2. Hashimoto, K., Dibella, R. J., Borsuk, G. M. & Lever, W. F.: Eruptive hidradenoma and syringoma. Arch Dermatol *96:* 500, 1967.
3. Hashimoto, K.: The ultrastructure of the skin of human embryos. Formation of the apocrine gland. Acta Dermatovener (Stockholm) *50:* 241, 1970.
4. Hughes, P. S. H. & Apisarnthanarax, P.: Acral syringoma. Arch Dermatol *113:* 1435, 1977.
5. Kurihara, Y., Yasuhara, M., Takagi, T., Mori, A. & Tanida, M.: Syringoma. Report 1. Acta Dermatol (Kyoto) *52:* 248, 1957.
6. Kurosumi, K.: Fine structure of the human sweat duct of eccrine and apocrine types. Arch Histol Jpn *40:* 203, 1977.
7. Lever, W. F. & Schaumburg-Lever, G.: Syringoma. *In* Histopathology of the Skin, 5th ed., 513 pp. J. B. Lippincott Co., Philadelphia, 1975.
8. Pinkus, H. & Mehregan, A. H.: Syringoma. *In* A Guide to Dermatohistopathology, 2nd ed., 539 pp. Appleton-Century-Crofts, New York, 1976.
9. Tani, M., Yamamoto, K. & Mishima, Y.: Electron microscopic study of normal and carcinomatous human apocrine sweat duct. J Clin Electron Microscopy *9:* 5, 1976.
10. Tanimura, Ch.: Über das Syringom. Jpn J Dermatol *22:* 111, 1922.

Banded Structure in Solitary Trichoepithelioma

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Abstract. Electron microscopical observations were made in a case of solitary trichoepithelioma. Enlarged ERs were found in the tumor cells, showing a peculiar structure with fine granules and an electron-dense banded structure, about 50 nm wide respectively, lying at intervals of 250 nm. In addition to this structure, dense ovoid bodies, about 500 to 600 nm in diameter, were also observed.

Key words: Solitary trichoepithelioma; Enlarged ER

Solitary trichoepithelioma is a trichogenic hamartoma seen predominantly on the face. This condition occurs more rarely than trichoepithelioma papulosum multiplex. Ultrastructural observations of trichoepithelioma have been rare (4, 6).

The purpose of this paper is to describe a peculiar structure; enlarged ERs found in the tumor cells of solitary trichoepithelioma. This structure resembled that described by Suzuki (7) in trichoepithelioma papulosum multiplex. We will discuss whether the structure described by Suzuki and the one we found were identical or not and whether or not these structures are specific in this condition.

CASE REPORT

A 45-year-old Japanese woman visited the Department of Dermatology, Kumamoto University Hospital in February 1978, because of an asymptomatic nodule on the right ala nasi of 4 to 5 years' duration. After long remaining rice-corn in size, the nodule had then grown for the past one year. Examination revealed an elastic, hard, pink-colored nodule, 8 mm in diameter and 6 mm in height, with teleangiectasia. On the top of the nodule, several yellowish points were noted. There was neither umbilication, ulceration, nor were hairs attached to the lesion (Fig. 1).

MATERIALS AND METHODS

The nodule was removed under local anesthesia and was cut into two pieces. One was fixed in 10% neutral formalin for light microscopy, while the other was cut into 1 mm cubes, fixed in 2% osmium tetroxide buffered solution for 2 hours for electron microscopic observation, dehydrated through a series of graded ethanol solutions, and then embedded in Epon 812.

Ultrathin sections, made on a Porter-Blum MT 2, were double stained with uranyl acetate and lead citrate. Electron microscopical observations were made with a Hitachi 12 A electron microscope.

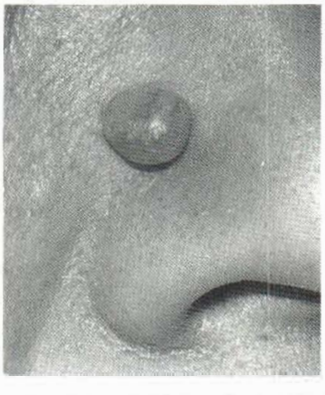

Fig. 1. Clinical picture of a solitary trichoepithelioma in a 45-year-old woman. A pink-colored elastic hard papule, 8 mm wide and 6 mm high, is present, with teleangiectasia and several yellowish points.

