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Preventive Treatments Involved in Nutritional Genomics and its Applications

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Opinion Article

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ABOUT THE STUDY

Nutritional genomics, also known as nutrigenomics, is a science that investigates the link between the human genome, nutrition, and health. People in the field use systems biology to learn about how the entire body reacts to food, as well as single gene/single food compound relationships. Nutritional genomics, also known as Nutrigenomics, is the study of the relationship between food and inherited genes. It was first proposed in 2001. Nutritional science began as a field that studied people who were deficient in certain nutrients and the consequences, such as the disease scurvy, which is caused by a lack of vitamin C. As obesity and other diseases closely related to diet (but not deficiency) became more common, nutritional science expanded to include these topics as well. Nutritional research typically focuses on prevention, attempting to identify which nutrients or foods increase or decrease the risk of disease and damage to the human body. Prader-Willi syndrome, characterised by insatiable appetite, has been specifically linked to an epigenetic pattern in which the paternal copy in the chromosomal region is erroneously deleted, and the maternal loci is inactivated by over methylation. Nonetheless, while certain disorders may be associated with Specific Single-Nucleotide Polymorphisms (SNPs) or other localized patterns, variation within a population may yield many more polymorphisms.

Applications

Nutritional genomics has numerous applications. Some disorders (diabetes, metabolic syndrome) can be identified using personalized assessment. Nutrigenomics can aid in personalized health and nutrition by assessing individuals and determining specific nutritional needs. The emphasis is on the prevention and treatment of specific genetic disorders. Obesity, Coronary Heart Disease (CHD), hypertension, and type 1 diabetes are examples of genetically related disorders that improve with nutritional correction. Spina bifida, alcoholism, and phenylketouria are examples of genetic disorders that can often be avoided by parents' proper nutritional intake.

Coronary heart disease: Nutrition-related genes manifest themselves through the body's sensitivity to food. There is a link between CHD and the presence of two alleles found at the E and B Apo lipoprotein loci, according to research. Individual responses to lipid consumption result from these loci differences. Some people gain more weight and have a higher risk of CHD, whereas others with different loci do not. Across all populations, research has found a direct correlation between lower CHD risk and lower lipid consumption.

Obesity: Obesity is one of the most extensively researched areas of nutritional genomics. Individuals may respond differently to diet because of genetic differences. The field aims to suggest dietary changes that could prevent or reduce obesity by investigating the interaction between dietary pattern and genetic factors.

There appear to be some SNPs that make it more likely that a person will gain weight from a high fat diet; people with the AA genotype in the FTO gene had a higher BMI when eating high fat or low carbohydrate. Another diet-related variation is the APO B SNP rs512535; the A/G heterozygous genotype was found to have an association with obesity (in terms of BMI and waist circumference) and for individuals with a habitual high fat diet (>35% of energy intake), whereas individuals with the GG homozygous genotype are likely to have a higher BMI than AA allele carriers. This difference, however, does not exist in the low fat consuming group (35% of energy intake).

Phenylketonuria: PKU or phenylketonuria is a rare autosomal recessive metabolic disorder that manifests itself postpartum, but the debilitating symptoms can be reversed with nutritional intervention.