



## TITLE – AYURGENOMICS - A FUTURISTIC APPROACH FOR DIET AND HEALTH

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### Abstract

Nutrition and health are deeply correlated just as a genotype to an organism. The study of how food affects genes of an individual along with how they affect the manner his body responds to food is essential in present day scenario. Nutrigenomics provides us important knowledge to learn more about how both genes and diet work together and affect a person's health and risk of developing many ailments. It is an emerging biological and medical science that investigates and employs tools to access the numerous responses reported through a planned type of diet and applied for an individual and population. Nutrigenomics includes nutrigenetics, epigenomics, transcriptomics along with study of nutrients and bioactive compounds of food through proteomics and metabolomics e.g. there are certain epigenetic changes that could be removed or added in the form of response to various changes in environment or behavior for examples after quitting smoking, smokers were seen to have increased DNA methylation even at gene level. Nutrigenetics is the science that deals with the effects of variation of genetics of an individual on response to certain diets, that may lead to personalized dietary formulations and recommendations in the long run, Transcriptomics on the other hand may be utilized to provide detailed information about mechanisms of a particular diet or nutrient. It could also aid in knowing the way any gene, metabolite or protein may result in changes in patterns of diseases in its various phases or the benefits of various nutrients in preventing diseases or resulting in good health.

**Keywords-** Nutrigenetics, Epigenomics, Metabolomics, Transcriptomics, Ayurveda .

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## INTRODUCTION

In *Ayurveda*, every individual is emphasized on. *Ayurvedic* scriptures considered each person as unique and sickness as the result of a complex interplay of numerous inherent and environmental elements long before individualized treatment became popular in discussions of public health. The principle of *Trisutra* are: the causes, the symptoms and the remedies that are predictive and tailored strategy of *Ayurveda*. An emerging area of science called nutrigenomics lays the groundwork for understanding how dietary nutrients affects the body, how genomes express themselves. Nutrigenetics also includes the diverse ways that genes react to various nutrients, food groups, and newly developed nutraceuticals. In order to develop methods for determining the etiology of diseases, it has been conceptualized to explore the features of nutrigenomics.<sup>1</sup> It leads to formation of disease due to gene mutation.

## AYURGENOMICS

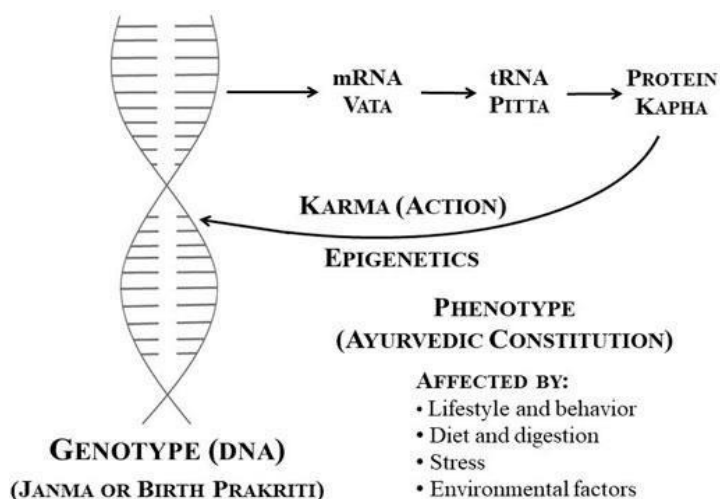
Ayur genomics - *Ayurveda* strongly asserts the age old talismans of health that incorporates the facts, stating that , *Ahara* (~ dietary regime) determines a person's health and the presence of disease.<sup>2</sup> It establishes the distinctiveness in each person's need for diverse nutritional sources, which is different and special.<sup>3</sup> It will be possible to preserve health and treat ailments in the subject when diet is tailored to the individual based on their *Prakriti* (~normalcy).<sup>4,5</sup> Additionally, nutrigenomics research on a specific individual may examine how a gene is impacted by *Asatmya sewana* (~ Non conducive consumption ) and how this results in disease creation owing to gene mutation<sup>6</sup>.

The conventional medical knowledge in our search is to comprehend the disease, we often forget about the patient and his heterogeneity among people, even in a healthy state. As a result, the Ayurgenomics is a detailed study of latest molecular framework for combining and integrating genomics research with *Ayurvedic* concepts of inter-individual variability and intensifying the search for markers for preventive, curative, and customized medicine. Thus, the Ayurgenomics approach makes use of molecular phenotyping and genomics to explore *Trisutra Ayurveda* in a systematic manner. The goals of preventive and tailored treatment may be achieved quicker because of Ayurgenomics. It has been established that ethnicity (~ *Jatiprasakta*), familial

traits (~ *Kulanupatini*), and geoclimatic areas (~ *Deshanupatini*) are all influenced by variability of phenotypes. Ayurgenomics, the fusion of *Ayurveda* and genomics, has shed fresh light on *tridosha* and may open the door for personalized medicine (precision medicine). The *Ayurvedic* understanding is based on three types of *Prakriti* aspects for an individual: *Ahara* (~ Dietary regime), *Aushadhi* (~ Medicines) and *Vihaar* (~ lifestyle) A strong base of *Prakriti* based medication, with an enhancement in quality of life with increasing longevity along with preventive medicine can be achieved through these characteristics explained in ancient ayurvedic classics. *Ayurveda* and genetics can work together, especially when it comes to preventive health measures.<sup>7</sup>