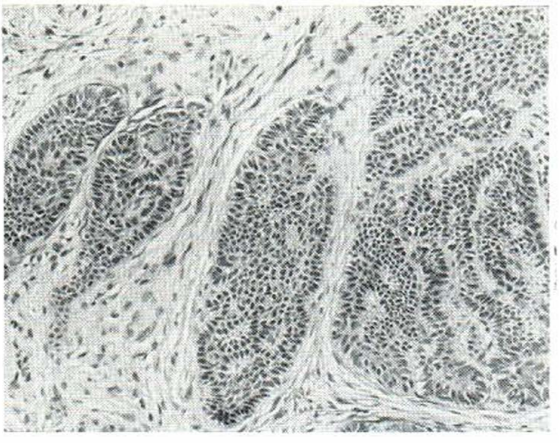

Fig. 2. Tumor cell nests with palisading basaloid cells without retraction space.

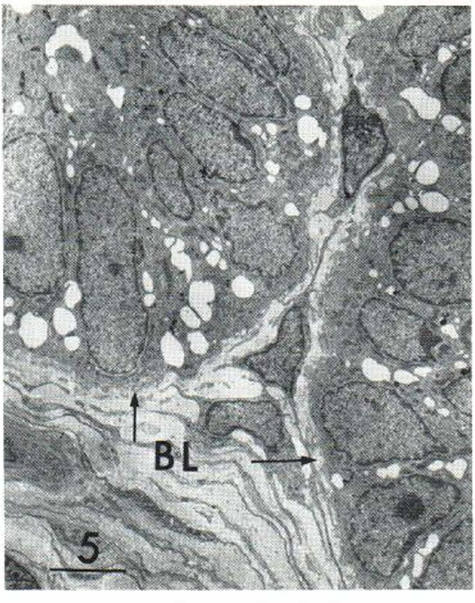

Fig. 3. Tumor cells encircled by basal lamina (*BL*). The nucleus/cell ratio resembled that of basal cell epithelioma (×2 000).

RESULTS

Light microscopy. By routine staining, a well circumscribed tumor tissue was noted below an atrophic epidermis. It was connected with the epithelial component of tumor tissue at one part. Tumor cell nests and many keratotic cysts containing eosinophilic substances were noted. The tumor cells were generally basophilic, basaloid in appearance and were arranged in a palisading fashion in the outermost layer (Fig. 2). There were a few PAS-positive substances within the tumor cells. Structures which were considered to be rudimentary hair shafts were noted within the tumor cell nests, although there were no well-developed hair shafts.

In a few places, onion-like hyperkeratotic lesions were noted, surrounded by a cellular infiltrate composed of small round cells. No such cellular infiltration was observed elsewhere. A mild hyperplasia of the connective tissue in the stroma was observed, but the so-called retraction space between the stroma and the tumor cells was not clear. Based on the above-mentioned findings, a histopathological diagnosis of solitary trichoepithelioma was made.

Electron microscopy. The tumor cells formed a nest, encircled by the basal lamina. The intercellular spaces were generally narrow, though widely spread spaces were seen occasionally (Fig. 3). The desmosomes were not so numerous, but they were all well-developed. The tumor cells were ovoid in shape, measuring 7μm in diameter, on average, and

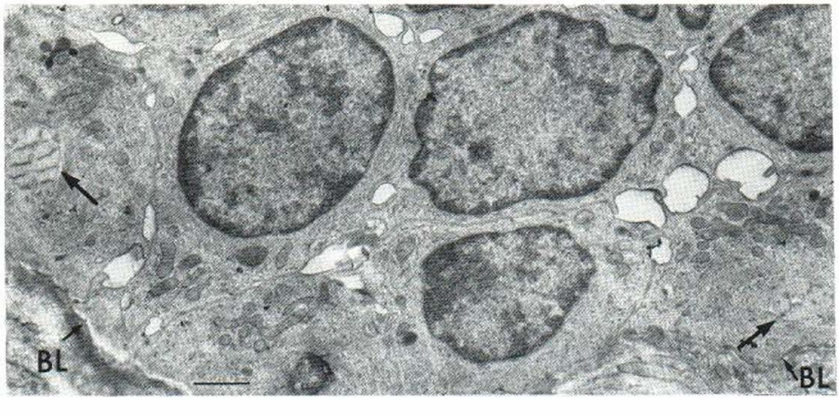

Fig. 4. Enlarged ERs are seen in the cytoplasm of tumor cells. Among them are banded structures (×7 400).

