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## Review Article

### EMERGING CONCEPTS OF GENOMICS: AN AYURVEDIC PURVIEW

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#### ABSTRACT

In the 21st century we are in the midst of Omics such as Proteomics, metabolomics, Genomics etc. The integration of Omics with the contemporary and traditional sciences paves the way for newer research concepts in this field. This integrative approach of Genomics with Ayurveda leads to the sprouts of Ayurgenomics which in turn advance its domain into the concepts of Nutrigenomics, Toxicogenomics, Epigenomics etc. The present paper is an attempt to review on the emerging concepts of Genomics in integration with Ayurveda.

**Key words:** Ayurgenomics, Nutrigenomics, Toxicogenomics, Epigenomics.

#### INTRODUCTION

Ayurveda is the holistic science which aims at the overall wellbeing of an individual. The vast treasure of Ayurvedic science expounded by our acharyas provides the magnanimous scientific evidence which was used by different systems later for their upliftment. As we are striving for the goal of Evidence based Ayurveda, the very fact behind is it's already an evidence based medicine propagated by our Acharyas.

Genomics is the branch that deals with the study of all the genes in an organism. The newer research outlooks comes with an integrative approach of genomics hand to hand with our contemporary sciences. The emerging trends in genomics in Ayurvedic purview flourished as the concepts of Ayurgenomics, Nutrigenomics, toxicogenomics, Epigenomics etc. This concepts while in integration with Ayurveda provides a new insight to the researchers to tackle its abundant possibilities.

#### AYURGENOMICS: A NEW INSIGHT

Ayurgenomics is the integration of principles of Ayurveda with Genomics.<sup>1</sup> The central theme behind this concept is Prakruthi (Phenotype) mentioned in Ayurveda can be correlated in molecular terms.<sup>2</sup>Prakruthi Genomics provides a wider platform for Predictive, Preventive and Personalized aspects in medicine. Ayurveda categorizes the individuals based on their innate constitution as Vata, Pitta and Kapha and their combinations.<sup>3</sup> This Particular doshas (humors) determine the specific Physical, Physiological and Psychological attributes of an individual. Prakruthi is mentioned as the genetically determined relative proportion of doshas within the normal range.<sup>4</sup>Prakruti determines an individual's susceptibility to diseases, helps in prognosis and diagnosis of a disease and in the selection of suitable therapeutics. The Phenotype is mentioned to be just an expression of Genotype. The main focus behind the concept is to excavate the genomic counterpart for the specific phenotypic

features mentioned in our classics. The ultimate goal is to attain the goal of personalized medicine. Ayurvedic genomics mandates that every individual is different from another and hence should be considered as a different entity and hence the concept of Personalized medicine becomes inevitable.<sup>5</sup> Ayurgenomics holds the promise for Predictive, Preventive and Personalized aspects of medicine.<sup>6</sup>

#### NUTRIGENOMICS: PERSONALISED NUTRITION

Personalizing health care in an individual basis is a need of hour in the present scenario. Among the three pillars of life Ayurveda gives ultimate emphasis to Ahara (food) as it is indispensable to maintain the health status of an individual. Nutrigenomics is the branch which studies the nutrient-gene interaction in relation to the health of an individual. Identifying genes which are more prone to diet related disorders and to recognize the genetic predisposing factors of the disease are the major challenges in today's healthcare scenario.<sup>7</sup>

Prakruthi based diet is the basic step towards personalized nutrition as Prakruthi determines the diet, activities, lifestyle and wholesome regimes of an individual. Thus the adoption of the dietic factors in due regard to the Prakruthi (Phenotype) in turn affects the genetic makeup of an individual. Thus Ahara (diet) plays a major role in maintaining the health of a healthy person and to pacify the disease of a diseased.

#### TOXICOGENOMICS: PERSONALISED PREVENTION

Toxicology is a branch of Ashtanga Ayurveda which includes the science of poisons. The toxins (poison) is mainly classified as the Natural poisons and Artificial poisons. Natural poisons include both inanimate (Sthavara) and animate (Jangama) variety.<sup>8</sup> Inanimate poison has its origin from plants and minerals, whereas animate poisons consists of venoms of animals like snakes, scorpions, worms, insects etc. Artificial

poisons are invented poisons by the combination of different varieties.<sup>9</sup> Apart from this the term poison suits for the food stuffs which are of opposite qualities (Virudha) which are responsible for various health ailments.<sup>10</sup> There are numerous descriptions about poisons which can be used as medicine after proper processing and quantification. Present life style, food habits and mental attitudes are invariably different from the past generation. The basic essentials of healthy life such as air, water, food etc. are polluted by this changing life style in this era. This changes manifest as various polymorphisms which in turn affects the gene expression of an individual.

There comes the role of toxicogenomics which deals with the understanding of toxin-gene interaction and thereby it provides a wider perspective of personalized prevention. The effect of various toxins on gene expression helps to tackle the etiology of serious genetic disorders which are unknown. Thereby it provides a new doorstep for personalized prevention.

