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Effects of cardiorespiratory fitness, acute aerobic exercise and common single nucleotide polymorphisms in FNDC5 gene on serum irisin levels and glucose metabolism.

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The purpose of this study was to investigate the effects of cardiorespiratory fitness, acute aerobic exercise, and common single nucleotide polymorphisms (SNPs) in FNDC5 gene on serum irisin levels and glucose metabolism. In the cross-sectional study, cardiorespiratory fitness was assessed by measuring peak oxygen uptake (VO₂peak) in Japanese men (n=163) aged 21-79 years, and their serum irisin levels were measured by ELISA. Subjects were divided into low- and high-fitness groups according to the median value of VO₂peak in each decade. Common SNPs (rs3480 and rs16835198) were genotyped by TaqMan assay. Glucose metabolism was evaluated by measuring fasting glucose, HbA1c, and HOMA-IR. In the experimental study, 10 young men, 8 young women, and 9 elderly men performed bicycle ergometer exercise for 30 min at 70%

VO₂max, and blood samples were collected before, immediately after, 30 min, 1, 3, and 24 hr after exercise. Serum irisin levels were not associated with VO₂peak and parameters of glucose metabolism. SNP analysis revealed that subjects with rs3480 AG and GG genotype had higher HOMA-IR than AA genotype only in low-fitness group, (p<0.01). Furthermore, the GG genotypes of rs16835198 were associated with increased fasting glucose and HbA1c only in low-fitness group (p<0.05). However, no SNPs were associated with serum irisin levels. These results suggest that neither cardiorespiratory fitness nor common SNPs in FNDC5 gene are associated with serum irisin levels, but the SNPs are associated with glucose metabolism in low-fitness men. At present, we are investigating the effects of acute exercise on serum irisin levels.