

Ultrastructural Study on Malignant Eccrine Poroma with Special Reference to Cell Junction

悪性エクリン管孔腫の細胞接着装置に関する超微形態学的研究

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Abstract

We report junctional complex (altered tight junction, desmosomes and gap junction) in tumor cells of malignant eccrine poroma (eccrine porocarcinoma) in a 74-year-old Japanese woman. Histopathologically, the tumor consisted of irregular cords and lobules of tumor cells infiltrating dermis. The tumor cells varied from smaller round cells to larger bizarre-shaped giant cells. Nuclear atypia and mitosis were presented. Small duct formation was recognized at some parts of tumor. Ultrastructurally, the tumor cells showed euchromatic nuclei with prominent nucleoli, large amount of free polysomes, a few scattered tonofilaments, and a few intracytoplasmic cavities. Moreover, small-sized desmosomes, tight junctions and gap junctions were frequently observed. These junctional complex may represent that the tumor cells originated from the epithelial cells of eccrine duct, and may facilitate the diagnosis of porocarcinoma from invasive keratinocytic tumors. This is the first report of junctional complex in malignant eccrine poroma in the literature.

Keywords: Ultrastructure, Malignant eccrine poroma, Cell junction, Differential diagnosis

Introduction

Malignant eccrine poroma (eccrine porocarcinoma) is an appendage tumor of the skin with differentiation towards the intraepidermal portion of eccrine coil (acrosyringium)^{1,2,3}. In a typical case, histologically, the absence of keratin formation, small duct formation and association with pre-existing benign poroma should facilitate diagnosis of porocarcinoma from invasive squamous cell carcinoma and basal cell carcinoma⁴. Ultrastructurally, the tumor cells contain a variable amount of glycogen, rare tonofilaments and intracellular lumina. The cell membranes have complex interdigitating microvilli-like cell processes^{5,6,7}. Crystalline membrane bound granules have also been reported⁸.

In addition to these common types mentioned above, poorly differentiated cases which show large bizarre-shaped giant cells and less prominent ductular formation has been reported. In this case, it may difficult to differentiate this tumor from the keratinocytic tumors by light microscopic examination. Even these poorly differentiated cases electron microscopic examination may be very helpful to detect the small duct formation and or intracytoplasmic

cavity of the tumor cells. However, the ductular structure or the intracytoplasmic cavity are not always recognized in the small samples for electron microscopic examination.

Junctional complex (tight junction followed by desmosomes) is a highly characteristic feature in the common adenoma and adenocarcinoma¹⁰. The junctional complex is easily found in the small samples for electron microscopy. For this reason we have been studied differences of intercellular junctions between the eccrine porocarcinoma and squamous cell carcinoma. Moreover, there has no other report describing the ultrastructure of intercellular junction in eccrine porocarcinoma. Here we describe the junctional complex such as tight junction, desmosome and gap junction in the eccrine porocarcinoma.

Materials and Methods

A 74-year-old Japanese woman came to the hospital complaining of a mass in her skin in the right lateral abdominal wall. The tumor presented as solitary nodule colored brownish black with an ulceration of the central part. It measured 70×75mm. Complete excision was done. It was diagnosed as an eccrine porocarcinoma by histopathological examination.

Small pieces of tumor tissue were fixed in 2% paraformaldehyde and 2.5% glutaraldehyde mixture in 0.1M phosphate buffer (pH 7.2) for 2 hours, dehydrated in increasing concentrations of ethanol, cleared in propylene oxide and embedded in epoxy resin. Ultrathin sections cut with diamond knives were mounted on copper grids. They were stained with uranyl acetate and lead citrate and examined with the JEM 1010 electron microscope (JOEL, Tokyo, Japan).

Results

Histopathologically, the tumor consisted of irregular cords and lobules of tumor cells infiltrating dermis. The tumor cells were uniformly atypical, although they varied from smaller basaloid round cells to larger bizarre-shaped giant cells (Fig.1). Nuclear atypia and mitosis were presented. Small duct formation and intracellular vacuoles similar to early embryonic stage of duct formation were recognized within some parts of the dermal components.



