EFFECTS OF MILK INTAKE + 1-MONTH INTERVAL WALKING TRAINING ON NFKB2 GENE METHYLATION IN OLDER MEN

Sakura Nakano1, Shizue Masuki1,2, Mayuko Morikawa1,2,3, Satoshi Takasugi4, and Hiroshi Nose1,2,3


We have previously reported that the methylation of NFKB2 gene, one of the master genes of pro-inflammatory response, was enhanced by milk product intake during 5-mo interval walking training (IWT) in middle-aged and older women.

In the present study, we examined whether the similar effects were obtained when a kind of protein rich milk was ingested during IWT for a month, a shorter period than in the previous study, and whether IWT was an indispensable condition to obtain the methylation of NFKB2 by the milk intake. First, we divided older men (~76 yr) who had had no exercise habits into two groups; CNT group (n = 11) ingesting 200 ml carbohydrate-electrolyte solution (105.2 kcal; 0.0 g protein and 27.4 g carbohydrate); and MLK group (n = 12) ingesting 200 ml milk (114 kcal; 10.5 g protein and 9.3 g carbohydrate) with no IWT for a month [1st trial: February to March]. They ingested the assigned beverage at the breakfast. After a one-month washout period, the subjects in each group exchanged the beverages and underwent the same trial for a month [2nd trial: April to June] by the crossover design. Then, after a one-month washout period, the subjects in each group repeated additional two trials but with IWT for a month each by the crossover design [3rd trial: August to October, 4th trial: November to December, respectively]. They ingested the assigned beverage within 30 min after daily IWT. We measured NFKB2 gene methylation by pyrosequencing before and after each trial in each group.

We found that the methylation was enhanced in the MLK than in the CNT group (P<0.05) only in the 4th trial and that the methylation level showed seasonal variation, marking the highest in February and the lowest in October, with the range of ±4.0% from the average value throughout the experiment.

Thus, IWT+milk intake might enhance the NFKB2 gene methylation and the effects might be affected by seasonal variation.

Keywords: milk intake, anti-inflammatory response, methylation, NF-κB2, seasonal variation