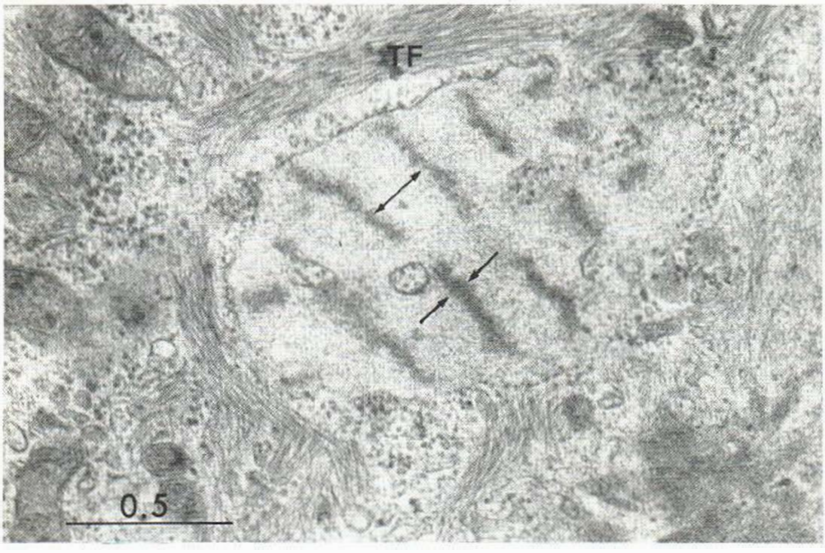

Fig. 5. Close-up view of an enlarged rough ER (×44 000). A band is 50 nm thick and is situated at an interval of 250 nm.

had a large nuclear cytoplasm ratio. The tumor cells were rich in mitochondria, and also rich in tonofilaments and tonofibrils, in comparison with those of the basal cell epithelioma. One characteristic electron microscopical finding was the cystic enlargement of ERs, associated with peculiar structures (Fig. 4). The enlarged ERs were ovoid or slightly irregular in shape and measured about 1.5 μm in diameter. They were assumed to be rough-surfaced ERs, while some of them possessed only a few ribosomes. The contents in the above enlarged ERs appeared more clearly than the surrounding cytoplasmic components, as the ERs contained low density fine granular substances. In addition to the above findings, highly electron-dense banded structures, each band measuring 50 nm were characteristically observed in our case (Fig. 5). The banded structures were bordered a little diffusely, since

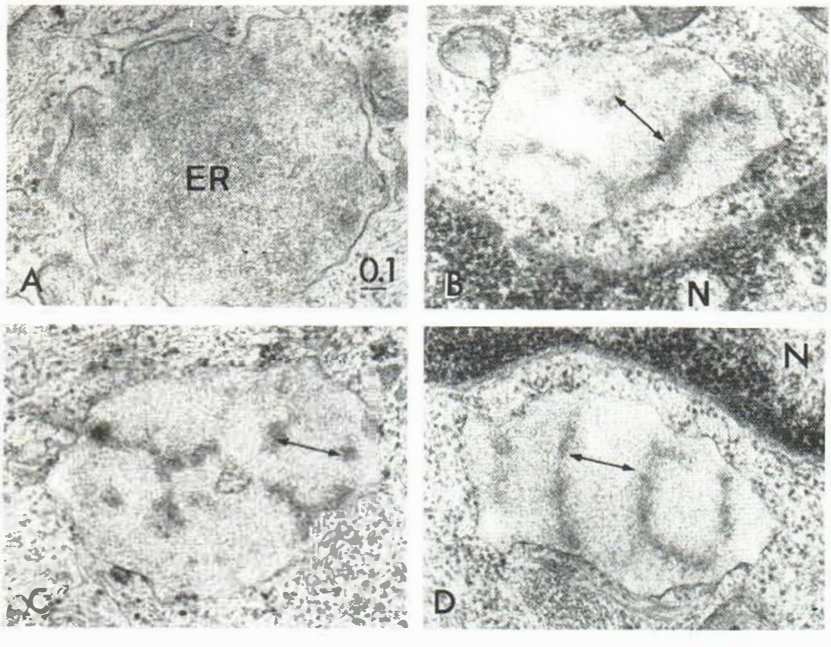

Fig. 6. Four enlarged ERs (×38 000). The upper left (*A*) does not show a banded structure, whereas other show varying patterns of banded structure. The thickness of and intervals between the bands are the same (↔).