Fig.1a: Low-power view of tumor mass involving both the epidermis and dermis. Irregular cords of the tumor cells are seen. Bar equals 250 μ m.

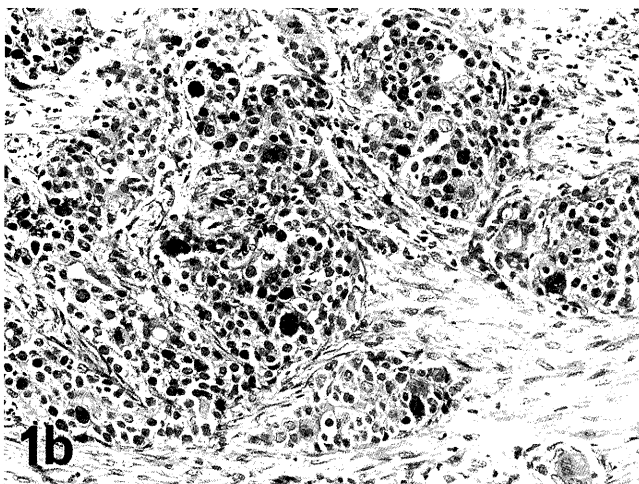


Fig.1b: High-power view of Fig.1a, bizarre-shaped giant cells are noted in the tumor nest. Ductular differentiation is not obvious. Bar equals 50 μ m.

Ultrastructurally, the tumor cells had round-shaped nuclei with smooth nuclear outline. A large amount of euchromatin and well developed nucleoli were noted in the nuclei (Fig.2) . Mitotic figures were frequently observed. In the cytoplasm, there were small numbers of mitochondria, short strands of granular endoplasmic reticulum, and poorly developed Golgi apparatus (Fig.2). The tumor cells showed numerous short microvillous cytoplasmic processes on the cell surface. In some parts, intracytoplasmic lumen (cavity) with numerous short microvillous projection and small duct formation were also noted (Fig.3). At high magnification, altered tight junctions followed by desmosomes and gap junctions between adjacent cells were frequently observed (Fig.4). The altered tight junctions were identified by its position and fuzzy materials near the structure (Fig.5). The gap junction was identified by very narrow intercellular space (gap) between neighboring cells and central beaded line. The width of the intercellular gap of the tumor cells was about 5 nm (Fig.4, insert).

Discussion

Eccrine porocarcinoma is the most common form of malignant eccrine carcinoma, accounting for approximately 50% of these tumors¹⁾. And now it is well known that the eccrine porocarcinoma show some histopathological variations from differentiated common types to poorly differentiated giant cell type⁹⁾. In the cases of ill-differentiated solid type of eccrine porocarcinoma, it may be difficult to differentiate from invasive squamous cell carcinoma and basal cell carcinoma because of inconspicuous ductular formation and large-sized atypical cells by light microscopic examination⁴⁾.

The present case was considered as one of the poorly differentiated cases, and electron microscopic examination revealed intracytoplasmic lumen and small duct formation only in some parts of the tumor. And undifferentiated case which did not show the lumen formation by electron microscopic examination has been reported⁹⁾. This case was diagnosed by typical histochemical patterns of eccrine enzyme. Therefore it was suggested that the electron microscopic examination is a valuable method for diagnosis of the poorly and undifferentiated cases of eccrine porocarcinoma. But in some cases, ductular differentiation may be hardly detected under electron microscope, because the examination is limited to small areas of the samples, and the

