**Association of Taste-Related Genes With Diet Quality and Cardiometabolic Risk Factors Among Community-Dwelling Adults – The Framingham Heart Study**

Understanding the individual-level drivers of food choices is critical for designing personalized nutrition guidance. Taste perception is one factor, yet the effects of genetic variants (SNPs) related to taste perception on diet quality and cardiometabolic risk factors (CRFs) are unknown. Thus, our aims were to determine the associations of taste-related SNPs, combined as polygenic risk scores (PRS), with diet quality, and CRFs (waist circumference, glucose, systolic and diastolic blood pressure [SBP and DBP], and log[triglyceride] [TG] and HDL levels).

Cross-sectional analyses were conducted in 6,230 Framingham Heart Study Offspring (1998-2001) and Third Generation (2002-05) participants (mean age ± SD: 50 ± 14 y; 54% female). Diet quality was estimated using food group intakes (log[sev/wk]) derived from food frequency questionnaires. Weighted PRS were derived for tastes with ≥2 SNPs identified from prior GWAS (32 SNPs; 19 sweet, 9 bitter, 2 umami, 1 salt, 1 sour). Higher PRS indicated more alleles for higher taste perception. Associations were assessed via linear mixed models adjusted for age, sex, population stratification and energy intake.

PRS were built for sweet, bitter, and umami perception (mean PRS ± SD: 19.5 ± 2.5, 5.3 ± 1.6, and 3.1 ± 0.8, respectively). Inverse associations were identified for PRSbitter and whole grains, PRSumami and vegetables, and PRSsweet and TG levels (β [95% CI] = -0.03 [-0.05, -0.02], -0.03 [-0.06, -0.01], and -0.008 [-0.014, -0.003], respectively) (all FDR G; G = higher perception), but higher HDL levels for those with AA/AG (P=4x10-4).

Among community-dwelling adults, sweet-, bitter- and umami-related genes were associated with diet quality and CRFs, suggesting that taste-related genes impact food choices and may be beneficial to consider when personalizing risk reduction dietary guidance.

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