Participants were requested not to eat anything after 09:00 PM on the previous night and not eat anything for breakfast the following morning. Between 9:00 AM and 10:00 AM, blood was sampled using a syringe, and participants were given either glucose or sucrose solution or water as a control. We measured blood glucose using a finger stick (TERUMO kit) before and 15, 30, 60, and 120 min after the administration of glucose or sucrose. Furthermore, other plasma factors were measured after plasma was separated from blood. Ethylene diamine tetra acetic acid (EDTA) was used as an anticoagulant. Insulin was measured by the CLEIA (chemiluminescent immunoassay) method.

**Ethics:** This work was approved by the ethical committees of Showa Women’s University (15-02) and the NPO “International projects on food and health” (15-01) and was conducted in accordance with The Code of Ethics of the World Medical Association (Declaration of Helsinki) for experiments.

**Statistics:** The results are presented as means ± SEM. Statistical significance of the differences between groups was calculated according by one-way ANOVA. When ANOVA indicated a significant difference (P<0.05), the mean values of the treatment were compared using
Results

Figure 1 shows that GI of old men given glucose was 156 when GI of young men was set 100. GI of young men given sucrose was 64 when GI of young men was set 100. Figure 2 describes AUC (area under the curve) of plasma insulin levels when glucose or sucrose was given to young men and women, an old man compared to insulin levels of young men who took glucose.

Sucrose levels were significantly lower compared to those of young and old men given glucose.

Discussion

Glycemic index was shown to be a useful indicator of dietary carbohydrate uptake. Oba et al. [8] reported the relationship among dietary glycemic index, glycemic load and carbohydrate uptakes and the risk of mortality from strokes and indicated that the hazard ratios increased in high dietary GI in women. On the other hand, Fan J et al. [9] reported that gender significantly modified the effects of glycemic index and glycemic load on cardiovascular risk, and high glycemic load level was associated with higher risk of cardiovascular disease in women, but not in men. It has been recognized that diet plays a major role in increasing the risks of cardiovascular diseases. Dietary GI and dietary GL are used to evaluate the glycemic properties of the diet. The dietary GI was shown by Nurses Health Study to be associated with the risk of cardiovascular disease [10] and later with hemorrhagic stroke [11] and these associations were shown to be the most evident in overweight women in both studies. Later, similar findings for CVD risk have been reported in several, but not all studies [12-14].

These controversial results may have been obtained because basic studies of age or gender differences were not well performed. In this study, we showed that GI was so much different between young and old men even if the same amounts of glucose were given and GI of sucrose was not 50% of GI of glucose even if the amount of glucose in sucrose was 50% of glucose.

Since blood insulin levels of old men were like those of young men, the sensitivity to insulin may be higher to young men than old men. The release of insulin when sucrose was given to old men may be lower than the release of insulin in young men. These data clearly show that we must examine the roles of age and gender in GI more precisely to know dietary effects on plasma levels of glucose.

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Experiments were designed and performed by all the authors. AT wrote a manuscript. Statistical analyses were done by TT. All authors read the manuscript and approved the final version. All the authors had responsibilities for the final content. Ogawa, M.: No conflicts of interest for any member of researchers.

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