3736528 STNS/D: MAJOR: NEUROSCIENCE; Ph.D. (NEUROSCIENCE)

KEY WORDS : NEURONAL RESPONSE/ SALT APPETITE/ ZONA INCERTA/ LATERAL HYPOTHALAMUS/ SHEEP

SURIYAPHUN SUKHCHAI: THE RESPONSIVENESS TO INGESTIVE STIMULI OF NEURONES IN THE ZONA INCERTA AND LATERAL HYPOTHALAMUS OF CONSCIOUS SHEEP DEPLETED OF SODIUM. THESIS ADVISORS: NAIPHINICH KOTCHABHAKDI, Ph.D., B. A. BALDWIN, Ph.D., PIYARAT GOVITRAPONG, Ph.D. 200 P. ISBN 974-663-070-9

In this research, a novel approach is used to study the behavioural neurophysiology of salt appetite in conscious non-horned sheep (N=6). Single-unit recordings were made from neuronal activity in the zona incerta (ZI) and lateral hypothalamus (LH). The effects of intracerebroventricular (*icv*) administration (n=12) of 0.85 M hypertonic saline or 200 *n*g Angiotensin-II, which induce intense thirst, on the responses of neurones initially responsive to food but not to water, revealed that they became strongly responsive to water under the influence of these dipsogenic agents (P<0.001). Thus, the neuronal response could be altered by inducing changes in the animals' dominant motivational state from hunger to thirst. It was also shown that single neurones can be conditioned by learning to respond to stimuli with a yellow syringe associated with delivery of salt solution (positive conditioned stimulus, *CS*+ve), and a black syringe without an associated delivery of the solution (negative conditioned stimulus, *CS*-ve), within the range of 10 trials. The resistance to extinction of neuronal responses was studied in experiments in which the sheep were shown salt solution but not allowed to drink it. This revealed a range of extinction from 8 to 14 trials in 12 neurones tested. The latency of response to the sight of food or salt solution in ZI neurones revealed that they had latencies of 150-250 msec for salt-responsive neurones and 250-300 msec for food-responsive neurones. The effect of intracarotid (*ic*) infusion of 4 M NaCl on the response of neurones responding to the sight of food or salt solution indicated that increasing Na^+ in the cerebral circulation at the rate of 3.8 ml/min for 20 min did not have any significant rapid effects on these neuronal responses. These results clearly demonstrated that changing an animal's motivational state allows significant changes in the responses of neurones in the ZI responding to the static visual presentation or visual approach of ingestive stimuli.