According to the *Ayurvedic Tridosha* (~ three regulatory functional factors of the body) theory, each person's physiology is regulated by three basic principles or forces known as *Doshas* (~ regulatory functional factors of the body ). Every person is innately born with a different and unique blend of three *Doshas* *Vata* (~*Doṣa* responsible for movement and cognition), *Pitta* (~ *Doṣa* responsible for regulating body temperature and metabolic activities) and *Kapha* (~ *Doṣa* responsible for regulating body fluids and keeping the body constituents cohesive); and that makes the *Prakriti*. *Prakriti* can be divided into a total of seven categories: *Vata*, *Pitta*, *Kapha*, *Vata-Pitta*, *Pitta-Kapha*, *Vata-Kapha*, and *Vata-Pitta-Kapha*. Is *Prakriti* explicable in terms of science? The best definition to far has been offered by the latest horizon of Ayurgenomics, that aspires to explain *Prakriti* types through modern genetics along with physiology. Researchers discovered a connection between the *Prakriti* type and HLA type, with the *Kapha* kind having an

HLA DRB1\*13 allele and the *Vata* kind altogether lacking the HLA DRB1\*02 variant. Additionally, the *Kapha* kind of HLA DRB1\*10 showed a comparatively high allele frequency than the *Pitta* and *Vata* types. It is especially relevant to P4 medicine, which is predictive, preventive, personalized, and participative due to the integration of *Prakriti* differentiation methodologies of *Ayurveda* with cutting-edge genomic theory<sup>8</sup>, it was easy to identify the molecular genetic foundations of the basic of *Dosha Prakriti* for the first time.



**Figure 1** - Cellular function and DNA correlation with Ayurveda, messenger ribonucleic acid, deoxyribonucleic acid, mRNA, transfer ribonucleic acid, tRNA and DNA, <sup>9</sup>

The CSIR-TRISUTRA Unit that's called (Translational Research and Innovative Science via Ayur genomics at CSIR-IGIB), a cross-disciplinary

networked hub, fosters collaboration between Ayurveda, modern medicine, and genomic science.<sup>10</sup>

**Table 1** FEATURES OF TRIDOSHAJ PRAKRITI ACCORDING TO ACHARYA CHARAKA<sup>11</sup>

| <i>Kaphaj Prakriti</i>  | <i>Pitta Prakriti</i>   | <i>Vata Prakriti</i>   |
|---|---|--|
| <i>Physical appearance</i>  |   |  |
| <i>Snigdhaangha</i> (~ Unctousness of body parts)   | <i>Ushna asahya;</i> (~ Heat intolerant)  | <i>Ruksha,</i> (~ Dry)<br><i>Alpa shareera;</i> (~ Lean Body )   |
| <i>Sukumara</i> (Delecate)  | <i>Ushna mukha;</i> (~ Warm mouth)  | <i>Sheeta asahishnava;</i> (~ intolerant to cold)  |
| <i>Sushlishtasaar Sandhibandhana</i> (~ compactness of body joints )  | <i>Prabhuta ashna paana;</i> (~ Excessive food and Water intake)  | <i>Bahu pralapa kandra sira pratana</i> (~ Emaciated body)   |
| <i>Saarsanhat sthira shareera</i> (~ compactness of body parts );   | <i>Prabhuta sweda mutra purisha;</i> (~ Excessive Sweating, micturition, Defaecation )  | <i>Parusha kesha shamshru roma nakha dashan</i> (~ Roughness of Scalp Hair, Moustache, Body hair Skin , Nails and teeth )  |
| <i>Prasanna snigdha varna swara</i> (~ pleasing complexion , Voice )  | <i>Shithila mridu snigdha maamsa</i> (~ lax muscles)  | <i>Jarjara swara;</i> (~shattered/broken voice)  |
| <i>Physical activities</i>  |   |  |
| <i>Balavanta</i> (~ Strong)<br><i>Vidyavanta</i> (~ Knowledgable)<br><i>Ojaswani;</i> (~ Essence of all Dhatus ~ major structural components of the body )<br><i>Ayushmanta</i> (~ enhanced life span)<br><i>Manda cheshta</i> (~ Less Body Activities) | <i>Madhya bala;</i> (~ Moderate strength)<br><i>Madhya gyan vigyana;</i> (~ Moderate Knowledge)<br><i>Madhya ayusha</i> (~ Moderate enhanced life span) | <i>Alpa bala;</i> (~ Less Strength)<br><i>Alpa ayusha;</i> (~ Less Life span)<br><i>Shruta grahino alpa samriti</i> (~)<br><i>Chapala gati cheshta ahara vyahara</i> (~ Excessive body Movements and Activity) |

