Further investigations reported here. 49 brain tumors were examined. The left-right difference of insensible water loss of body showed marked tendency in the case of cerebral tumors, but showed half cases in cerebellar and cerebello-pontine angle tumors.

In the cases of cerebral tumor, the increase or decrease of insensible water loss of body were noticed on the affected side, but only decrease of insensible water loss by cerebellar and cerebello-pontine angle tumor on the affected side.

There was no correlation between insensible water loss and skin temperature in brain tumor cases.

13. Nucleic Acid Contents and their Metabolism in Human Brain Tumors

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Surgical specimens of brain tumors were analysed to determine organic phosphorus compound, nucleic acid and protein contents and in vitro incorporation of radioactive phosphorus into brain tumors was also carried out to determine the metabolic activity of the nucleic acids.

Following results were obtained:

1) Acid-soluble phosphorus was low in the normal brain tissue and high in the tumors, especially in the malignant tumors. However, on a protein base, the difference was negligibly small.

2) Lipid phosphorus was found much higher in the normal brain tissue than in the tumors. There was only one oligodendroglioma in this series, its lipid phosphorus was higher than the other tumors except for that in medulloblastoma. On a protein base, high concentration was estimated in the benign gliomas, such as oligodendroglioma and astrocytoma, which seems to be due to gliosis of invaded brain tissue remaining in the tumor.

3) Ribonucleic acid concentration was generally low in the brain tumors. In the epithelial tumors such as papilloma and metastatic cancer, it was higher than that in the other tumors except for medulloblastoma which also showed high value. In glioblastoma, it was strikingly low.

4) Deoxyribonucleic acid content was generally high in the malignant tumors but in the highly cellular benign tumors such as meningioma, papilloma and ependymoma, it was higher than that in the other tumors.

On a protein base, malignant tumors still showed higher value than benign tumors. This difference might as well be explained that the malignant tumor cells
had polyploid nucleus which was high in deoxyribonucleic acid content. This may be verified by the evidence that the malignant tumor stained darker and more irregular in Feulgen stain than the benign tumors.

5) RNA/DNA ratio showed remarkable difference between malignant and benign tumors. In the benign tumors it was 0.5 to 0.7 and 0.2 to 0.3 in the malignant tumors. Cancer metastasis had rather high ratio which was considered to be due to high ratio in the original organ of cancer.

6) Larger amounts of radioactive phosphorus were incorporated into the malignant tumors than the benign tumors. Into deoxyribonucleic acid fraction, no incorporation occurred in the normal brain tissue, but in the tumors, it was proved higher in the malignant tumors than in the benign tumors. Ribonucleic acid fraction showed strikingly high relative specific activity in the malignant tumors which was considered to be characteristic of malignancy as well as high relative specific activity in deoxyribonucleic acid fraction.

Though the number of analyses is limited, especially in the incorporation, general trend seems to be found that the brain tumors which showed evidences of malignancy in routine microscopic examination has also cytochemically malignant characteristics in organic phosphorus compounds, nucleic acid content and radioactive phosphorus incorporation.

14. Studies on the Metabolic Changes in the Case of Brain Tumor and Brain Trauma; with Special Reference to the Renal Function

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In order to clarify the renal disorders in the case of the brain tumor and brain traumas, pathological observations were done on the kidney of the 125 cases of autopsy, died of the brain lesions, the renal functions were examined in 50 of the clinical case. And some of the renal functions were examined in the dog with the experimental production of the cerebral lesions in the various part.

The result obtained were as follows:

(1) The histological evidence of the kidney changes was intensively observed in the autopsy cases of the lesions which occupied in the basal nuclei, cerebellar vermis and hypothalamus.

(2) On the other hand, the renal insufficiency was recognized most frequently in the clinical cases which were accompanied by the lesions in the thalamus