

## A REVIEW ON THE BEEJA, BEEJABHAG AND BEEJABHAGAVAYAV: THE IDEA'S OF GENETICS IN AYURVEDA

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Article Received on  
03 Sept. 2018,  
Revised on 23 Sept. 2018,  
Accepted on 14 Oct. 2018  
DOI: 10.20959/wjpr201818-13573

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### ABSTRACT

Ayurveda is recognized as an ancient therapeutic system and it known to mankind from about three thousand years before Christ. However the current information of human genetics be in debt of work of Gregor Mendel but before that the number of Indian manuscripts have explained the scientific theme on genetics. Though the term Genetics had not used in Ayurveda but the theme of genetics is sated at different places in all classical text of Ayurveda especially in Samhitas. It is the wonderfull involvement of Ayurved in genetics is being designated as the following Ayurvedic terms i.e., concept of basic unit of genetics like Beeja, Beejabhag, Beejabhgavayav, concept of mutation, inheriting factors, concept of fertilization and sex determination,

description of congenital diseases like Madhumeha, Arsha, Kustha etc. Prakriti and its clinical applications, therapy applied for Pumsavan kriya, how to prevent birth of a physically and mentally handicapped child. The review concentrates on the numerous literary impression and clinical applications of genetics in Ayurved. And thus it help to understand the ayurvedic genetics.

**KEYWORDS:** Genetics, Beeja, Beejabhag, Beejabhgavayav, concept of mutation.

## INTRODUCTION

The human mind was busy with vital questions on the nature of inheritance, Genetics since before the study of genetics converted as a scientific discipline. Genetic is the science of inheritance it came into existence at least 2500 B.C. The bloom of scientific revolution in human genetics has been started since ancient period. Current genetic research authorizes that all humans on the earth descended from a group of African ancestor who started their journey around 60000 years ago. Spencer Wells said that every drop of human blood contains a history book written in the language of genes. Many traits such as height, eye color, complexion, disease susceptibility had been known to run in families although the chromosome, DNA structure, the genes or combination of gene that underlies these observable characteristic were unknown.

The Ayurvedic scholar had a fundamental knowledge of genetics much before the modern genetic scientist. Though Ayurveda does not implicated the pure and literally aspect of genetics in much details but has taken up its applied aspect scientifically under the following heads i.e. the theory of evolution, the role of Panchamahabhuta in the formation of different organs in human body, manifestation of different genetically determined congenital disorders. The genetic factors which are responsible for procreation of human being, concept of Beeja (germ cells), Beejabhag (chromosome) and Beejabhagabayav (gene) Upotapta, (mutation) determination of sex, concept of eugenic principle etc

## EVOLUTION THEORY IN AYURVEDA

From the very ancient period the question was raised by everybody that when, how, why and where the evolution of the universe has been started. The various Indian philosophies have been provided their opinion regarding the theory of evolution. According to Jainism and Nyaya, Vaisesik, all the objects are produced by the combination of atoms. The Samkhya darsan stated that there must be some finest and subtle elements or principle underline under all physical existence. Prakriti is the principle factor which is the first and ultimate cause of all gross and subtle objects. The word Prakriti is derived from the Sanskrit root “Dukrin-karane” meaning “Prakrishtena kriyate” which signifies the progression on dynamicity. The evolution theory depicted in Ayurveda which has been adopted from Sankhya darsan. In this theory first and foremost factor is Avyakta (unmanifestation). Avyakta itself remain in unmanifested form and the causative factor of all the creatures of universe, Mahan is derived from Avyakta, Mahan is the dimension of consciousness enveloping the entire universe i.e.

knowledge by which speciation could occur. Then Ahamkara is developed from Mahat i.e. Self identity and the biological mechanism which has enable billions of species to survive in the universe. The Ahamkar interact with three prime qualities like Satwa, Raja and Tama and by several permutation and combination of these three primal qualities manifests infinite numbers of living and non- living substances chronologically by Panchatanmatra and Panchamahabhuta.<sup>[1]</sup> DNA is the key factor of genome and DNA is also the regulating factor of life is driven by intelligence (Mahan). It creates all the molecule, cells, tissues and organs in the human body. Each of the cells in the body has its own intelligence by which they can take part in the manifestation of living substance.