**NUTRIGENOMICS**

The investigation of how a person's genes are impacted by food and how their bodies react to it was done in a scientific fashion. With the use of nutrigenomics, researchers can better understand the way an individuals's health and chances of

developing diseases like non-communicable diseases may be determined by their food and genes. It might also lead to the discovery of brandnew medical interventions. It is believed that nutrigenomics would make it easier to prevent widespread illnesses that are linked to diet by

taking into account the association between certain nutrients or diet and gene expression. Nutritional science is the study of nutrition, and it largely focuses on human nutrition. This personalized approach to nutrition research has recently , developed in order to comprehend the processes of individualized nutritional responses and nutrigenomics. In actuality, nutrition has a significant role in human health, sickness, and the management of a number of prevalent multifactorial chronic diseases. The use of nutrigenomics makes sure that dietary choices or public health are unaffected by human genomic diversity. Additionally, nutrigenomic research covers a wide range of genome-wide topics, which could lead to the discovery of novel molecular pathways controlling the host's response to food. Response to food on host, diet related habits, and preference of food are all significantly influenced by genetics, despite the fact that heritability estimates differ between studies. Nutrigenomics assesses the impact of food components on the genome in order to connect relevant phenotypical variance in cellular responses, like metabolic activities along with homeostasis of the biological systems. Genetic interactions may then further regulate these reactions. Historically, plants which are consumed as a source of nutrition and medication are of medical importance around the world since the cornerstone of innovation of nutraceuticals in personalized food plan out may be used in innovation of new lead compounds to be employed in drug research.<sup>12</sup>

Dietary chemicals modify the genome's structure and change gene expression, making improper diets a risk contributor to diseases. Genetic makeup of an individual may have an impact on how much nutrition affects the harmony between wellness and illness states. It's believed that several diet-regulated genes contribute to the development, occurrence, degree of severity of chronic diseases. The delicate equilibrium between health and sickness can be modified by specific food patterns, which can directly or indirectly impact gene expressions. Person's susceptibility to diseases is influenced by their genetic makeup, namely by the existence of polymorphisms in genes that are regulated by nutrients. The ultimate goal of nutrigenomics/ nutrigenetic investigations is a personalized diet that takes into account each person's genotype. These can reduce the chance of illness manifestation in individuals and populations who are genetically susceptible to it. Proteins enable the expression of genes, the specialized proteins called enzymes are meant to initiate reactions. The genome gives instructions to ribosomes for producing a variety of enzymes

capable of scavenging toxins out of the body. Genes in some people convey imprecise directions for producing an enzyme that breaks down the amino acid phenylalanine. Because of the accumulation of this amino acid, brain damage results. If the damage is discovered in the earliest stages of infancy, a diet reducing this amino acid will reverse it.

Changes in diet have long been used to address inborn metabolic abnormalities, also known as nutrigenomic interactions between food and genes that are handed down. Examples

1. Phenylketonuria (PKU), that can be brought on by a single gene modification (mutation). Individuals who have been impacted need to keep themselves away from food containing phenylalanine.<sup>13</sup>
2. Lactose Intolerant Cases. The large group of people globally are found to be lactose intolerant, which means they are incapable to digest milk products. This happens as a result of the lactasedegrading enzyme lactase's gene or component of a person's genome generally becoming "switched off" after weaning.<sup>14</sup>
3. Tocopherol which bioactive substance in green tea, works through reducing the intensity of processes of inflammation and reaction that accumulate in obese people. According to research, this element might help with the control of obesity as a result.<sup>15</sup>
4. According to different research, cancers might be caused due to deficiency of micronutrients like, vitamins B12, folic acid, vitamin B - complex, niacin and zinc may change DNA in a way similar to what happens after exposure to radiation. These modifications may cause doublestrand breaks in DNA or oxidative damages, or a combination of both. These are also proven to be particularly connected to the rise in cancer incidence. Compounds linked to foodborne illnesses are capable of generating dangerous metabolites which could interact with DNA, changing its basic structure and causing various kinds of mutations. For instance, aflatoxin B1 creates a molecular structure that could bind to the guanine residue's N-7 site and produces a new product. This novel molecular structure first dissociates the bond between one nitrogen-based nucleotide and one sugar to result in creation of an apurinic site. As a result, the genetic mutation may cause the liver to develop cancers, cirrhosis, or necrosis.
5. In folate metabolism, the gastrointestinal system absorbs folic acid from food, which is then converted into 5-methyltetrahydrofolate by a number of chemical reactions involving catabolism and biosynthesis. For methionine

synthesis, this chemical component is important, which is then utilized while mutation of DNA takes place. As a result, a food plan deficient in folic acid may disturb this procedure and replication of DNA, increasing the risk of getting cancer.

