



## Nutrigenomics- An Emerging Area

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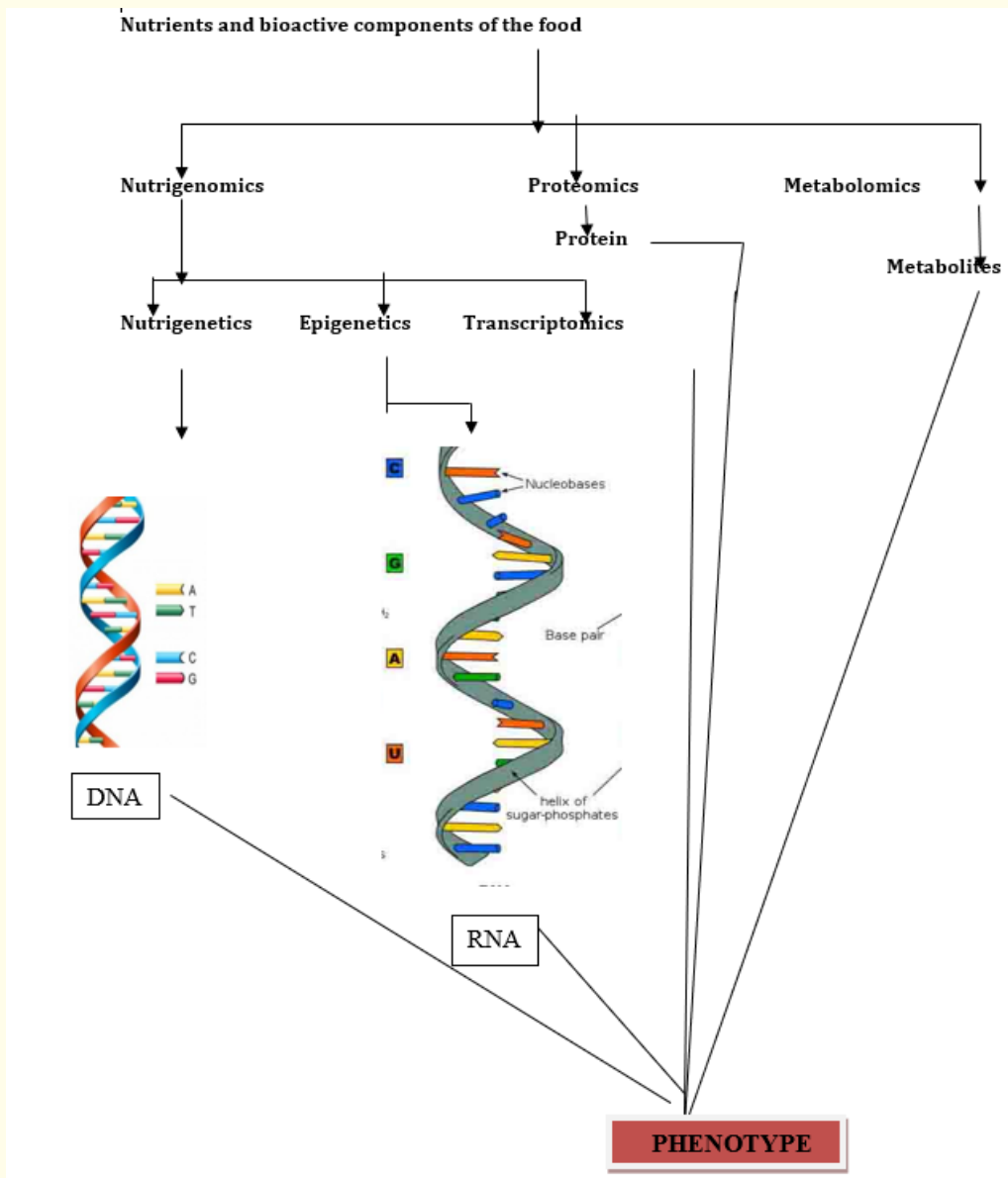
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Nutrigenomics is an emerging issue that combines a certain area of nutrition and molecular tools to study the level of responses of different nutrients in the body of a population. It is a field of research related to the analysis and understanding of the molecular level of interactions between dietary bioactive components with gene expressions at different levels. The actual uptake of nutrition we receive from food or exogenous source depends on the genetics. The uptake, absorption and assimilation of nutraceuticals, which prevents diseases is directly regulated by nutrigenomics through gene-diet interaction or epigenetics. The onset of various diseases (as diabetes, cardiovascular diseases, osteoporosis, ageing, cancer, immunological diseases and neurological disorders) directly depends on the nutrient imbalances, but the susceptibility varies from individual to individual with the similar kind of nutrition level, which is entirely due to nutrigenomics. The study is equally applicable for human and animals. To study the efficacy of newer probiotics or vitamins or minerals as nutraceuticals in basic biological processes, as growth, reproduction or immunity, nutrigenomics can be very well studied with Real-time PCR or DNA microarray. Differential mRNA expression profile of genes involved with various level of nutrients supplementation as probiotics or micronutrients provides us the most useful information for determination of efficacy and appropriate dosage of probiotics or micronutrient and prevention of toxicity induced by excess administration. Such studies are in progress in our laboratory. Vitamins and minerals are helpful for vital function and metabolism of the body and they are involved in various metabolic pathways, regulated by various enzymes. These enzymes are mostly protein and are controlled by respective genes and controlled by nutrigenomics. The concept of biomarker in nutrigenomics has evolved as an important avenue to avert disease and slow down the process of ageing, leading to the importance of pharmaceutical capabilities of the food. Nutrigenomics focus on nutritional interventions with an effect to prevent, delay, and treat diseases such as asthma, obesity, Type 2 diabetes, cardiovascular disease, and prostate cancer'. So, it is the Genomics which regulates the nutrition level of the body.

