

Parallel Session RTD Line 3 / Diet and weight gain prevention: observation perspective

Lecture 2: Modification effects of physical activity and protein intake on heritability of body size and composition

Karri Silventoinen
University of Helsinki, Finland

Abstract

Objective: Strong genetic component behind different obesity indicators is well known but it is not clear whether this genetic variation is modified by environmental factors. In this study we examined how physical activity and proportion of protein in diet (PPD) modify the genetic variation of body mass index (BMI), waist circumference (WC) and proportion of fat body mass (PFM).

Design: Twins from Denmark (756 complete pairs) and Finland (278 complete pairs) at age of 18 to 67 years and 21 to 24 years, respectively, participated in the study. PPD was estimated by using food frequency questionnaires. The participants also reported frequency and intensity of their leisure time physical activity. WC and BMI were measured at the study site. PFM was assessed in Denmark by bioelectrical impedance method. The data were analyzed using gene-environment interaction models for twin data by the Mx statistical package.

Results: High physical activity was systematically associated with lower while high PPD was associated with higher mean values of BMI, WC and PFM. Physical activity reduced genetic and environmental variances of BMI, WC and PFM. This effect was statistically significant for BMI (-0.18, 95% CI -0.31, -0.05) and WC (-0.14, 95% CI -0.22, -0.05) in the whole data. In Danish men high PPD decreased genetic and environmental variances of BMI and WC whereas in women or in Finish men similar effects were not found.

Conclusions: Our results suggest that high physical activity reduces genetic variation in weight highlighting the importance on physical activity in weight regulation, especially in persons with genetic predisposition to obesity.