6. Environmental and genetic factors interact to cause type II diabetes, which has a complex etiology. Based on genomic research, 65 SNPs have been found to be associated with a likelihood of developing type II diabetes. Thanks to developments in genome sequencing and human genome decoding, people now have access to assays to detect SNPs associated to Type II Diabetes. The patient can then establish whether there is a hereditary predisposition to the disease.<sup>16</sup>
7. Relation of Nutrigenomics and (NTCDs) Non-Transmissible Chronic Diseases: A person's nutritional condition is influenced by a number of factors, including their genetic make-up, physical characteristics, emotional state, and social environment. Diet is an important factor because many bioactive ingredients and nutrients of food may be advantageous or result in a number of illnesses. Numerous illnesses, including NTCDs, including cancer, diabetes, and Obesity, phenylketonuria, and celiac disease, among others, have been connected to food consumption.<sup>17</sup>

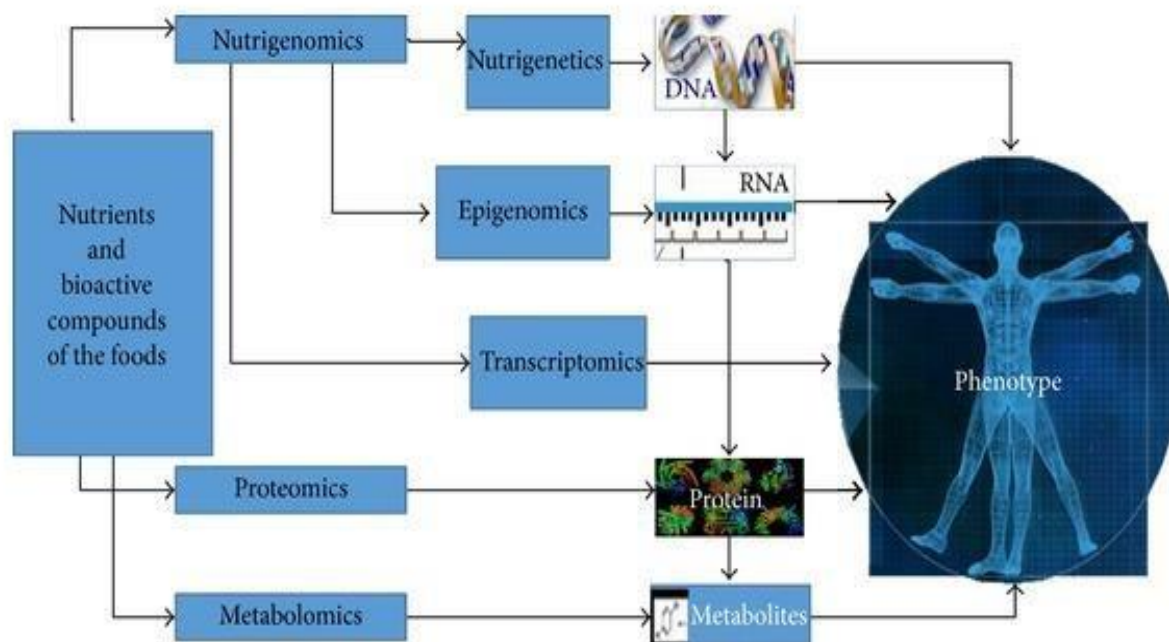
In this way, an individual's level of wellbeing is influenced by the interaction between their genetic make-up and nutrition. Therefore, the objective of nutrigenomics and other omic sciences is to get a deeper understanding of the interactions between genes and biologically active substances from food sources.

### AYURNUTRIGENOMICS

The incorporation of Ayur genomics with the ancient principles of *Ahara*, *Pathya* and *Apathya* eventually resulted in the word "Ayur nutrigenomics" being introduced. It is a methodical approach to integrating traditional nutritional practices with respect to person's *Prakriti* which incorporates data from proteomics, genome sequencing, and metabolomics and seeks to provide a solid basis in science based on verification for customized nutrigenomic dietetics. Employing foods that distinct the biochemical component that have their metabolomes standardized could enable creative treatments in

circumstances where medicines are ineffectual when used alone or mixed with other from a preventive perspective in vulnerable population. As customized, holistic food products generated from traditional aspects encourage human health care and enhance prophylactic applications, it may prove to be very helpful. The overview subsequent to it illustrates the revolutionary concept of *Ayur nutrigenomics* by emphasizing distinctive significant elements of *Ayurveda*-inspired methodology and innovative nutrigenomic techniques.<sup>18</sup>

