Nutrigenomics – Impact on Health

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ABSTRACT  When perceived from a holistic point of view, the aliment is more than what it seems to be: for some people it is a manner of using their senses, for others it is a physiological necessity, or both, intertwined with culinary symbols and traditions. The metabolism of the cells which form the human body processes the information provided by the alimentary matrix, fulfilling the integrity of the entire system and helping it to adapt to the environmental changes. In other words, “we are what we eat and what our parents and ancestors ate”, “basically living and dying at a cellular level”. This information is nowadays well founded by a new branch of nutrition and genetics, nutrigenomics. Nutritional genomics will play an important part in managing the complex chronic maladies, this type of management being based on the interaction between nutrients and genes.

KEY WORDS  Food, health, nutrition

JEL CODES  I. M, Q

1. Introduction

A new science is being born from molecular biology, revolutionizing the discipline of human nutrition. When perceived from the point of view of quantum physics, the universe is a giant calculator which processes information with the most accurate precision permitted by natural laws. A universal informational matrix divides the Universe; therefore, matter cannot be separated from information.

The aliment is made of the elements of the quantum and supra-atomic Universe and it is subdued to these internal biological rules, bearing information. Aliment’s information is, in fact, the deepest and the most profound feature of its quality, determining its nutritional effect and its biological value.

If perceived as environmental element, the aliment is one of the most epigenetic factors, which relates each living entity to the universal informational matrix; the effects that it produces are the modulation of individual life and that of its subsystems and supra-systems.
The strong anthropization of the aliment leads to a deep modification of the information it provides, affecting both the individual and the environment.

The holistic and systemic version of the Universe that we live in appears to be a harmonious and indivisible whole. It is, in fact, a network of dynamic relations which includes the human observer and his rational and intuitive consciousness in a natural and organic manner.

The material world cannot be reduced to fundamental entities (for example, matter’s basic bricks) as it must be integrally perceived by means of its coherency with itself. The Universe is a dynamic network of interconnected events in which the whole is packed in each of its components just like in a hologram. However, Universe is not a static hologram, because it contains an order – information which is packed at a subatomic level (for example, the negentropic domain of the electron) in an essentially dynamic manner (Holodynamics). Bohm said that consciousness is a basic feature of holodynamics. Moreover, modern research shows that the laws of physics can be considered instructions of a computer program, the Universe itself being a giant computer. Each subatomic particle (electron, photon etc.) saves the information in the form of data bytes and every time such two entities interact, these bytes are transformed. Matter, physical existence and its data content are inextricably related. Matter cannot be separated from information. In other words, the subatomic (quantum) universe and the atomic one which derives from the former are organized by a dynamic informational matrix (ISET – Informational, Substantial, Energetically, Temporal). The computer Universe calculates. It calculates itself, the quantum fields, chemical substances, living entities including human beings, which are open informational systems characterized by self-adjustment, self-breeding and anti-entropic development. They are also defined by organizational patterns formed by ISET matrixes. A living system is defined by a configuration of the relationships between its component subsystems, carried out in ISET matrixes, which determine the system’s matrix structure. The continuous dynamic process of concretizing these patterns from the ISET matrixes represents the phenomenon of life.

The entire Universe is governed by an informational matrix which traverses it from the quantum depths to the last element of the supra-atomic world: molecular, living entities, galaxies. All living creatures on Earth are organized and function according to an informational matrix. Man himself is an informational-genetic-substantial entity, placed in a dynamic equilibrium and directly connected to the universal informational matrix. The human being’s connection to the ISET matrixes is made at the levels of all subsystems and supra-systems by means of various informational channels. One of the strongest informational integration channels of the human being is represented by the aliment.

2. Nutrigenomics and Public Health

The research on Nutrigenomics can discover the keys of using genetic information in order to create alimentary products which could improve public health by reducing chronic diseases.

Nutrigenomics is a relatively new research domain which is rapidly developing and it combines molecular biology, genetics biology and nutrition. It focuses on the role of nutritional status or that of specific nutrients used in fixing the genetic expression.

One of its effects could be the development of personal diets based on the genetic code of an individual and focused on optimizing the expression of various genes. In this case, there are other results related to health which prove better perspectives and have greater implications in promoting public health.