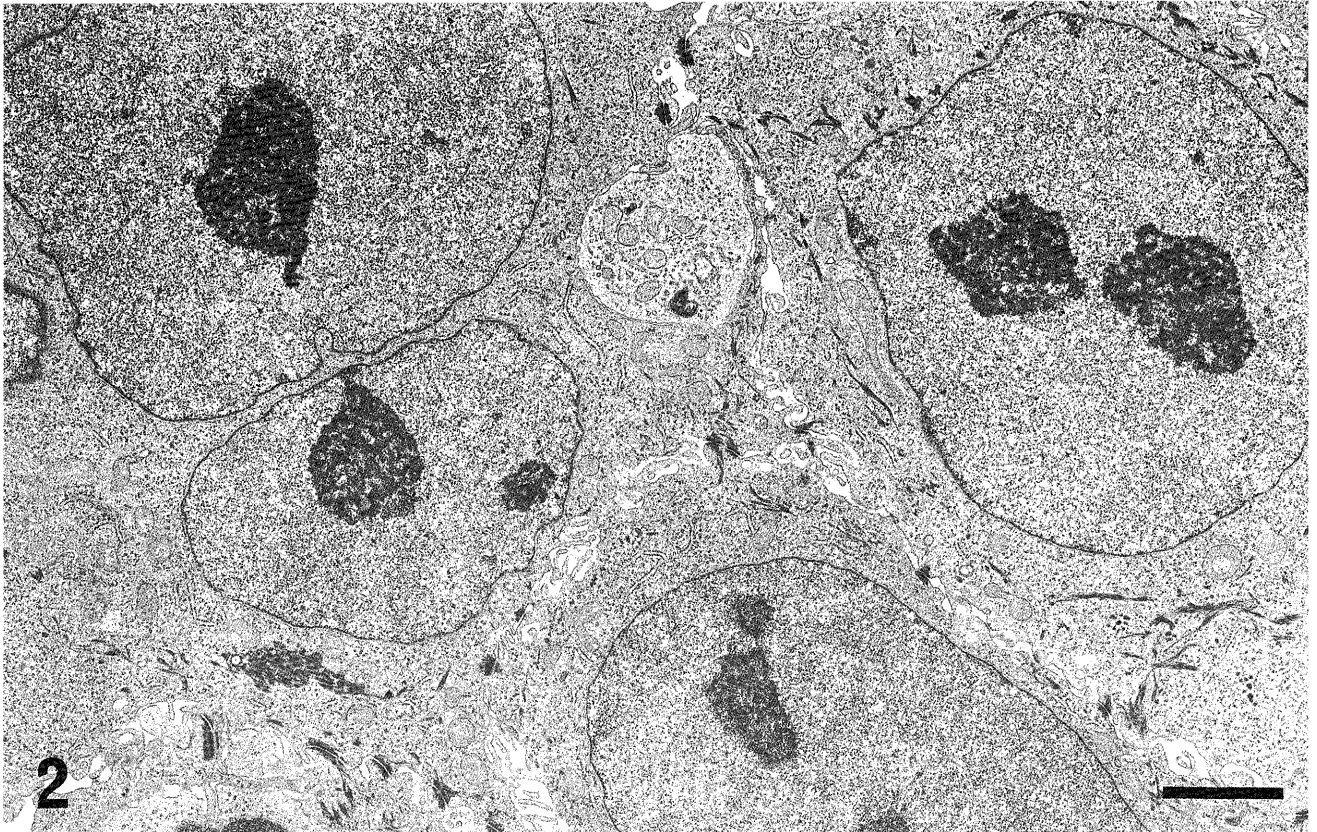


Fig.2: The tumor cells have large euchromatic nuclei with prominent nucleoli, numerous free polysomes and a few tonofilaments. Desmosomes and microvillous cell processes are also noted. Bar equals 2 μ m.