According to the ancient wisdom of *Ayurveda*, *Ahara* is defined as dietary regimen for different time period on daily and seasonal basis, according to an individual's age &, particularly, their distinctive constitution, or *Prakriti*. Every sentient object relies on energy for their survival, that is generated by any sort of nutrition, in accordance to the *Taiteriyopanishad*, which connects *Ahara* to *Brahma* (mythologically, the world's creator). Diet is referred to in the *Bhagwad Gita* as the basis for the basis of life. In practical terms, healthy eating along with additional tasks and daily routines are taken into account in addition to success in *Yoga*<sup>19</sup>. It has been claimed that anything consumed orally,, after thorough digestion, transforms into tissue components and serves as a means of encouraging growth, recovering from injury, and giving protection against diseases is referred to as *Ahara*. According to *Charaka*, *Ahara* maintains a healthy equilibrium of *Doshas* and *Dhatus* through fostering wellness and illness prevention.<sup>20</sup> An ideal food revitalizes vitality and gives the body power while extending life and improving happiness, memory, *Ojas* (the immune system), and digesting abilities.<sup>21</sup> An essential aspect of *Ayurvedic* treatment is dietary examination with regard to wholesome and unwholesome diet, which ultimately determines whether a person is content or unsatisfied. Sometimes food management serves as the entire course of therapy. *Ayurvedic* dietetics places a strong emphasis on the designing of food plan as a technique to balance the basic three humours (*Doshas*). *Ayurvedic* nutrition, in contrast to modern nutrition, considers elements like our dietary intake and eating habits, the nature of the food, *Bala* or strength of *Agni* (enzymatic activity of the gastrointestinal metabolism), the method of preparing and blending the food, the season, surroundings and settings, etc. It is commonly acknowledged that dietary needs have an impact on health. It is commonly acknowledged that diet affects health.



**Figure 2-**Various Omics sciences and their relation with nutrition , health and diseases

### Gene-Nutrition Interaction

- Direct Interactions – Sometimes, nutrients or nutrient components e.g. chemical constituents of Ashwagandha such as Withaferins , Anahygrine, Saponins etc. may attach to specific receptors that act as transcription factors, causing them to bind to specific genes and cause the expression of those genes.
- Epigenetic Interaction - Alterations in the epigenome or DNA structure may also affect how genes are expressed.
- Genetic Variation – Changes in a genome's basic blocks or specific components could affect how a gene manifests or expresses itself.<sup>22</sup>

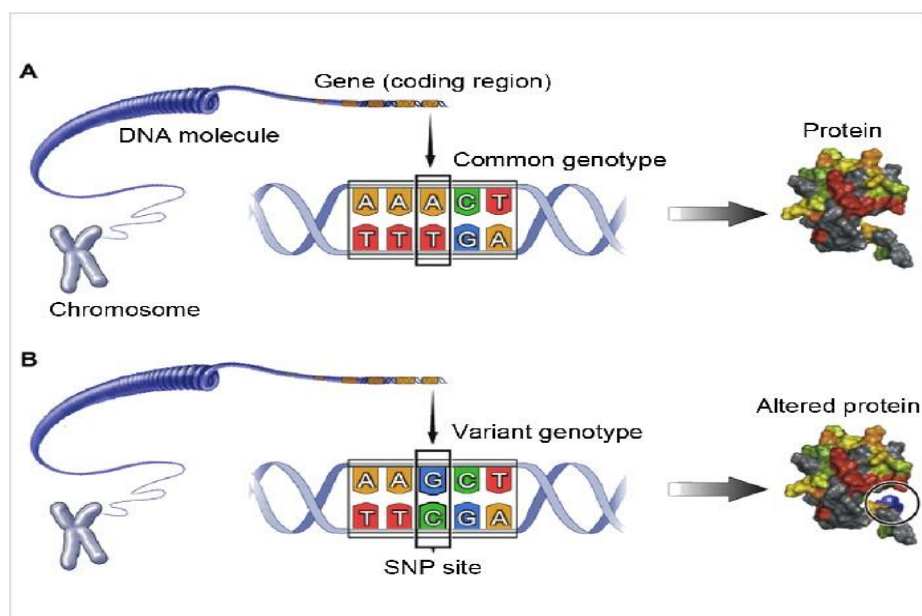
### EPIGENETICS

Epigenetics is the science that deals with lifestyle choices and how environment may affect genes and their expression. Changes in epigenetics may impact on the way human body reacts to a sequence of DNA though they may be reversible and don't change sequence of DNA. Over time, alterations in epigenetic makeup occur. In stage of being infant, a child, or an adult, epigenetic makeup is different from what it is when one is younger or older. Before birth, epigenetic changes begin to take place. Even if cells have the same genes, they look and function differently. Epigenetics control whether a cell will turn into a skin cell, a neuron cell, or a heart cell, among other functions, as you grow and develop a comparison between neuron and muscle cells. Although muscle and neuron cells have the same