### **Fertilization and Sex Determination**

Many factors mentioned in Ayurveda towards the study of developmental genetics including fertilization and sex determination, Ayurveda considered two basic factors in the development of human beings i.e. Sukra and Sonita to resemble that of sperm and ovum in modern medical science and which are responsible for the fertilization in the human beings. In these contexts Charak clearly stated that dominance of Sonita during conception resulting procreation of female child and dominance of Sukra (sperm) leads to male child. The sex of an individual is determined by the X and Y chromosome. Presence of Y chromosome leads to maleness regardless of the number of X chromosome present, absence of Y chromosome results in female development.<sup>[2]</sup>

### **Concept of Genome in Ayurveda**

Prakriti is one of the outstanding contributions in Ayurveda in the field of genetics. Prakriti is the basic factor which is determined at the very time of the conjugation of Sukranu and Andanu in the presence of Beeja, Kshetra. The concept of the Prakriti plays a central role in understanding health and disease in Ayurveda. Prakriti has a genetic connotation that can provide knowledge for classifying human population based on phenotype characteristics. Ayurvedic literature classifies all individuals into different Prakriti types based on relative proportion of each Dosa. The human phenotype can provide a genetic basis for the three major constitutions. The concept of Prakriti in Ayurveda should be considered from genomic perspective. Permutation and combination of Vayu, Pitta and Kapha attributes characters along with other factors like different types of Purusa. Involvement of Manas Dosa, Desa, Kala, Vayas, and Pratatmaniyata which gives sufficient variant for a unique constitution for every individual. Prakriti constitute the bodily constitution, mental status on the fundamental

form specific for every individual. Prakriti remain unaltered during the lifetime determined at conception with contribution of environmental factors like Dosaja, Kalaja, Garbhasaya etc. Thus Ayurveda determined the Prakriti on the basis of the individual variation and it is proven to have strong genetic component.<sup>[3]</sup> Prakriti assessment evaluates each Dosas degree of dominance. It gives an important idea for diagnosis, prognosis and therapeutics. In Ayurveda Individuals can be categorized into one of the three basic humors. Even Ayurvedic literature classifies all individuals into different Prakriti types based on relative proportion of each Dosa like Vata-Pitta, Kapha-Pitta and Vata-Kapha. Prakriti constitute the bodily constitution, mental status and fundamental form specific for every individual. It is remain unaltered during the lifetime and determined at conception, with contribution from environmental factors, Prakriti types Vata, Pitta and Kapha. Almost every individual has one Dosa dominant with one or both the others subdominant. Subtle combination of the three Vata, Pitta, Kapha Prakriti types are specific and individualized as the DNA sequence based genetic background. Vayu is the cause of pleasure or happiness and enthusiasm, controller and activator of mind, primarily vayu gives shape and form to the embryo.<sup>[4]</sup> Pitta is responsible for all metabolic functions of the cells, production of various enzymes, and other biochemical in the body.<sup>[5]</sup> Kapha contributes in stability of all functional activities of human body and capacity to produce progeny, promotion of strength and resistance to disease.<sup>[6]</sup> Prakriti specific treatment including medicine, diet & lifestyle is a distinctive feature of Ayurveda. Prakriti has a genetic connotation that can provide a pool for classifying human population based on broad phenotype clusters. The human phenomena based on Ayurveda can provide a genetic basis for the three major constitutions or Prakriti.

#### **Prakriti of the foetus is also determined by the following factors<sup>[7]</sup>**

1. Sperm and ovum (Sukrasanita prakriti).
2. Season and condition of uterus (Kal garbhasaya prakriti).
3. Food and regimen of the mother (Matur ahar-vihar prakriti).
4. Nature of the Mahabhutas comprising the foetus (Mahabhuta vikar prakriti).

Caste e.g.- purity among Brahmanas (Prakriti jati prasakta), Family e.g., purity with regard to character and conduct in a good family (Kula prasakta), Locality among people of Antarvedi region (Desanupatini), Time e.g.- purity in Satyayuga (Kalanupatini), Age of the patients e.g., impurity in childhood (Vayanupatini) and the individual e.g. purity rarely found in some individual (Pratatmaniyata).<sup>[8]</sup>

### CONCEPT OF INHERITANCE PATTERN IN AYURVEDA

The factors responsible for the procreation of foetus or human being derived from the following sources like one is mother (Matrijabhav), father (Pitrijabhav), soul (Atmaja), wholesomeness (Satmaja), proceeding from chyle (Rasaja) and mind (Satmaja). The factors derived from mother – the most of the soft organs like skin, blood, flesh, fat, heart, liver, kidney, stomach. The factors derived from father are as follows scalp, hair, nail, teeth, bones (most of the hard structures) veins, ligaments, arteries etc. Some functional factors which derived from Atma like desire for happiness, courage, intellect, memory and voice. Other factors derived from Satmya are growth, strength, satisfaction, enthusiasm etc. The emotional factors derived from Sattva - fear, anger, softness, vigor and memory.<sup>[9]</sup>

