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Green tea extract supplement enhances insulin sensitivity via regulation of plasma adipokine levels and transcriptional response in diet-induced obesity mice

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Obesity-induced inflammation play a pathogenic role in development of insulin resistance, and various adipokines are linked to inflammation. Green tea, one of oriental herbal teas, is well known to have beneficial effects on obesity. However, changes in transcriptional profiles in response to green tea are little known and still needs to be elucidated. In the present study, we investigated the effect of green tea extract (GT) on phenotype characteristics and elucidated anti-obesity mechanism based on RNA-sequencing analysis of transcriptomic profiles in an animal model of diet-induced obesity. C57BL/6J mice (4-week-old, Male) were fed a normal diet (16.58% kcal from fat, ND), high-fat diet (60% kcal from fat, HFD), and HFD supplemented with 0.25% (w/w) GT. They were given free access to food and distilled water for 12 weeks. GT supplement significantly decreased fat mass, body weight as well as plasma of triglycerides, cholesterol, and HDL-cholesterol levels compared to HFD group. Also, GT decreased plasma glucose, insulin resistance index (HOMA-IR) and improved glucose tolerance. GT led significant decrease in plasma leptine, IL-6, TNF-alpha, MCP-1, IFN-gamma levels and leptin:adiponectine ratio. Moreover, mRNA sequencing analysis revealed that GT improved insulin resistance by up-regulating glucose transporter type 4(GLUT4) gene expression in epididymal WAT. In addition, GT up-regulated genes involved in glucose metabolism and lipid metabolism, such as IRS, PECK, HSL, ACC, SCD1 and SREBP1c. Together, our findings suggest that green tea is one of bioactive material for improving HFD-induced insulin resistance by regulating glucose metabolism and plasma adipokines levels as well as expression of inflammation-related gene.

Biography

Myung-Sook Choi has completed his PhD in Texas Woman's University, and Post-doctoral studies in North Texas State University and Cincinnati University. She is a Professor in Department of Food Science and Nutrition and the Director of Center of Food and Nutritional Genomics in Kyungpook National University. She has published more than 220 papers in international journals on nutrition and medicine and has been serving as an Editorial Board Member of several international journals.

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