DNA, they have different functions. A nerve cell communicates with other cells in the body. The design of a muscle cell affects how mobile an individual's body is. A muscle cell can toggle "on" genes that create proteins required for its activity and "off" genes required for a nerve cell's function thanks to epigenetics. The levels of DNA methylation a newborn or infant, a young 26-year-old, and an old person of 103 years - were examined in lots of places. DNA methylation reduces as age progresses. A DNA methylation was found the highest in a newborn and was found lowest in a 103 year old person.<sup>23</sup>

### Reversibility and Epigenetics

All changes in epigenetics are not permanent. Few epigenetic modifications may be removed or added to as response to variations in environment or behavior. In comparison between current and former smokers, non-smokers, by studying, we may find changes in the Epigenetic processes of smokers. For example, DNA methylation at main regions of AHRR gene are mostly found on lower side in smokers as compared to non-smokers. Bigger discrepancy is found in among heavy smokers and chain smokers. It is observed that former smokers had improved DNA methylation at their locus post quitting smoking. They might finally be at par with levels compared to non-smokers. Depending on how much and how long is involved, this process could occasionally take less than a year.<sup>24</sup>



**Figure 3-** Single-nucleotide polymorphisms (SNPs) transform single base DNA, leading to amino acids sequence modification causing malfunction of a the protein<sup>25</sup>

### CONCEPT OF SATMYA

*Satmya* (~wholesome) refers to a substance or food that is suitable for a person's health. It also refers to those factors that, even when utilized repeatedly, are healthy for the person that may be unhealthy for others in a particular area or season etc. *Upashaya* (~Conducive to health) is another name for *Satmya* (~habituation). Synonyms for *Satmya* that are widely used included

*Hita* and *Pathya*. One of the evaluable points of *Dashavidha Pareekhsa* (~ten important aspects for examination) is *Satmya*. A substance that is beneficial for an individual is known as *Satmya*, and using such substances adds to that person's wellbeing. This comes in three varieties: the best (*Pravar*), less (*Awar*), and the average (*Madhya*). Another classification scheme divides it into seven distinct groups based on how the individual rasas or tastes are administered (the first six categories) and how the rasas or tastes are used in combination (the seventh category). Using all of the rasas results in the superior form of *satmya*, using only one rasa results in the inferior type, and falling somewhere in the middle is the middling type of *Satmya*. The concept of *Okasatmya* is expressed by the phrase "*Satmya*" (i.e. to make any substance favorable to

the body by its habitual ingestion) also. *Oka Satmya* refers to things that, even when utilized frequently, are good for a person. People who consume oil, meat soup, ghee, milk, as well as medicines and diets that have all six tastes, are endowed with strength, the ability to handle adversity, and sustain a long life. People who are used to bland foods, unappetizing medications, and diets with only one taste tend to be weaker, less able to handle stressful situations, have shorter lifespans, and have less possessions, such as medicines for curing illnesses. Individuals have moderate strength if both of these kinds of homologation are present. When *Satmya* food is consumed, it won't harm or alter a cell's genetic makeup over time. In contrast, when *Asatmya* food is consumed, it may interfere with a cell's normal metabolic process, that involves multiple reactions and the participation of specific enzymes and catalysts. In order to maintain a cell and following organ system healthy, one needs to only consume *Satmya* food.

Reversal of gene mutation can be achieved by *Satmya sewana* or following dietary habits with personalized approach.