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Of a high importance it is also the potential for a better acknowledgment of the way in which the diet can influence the disease at the level of genes or molecules. Many public health threats, such as cancer, diabetes, obesity and other chronic diseases, are highly influenced by genetic factors.

Traditionally, many of the recommendations for the admitted diet were based on population, as the result of epidemiological studies. For example, the recommendations regarding a lower fat intake for a specific population relies on a relationship between fats intake and hearth diseases. However, despite this thing, not all persons who have a fat-rich diet would develop hearth diseases. If we know who has a genetic susceptibility to a certain heart disease, associated to a high level of cholesterol in blood, then the diets could probably be adapted to that person.

Once the human genome project and the continuous identification of the human gene’s role had been finished, the process of obtaining more information on the persons predisposed to developing certain diseases and the diet’s impact on preventing these diseases turned out to be a fundamental research domain. Nutrigenomics’ impact is not limited to public health. The science of alimentary products and culinary industries can benefit from the data revealed after a careful study of nutrigenomics and they can also take advantage of public health promoting activities in a more active environment.

Understanding the impact of processing the aliments’ composition, together with new information on nutrients’ effects on genetics and disease processes, would improve public health by means of daily practices of producing and processing the aliments. Such an opportunity is the development of functional aliments which have a superior nutritional and sensorial quality.

3. Aliment and consumption’s evolution

Each individual is interested in the main issues of aliments, alimantation and alimentary behavior, looking for right solutions to questions such as: what, how, when, how much and where we eat in order to satisfy both our physiological and cultural necessities; it is a known fact that food and lifestyle are the essential factors which prevent diseases, preserve health, develop life quality and slow the ageing process. Moreover, nutrigenomics, a modern science, has proved at the deepest level – the molecular one – that “we are what we eat and what our ancestor ate”, that “we are unique individuals and we need a strictly personalized diet” and that “we are the sum of our choices, including the alimentary ones”.

Perceived from a holistic point of view, the aliment is more than what it seems to be: feast opportunity for some, physiological necessity for others or both. In fact, the aliment is the environment’s main information vehicle. This information is absolutely necessary to a good functioning of the “human” entity which is a biologically open informational system, characterized by self-adjustment and anti-entropic development.

This information of the alimentary matrix is encrypted in the composition of macronutrients, micronutrients, non-nutrients, but especially in the quantitative and qualitative relationships between these. Therefore, the natural aliment (microorganisms, plants, wild animals) is, in fact, an extremely complex informational matrix which sends signals from the environment to the human organism’s informational machinery. Natural information, transmitted by natural elements to human organism, preserve the state of individual health, but it also provides its correct integration in the social and biological environment and it finally determines the human species’ balance in biosphere.
Despite all studies and researches made so far regarding the chemical composition of aliments, the knowledge in this domain remains coarse material. We know some aliments’ composition regarding some macro-, micro- and non-nutrients, but we still can’t decipher the manner in which they are related one to another, their stereochemistry. We only have limited knowledge regarding the information that the aliment transmits to the metabolism and its influence on the physiology of cells, tissues, organs and human body. Therefore, we are not able to discover how they influence the health or disease conditions.

Aliments come to life and develop inside extremely complex natural networks called trophic or alimentary chains. These foods chains start from the soil, water, air, primary vegetal production (informational-energetic key between Sun and Earth made in the photosynthesis process), then we have different degrees consumers (herbivores, carnivores, reducers). The human being is at the top of the trophic pyramid and it integrates all these trophic chains. This is how the human species has developed, becoming the entity which separated from all the others creatures millions of years ago, by adopting an original lifestyle as a hunter, with an alimentary behavior that allows him to eat a great variety of plants and wild animals with high nutritional qualities (over 300 species), by means of a continuous and intense physical activity. In order to be healthy, even the apparently healthy food needs to have been worked, as sedentariness is a well known enemy of health.

Food variety has become the essential element for human species’ survival, which has developed a digestive system that allowed maximum absorption of energy (calories), fats, proteins and other nutrients and phytochemicals.

