Editorial

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A Short Note on Genetics of Obesity

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Description

Like many other medical conditions, obesity is the result of an interplay between environmental and genetic factors. Studies have identified variants in several genes that may contribute to weight gain and body fat distribution; although, only in a few cases are genes the primary cause of obesity. Polymorphisms in various genes controlling appetite and metabolism predispose to obesity under certain dietary conditions. The percentage of obesity that can be attributed to genetics varies widely, depending on the population examined, from 6% to 85%. As of 2006, more than 41 sites on the human genome have been linked to the development of obesity when a favorable environment is present. The involvement of genetic factors in the development of obesity is estimated to be 40–70%. Some of these obesogenic or leptogenic genes may influence the obese individual's response to weight loss or weight management.

Genes

Although genetic deficiencies are currently considered rare, variations in these genes may predispose to common obesity. Many candidate genes are highly expressed in the central nervous system.

Several additional loci have been identified. Also several quantitative trait loci for BMI have been identified. Some studies have focused upon inheritance patterns without focusing upon specific genes. One study found that 80% of the offspring of two obese parents were obese, in contrast to less than 10% of the offspring of two parents who were of normal weight. The thrifty gene hypothesis postulates that due to dietary scarcity during human evolution people are prone to obesity. Their ability to take advantage of rare periods of abundance by storing energy as fat would be advantageous during times of varying food availability, and individuals with greater adipose reserves would more likely survive famine. This tendency to store fat, however, would be maladaptive in societies with stable food supplied. This is the presumed reason that Pima Native Americans, who evolved in a desert ecosystem, developed some of the highest rates of obesity when exposed to a Western lifestyle. Numerous studies of laboratory rodents provide strong evidence that genetics play an important role in obesity. The risk of obesity is determined by not only specific genotypes but also gene-gene interactions. However, there are still challenges associated with detecting gene-gene interactions for obesity.

Genes protective against obesity

There are also genes that can be protective against obesity. For instance, in GPR75 variants were identified as such alleles in ~ 640,000 sequenced exomes which may be relevant to e.g. therapeutic strategies against obesity. Other candidate anti- obesity-related genes include ALK, TBC1D1, and SRA1.

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