**Table 2 -Scope for particular Pathyaapathya**

| Dosha | Lakshana  | Opposite lakshana  |
|-------|---|--|
| Vata  | Rasa(Taste): <i>Katu</i> (~Pungent), <i>Tikta</i> (~Bitter), <i>Kashaya</i> (~Astringent)   | Rasa: <i>Madhur</i> (~ Sweet)- <i>Amla</i> (~ Sour) <i>Lavana</i> (~)  |
|       | Gunas (~Qualities): <i>Ruksh</i> (~dry), <i>Laghu</i> (~light), <i>Chalaa</i> (~mobile), <i>Sheeghra</i> (~fast), <i>Sheeta</i> (~cold),<br><i>Veerya</i> is <i>Sheeta</i> (~ Cold)   | <i>Veerya</i> is <i>Ushna</i> (~)<br>Gunas are <i>Snigdhaa</i> , <i>Ushnaa</i> , (~)<br>heavy,   |
|       |   |  |
| Pitta | Rasa: <i>Katu</i> , <i>Amla</i> , <i>lavana</i>   | Rasa: <i>Madhur</i> - <i>Tikta</i> - <i>Kashaya</i>  |
|       | Guna is <i>Ushna</i> , <i>Tikshana</i> , <i>Drava</i> (~ fluidity),<br><i>Veerya</i> : <i>Ushna</i>   | Guna: <i>Sheeta</i> , <i>Mridu</i> (~ Soft), <i>Sugandhit</i> (~ Flavoured )<br><i>Eg.Ghee</i><br><i>Veerya</i> : <i>Sheeta</i>  |
|       |   |  |
| Kapha | Rasa: <i>Madhur</i> - <i>Amla</i> - <i>Lavana</i>   | Rasa: <i>Katu</i> - <i>Tikta</i> - <i>Kashaya</i>  |
|       | Guna: <i>Snigdha</i> (~unctous), <i>mrudu</i> (softer) , <i>Madhur</i> (sweet), <i>Ghana</i> (dense), <i>Guru</i> (heavy), <i>Sheeta</i> (cold), <i>Shlakhna</i> (slimy) all in terms of ayurveda<br><i>Virya</i> – <i>sheeta</i> | Guna - <i>Ruksha</i> (~ dry), <i>Laghu</i> (~ light), <i>Chala</i> (~ mobile), <i>Khara</i> (~ coarse), <i>Vishada</i> (non-slimy) all in terms of Ayurveda<br><i>Virya</i> - <i>Ushna</i> |
|       |   |  |

**Table 3-Diet according to Prakriti<sup>26,27</sup>**

| Food                           | Vataj  | Pittaj   | Kaphaj   |
|--------------------------------|--|--|--|
| Cereals (~Shali/Shastikvarga)  | <i>Shasthikdhanya</i> (~ Rice) <i>Godhum</i> (~wheat), <i>Shaalidhanya</i> , <i>Lohitshaali</i>  | <i>Shaalidhanya</i> , millet, <i>Kodrav</i> <i>Lohitshaali</i> , <i>Yava</i> (~Barli), <i>Godhum</i> (wheat)   | <i>Shaalidhanya</i> <i>Brihidhanya</i> , (~millet), <i>Yava</i> (barley), <i>Lohitshaali</i> <i>Shasthikdhanya</i> ,                 |
| Legumes(~Shami/SimbiVarga)     | (green gram), (horse gram)(black gram),(red broad beans)   | <i>Moong</i> (greengram), <i>Channa</i> (~ Chick Peas), <i>Rahar</i> (~yellow lentils), <i>Masoor</i> (~red lentils)   | <i>Moong</i> (~green gram), <i>Kulattha</i> (~horsegram) <i>Rajmash</i> (~red broad beans).  |
| MaamsaVarga(~Meat)             | <i>Aanupa</i> , <i>Varishaya</i> & <i>Varichar Varga</i> ( Ex: aquatic-fish, sea foods, oysters, shellfish, duck, quail, buffalo, boar, pigs), <i>mutton</i> , <i>Jangaal</i> (deers musk deer,, antelope, etc), | <i>Vishkir</i> & <i>PratudVarga</i> (Ex: cock, quail, turkey, ostrich birds, pigeons, peasants), <i>Jaangalvarga</i> (Ex:deers,), <i>mutton</i>  | <i>Jaangalvarga</i> (ex.deers.), <i>Samanya</i> <i>Deshvarga</i> (~mutton, rabbits), <i>quails</i> <i>Vishkir</i> (~birds/scatterer) |
| ShaakVarga (~Green Vegetables) | <i>Bathuwa</i> (~white goosefeet/wild spinach), <i>Indian spinach</i> , <i>Rajkshavak</i> (black mustard)  | <i>Bathuwa</i> (White) <i>Goosefeet/wild spinach</i> , <i>Narisaag</i> <i>Spinach</i> , <i>J</i> (Water eevanti, <i>Paalak</i> , <i>Vidarikand</i> flower, <i>Rajkhavak</i> (Spinach), <i>mustard</i> , <i>leave</i> s, (black | <i>Bathua</i> ., <i>Rajkhava</i> k, <i>Kusumbha</i> ( <i>Tambulapatra</i> ~ beetle leaves)   |
| PhalaVarga (~Fruits)           | <i>Egg Plant</i> , <i>Ginger</i> <i>Karvellak</i> (bitter gourd), <i>Kanda</i> (~tubers), <i>Bala</i> ( <i>moolaka</i> ~ (Baby Radish), <i>Shobhanjan</i> (drumsticks),  | <i>Trapush</i> (cucumber), <i>baby</i> (cucumber), <i>radish</i> <i>Kshavakudbhid</i> (bottle gourd), ( <i>mushroom</i> ), <i>Kanda</i> (~tubers)(drumsticks), ( <i>brinjal</i> ), ( <i>bitter gourd</i> )                     |  |



