

## EXPLANATION OF THE CENTRAL NERVOUS FUNCTION IN THE JAPANESE BLACK CALF USING EEG

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### Introduction

Physiological evaluation of central nervous function using the method of Electroencephalogram (EEG) in large domestic animals has been handicapped by various problems concerning measurements. However, it is possible to obtain EEG recording from neonate (Toyosawa et al., 1988).

On the other hand, judgement of *hydranencephaly* induced by Akabane disease is becoming a serious problem recently in the Japanese Black calf (Uemura et al., 1987). The objectives of the present investigation are to confirm the central nervous function in unanesthetized Japanese black calves with EEG and contribute toward the prevention of financial loss concerning animal production.

Experiments were designed for the basic research of EEG normal patterns and abnormal patterns in unanesthetized Japanese Black calves.

### Materials and Methods

Japanese Black calves of either sex between one day and 4 months of age were used. We divided the animals into three groups (A, B and C). Group A belonged to a healthy state. Group B belonged to abnormal state except for the CNS disease. Group C belonged to an abnormal state of CNS. Clip electrodes and needle electrodes were used. EEG was recorded by unipolar and bipolar leading methods. Analysis of EEG recording concerning amplitude and frequency was calculated by a computer.

### Results and Discussion

Group A: In the EEG pattern of awake animals, slow waves (40-50  $\mu$ V) accompanying the fast

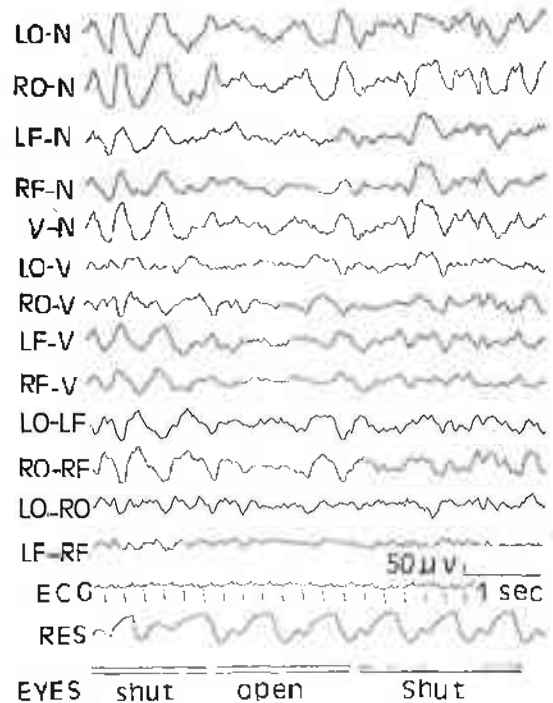


Figure 1. EEG of Japanese Black calf (7 days of age). Desynchronization was observed when animals opened their eyes.

waves were observed. Average frequency tended to increase with aging. In the EEG pattern of sleeping animals, the EEG wave form had moderate to high amplitude slow waves (150-) and markedly reduced fast activity. In one week old animals, desynchronization was observed frequently when the animals opened their eyes (figure 1).

Group B: Abnormal pattern of EEG was negative.

Group C: We detected sometimes abnormal EEG patterns. Namely, in the case of complete *hydranencephaly* (lack of cerebral cortex), the

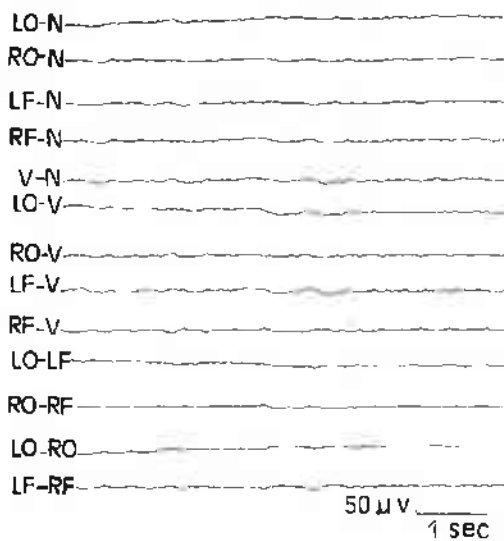


Figure 2. EEG of Japanese Black calf (12 days of age). Flat EEG wave induced by lack of cerebral cortex.

EEG wave was flat (figure 2).

In conclusion, the present experiments clearly demonstrate that EEG obtained from unanesthetized Japanese Black calves show the same conditions of consciousness as in other small animals. It appears that EEG recording is very useful in early detection of hydranencephaly and prognosis of animals with brain damage especially in Japanese Black calves.

(Key Words: EEG, CNS, Japanese Black Calf)

#### Literature Cited

- Toyosawa, K., T. Takeuchi, K. Sitijyo, K. Kagota, A. Matuhashi and M. Suzuki. 1988. Basic research for the clinical application of EEG in the Japanese Black calf. Proceedings of 15th World Buiatrics Congress 530-533.
- Umemura, T., H. Sato, M. Goryo and C. Itakura. 1987. Histopathology of congenital and perinatal cerebellar anomalies in twelve calves. Jpn. J. Vet. Sci. 49:95-104.