CONTRIBUTION OF OBESE-RELATED GENES AND CARDIORESPIRATORY FITNESS TO THE METABOLIC SYNDROME IN MIDDLE-AGED AND OLD MEN AND WOMEN

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Objective: Little information is available regarding the relationships among human obesity-related genes, cardiorespiratory fitness and metabolic syndrome (MS) or predisposition to MS (MP). The present study was performed to investigate the contribution of obese-related genes and cardiorespiratory fitness to the MS in middle-aged and old men and women.

Research Methods and Procedures: Sedentary and moderately active men (n = 85) and women (n = 271) aged 30–84 yrs participated in this study, and were divided into 4 groups: 48 healthy men, 37 MP men (up to 1 or more risk factors involved in abdominal obesity), 237 healthy women, and 34 MP women. We measured maximal oxygen uptake (VO2max) during an incremental cycle ergometer exercise test. Serum HDL-cholesterol, triglyceride and plasma glucose levels were measured in all subjects. Total and regional lean soft tissue and fat mass were also measured by dual-energy X-ray absorptiometry (DXA). We analysed the genotype of obesity-related genes beta-3 adrenergic receptor (ADRB3), fatty acid binding protein 2 (FABP2), peroxisome proliferator-activated receptor gamma (PPARγ;), and uncoupling protein 1 (UCP1) using a polymerase chain reaction-restriction fragment length polymorphism (PCR-RFLP) assay.

Results: A total of 24 men (28.2%) and 9 women (3.3%) developed MS. In addition, a total of 37 men (43.5%) and 34 women (12.5%) showed MP. VO2max in men and women with MS or MP (31.5 ± 4.7 and 25.2 ± 5.5 ml/kg/min) were significantly (P<0.05) lower than in healthy men and women (35.9 ± 5.9 and 30.3 ± 5.4 ml/kg/min). Significant associations were observed between VO2max less than 35 ml/kg/min in men and 30 ml/kg/min in women and increases in the number of risk factors of MS (P<0.05). The number of risk factors of MS in C1431T (CT+TT) and Pro12Ala (ProPro) polymorphism in PPARγ; gene were significantly higher than those in subjects with the normal genotype (P<0.05). When the subjects were classified into High and Low Fitness Groups according to age through VO2max per weight, the subjects with low fitness had significantly more risk factors for MS than those with high fitness level despite PPARγ; C1431T and Pro12Ala polymorphism.

Discussion: We concluded that poor VO2max was associated with the prevalence of MS in men and women, and the C1431T polymorphism in PPARγ; is associated with obesity and risk factors of MS in Japanese men and women. Moreover, poor VO2max was shown to be associated with the risk factors of MS independently of the