#### EPIGENOMICS: ENVIRONMENTAL INFLUENCE

Epigenetics can be defined as the study of mitotically or meiotically heritable changes in gene function that cannot be explained by changes in the DNA sequence. The principle mechanisms involved are (1) DNA methylation (2) histone modification, (3) regulation of gene expression by ncRNAs.<sup>11</sup> In addition there are also mechanisms that can affect gene expression epigenetically such as phenomenon of transvection. The influence of environment in gene function is thus attributed to the field of Epigenomics. In Ayurveda, the role of these environmental factors in the basic constitution (Prakruthi) of an individual is given utmost importance. The examination of a diseased or a healthy individual should be done in due regard to the environment in which he is born and brought up.<sup>12</sup> Environmental Epigenetics holds the view that various environmental factors such as temperature, humidity, light cycles all have an impact on the genetic expression of an individual which ultimately affect Phenotypes.

Genotype (G) + Environment (E) + Genotype Environment interactions (GE) = Phenotype (prakruti).<sup>13</sup>

Thus the Epigenomics provides a newinsight of research streams in integration with Ayurvedic principles.

#### SCOPE OF GENOMICS: AYURVEDIC PURVIEW

The main aim behind the integrative approach of genomics with Ayurvedic strategies is to offer a predictive, preventive and personalized healthcare tailored to the specific characteristics of an individual. The Phenotype is just an expression of the Genotype of an individual, and thus the genetic variation in turn concords with the Phenotypic alteration. The integrative aspects of Genomics in an Ayurvedic purview is a doorstep to Right treatment for the right patient at the right time.<sup>14</sup> Nutrigenomics provides a platform for Personalised nutrition based on the Prakruthi (Phenotype) of an individual. Toxicogenomics aims at the personalized prevention by providing an awareness of toxin-gene interaction and thereby tackle the serious genetic disorders. Epigenomics through its light on the environmental influence on an individual's genetic makeup. Thus Prakruthi genomics

provide a wider platform of research interests for Ayurvedic research scholars.

The ultimate Personalization of today's health care strategies in relation to the Phenotype- Genotype expression of an individual is the promise behind these concepts.

#### CONCLUSION

Personalizing healthcare in an individual basis based on Ahara (diet), Vihara (activities) and Oushadha (medicine) are the major challenges in today's healthcare Scenario. The wide scope of Genomic concepts provides a new facet for Ayurvedic researches and thereby to attain the ultimate goal of Personalized medicine. The proper adoption of this research outlook paves the way for a better global acceptance and thereby to attain Evidence based Ayurveda.

#### REFERENCES

1. Mitali Mukerji, Bhavana Prasher. Ayurgenomics: a new approach in personalized and Preventive medicine. *Science and Culture*, Jan-Feb 2011; 77(1-2): 10-17.
2. Haritha Chandran, Arun Raj GR, Ajayan.S. Ayurgenomics: A new research outlook. *Pharmanest*, July-Aug 2014; Vol 5(4): 2214-2216.
3. Acharya YT. Acharya NR. *Susrutha Samhitha of Susrutha*. 7th ed. Varanasi: Chowkhamba Orientalia; 2005.p.8.
4. Harishastri. P. *Ashtanga Hrudayam by Vagbhata*. 7th ed. Varanasi: Chaukhamba Orientalia; 2005 p. 8.
5. Acharya YT. *Caraka Samhita by Agnivesha*. 4th ed. Varanasi: Chowkhamba Samsthana; 1997.p.325.
6. Mitali Mukerji, Bhavana Prasher. Ayurgenomics: a new approach in personalized and Preventive medicine. *Science and Culture*, Jan-Feb 2011; 77(1-2): 10-17.
7. Bijoya Chatterjee, Jigisha Pancholi. *Prakriti-based medicine: A step towards personalized medicine*. *Ayu*. Apr-Jun 2011; 32(2): 141-146.
8. Acharya YT. *Caraka Samhita by Agnivesha*. 4th ed. Varanasi: Chowkhamba Samsthana; 1997.p.571.
9. *ibid*
10. Acharya YT. *Caraka Samhita by Agnivesha*. 4th ed. Varanasi: Chowkhamba Samsthana; 1997.p.141.
11. Supratim Choudhuri, Yue Cui, Curtis D.Klaassen. Molecular targets of epigenetic regulation and effectors of environmental influences. *Toxicology and Applied Pharmacology*. 245(2010).p.378-393.
12. Acharya YT. *Charaka Samhita by Agnivesha*. 4th ed. Varanasi: Chowkhambha Sanskrit Sansthan; 1997. p. 276.
13. Ralston. A, Shaw. K. Environment controls gene expression : Sex determination and the onset of Genetic disorders.[internet]2012 [Cited 2008]. Available: <http://www.nature.com/scitable/topic page/title-and-982>
14. Bijoya Chatterjee, Jigisha Pancholi. *Prakriti-based medicine: A step towards personalized medicine*. *Ayu*. Apr-Jun 2011; 32(2): 141-146.

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