

Thesis Title Determinations of Mononuclear Blood Cell
Magnesium and Magnesium Status in Healthy
Thais and of Magnesium, Calcium, Sodium,
Potassium Status in Individuals Suffering
from Rest Cramps

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Abstract

This study contained two main objectives. The first objective was to determine the level of magnesium in blood mononuclear cell, in serum and in urine as well as in the diet of healthy Thai subjects. The second objective was to determine the magnesium, calcium, sodium and potassium in the diet, mononuclear cell, serum and urine of volunteers with and without cramps. The determination of mononuclear cell magnesium was used for the first time in the evaluation of magnesium status in Thai population. To attain the first objective, one hundred healthy volunteers (32 males and 68 females) were studied, whereas eighty volunteers consisting of forty healthy females as control and forty females suffering from frequent rest cramps were studied to fulfil the second objective. They were twenty to eighty years old. Exclusion criteria consisted of volunteers who were suffering from kidney diseases, diseases of the gastro-intestinal tract and endocrinologic diseases, metabolic bone problems, arthritis and oophorectomy. Inclusion criteria for cramp group consisted of subjects who had been suffering from muscle cramps for at least twice a month for more than 6 months prior to the study. Data collection including questionnaires about cramps,

three-day food records, a twenty-four hour urinary collection and a fasting blood sample were analysed for magnesium, calcium, sodium and potassium. The result of mononuclear cell count by manual counting method (using the counting chamber) was similar to the automatic method. The percent coefficient of variation was acceptable. The mean value of human mononuclear cell magnesium was 66.2 ± 21.6 fg/cell. Age and sex did not have major influence on mononuclear cell magnesium. No significant correlation was found between serum, urine and mononuclear cell magnesium. The dietary intake and urinary excretion of magnesium in normal males were 180.6 ± 66.7 and 202.8 ± 168.8 mg/day, and in females were 154.0 ± 59.9 and 138.6 ± 100.8 mg/day. The serum magnesium in normal males and females were 0.7 ± 0.1 and 0.7 ± 0.0 mmol/l, respectively. Comparison between subjects with and without cramps could not demonstrate any significant difference in the mononuclear cell magnesium, as well as the intake, urine and serum concentrations of magnesium, calcium, sodium and potassium. The only significant difference was the lower sodium intake in the cramp group (4552 ± 622 vs 4943 ± 1068 , $P < 0.05$). Levels of magnesium, calcium, sodium and potassium in the dietary intake, urine and serum as well as the levels of mononuclear cell magnesium were not different between subjects with and without cramps in both premenopausal and postmenopausal volunteers.