Special lipids - long chain (EPA, DHA) Omega 3 fatty acids – and qualitative animal proteins gave the human body essential structural components for a bigger and more complex brain, better eyesight, sensitivity, complexity, taste, development of phonatory system. Antioxidants from wild plants allowed the development of a vigorous immune system, protecting people from free radicals (reactive oxygen species), infectious and degenerative diseases (Parkinson, Alzheimer) or proliferative diseases (cancers).

Choosing this way of living and nutrition had a great biological success and it determined our ancestor to remain hunters and harvesters – of wild plants and animals, of course. The domestication process is a recent one and it took place some thousands of years ago.

It seems that the human species had remained the same way for over 100,000 generations (for over 99% of the time since Homo sapiens sapiens became known) until agriculture was invented. From then on there had been over 500 generations of farmers, 10 generations since the industrial revolution and a generation since the invention of computers. Therefore, in an extremely short period of time, there have been many changes in the way that we eat and live, without our physiology and biochemistry being able to adapt to the modern aliments and diets or to the new activity levels (sedentariness). We have become a species which is not adapted to its own lifestyle, created by itself.

Taste, smell, texture, color, flavor, satiety – aliments’ sensorial features – were natural and correct, determining a healthy alimentary behavior before sedentariness generated by agriculture and agro-industry’s chemistry. Aliments were natural, their composition wasn’t modified, processed or polluted (non-anthropic natural alimentary matrixes). Under those circumstances, a tasty, flavored and colored aliment, with a masticable texture, was a clue for determining a healthy aliment (the information of the alimentary matrix was not modified by the human being).
Nowadays, agriculture has become intensive, highly chemical; the soils are poor in macro and micro-minerals, which are chemically and biologically polluted. Moreover, agriculture uses governmental organizations and highly processed raw materials lead to the following consequences:

- the aliment is polluted;
- the aliment is poor in nutrients;
- the more processed the element, the more different from natural aliments (it has a different matrix information, a modified, unnatural, anthropized one);
- we face a growing number of composite aliments with unnatural and unbalanced flavors, textures, colors, compositions and nutritional profiles. They also have highly refined sugar content, degraded and modified proteins which are chemically and physically polluted.

The sensorial features are not the natural ones anymore and there appear highly addictive artificial colors, tastes and flavors under the circumstances of nutritional disequilibrium (the difference between sensorial and nutritional quality becomes more and more obvious). Therefore, taste, smell and aspect become nutritional lie for the organism and the better/delicious the aliment is polluted;

There is no nutritional equivalency between an artificially processed aliment and a natural aliment which had not been processed at all.

The variety of modern food diet is only a superficial one; in reality, the vegetal alimentary resources have dramatically decreased (from hundreds of plants belonging to wild flora to only a few cultivated plants – approximately 40 cereals) and the animal alimentary resources have been reduced from a few dozens of wild species at 4 or 5 species of domestic animals. Aliments’ pseudo-diversity has dramatically increased, but it has become nutritionally dangerous, because of the processing of some compositionally modified and polluted food resources.

Before agriculture and industrialization, the only liquid ingested by the human being was natural water. Nowadays we are forced to drink alimentary liquids that have calories, and this brings about negative effects, such as obesity.

Obesity associated to metabolic syndrome generates the morbid image of modern civilization’s diseases: arterial hypertension, cardiovascular diseases, brain vascular diseases, some forms of cancer, neurodegenerative maladies etc.

Obesity and sugar diabetes type 2 (diabesity) have become an epidemic phenomenon. Obesity is the most spread nutrition disease, having disastrous consequences for adults and children especially (juvenile obesity).

Agriculture and industrialization lead to a radical and unhealthy compositional modification of alimentary resources and of modern aliments as compared to natural integral ones, which used to be man’s main food before agro-industry and sedentariness.

Nowadays, a meal can contain, simultaneously or successively, four major aliment categories, each coming from a specific agro-alimentary chain:

1. Conventional aliments
2. Ecological aliments
3. Genetically modified aliments (GM-FOOD)
4. New aliments (NOVEL FOOD)

Thanks to its exceptional cognitive resources, the human being can adjust the alimentary input in order to fulfill the individual physiological nutritional necessities by means of a complex
learning mechanism and its own experience. In time, this mechanism can allow the individual to recognize and differentiate between favorable and unfavorable products. Unfortunately, the main condition of these choices functions only if the aliments have different sensorial features. The organism cannot assess the aliment’s nutritional value just through its senses (Diagram 1).

