Nutritional genomics manipulating plant micronutrients to improve human health.

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Introduction

Nutrigenomics, or nutritional genomics, is a science that studies the link between the human genome, nutrition, and health. People in the area use systems biology to learn how the entire body reacts to a meal, as well as single gene/single food chemical interactions. Nutrigenomics, also known as nutritional genomics, is the study of the relationship between diet and inherited genes. It was initially proposed in 2001.

Nutrigenetics, nutrigenomics, and nutritional epigenetics are all subcategories of "nutritional genomics," which is an umbrella word that encompasses multiple subcategories. Each subcategory explains a different component of how genes respond to nutrition and exhibit certain phenotypes, such as disease risk. Nutritional genomics has a variety of uses, such as determining how much nutritional intervention and therapy may be utilised successfully for illness prevention and treatment [1].

Nutritional science began as a study of people who were deficient in particular nutrients and the consequences, such as the disease scurvy, which is caused by a deficiency of vitamin C. Nutritional science developed to address these areas when additional disorders closely connected to food (but not deficiency), such as obesity, became increasingly common. Typically, nutritional research focuses on preventative measures, attempting to to determine whether nutrients or meals may increase or decrease the risk of disease and harm to the human body [2].

Prader–Willi syndrome, for example, has been related to an epigenetic pattern in which the paternal copy in the chromosomal area is incorrectly deleted, while the maternal site is inactivated by excessive methylation. Despite the fact that particular illnesses may be connected to specific single-nucleotide polymorphisms (SNPs) or other localised patterns, population variation can result in many more polymorphisms.

Applications

Nutritional genomics has a wide range of applications. Some illnesses (diabetes, metabolic syndrome) can be detected with a tailored examination. By screening people and determining particular nutritional requirements, nutrigenomics can assist with individualised health and nutrition consumption. The focus is on genetic abnormalities and their prevention and repair. Obesity, coronary heart disease (CHD), hypertension, and diabetes mellitus type 2 are examples of genetically connected illnesses that improve with dietary adjustment. Spina bifida, alcoholism, and phenylketouria are examples of genetic illnesses that can be averted by good dietary intake of parents [3].

Coronary Heart Disease

Nutrition-related genes express themselves in the body's sensitivity to food. There is a link between CHD and the existence of two alleles discovered at the E and B apolipoprotein loci, according to research. Individualized responses to lipid ingestion come from these locus variations. Some persons gain weight and have a higher risk of CHD, while others with other loci do not. There is a clear link between lower lipid consumption and lower CHD risk in all groups, according to research [4].

Obesity

In nutritional genomics, obesity is one of the most investigated issues. Individual genetic differences may cause people to react to nutrition in various ways. The area tries to identify dietary adjustments that might prevent or decrease obesity by investigating the interplay between food pattern and genetic variables.

There appear to be certain SNPs that increase the likelihood of gaining weight from a high fat diet; those with the AA genotype in the FTO gene had a higher BMI than those with the TT genotype whether eating a high fat or low carbohydrate diet. Another diet-related variation is the genotype has been linked to obesity and persons who eat a high-fat diet on a regular basis [5].

Phenylketonuria

PKU, or phenylketonuria, is a rare autosomal recessive metabolic condition that manifests after childbirth, although the devastating symptoms can be cured with proper diet.

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