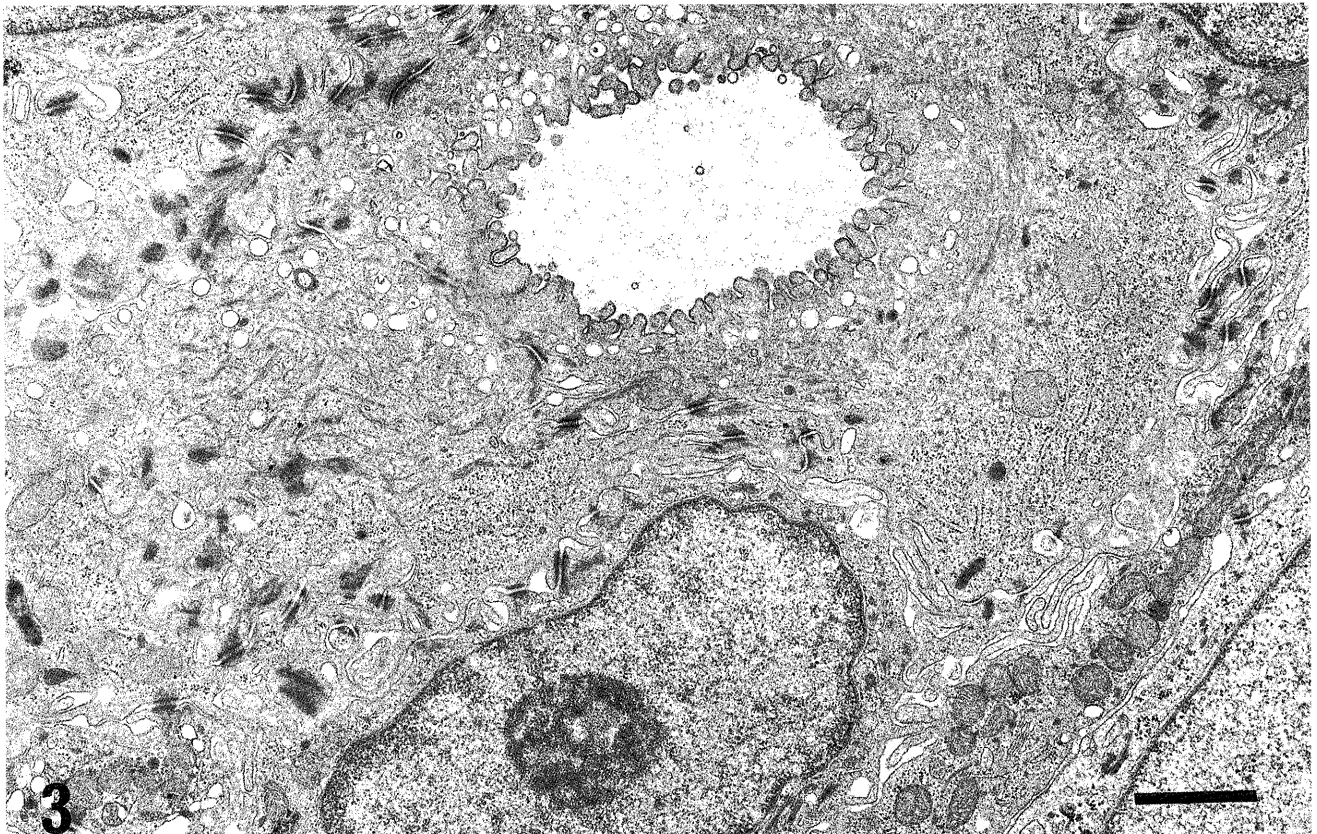


Fig.3: Intracytoplasmic lumen bordered with numerous microvilli and large number of desmosomes are seen. Bar equals 2 μ m.

