Polymorphism in the CNTF Receptor Gene Is Associated with Elite Japanese Endurance Athlete Status: A Case-Control Study

HISASHI NAITO*1), NORIYUKI FUKU*1), HIROFUMI ZEMPO*1),
ERI MIYAMOTO-MIKAMI*2), NAOKI KIKUCHI*3),
HARUKA MURAKAMI*4), MOTOHIKO MIYACHI*4)

*1) Graduate School of Health and Sports Science, Juntendo University, Chiba, Japan, *2) Department of Sports and Life Science, National Institute of Fitness and Sports in Kanoya, Kagoshima, Japan, *3) Sports Training Center, Nippon Sport Science University, Tokyo, Japan, *4) Department of Health Promotion and Exercise, National Institute of Health and Nutrition, Tokyo, Japan

Introduction: Ciliary neurotrophic factor (CNTF) is a protein that promotes the differentiation and survival of a wide range of neuronal cell types and signals through its receptor (CNTFR) thereby regulating neuronal and muscle growth.

Purpose: To examine the association between CNTFR gene polymorphism and elite Japanese endurance-athlete status.

Methods: 209 endurance/middle-power athletes: EMA (middle- and long-distance runners) and 814 Japanese controls were genotyped for C/T polymorphism of 3'-UTR of the CNTFR gene by use of TaqMan Genotyping Assay. All athletes were national (n=143) or international (n=66) level and the group included several medalists at the international competitions such as Olympic Games.

Result: Genotype distribution of C/T polymorphism in EMA (CC: 40, CT: 48, and TT: 12%) and controls (CC: 52, CT: 40, and TT: 8%) were in Hardy-Weinberg equilibrium. TT + CT genotype frequency was higher in EMA than controls under the T-allele-dominant model (p = 0.0015, OR: 1.64 [95% CI: 1.21 - 2.24]). When EMAs were divided into 2 groups: national (N) and international (I) athletes, the TT + CT genotype frequency was higher than controls only in I-EMA under the T-allele-dominant model (p = 6e-04, OR: 2.49 [95% CI: 1.45 - 4.28]).

Conclusion: The association found between the C/T polymorphism of 3'-UTR of the CNTFR gene and elite Japanese athlete status is of interest and worthy of further study in other elite athlete cohorts.