The Relationship Between Alpha-Actinin-3 Gene R577X Polymorphism and Muscle Flexibility

HIROFUMI ZEMPO*1), NORIYUKI FUKU*2), HARUKA MURAKAMI*3), MOTOHIKO MIYACHI*3)

*1) Research fellow of the Japan Society for the Promotion of Science, Tokyo, Japan, *2) Graduate School of Health and Sports Science, Juntendo University, Chiba, Japan, *3) Department of Health Promotion and Exercise, National Institutes of Biomedical Innovation, Health and Nutrition, Tokyo, Japan

Muscle flexibility is a component of physical fitness. It is suggested that genetic factor affects individual muscle flexibility, however, the relationship between alpha-actinin-3 gene (ACTN3) R577X polymorphism and muscle flexibility is unclear. The purpose of this study was to investigate an association between ACTN3 R577X polymorphisms and muscle flexibility in Japanese.

In this study, 776 people (208 men and 568 women, 23-88 years old) were included. All subjects answered a questionnaire about exercise habits, and were subjected to a battery of tests to assess their fitness status (including grip strength and sit and reach). Genotyping was performed using the TaqMan approach for the ACTN3 R577X polymorphism (rs1815739).

The genotype frequencies of the ACTN3 R577X polymorphism in men (RR, 24.5%; RX, 52.9%; XX, 22.6%) and women (RR, 19.9%; RX, 52.6%; XX, 27.5%) were in the Hardy-Weinberg equilibrium (men, p = 0.402; women, p = 0.160). In men, there were no differences in age, height, weight, BMI, grip strength, and sit and reach among genotypes. In contrast, the sit and reach flexibility in the RR genotype (36.1±0.9 cm) was significantly lower than that in the RX and XX genotype (38.9±0.4 cm) even after statistically adjusted by age and exercise habit as covariates in women (p<0.01).

In conclusion, ACTN3 R577X genotype was associated with muscle flexibility assessed by sit and reach test in women. RR genotype had lower muscle flexibility than RX and XX genotype.

Key words: alpha-actinin-3, gene, polymorphism, muscle flexibility, sit and reach

Corresponding author: Hirofumi Zempo
Graduate School of Health and Sports Science, Juntendo University
1-1 Hirakagakuendai, Inzai-shi, Chiba 270-1690, Japan
TEL: +81-476-98-1001 E-mail: zempo.hirofumi@gmail.com
The 2nd Congress, International Academy of Sportology (Held on Sep. 12, 2015)