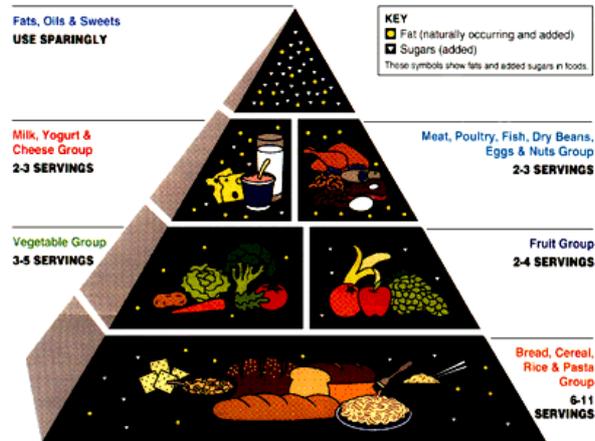


# “UNDERSTANDING NUTRIGENOMICS”

by Paolo Manzelli ; [pmanzelli@gmail.com](mailto:pmanzelli@gmail.com)



[www.pellegrino-online.com](http://www.pellegrino-online.com)

The marked differences in individual response to dietary factors and in particular the recent documentation of the effect of “**single nucleotide polymorphisms**” (SNPs) with metabolic imbalances have demonstrated the importance of the gene- dietary interactions studied by nutrigenomics. (see :**Note 1.**) Hence the emerging field of nutrigenomics initiates to help us to understand the basis of a better personalized dietary guidelines (*tailoring diet on the basis of genotype*) to select nutrients.

The scientific new understanding of nutrigenomics has led to the increase of commercial development of nutraceuticals and functional foods that can be an opportunity to modify negative health effects, of individual genetic profile, bringing the field to the “**food/genome**” junction.

Despite the future promise of nutrigenomics to personalize diet, today there is skepticism whether it can truly bring about meaningful modification of the risk factors connected to chronic diseases, it is evident that the lack of applications is mainly due to a diffuse mis-understanding of people about nutrigenomics advancement in science about the bidirectional interactions between genes and diet.

However, the scientific evidence concerning *diet-gene interactions* offers today significant opportunities to improve public health by enhancing a clear understanding of the importance that assume personalized diet to reduce the risk of common polygenic diseases coming from the dysfunction of n-DNA -SNPs and especially from mt-DNA, as a molecular clock in self-organization of living activities. Several multidisciplinary research of Nutrigenomics currently underway in the Europe and abroad in several nations (U.S.A. ,Canada, Israel, Japan, New Zealand and Australia ) will further help to validate nutrigenomic concepts. In spite of the world wide research on Nutrigenomics, quite all those specialistic studies of ( genomics,proteomics, metabolomics..ecc ) are developed in a “**close innovation system**” base on several academic or industrial specialistic researchers , that have not the goal of putting nutrigenomics in an “**open innovation system**”, involving the general public, to enhance the understanding about importance of new concepts relates to the fields of *nutritional genomics*, in order to advance in the personalized control of the quality of food intake and for getting a better wellness and fitness and health of individual life .

Those benefits should be obtained growing up a **NUTRIGENOMIC KIC** (*Knowledge Innovation Community*) , having the fundamental goal to translate the scientific findings of advanced studies in nutrigenomics into a manageable ,appropriate target of food and agricultural SME's industry, and also to the target of food consumer. In particular the goal of the **NUTRIGEN-KIC** is focused to educate the public to go over the traditional concepts and popular theories based on the “**quantitative**” calculation of diets in “**Calories**”. In that traditional way of dietary conceptions, people link the weight and health control to an old view of *thermodynamics* , losing as a consequence the importance to take in appropriated consideration the “**quality of food**”, so that people forget to learn about the importance of the role of genes interaction on the metabolic reconstruction of the proper life.

Therefore the **NUTRIGEN-KIC** will improve a ***cognitive change from mechanical point of view to a better understanding of life science***; in fact this conceptual change of mentality evidently is a real need for improving the ***knowledge society in Europe*** for getting a better wellness fitness and especially to avoid chronic disease of health.

In synthesis the **NUTRIGEN-KIC** Program would enhance the *worldwide public understanding of the key concepts of nutrigenomics and nutrigenetics*, through offering *gene-tests* directly to the public in a context of ***Community Based Participatory Research***, to gain a deep consciousness for a better nutrition and diet to health , opening in that way a new dietary concepts and guidelines based on nutrigenomic sciences , in order to favour a more useful community's planning for a reduction of chronic disease risks and also for

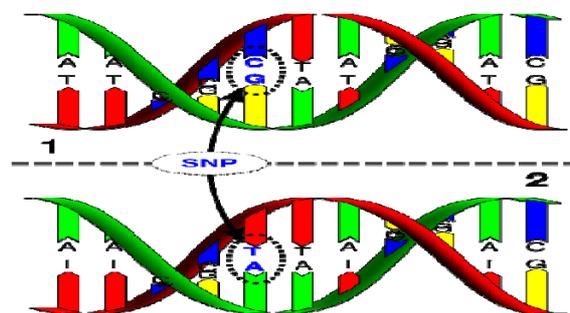
pondering the opportunity to guarantee the quality of the agricultural and industrial production of food. (see: **Note 2.** )

To obtain the goal of a diffuse “*UNDERSTANDING NUTRIGENOMICS*” can be a good strategy to launch an International Cooperation networking activity (see for instance :EU- COST Action in <http://www.cost.esf.org/> ) to improve an open and flexible framework named **NUTRIGEN-KIC** (<http://www.wbabin.net/manzelli5.pdf>) able to popularize the processing, transmission, storage, retrieval, management, usage, and exchange of information and knowledge about nutrigenomics.