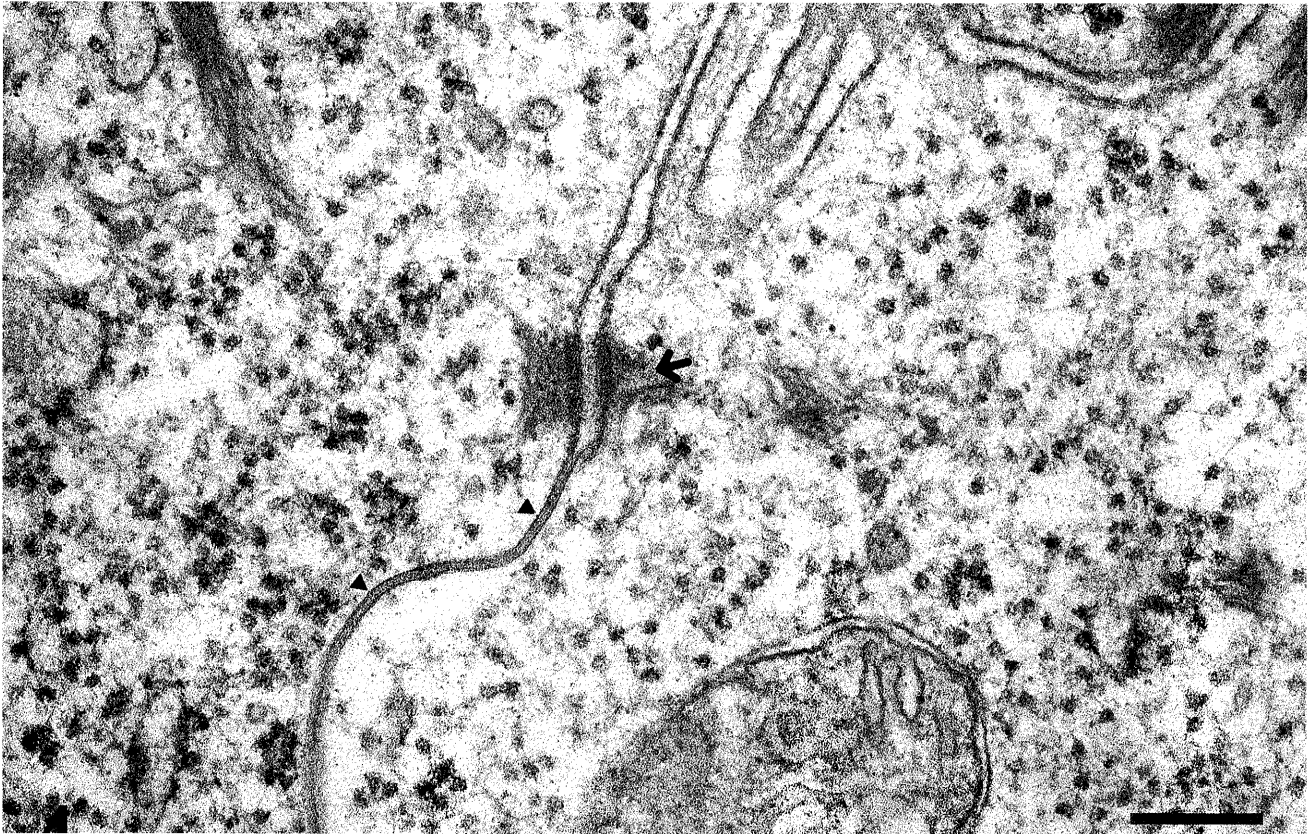


Fig.4: Desmosome (arrow) and gap junction (arrowhead) are seen between neighboring tumor cells. Bar equals 500 nm.