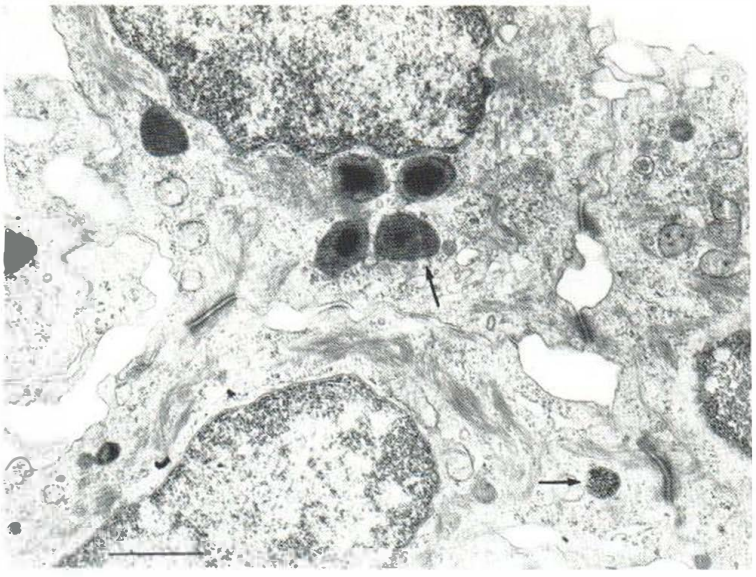

Fig. 7. Ovoid dense bodies are present within tumor cells, with limiting membrane and electron-dense granules (×13 000).

they did not possess limiting membranes. It appeared to be composed of condensed materials of the previously mentioned granular substances.

The band-like structures did not contact the membranes of the ER. Various forms of banded structures were present in these tumor cells in which the bands were always noted at intervals of about 250 nm (Fig. 6). These ERs may show identical structures when observed three-dimensionally. The other ERs did not show the banded structure, but they are considerably enlarged so as to contain fine granular particles (Fig. 6 A). These peculiar ERs were found frequently in most of the tumor cells, while some which lacked ER contained the banded structures. The banded structures were found particularly in the tumor cells of the outermost layer, displaying a palisade arrangement. However, these structures were also observed in the center of the tumor cell nests. Some were noted near the nucleus, and were also noted adjacent to the cell membrane.

As an additional finding, relatively electron-dense bodies were noted in the tumor cells (Fig. 7). These bodies were round or oval in shape, 500–600 nm in diameter and granular. Some contained electron-dense granules which granules might be related to trichohyaline granules, though there were actually no mature trichohyalin granules. These bodies and enlarged ERs had no direct relation, although there were areas where the two were located close to each other.

COMMENT

Solitary trichoepithelioma is well known for its widely varying characteristics. For instance, keratotic cysts predominate the histopathological picture in some, while the sebaceous and eccrine components are still included in others (5). The present case appears to be a typical case of trichoepithelioma and we would like to discuss the electron microscopical findings. Electron microscopical studies have been made by Mihara (4) and Radnot (6); the latter found virus particles within the tumor cells, and he stated that the tumor cells were rich in Langerhans cells.

Histopathologically, solitary trichoepithelioma displays characteristics similar to those of trichoepithelioma papulosum multiplex. Hirone et al. (2) and Matsuzaki et al. (3) found large amounts of glycogen granules in the tumor cells of trichoepithelioma papulosum multiplex; the latter even stated that the presence of large glycogen deposits is a characteristic of trichoepithelioma. On the contrary, however, we could not observe any large amounts of glycogen particles in the tumor cells.

