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Epigenetics: Role in the etiology of adult diseases

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Search for the origins of diseases have led to investigations into the roles of dietary and environmental factors as potential triggers or modifiers of risk. These may occur with or without specific periods of permissiveness or vulnerabilities. These concepts are particularly intriguing in the context of diabetes, obesity and metabolic syndrome. Genetic contributions to obesity have been estimated from twin, non-twin siblings and adoptees, and range from 40 to 70%. Epigenetics involves the study of heritable changes in gene expression that are not due to changes in the nucleotide sequence, but involve other mechanisms such as histone modifications or changes in DNA by altering the methylation patterns. Such modifications can be impacted by diet, nutrients, and environmental factors such as chemical, psychological and behavioral factors. While the roles of dietary factors are readily understood in the context of obesity, diabetes and metabolic syndrome, the epigenetic phenomenon provides the linkage between factors such as stress, sleep deprivation and obesity. The term exposome has been used to define the sum of all of the individuals' exposures. Data provided by animal experiments and from follow up of human cohorts exposed to poor nutrition or other adverse influences in early life has helped elucidate these interrelationships. Evaluation of the impact of these exposures and its relationship to health outcomes facilitates better understanding of the origins of diseases.

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