Diagram 1. Food and lifestyle pyramid

Unfortunately, this is the place where the modern food industry acts by creating products with high sensorial features, but low nutritional value. Therefore, there is a gap between the aliments’ exceptional sensorial characteristics and their low nutritional values, expressed in unbalanced and dangerous nutritional profiles. This is why only after the consumption of an aliment we can establish the relationship between its dangerous character and the manifestations of the disease it induces.

In order to establish an aliment’s nutritional profile, we must take into consideration (Reg, CE 1924/2006 of the EU) the content of nutrients and substances with nutritional or physiological effects, such as: fatty substances, saturated fats, trans fatty acids, salt/sodium, sugars which are not recommended to appear in the world’s alimentary diet, or polysaturated or monounsaturated fats, assimilable glucides other than sugars, vitamins (natural or synthetic), minerals, proteins or fibers.

An aliment’s nutritional profile is also characterized by its bioavailability. Bioavailability means the “quantity of nutrients or non-nutrients in an aliment and the speed to reach this quantity in the organism’s general circulation and which can be used by cells or target-tissues”. In other words, it establishes the quantity that the organism uses. The smaller the bioavailability, the more useful or even dangerous is the aliment. What essentially matters for preventing a disease and keeping the organism healthy is the nutritional quality of aliments.
By preserving our traditions and by adopting a different lifestyle, we lost a part of our identity, culture and belief that gave us the strength of resisting in time.

We traded our health for a superficial and very dangerous wellbeing. Besides pleasure, eating must also be a responsible act for us and our children.

We must acknowledge that aliments are necessary for the organism which is characterized by a dynamic equilibrium, in order to develop and grow. Aliments are the fuel that gives us energy (glucides and some fats) but they are also our doctor (good proteins and fats – essential fatty acids).

Aliments provide us substances which help us fight effeteness (free radicals - antioxidants), pathogen and pollutant agents or stress. It also brings us natural correct information or corrupted by chemicals and industrial processing.

Our body is a complex computer and is made of two component parts: the hardware – cells, tissues, organs, anatomic-functional systems and the software – the genetic material in our chromosomes which bear the information useful to all vital processes (DNA).

Our aliments, which are in fact animal and vegetal cells bearing genetic information, once ingested interact with our genes, positively or negatively affecting their functioning. Nutrigenomics proves nowadays the interaction of aliments and our genes.

Any artificial modification of the information carried by the aliment generates unhealthy food. This leads to our genetic uniqueness. This is the reason why a diet should be individualized and personalized. In other words, we are not equal when it comes to aliments, medicaments and diseases.

An aliment could have a positive effect on a consumer, but it could also negatively affect other persons through the biocompatibility function.

We must not seek for solutions given by others, even if they are specialists. They can only guide us, but we have to keep in touch with our nature and pay attention to the signals given by our own organism after consuming each and every aliment. If the body doesn’t accept that aliment, we must replace it with other aliment from the same category so that we avoid a monotonous diet.

4. Conclusions

A healthy diet, an adequate alimentary spectrum established according to the person’s age, gender, profession, special physiological states (health condition, illness, pregnancy - nursing), genetic heritage should always be diversified (it should contain aliments from all categories, including raw fruits and vegetables) and balanced (in nutrients and non-nutrients) in order to provide all necessary factors for promoting a durable health, for preventing illnesses and early ageing.

Illnesses always have an inherited genetic component which is inherited as a predisposition, but the result of its interaction with the lifestyle and alimentation would lead either to health conditions or illnesses conditions.

A healthy alimentation and an active lifestyle can prevent illnesses. This is why it is said that a sedentary lifestyle and an unhealthy alimentation are the cause of approximately 70% of current diseases, while the hereditary factors are the cause of only 3-5% of the same diseases.

Therefore, we can say that diet does not only consist of consuming aliments, but it also implies a healthy and active lifestyle. This is why we should possess some fundamental notions
about ailments. Whoever said that it is simple, he lied. It is not simple at all, but if we are willing to make some efforts, this thing could become a reflex. We should also stay away from unhealthy foods and from culinary temptations.

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