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Genomic predictors of Body Mass Index (BMI) in relation to longevity

ABSTRACT

Elevated BMI is associated with high blood pressure, a trait that according to the American Heart Association affects one out of three adults in the US, or high concentration of some types of Cholesterol, Triglycerides or Glucose and is a strong risk factor for several diseases such as diabetes and cardiovascular disease and, ultimately, reduced lifespan. All these traits have a genetic component and are known to be associated with body mass index (BMI). In this study we aim at identifying genetic factors affecting these traits as well as the relationship between these traits and BMI in preparation for analyses understanding the relations among BMI, genotypes, and mortality rate. We present a genome wide prediction results from the Framingham longitudinal study on cardiovascular diseases and includes 3,529 individuals that were evaluated for these traits and genotyped for 500,000 SNPs. First, using summary statistics and graphical methods, we evaluated departures from normality and the need of transformations. After this, the association between traits and markers was assessed with single-marker regression (SMR) models. In addition to marker genotypes, our SMR models will include a semi-parametric regression on BMI and the effects of factors such as sex, age, and use of certain medicines or diets that were expected to affect these traits.