TRANSMISSION ELECTRON MICROSCOPIC OBSERVATIONS ON A CASE OF FOLLICULAR LYMPHOMA

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The observation through the transmission electron microscope on the follicular lymphoma, which appeared in the left side lower jaw and the same side cervical regions of a 41-year-old male, is as follows.

1) The tumor cell consisting of a follicle exists close with one another and this tumor cell consists of three kinds of cells - clear cell, dark cell and small lymphocytes.

2) The nucleo-cytoplasmic ratio in the tumor cell is large, and pseudo-inclusion bodies can be observed in the clear cells.

3) The development of the tumor cells within the cytoplasmic organelle is various and in the dark cell exist various kinds of inclusion bodies.

4) Each of the tumor cells comparatively exists rather smoothly and desmosome-like junction can not be observed, and the collagen fiber running a furnicular structure can be seen between the tumor cells.

From the above mentioned findings, it is suggested that the tumor tissue considerably originates from the lymphatic cells.

As we have recently had a case appeared in the left side lower jaw and cervical regions, the report on the extirpated tumor mass observation through the transmission electron microscope runs as follows.

MATERIALS AND METHODS

Patient : 41-year-old-male, who came to our clinic with a chief complaints of
the tumor mass forming on the left side lower jaw and the same side cervical regions, and was administrated to be operated. The tumor mass was totally extirpated under the general anesthesia.

For the electron microscopic observation, a piece of the tumor mass extirpated was prefixed buffered in 2.5\% glutaraldehyde with 0.1\% cacodylate and then postfixed buffered in 1\% osmium tetroxide. It was then prepared in routine. Ultrathin sections were stained with uranyl acetate and lead acetate. They were examined with a Nippon Denshi JEM-7 type electron microscope.

**OBSERVATIONS**

Hematoxylin-eosin preparation shows that the tumor mass is covered with the thin fibrous connective tissues and a rot of lymph follicles can be observed in its cortex of the superficial layer and medulla, and the giant follicular lymphoma caused by the fused follicular lymphoma can partially be observed (Fig. 1).

The electron microscope preparation for orientation indicates that most of tumor cells composing lymph follicle exist closely to one another and that there are mixed large tumor cells showing clearance of nucleus with small tumor cells having high density and round shaped nucleus (Fig. 2).

The observation through transmission electron microscope indicates that most of the tumor cells exist close mutually, which are classified into three kinds of cells, that is, clear cells, dark cells and lymphatic cells, and that the collagen fibrils can be seen between the tumor cells, partially funicular structure running between them (Figs. 3, 5 and 6).

Generally, the clear tumor cell is round or cubic, sized mostly about 15-20 \( \mu \) in diameter. The nucleus is large compared with cytoplasm, the shape of which is irregular in lobule, forming polynuclear occasionally. Also a nucleolus is sometimes observed, and the distribution of chromatin exists comparatively in balance. Some parts of the nucleus, however, obtain dense granules, fine filaments, ribosome, and vacuolated structure in their nuclear membranes, especially in their infolding nuclear membranes (Fig. 5).

The development of cell organelle of the clear cell shows in variety but the sizes of mitochondria are various, the cristae of which is badly formed and the density of matrix is low (Figs. 3-5). Furthermore, in some part of the tumor clear cell there is mass of tubular rough surfaced endoplasmic reticulum lined in fragment, occupying majority of cell organelle, and it is observed that the lumen is full of materials in high electron density (Fig. 6).

On the other hand, the dark tumor cell is mostly sized about 6-10 \( \mu \) in diameter, the outline of which is round and its nucleus is almost round as well, but such lobule or polynucleus construction as seen in the clear tumor cell can not be observed. In particular, however, the chromatin condensation of nucleus can be seen around nuclear membrane envelope, and the nucleolus can often be observed as well. In the cytoplasmic organelle there is free ribosome, and the appearance of the dense bodies - myeline features showing the lysosomes structures is sometimes observed, but the development of the other cell organelle is hardly observed in general (Figs. 3-6). Also some of the dark tumor cell have long process structure and show fingerlike or wrinklelike structure here and there, resulting in surrounding the clear tumor cell among them (Figs. 4-6).

Moreover, among the above mentioned
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clear and/or dark cell group there exist another cells, round in shape, sized about 6-8 µ in diameter, with round nucleus, which is considered as small lymphocytes judging from the insufficient development of the cell organelle (Fig. 7).

