K. Application of Electron Microscope to the Neurosurgical Field

K-1. An Electron Microscopic Study on Brain Tumor

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The fine structures and measurement of relative volume of extracellular spaces in tumor tissue were studied with electron microscope, in 12 cases of glioma and 12 cases of meningioma of various types.

1) Glioma; Ependymoma was distinguished by microvilli on the free surface of cell, cilia and prominent desmosomes. The cytoplasm of oligodendroglioma included numerous dense bodies which would be probably lysosomes. Astrocytoma had a lot of loose fibrills in the cell body, and glioblastoma showed various figures according to their types of the constituent cells.

2) Meningioma; Meningocytic meningioma consisted of large, lighter cells having abundant fibrillar materials in the cytoplasm and many cytoplasmic processes. Fibroblastic type comprising spindle shaped dense cells showed many prolonged processes extending along the long axis of the cell body and had a lot of rER in the cytoplasm. In the extracellular spaces many fibrous components were present. Psammoma bodies were formed by hyalinised collagen fibers or by granular components.

3) Vessels; In glioma they indicated swelling of the endothelial cell and decrease in electron density of wide perivascular spaces. In meningioma endothelial cell was dense thin cytoplasm including many pinocytotic vesicles. Perivascular space was very broad.

4) Relative volume of the extracellular spaces was 11.4 to 26.5% (mean value 18.6) in glioma and 14.6 to 33.6% (mean value 24.1) in meningioma. It will be expected that the measurement of extracellular spaces may give a further information for the metabolism or scanning of the intracranial tumor.