

4036390 SCPS/M : MAJOR : PHYSIOLOGY; M.Sc. (PHYSIOLOGY)
KEY WORDS : PROLACTIN / CALCIUM METABOLISM / BALANCE
STUDY / CALCIUM ABSORPTION

PRITSANA PIYABHAN : AN INVESTIGATION OF THE SIGNIFICANCE OF ENDOGENOUS PROLACTIN IN THE REGULATION OF CALCIUM METABOLISM IN YOUNG AND NONMATED MATURE WISTAR RATS-A LONGITUDINAL STUDY. THESIS ADVISORS : NATEETIP KRISHNAMRA, Ph.D., LIANGCHAI LIMLOMWONGSE, Ph.D., CHUMPOL PHOLPRAMOOL, Ph.D., SURAT KOMINDR, M.D. 138p. ISBN 974-663-128-4

The role of endogenous prolactin in the regulation of calcium (Ca) metabolism and the effect of hyperprolactinemia on calcium balances were evaluated in longitudinal studies in Wistar rats from the age of 3 to 11 weeks. The experiment was divided into two parts : part I, comparison of calcium metabolism in male and female rats; and part II, evaluation of the role of endogenous prolactin and effect of hyperprolactinemia in female rats. In part II, 3 week old female rats were divided into 5 groups according to a daily injection of drug or hormone : i) control group, receiving 0.9% NaCl; ii) 0.6 mg/ 100 g BW bromocriptine-treated group (-PRL_{endo}); iii) 0.25 mg/ 100 g BW ovine prolactin-treated group (+PRL_{exo}); iv) hyperprolactinemia induced by anterior pituitary gland implantation (AP); and v) sham. Each animal underwent the three day calcium balance study at the age of 3, 5, 7, 9 and 11 weeks.

Part I of this study showed that calcium metabolism was generally similar in female and male rats from weaning age to adulthood but some differences were seen in the magnitude of the fractional calcium absorption and calcium content in bone. The fractional calcium absorption of males was higher than that of females by approximately 10% especially in the growing period (5 weeks) whereas total calcium content in both trabecular and compact bone of males was twice that of females. Moreover, the fractional calcium absorption in 5 week old animals was maximum with the values of 68.37 ± 0.63 and $74.31 \pm 1.09\%$ of total calcium intake in females and males, respectively.

Part II of this study showed that endogenous prolactin was responsible for the high percent increase in the three day body weight gain in weaned rats (ie., $9.03 \pm 1.67\%$ in intact vs $6.82 \pm 1.58\%$ in -PRL_{endo} group) and 9 week old rats (ie., $3.29 \pm 0.51\%$ in intact vs $0.20 \pm 0.67\%$ in -PRL_{endo} group) by increasing food consumption by approximately 40% and 20% in weaned and 9 week old rats, respectively. Moreover, in 5 week old rats, prolactin increased the fractional calcium absorption from $41.78 \pm 4.04\%$ to $68.37 \pm 0.63\%$ of calcium intake ($P < 0.05$) leading to a significant increase in calcium content of the lumbar vertebrae 5-6 from 3.24 ± 0.17 to 3.71 ± 0.22 mmole/g dry weight ($P < 0.05$). In contrast, hyperprolactinemia, induced either by exogenous prolactin or pituitary implantation, significantly decreased the fractional calcium absorption by 20-30% in 5 week old rats. However, the biphasic effect of prolactin was demonstrated in AP group ie., in 7, 9 and 11 week old rats, hyperprolactinemia increased the fractional calcium absorption by 35-60%.