: Recently, Nakazato et al. observed the presence of S-100 protein in normal and neoplastic myoepithelial cells of the salivary glands (Lab. Invest. 46: 621, 1982).

References