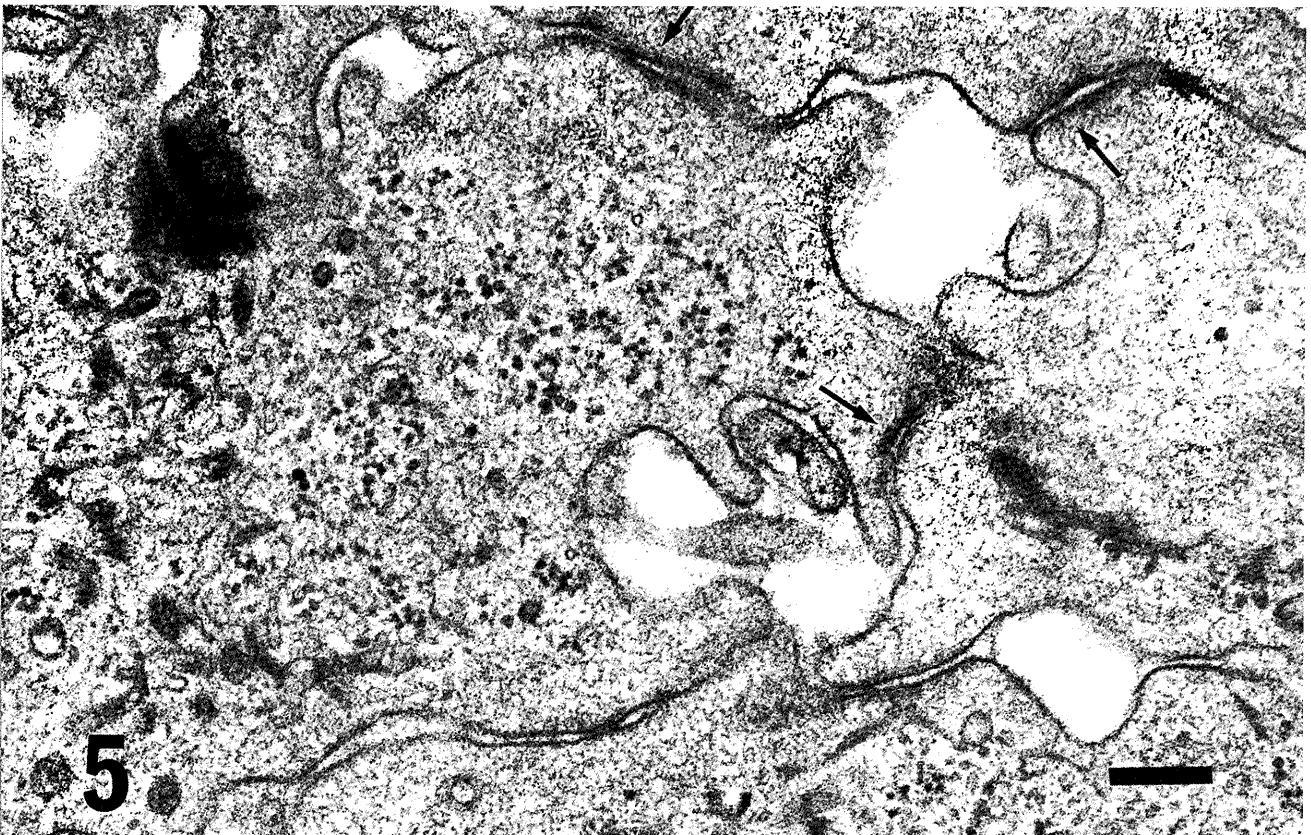


Fig.5: High magnification of altered tight junction (arrow) . Bar equals 250nm.

degree of differentiation. Thus, other ultrastructural features for eccrine porocarcinoma were examined. It was clarified that junctional complex is characteristically recognized in eccrine porocarcinoma but never in squamous cell carcinoma and basal cell carcinoma. The present paper is the first to describe a junctional complex at non-ductular component of eccrine porocarcinoma cells. The junctional complex is a highly characteristic feature, and assists in the diagnosis of adenocarcinoma¹⁰⁾. Therefore, the junctional complex in eccrine porocarcinoma may represent the characteristics of adenocarcinoma, which probably originated from the epithelial cells of eccrine duct. Finally the junctional complex may facilitate the diagnosis of eccrine porocarcinoma from invasive keratinocytic tumors.

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悪性エクリン管孔腫の細胞接着装置に関する超微形態学的研究

瀬野尾 章

要 約

悪性エクリン管孔腫はエクリン管上皮細胞由来の稀な腫瘍で、表皮基底細胞癌などの皮膚腫瘍との鑑別が難しいことが多い。今回、著者は74歳女性の悪性エクリン管孔腫について組織学的並びに超微形態的に検討した。組織学的に腫瘍細胞は不規則な索状あるいは小葉構造を呈し真皮内に浸潤していた。個々の腫瘍細胞は小円形細胞から大型の不定形細胞まで存在し、核異型や核分裂像も認められた。小腺腔も一部で認められた。超微形態的には、腫瘍細胞は核小体明瞭なユークロマチンに富む核を持ち、細胞質内には豊富な遊離ポリソーム、少量のトノフィラメントや一部で小腺腔が観察された。これに加え細胞接着装置がしばしば観察された。この細胞接着装置の存在は腫瘍細胞が腺上皮由来であることを意味するもので、皮膚腫瘍のなかでエクリン管孔腫や悪性エクリン管孔腫の診断を容易にするものと考えられた。悪性エクリン管孔腫における細胞接着装置に関する報告は調べた限りでは初めての報告である。

キーワード：超微形態，悪性エクリン管孔腫，細胞接着装置，鑑別診断