Review

Genetic factors associating the effects of exercise and diet on cardiovascular disease risks -Application of tailor-made healthcare-

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ABSTRACT

Approximately 26% of annual death rate in Japan is caused by cardiovascular disease risks. Individual differences in the DNA sequence may lead to phenotypic variation in physiological function and morphology. The genetic variation accounts for individual differences in physiological features such as skin, eye, and hair color; predisposition to obesity; disease morbidity; and drug response. Therefore, genetic and environmental factors affect the causation of cardiovascular diseases. In 2000, the Japanese Millennium Genome Project was investigated to explore single nucleotide polymorphisms (SNPs) and other genetic variations in Japanese individuals. Consequently, 174,269 genetic variations were identified by 2002, and the results releases as the Genomic database. The identified genetic variation is utilized to investigate in developing tailor-made medicine: gene-based diagnoses and individualized approaches to the selection of treatment. In the area of nutrition and sports sciences, previous studies examined to identify gene polymorphisms that influence the effects of exercise and diet. Recent studies showed that the exercise and diet may be needed to cancel the genetic negative effects of gene polymorphisms, which associated with risks of cardiovascular disease. Thus, as to the many genes involved in exercise and diet responses, to date, the application of patient genetic information to tailor-made healthcare has been achieved at the practical level.

Keywords: arterial stiffness, gene polymorphism, exercise, physical activity, cardiorespiratory fitness