

Television Watching, Leisure-Time Physical Activity and the Genetic Predisposition in Relation to Body Mass Index in Women and Men

All humans are 99.9% genetically identical, but within the 0.1% difference among individuals are regions of genetic information that predispose to overweight and obesity. These genetic variations helped mankind adapt to starvation throughout human history. For the first time in human history there are more overweight than underweight individuals in the world due to changes in diet and lifestyle. It is known that increased physical activity as measured by a leisure time physical activity questionnaire reduced the impact on obesity of having one of the best studied such regions called the “FTO gene” for obesity. There are actually 19 identified variations of this genetic factor and about six of these have been associated with obesity. This recent study analyzed interactions between TV watching, leisure-time physical activity and genetic predisposition in relation to body mass index (BMI) in 7740 women and 4564 men. Data on physical activity and TV watching were collected 2 years prior to assessment of BMI. A weighted genetic risk score (GRS) was calculated on the basis of 32 established obesity associated genetic variations among individuals.

In both women and men, the genetic associations with BMI strengthened with increased hours of TV watching. An increment of 10 points in the weighted GRS was associated with 0.8 [SE 0.4], 0.8 [0.2], 1.4 [0.2], 1.5 [0.2] and 3.4 [1.0] kg/m² higher BMI across the 5 categories of TV watching (0-1, 2-5, 6-20, 21-40, and >40h/wk) (P for interaction=0.001). In contrast, the genetic association with BMI weakened with increased levels of physical activity. An increment of 10 points in the weighted GRS was associated with 1.5 [0.2], 1.3 [0.2], 1.2 [0.2], 1.2 [0.2] and 0.8 [0.2] kg/m² higher BMI across the quintiles of physical activity. The interactions of TV watching and physical activity with genetic predisposition in relation to BMI were independent of each other. This study demonstrated that sedentary lifestyle indicated by prolonged TV watching may increase the genetic predisposition to high BMI. In contrast, increasing leisure-time physical activity may attenuate the genetic effect on BMI.

Comment: These findings emphasize the importance of a healthy active lifestyle. In doing this public health effort, it is important to both increase exercise levels and decrease sedentary behaviors such as TV watching in order to prevent obesity, particularly in individuals who are more genetically predisposed to obesity.

On the other hand, this paper does not tell us anything we did not already know. Genome-wide scanning is a way of looking at all the genetic regions in individuals and populations and it has developed a lot of data. It will require major advances in computing ability as well as the inclusion of more exact measurements of diet, exercise, the microbiome, and human metabolism before the true potential of precision nutrition can be realized.

Reference: Qi Q, Li Y, Chomistek AK, Kang JH, Curhan GC, Pasquale LR, Willett WC, Rimm EB, Hu FB, Qi L. Television watching, leisure time physical activity, and the genetic

predisposition in relation to body mass index in women and men. *Circulation*. 2012 Oct 9;126(15):1821-7.