The added value of this **NUTRIGEN-KIC** will be derived by the impact of the action on the fundamental aspects of a pre-competitive *Knowledge Based Bio-Economy (KBBE)* development, focused on bettering SME's innovation, and coming from the dissemination outcomes & achievements driven by improving guidelines of nutrigenomics to help in personalizing dietary nutrition world wide, and by working to popularize the Knowledge about the *interaction of genes with diet* to avoid the risks of common food-intake diseases aiming to help a self-protection consumers.

**Biblio:** <http://www.creativehealthinstitute.com/articles/NutrigenomicsOverview.htm>  
[http://books.nap.edu/openbook.php?record\\_id=11845&page=7](http://books.nap.edu/openbook.php?record_id=11845&page=7)

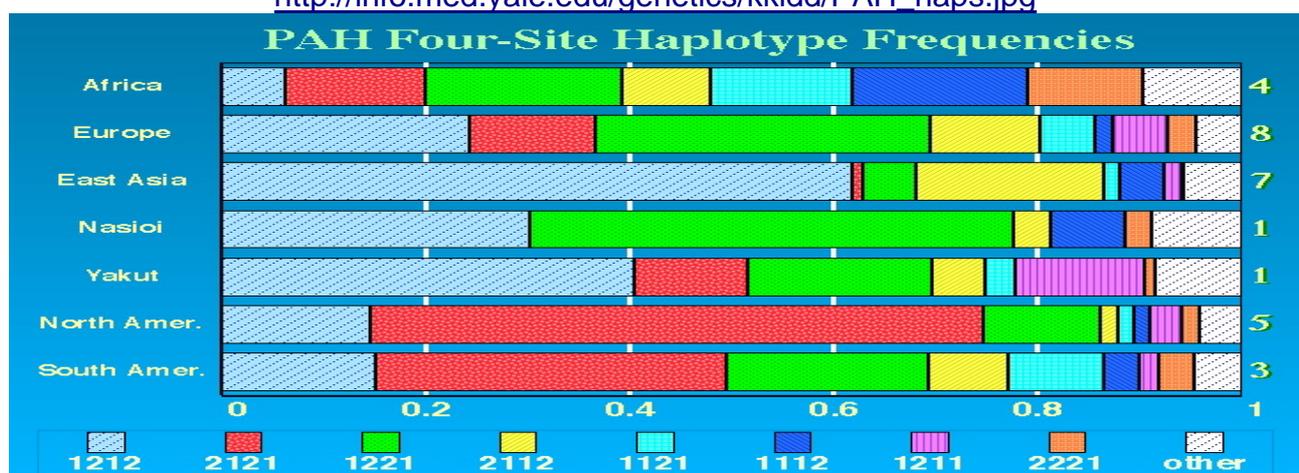
**Note 1 from :** <http://las.perkinelmer.com/content/snps/genotyping.asp>



[http://science.marshall.edu/murraye/341/Images/416px-Dna-SNP\\_svg.png](http://science.marshall.edu/murraye/341/Images/416px-Dna-SNP_svg.png)

**Single nucleotide polymorphisms (SNPs).** A SNP is a single base substitution of one nucleotide with another, and both versions are observed in the general population at a frequency greater than 1%. Human DNA is comprised of only four chemical entities, e.g. **A, G, C, T**, whose specific chemical order is the alphabet of the genome. An example of a SNP is individual "A" has a sequence **GAACCT** while individual "B" has sequence **GAGCCT**, the polymorphism is a **A/G**. Recent work has suggested that about 10 million **SNPs** that are common in human population are not inherited independently; rather, sets of adjacent **SNPs** are present on alleles in a block pattern, so called “**haplotype**”. Many *haplotype blocks* in human have been transmitted through many generations without recombination. This means although a block may contain many SNPs, it takes a few SNPs to identify or tag each haplotype in the block.

[http://info.med.yale.edu/genetics/kkidd/PAH\\_haps.jpg](http://info.med.yale.edu/genetics/kkidd/PAH_haps.jpg)



**Note 2. from :** <http://www.liebertonline.com/doi/abs/10.1089/omi.2008.0041>

To reach the goal of personalizing medicine and nutrition, new experimental strategies are needed for human study designs. A promising approach for more complete analyses of the interaction of genetic makeups and environment relies on **Community-Based Participatory Research** methodologies. **CBPR's** central focus is developing a partnership among researchers and individuals in a community that allows for more in depth lifestyle analyses but also translational research that simultaneously helps improve

the health of individuals and communities.

**PAOLO MANZELLI** [pmanzelli@gmail.com](mailto:pmanzelli@gmail.com) 07/07/09/FIRENZE