Nutrients effects gene in a number of ways. It can as an integral part of enzyme, cofactor in metabolism, it acts through hormonal regulation, it can act as a transcription factor. The application of nutrigenomics is in food industry, nutrient uptake and assimilation, nutrigenomics in diseases. The objective of Nutrigenomics is to effect the genomics of individual through nutritional interventions to prevent, delay, and treat diseases such as asthma, obesity, Type 2 diabetes, cardiovascular disease, and prostate cancer'. However current benefits from nutrigenomics are limited. Encouraging people to become more health conscious, acquiring personalized diet and discovering genetic susceptibilities as a strong motivator for making dietary and lifestyle changes are the basic beneficiaries. Nutrigenomics approach is divided into: (a) Gene switching; (b) emphasize in gene protein relation; (c) influence of food. To evaluate the interaction between diets and genes, DNA Microarray technique, Real-Time Polymerase Chain Reaction can be applied. 2 D gel electrophoresis might be an important tool to explore the effect of individual amino acid on protein composition.

Moreover, the potential future benefits from nutrigenomics are tremendous. The limits for intake of essential macro-nutrients-proteins, carbohydrates, fats and micronutrients such as vitamins and minerals will be better defined and understood. Diseases which are genetically controlled and influenced by nutrients may be avoided or abolished. Wastage of vitamins and other dietary supplements that is administered in excess can be avoided. People whose health is relatively unaffected by diet can continue to eat foods that they enjoy after they are genetically screened that they do not contain any SNP or deleterious mutation for diseases. Span of Life may be increased. Further development of Nutrigenomics promises us the better development of functional food and usefulness in studying of different human diseases. Researchers prove its potentiality in food and animal sectors, growth and health and safer life of animals and human beings. Genes that we inherit cannot be altered but we can definitely change their response and expressions to the environment through Nutrigenomics. In future,



food products are tailored to promote the health and well-being of groups in the population identified on the basis of their individual genomes [1-4].

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