Preliminary Note

Tissue concentrations of biogenic amines in experimental brain tumors
HPLC and clinical application (VII)

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There is increasing experimental and clinical evidence\(^1\) that disturbances in the metabolism of central monoamine play an important role in the pathogenesis of brain diseases.

Brain tumors are thought to affect and change the neurotransmitter function, the metabolisms in tumor and the surrounding cerebral tissues.

The purpose of this study was to examine tissue concentrations of biogenic amines in experimental brain tumors. Experimental brain tumor was induced by intracerebral implantation of 9 L rat glioma cells (4 \( \times \) 10\(^4\) cells) into male CD Fischer 344 rats. The 9 L rat glioma model has been extensively used to study cell kinetics and the pharmacology of antitumor drugs. Tumor-bearing rats began to lose weight after two weeks, developed neurological symptoms several days later, and died three weeks after implantation\(^2\). The macroscopic view of the histological section demonstrating tumor foci is shown in Fig. 1. The section was used for the biochemical analysis.

The concentrations of biogenic amines in tumor tissues were measured by high
performance liquid chromatography systems which were equipped with electrochemical detection (LCEC) and were particularly well suited for the separation and the measurement of the concentration of norepinephrine (NE), dopamine (DA), 5-hydroxytryptamine (5-HT) and their metabolites: homovanillic acid (HVA), 5-hydroxyindolacetic acid (5-HIAA) and 3-methoxy-4-hydroxyphenylethylenglycol (MHPG) in tumor tissues. Tissue concentrations of biogenic amines in experimental brain tumors are shown in Table 1. Compared with normal tissues, the concentrations of NE, DA and their metabolites in tumor tissues were remarkably decreased except for those of 5-HT and 5-HIAA. These results were similar to those in human brain tumor tissues\(^4,5\).

Low amine levels in experimental brain tumor tissues would suggest that there are metabolic changes of biogenic amines which are thought to act as neurotransmitters in normal brains.

References


(Received for publication, October 29, 1984)