

INTERACTION OF GENETIC AND LIFESTYLES IN DYSLIPIDEMIA RISK IN KOGES

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Abstract

Metabolic syndrome (MetS) is a complex disturbance of lipid (obesity, dyslipidemia), carbohydrate (glucose intolerance), and protein (microalbuminuria and hyperuricemia) metabolisms and arterial hypertension. People with MetS are susceptible to developing obesity, hyperglycemia, hypertension, dyslipidemia, hypertension, and hyperinsulinemia. The common factor related to MetS is increased insulin resistance. MetS increases the incidence of cardiovascular disease (CVD) which has become the world's leading cause of death and is the second most common cause of death in Korea. Dyslipidemia is a major modifiable risk factor for CVD. The prevalence of CVD has been increasing in Korea and it is partly related to dyslipidemia. A very-low-fat (<15 energy %) and high carbohydrate intake (>70 energy %) increases the risk of metabolic syndrome in Korean adults. High-carbohydrate diets (>57.4 energy % in men and >59.1 energy % in women) are associated with a low serum HDL-C in US men and high serum triglyceride in US women. These nutrient intakes and lifestyles can interact with genetic variants to lead to the development of MetS. Interactions with environmental factors, including nutrient intake, can be explained by identifying multiple genetic variants that explain the environmental impacts on the prevalence of MetS in Asians. Interestingly, genetic variants that influence MetS risk are mainly associated with lipid metabolism and they interact with lifestyles. Korean carriers of the *FADS1*_rs174547 and *FADS2*_rs2845573 minor alleles have a greater susceptibility to MetS and moderate fat intake protected against the risk of MetS in carriers of the *FADS1* major alleles. The carriers mainly exhibit decreased serum HDL-cholesterol and increased triglyceride levels and blood pressure after adjusting for MetS-related confounders. Carriers with *APOA5*_rs651821, *EFCAB4B*_rs4766165, and *APOBEC1*_rs10845640 also have increased risk of MetS, and they have interactions with carbohydrate intake and daily physical activity. In conclusion, genetic variants related to lipid metabolism are the major genetic factors which affect MetS risk and they have interactions with lifestyles. Asians who are genetically susceptible to MetS need to consume moderate fat and carbohydrate (about 65-70 %) diet and have daily physical activities to reduce the risk of MetS, especially dyslipidemia.

Keywords

Personalized dietary guideline, Genetic variants, Interaction, Nutrient intake, Lifestyles.