OBJECTIVE: Low-density lipoprotein-related receptor protein 1 (LRP1) is a multi-functional endocytic receptor and signaling molecule that is expressed in adipose and the hypothalamus. Evidence for a role of LRP1 in adiposity is accumulating from animal and in vitro models, but data from human studies are limited. The study objectives were to evaluate (i) relationships between LRP1 genotype and anthropometric traits, and (ii) whether these relationships were modified by dietary fatty acids.

DESIGN AND METHODS: We conducted race/ethnic-specific meta-analyses using data from 14 studies of US and European whites and 4 of African Americans to evaluate associations of dietary fatty acids and LRP1 genotypes with body...
mass index (BMI), waist circumference and hip circumference, as well as interactions between dietary fatty acids and LRP1 genotypes. Seven single-nucleotide polymorphisms (SNPs) of LRP1 were evaluated in whites (N up to 42 000) and twelve SNPs in African Americans (N up to 5800).

RESULTS: After adjustment for age, sex and population substructure if relevant, for each one unit greater intake of percentage of energy from saturated fat (SFA), BMI was 0.104 kg m\(^{-2}\) greater, waist was 0.305 cm larger and hip was 0.168 cm larger (all P<0.0001). Other fatty acids were not associated with outcomes. The association of SFA with outcomes varied by genotype at rs2306692 (genotyped in four studies of whites), where the magnitude of the association of SFA intake with each outcome was greater per additional copy of the T allele: 0.107 kg m\(^{-2}\) greater for BMI (interaction P=0.0001), 0.267 cm for waist (interaction P=0.001) and 0.21 cm for hip (interaction P=0.001). No other significant interactions were observed.

CONCLUSION: Dietary SFA and LRP1 genotype may interactively influence anthropometric traits. Further exploration of this, and other diet x genotype interactions, may improve understanding of interindividual variability in the relationships of dietary factors with anthropometric traits.