|                                      |   |   |   |
|--------------------------------------|---|---|---|
|                                      |   |   | ginger, baby radish,  |
| Spices                               | Ajawain(~Carrum), Sarshapa(mustard), Lashun(~Garlic),Palandu (~ onion), Saunf (~fennel)   | Saunf   | Ajawain, Sarshapa (mustard), Hingu (~ Asfoetida), Jeerak(~Cumin), Lashuna, Shunthi (dry ginger) |
| Lavana Varga (~ Salts)               | Saindhava (~black salt)   | Saindhav  | Saindhav  |
| Phala varga (~Fruits)                | Anjir, PindaKharjur, Madhuka (butter tree) raw Bilva (stone apple), Amra (~mango), Narikela ~coconut, Gambhar(~plum),   | Kharjur, Anjir (Fig), Ripe Ber (Jujube), Apple, Madhuka (Butter tree)banana, jackfruit, Dadima (Pomogranate), Pungphalam (~Areca nut), Amla (~Indian gooseberry), | Naashpati (~pears), dried Jujube, Amla), Kapittha (wood apple), Bibhitaki (~ Bellerica)         |
|                                      | Draksha (~ grapes), Phalasa (Indian sherbet berry) Dry fruits (almonds, cashew, walnuts, etc)   |   |   |
| Ksheer varga (~Dairy Products)       | Cow'smilk, Buffalo's-Camel's milk Puraan Ghreeta (~ old Ghee), Dadhi(~ Curd), Navneet (~ Butter), Kheera Sarpi(~ Cream),  | Godugdha (~cow milk) Milk of Buffalo, Ghrita, Navneet, Puraan Ghreeta Takra mixed with Sarkara (~ Sugar)  | Godugdha , Camel's milk, Puraan Ghreeta Takra with Trikatu (~)                                  |
| Madhur Varga (~ Sweet Food articles) | Ikshura(~Sugarcane Juice), Sita(sugar), Guda (Jaggery).   | Ikshura, Guda, Sita, Madhu.   | Madhu   |
| Kritaakrit Anna (~ prepared food )   | Peya (~Thin gruel of rice), Vilepi(~thick gruel of rice), Manda (~rice water), Vesawar (~boneless meat prepared with certain condiments), Yush (~soup of vegetables and/or pulse), Mamsaras (~ Meat Soup) | Peya, Vilepi, Manda, Sattu, Paanak (~beverages), Yush, Mamsaras   | Peya, Vilepi, Manda, Laaja (~thin gruel of parched grain)                                       |

**MAJOR ADVANTAGES OF AYURGENOMICS**

- Increases awareness about risk of many diseases.
- Pay attention to disease prevention.
- A better comprehension of the mechanisms underlying susceptibility of illness.
- Might reduce burden of healthcare economically.
- Prime focus on diet and a healthy lifestyle

**DISADVANTAGES OF AYURGENOMICS**

- Various modifiable hazardous risk factors are neglected.
- Prime focus is only on certain foods/nutrients.
- Claims might be misleading.
- High costs to customize diets and special meals.

**DISCUSSION:**

Individual genetic diversity is anticipated to have a major impact on dietary needs. Because of the latest declaration of human genome sequencing, the variations in cataloguing of human genetics and the SNP map regarding human genome, researchers may easily recognize an individual's polymorphisms related to his risk of disease or sensitivity to diet. This may act as the basis for nutritional plannings and recommendations that are uniquely based on each person's genetic profile. People with galactosemia, a disorder in which the liver lacks the enzyme required to break down galactose, should stay away from milk products and other meals containing lactose or galactose.<sup>6</sup> Self-

care would be simpler to implement if people had access to tried-and-true individualized preventative and lifestyle control guidance. The ultimate goal of nutrigenomics/ nutrigenetic investigations is a personalized diet that takes into account each person's genotype.<sup>6</sup>

As per *Ayurveda*, each person has a unique combination of *Doshas*, physical structure, *Agni*, and geographic conditions, etc. The need for nutrients, every individual's ability for food digestion, and absorption of those nutrients are all unique to each. This strongly reinforces the demand for individualized and customized nutrition and food.

## CONCLUSION

Emerging field of nutritionomics focuses on the significance of diet in terms of morbidity and health. Every person must have their genetic makeup mapped out in order to provide personalized dietary guidance that will keep them healthy and hide any metabolic abnormalities that may be inherited. Such management could place a significant financial strain on the entire populace. If promoting the ancient *Ayurvedic* wisdom that defines health in relation to diet— while taking into account recent developments in the field of nutrigenomics, we might achieve better results without draining the pockets of the population. *Prakriti*, which is an indirect representation of a person's genetic makeup and is established at the time of ovum fertilization, represents a person's phenotypic qualities. If nutrigenomics and Ayurgenomics collaborate, both fields can more effectively and humanely address public health-related challenges. There is general agreement that extensive research and regulation is needed before individualized nutrition can deliver the anticipated advantages

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