In addition, the membrane of each above mentioned tumor cell is running especially in smooth, and desmosome-like junction can not be observed between the tumor cells.

DISCUSSION

The transmission electron microscopic studies on the malignant lymphoma have been reported among cases. However, the follicular lymphoma, that is, giant follicular lymphoma is not reported so often.

Miyashita states in one of his reports on the tumor occured in right cervical region that the tumor tissue substantially consists of lymphocytes, among which exist almost balanced other three group - plasma cells, reticular cells and intermediate cells, and that the majority of the lymphatic cells are occupied in particular by something like immature lymphocytes.

On the other hand, after the observation of biopsy on an axillar lymph node, Mikuni et al. classified tumor cell into three types - large, middle and small, considering from its characteristic form, and considered these cells to be a series of cell group having mutual transition.

Furthermore, Kojima et al. have researched in detail the said tumor tissue construction, state that the follicular lymphoma may be the tumor originated in the germinal center under the reason why the tumor tissue is quite similar with germinal center within the normal lymph node substantially as well as from the cellular nature.

The tumor tissue construction we observed in this case indicates such three group as clear cell, dark cell and small lymphocytes and that these cell group appear almost in the same ratio.

The cell showing clearance of the tumor cell is quite similar with the lymphatic cells stated by Miyashita, and the dark cell is quite similar with the midde sized cell reported by Mikuni et al., and the cell showing small lymphocytes is considered to be suitable for the small lymphocytes as in case of Mikuni et al.

In addition, Kojima et al. verify the existence of desmosomes where exist the tumor cells close in mutual, particularly where exist the tumor cells in finger-like structure. Mikuni et al., however, state that although the increase of electron density is observed in the place of cell junction, typical desmosomes can not be recognized also in this case. The said typical junction structure can not be observed, either.

Furthermore, the appearance of the various kinds of pseudo-inclusion bodies occasionally recognized within the nucleus of the clear cell results in the remarkably curved nuclear membrane, and the various sorts of lysosomal structures, observed in large number within the cytoplasm of the dark cells, are probably considered to belong to secondary lysosomes. It is said that the above mentioned phenomenon generally appears in the malignant cell and that it is characterized as the tumor cell.

It is also said that the tumor cell has been verified through the transmission electron microscopic findings to simplify its structure in course of malignancy, that is, to have a form similar with immature cells, in other words, it shows a phenomenon called dedifferentiation, while an abnormal material is easy to appear within the various cell organelle. It is reported,
however, by a rot of researchers that in the tumor cell remains more or less differentiation, which becomes a lead to inquiring into a histogenesis.

From this point of view, it is regarded that this tumor tissue is considered to be caused by lymphocytes and this case is quite interesting as the transmission electron microscopic findings as well as clinico-pathological studies.

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REFERENCES


EXPLANATION OF FIGURES

Fig. 1. A rot of lymph follicle observed throughout in the cortex and medulla regions. (H.E. ×20.)

Fig. 2. The tumor cells showing the clear cell type mixed with the dark cell type. (Toluidine-blue. ×200.)

Fig. 3. The clear cell type and the dark cell type existing closely to one another: Showing high nucleo-cytoplasmic ratio.

Nu : Nucleus ; m : mitochondria ; Db : dense bodies ; ly : lysosome ; —— : pseudo-inclusion bodies ; Co : collagen fiber. ×3,800.

Fig. 4. The nucleus of the clear cells showing irregularly shaped lobule or polynuclear form. In the cell organelle of the tumor cell show a few mitochondria (m), tubular rough surfaced endoplasmic reticulum (Rer) and free ribosome, showing myeline-like features and dense bodies (Db) as well.

Nu : Nucleus ; NI : Nucleolus; ×6,600.

Fig. 5. The clear cells partially obtaining vacuolated structures in their nuclear membrane (—). The development of the cell organelle is poor. Nu : Nucleus ; NI : Nucleolus ; m : mitochondria. ×8,800.

Fig. 6. The clear cell - the mass of tubular rough surfaced endoplasmic reticulum lined in fragment with the lumen showing in high electron density (—). ×5,500.

Fig. 7. A part of the clear cell existing mixed with the small lymphocytes.

Nu : Nucleus. ×4,400.

Fig. 8. Cross section of the tumor mass.
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