In vivo flash labeling method was applied to the analysis of growth of human brain tumors, that is, astrocytomas (two cases), glioblastoma multiforme, meningioma and ependymoglioblastoma.

Materials and methods: $^{3}$H-Thymidine of 30-50 $\mu$c, which had been diluted to 5% glucose solution, was injected into the tumor tissue, during the craniotomy. After 30 min. tumors were removed and the materials were fixed in carnoy's solution for lightmicroscopy, and in glutaraldehyde, then in osmium for electronmicroscopy. Sections from paraffin or epon embedded materials were autoradiographed by dipping method with Kodak NTB$_3$ or Sakura NR-M2 emulsion. The labeling index (L.I.) was calculated on 5000 cells.

Results: 1) Astrocytoma. L.I.=0.6—2.7%. The values of L.I. were different by each case. In one case there were many labeled cells about the blood vessels and in such areas L.I. was 21%. 2) Glioblastoma multiforme. L.I.=0.7%. There were no labeled giant bizarre cells. 3) Meningioma (syncytial type). L.I.=0.16%. 4) Ependymoglioblastoma. L.I.=3.3%.

Discussion: The values of labeling indices in our cases are lower than those obtained by in vitro labeling methods, for example, those in the report by Kury et al. In the abnormal circumstances, such as in artificial medium of Kury et al., many cells, which are inactive in proliferation in vivo, might have begun to synthesize DNA. Therefore, L.I. with such in vitro labeling method becomes to be higher than that with in vivo method. It is preferable to avoid to use L.I. in vitro for analysis of tumor growth in vivo.

Electronmicroscopical examination is useful for the diagnosis of brain tumor. We have experienced a case of brain tumor which was diagnosed electronmicroscopically as ependymoglioblastoma. In this case the tumor was found at the wall of left lateral ventricles of a child of 2 years and six months. With lightmicroscopy the tumor was diagnosed as pilocytic astrocytoma. Electronmicroscopic examination revealed that the tumor cells had large number of microvilli and a single cilium on a part of its surface, and had long processes with great number of filaments. These processes were extended to the blood vessels and attached to their basement membrane. These characteristic appearances suggest that the tumor has its origin in a cell which must be placed between matrix cells and ependymal cells in the course of neurogenesis and has a capacity to differentiate either ependymal cells or glialblasts. Therefore, we call this tumor as ependymoglioblastoma. The L.I. of the ependymoglioblastoma is 3.3%. If the time of DNA synthesis (ts) is supposed to be 24 hrs, the generation time (tg) of the tumor cell is calculated to be 30.3 days. With this value of $tg$ and the volume of tumor (8—27 cm$^3$), the tumor is estimated to begin to grow two years and seven or eight months before the operation, that is, in 9th or 8th month in prenatal course. However, when the necrosis or maturation of tumor cells are taken into consideration, the tumor may begin to develop a little earlier than this stage. Ependymoglioblast is considered to be present about these period in human embryonal life.