

Sodium Intake and Balance in Japanese

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Summing up our human balance studies, we estimate that mean sodium requirement for Japanese is about 57 mg/kgBW/day.

1. INTRODUCTION

An inappropriate intake of sodium (Na), excessive as well as too low is thought to be one of the risk factor against the health. However, the quantitative against the health determine Na requirement was only made on the obligatory losses through urine, faeces and sweat.

In the previous salt symposium (1992, Kyoto), one of the authors showed that under a relatively low Na intake of 2.2 g/day (100 mmol/d), a Na deficit occurred. In that condition, Na was suppose to be released from the bone, as it is the sole physiological Na pool in the body, because of the following evidences to compensate for the deficit: (1) the high sweat concentration of calcium (Ca) and magnesium (Mg) during relatively strong exercise, (2) negative balance of Ca and Mg, both under a low Na intake of less than 100 mmol/d (5.8g of sodium chloride). This suggests that Na requirement is higher than has been considered in US Recommended Dietary Allowances.

In this study, the results of mineral balance studies conducted nine times in the National Institute of Health and Nutrition are evaluated together to determine the requirement of Na for Japanese population.

2. SUBJECTS AND METHODS

From 1986 to 1994, 86 volunteers (23 males, 63 females) aged ranging from 18 to studies with

written informed consent. The duration of balance period ranged from 5 to 15 days, with 2 to 4 days of adaptation period. The dietary intake of Na ranged from 2.2 to 6.9 g/day.

In six studies, sweat from the arm during exercise by the bicycle ergometer were collected to estimate sweat Na loss. Na content of diet, faeces, urine and sweat was measured by atomic absorption spectrophotometer (Varian AA-5) after ashing the samples when necessary.

Relation among dietary intake, fecal output, apparent absorption, urine output and balance of Na were statistically compared, and Na requirement was calculated using regression equation.

3. RESULTS

There appeared to be significant correlation between balance and dietary intake of Na (Fig. 1).

4. DISCUSSION

The requirement of salt (NaCl) for adult was considered to be less than 1g/d (17 mmol/d of Na) as a results of the obligatory Na loss as shown by several studies.

In this study, we were able to show that a dietary intake of Na of 56.739 mg/kgBW/d (2.467 mmol/kgBW/d) is required to maintain a positive Na balance in Japanese. For the standard Japanese male (30-49yrs, 169. 1cm, 67.0 kg), Na requirement is about 3.8g/d (165 mmol/d) or 9.7g/d of sodium chloride.