

logical saline group compared with dexamethasone and Metopirone groups. It must be taken into account that the treatment was performed by injection which can be a considerably big stress for such small animals.

#### EXP. 2

To exclude the influence of stress, per se administration of dexamethasone (0.05  $\gamma$ /cap./d.), dexamethasone (0.5  $\gamma$ /cap./d.) and Metopirone (1  $\gamma$ /cap./d.) was done on female DD mice of 8 weeks old.

The result was that both groups of dexamethasone showed highest water content. Metopirone-treated group also produced increase in water content of the brain.

Cerebral water retention caused by the minimal dose of dexamethasone should be interpreted to have been caused by a different mechanism from what is involved to increase cerebral water content by administration of conventional dose of adrenocortical steroids.

Apparently the depletion of adrenocorticoids induced by the minimal dose of dexamethasone is the cause for the water content increase.

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## m-2. "An Experimental Study of Ultrasonic Attenuation of the Brain"

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It is only in the recent years that attenuation of ultrasound in the brain has been studied in the hope of obtaining clinically applicable information concerning the changes in the brain. The authors obtained the interesting results observing the chronological changes of attenuation of ultrasound under experimentally induced pathological situation of adult rabbits.

1) Chronological changes of attenuation of ultrasound were recorded in the experimentally induced edema by the gunshot through a burr hole in the skull and in the experimental hypoxia and hypercapnea which were produced by auto-rebreathing. In the above experiment it was confirmed that attenuation value of ultrasound was decreased in brain edema, therefore the following three factors such as water content, blood flow and CSF pressure in the brain were seemed to influence on the attenuation of ultrasound.

2) In this series it was observed how each factor influences to the attenuation of ultrasound. It was confirmed that attenuation value was decreased in the increase of water content and blood flow in the brain, on the other hand it was increased in the decrease of blood flow and increased CSF pressure in the brain.

In the above first and second experiment it was confirmed that the brain edema apparently decreases attenuation value of ultrasound, and it was concerned that the important factors in the decrease of attenuation value should be increased

water content and blood flow in the brain. Furthermore the forth factor which is thought of the summation of the above three factors; cerebral architectural changes particularly enlargement and reduction of the cerebral blood vessel bed, have the most close relation to the change of attenuation of ultrasound. Therefore authors are going to search the relation between attenuation of ultrasound and cerebral architectural changes.

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### **m-3. Biochemical Changes in Cerebral Edema**

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Cerebral edema was produced in rats and cats by freeze treatment or by implanted balloons and its metabolic activity was studied. There observed an increase in water and sodium and a decrease in potassium content of the white matter that resulted in a sharp of Na/K ratio.

No significant difference in the content level of total protein, total lipid, RNA and DNA was shown between control and experimental. On the other hand there observed a sharp decrease of the level of creatine phosphate and a mild decrease in ATP level.

Radioactive amino acid incorporation into protein increased markedly after the production of edema and [5-<sup>3</sup>H] uridine incorporation into RNA also increased.

An increase in the level of proteolipid protein content of gray matter and a decrease in that of white matter were observed. On the other hand [2-<sup>14</sup>C] glycine incorporation into proteolipid protein increased markedly both in gray and white matter.

Respiratory response to cationic and electrical stimulation decreased. Na-K ATPase, GDC, SDH, MAO activities were not affected.

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### **m-4. Ultrasonic Attenuation in Cerebral Compression and Acute Brain Swelling**

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In the previous report, basing on the experiments of brain compression produced by expansion of an epidural balloon, we defined 5 successive stages of