Suzuki (7) reported enlarged ERs in the tumor cells of trichoepithelioma papulosum multiplex but did not describe them as banded structures. He and we have observed the same structures; this was the conclusion reached when Suzuki and one of us (T. O.) met personally and examined our electron micrographs.

The problem of whether this band-like structure and dense granular bodies are incidental findings or of diagnostic or etiologic significance had not been settled. We assume that these structures may be of significance in these tumor cells; and this will be demonstrated in future investigative studies.

REFERENCES

1. Headington, J. T.: Tumor of the hair follicle. Am J Pathol *85:* 480, 1976.
2. Hirone, T., Eryu, Y., Otsuki, N. & Fukushiro, R.: Light and electron microscopic studies of trichoepithelioma papulosum multiplex. *In* Biology and Diseases of the Hair (ed. T. Kobori, W. Montagna, pp. 397. University of Tokyo Press, Tokyo, 1976.
3. Matsuzaki, T., Baba, S., Ishida, Y. & Morioka, S.: Four cases of trichoepithelioma papulosum multiplex with special reference to the large glycogen granules in the cytoplasm. Jpn J Dermatol (in Japanese) *89:* 327, 1979.
4. Mihara, M., Kobe, N. & Shimao, S.: Electronmicroscopical observations of solitary trichoepithelioma. Jpn J Dermatol (in Japanese) *87:* 702, 1977.
5. Muller-Hess, S. & Delacretaz, J.: Trichoepithelioma mit Strukturen eines apokrinen Adenoms. Dermatologica *146:* 170, 1973.
6. Radnot, M.: Trichoepithelioma solitaire sur la paupière. Arch Ophtalmol (Paris) *33:* 231, 1973.
7. Suzuki, H.: Electron microscopic findings of the epithelioma adenoides cysticum. J Clin Electron Microsc Tokyo *3:* 656, 1970.

Histocompatibility Antigens in Viral Warts

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Abstract. One hundred patients with viral warts and 108 apparently healthy matched controls were typed for HLA-A and B antigens. No significant difference in the frequencies of antigens was revealed, which suggested that a possible genetic trend in warts is at least not related to A and B loci of the histocompatibility system.

Key words: Viral warts; Histocompatibility antigens in; Genetic trend of; Human papilloma virus

Viral warts caused by different types of human papilloma virus (HPV) are a common disease. The association between viral infection and the major histocompatibility system is well documented (1). Some predisposition to HPV infection is a feature of persistent warts and in epidermodysplasia verruciformis, a genodermatosis, HPV has been demonstrated as a factor (4, 5). This prompted us to search for a possible particular pattern of the HLA antigens in viral warts.

MATERIAL AND METHOD

One hundred patients with viral warts, 18 females and 82 males, aged 7 to 33 years were investigated. Forty-seven were of European origin and the remaining 53 of Afro-Asian origin. The control group consisted of 108 matched apparently healthy subjects. Both patients and controls were typed for 14 HLA-A and 18 HLA-B antigens. The results were statistically evaluated utilizing the χ^2-test (2).

RESULTS

The results reveal that HLA-Bw35 is somewhat less common in patients of Afro-Asian origin than in controls ($p<0.05$). However, after correction with the number of antigens, no significant statistical differences were noted between patients and controls. Therefore, no difference in relative risks on the basis of HLA frequencies could be expected.

DISCUSSION

Evidence exists, pointing to a relationship between viral infection and histocompatibility antigens (3, 6). However, our data fail to demonstrake any such association. We may therefore speculate that the genetic trend of epidermodysplasia verruciformis —and in some instances of wart infection—is at least not related to A and B loci of this system.

REFERENCES

1. Arnason, B. G., Fuller, T. C., Lehrich, J. R. & Wray, S. H.: Histocompatibility types and measles antibodies in multiple sclerosis and optic neuritis. J Neurol Sci *22:* 419, 1974.
2. Dixon, W. J. & Massey, F. J.: Introduction to Statistical Analysis, 3rd ed. McGraw-Hill, New York, 1969.
3. Honeyman, M. C., Dorman, D. C., Menser, M. A., Forrest, J. M., Guinan, J. J. & Clark, P.: HLA antigens in congenital rubella and the role of antigens 1 and 8 in the epidemiology of natural rubella. Tissue Antigen *5:* 12, 1975.