### CONCEPT OF CHROMOSOME, GENE AND CHROMOSOMAL ABNORMALITY

Sex chromosomal abnormality one of the congenital abnormality having strong genetic susceptibility. In this context Charak described regarding sex abnormality like Dwireta such type of abnormality may considered as true hermaphrodites, most patient of true hermaphroditism having 46XX Karyotype. In this extremely rare condition an individual has both testicular and ovarian tissue. The other like Pavanendriya it may consider as Klinefelter's syndrome (47 chromosome 44XXY) having unexplained involuntary infertility and evidence of azoospermia in the male partner ca using several mechanical disruption in meiosis that complete failure of gametogenesis occurs. Other one is Narashanda having normal male karyotype (XY) but the external phenotype is essentially that of a normal female, it may consider as male pseudohermaphroditism, Narishanda having karyotype is female (XX) but the external genitalia is virilized so that they resemble those of a normal male. The others are Samskarvahi (anaphrodisia), Vakri (hypospadi), Irsyabhirati (mixoscopia) and Vatikshanda (eviration).<sup>[10]</sup>

### GENETIC DISEASES IN AYURVEDA

Due to defects in seed (sperm, ovum) and associated with the soul, uterus, time and food as well as regimen of the mother, Dosas gets variously vitiated and leads to the impairment of the shape, colour, sensory as well as motor organs of the offspring.<sup>[11]</sup> In Susruta samhita the seven fold of disease consider on the Trividha dukha. Among these Adibala pravritta vyadhi indicates the diseases which are congenital in origin and genetically determined like Dusta arswa, Prameha (diabetes mellitus) etc., are manifested due to vitiation of Sukra and Sonita of father and mother respectively. Susruta mentioned two types of Prameha, one is Sahaja

(hereditary/congenital) which is inherited from mother and father due to vitiation of Sukra and Sonitsa (defects of seed) respectively Patients who are diabetic right from time of the birth and those are who born from diabetic parents are not curable because of the morbidity in their respective gene.<sup>[12]</sup> Patients who are diabetic right from the time of birth (congenital) and those who are borne of diabetic parents (hereditary) are not curable because of the morbidity in their genes. Piles are of two types one hereditary (congenital). Hereditary piles are caused by the vitiation of seeds (sperm & ovum), specially the part of the seed responsible for the formation of anal sphincter. Vitiation of seed is caused by two groups -1. Wrong diet and regimen of father and mother, 2. sinful acts of past life.<sup>[13]</sup> According to Madhavnidan, Sukragata kushtha is one of the hereditary causative factor which is responsible for inherent the disease condition to their next progeny.

### CONCEPT OF PERSONALIZED MEDICINE

In the perspective of Prakriti, the concept of personalized medicine has been recognized in Ayurved. It is a traditional approach using the genetic information to understand, to prevent or to treat the more specifically some chronic diseases. The personal genomic information carrying types of Prakriti identifying the health risk, drug response in order to personalize own medical care, take preventive measure to improve the health. Personalized medicine also provides to avoid hazards based on family history, environmental factors and genetic information. The three major constitutional types described in Ayurvedic literature have unique, putative metabolic activities in which Kapha signify the slow metabolic activity; Pitta indicates the fast metabolic activity while Vata consider having variable metabolism. Poor metabolizers have high plasma concentration of drug for longer period and so retained drugs in the body for longer time. Intermediate metabolizers retained drugs in the body for normal time period. Extensive metabolizes retained drugs in the body for least time and plasma concentration being high for shorter period.<sup>[14]</sup> Prakriti specific treatment including medicine, diet & lifestyle is a distinctive feature of Ayurveda. Vatala, Pittala and Slesmala these are the three morbid statuses in individual and more susceptible to Vatika, Paittika and Slesmaja disease respectively. If the Vatala types of individual resorts of such thing as a aggravators of Vata. Then the Vatika dosa gets aggravated immediately. This does not happen in case of remaining two Dosas. Therefore the treatment of individual or patients having different types of Prakriti should be determined accordingly.<sup>[15]</sup>

## EUGENIC PRINCIPLES IN AYURVEDA

The suitable age of conception of mother, father and physical condition of the mother has been recommended by Susruta. In this regard Susruta mentioned that the mother below the age of 16 and in case of father below the age of 25 does not allow conceiving to avoid birth of a undesirable quality of children<sup>[16]</sup> and also advised that a lady who is very old or who has been seeking for a long time should not be allowed to conceive.<sup>[17]</sup> Recent study has shown that maternal age plays a key role in various genetic abnormalities. This concept was established in clinical medicine by Dr. Langdon Down, as named Down's syndrome, now it is well established that there is a strong association between the incidence of Down's syndrome and advancing maternal age.<sup>[18]</sup>

Charaka advised for procreation of a healthy child, it is necessary that the male and female should be mutually of a different clan<sup>[19]</sup> and to avoid consanguineous marriage, a consanguineous marriage is the conglomerate between the blood relations who have at least one common ancestor. Several extensive studies have shown that among the offspring of consanguineous marriage there is an increase in both morbidity and mortality with an increase incidence of congenital structural abnormalities.<sup>[18]</sup> The Ayurvedic scholar has emphasized specific daily routine of the mother during menstrual, period, before coitus to give birth of a desirable quality of child. All the factors are derived under the heading of Eugenic principle stated by different Ayurvedic classics two types of Eugenic principle categorically described in Ayurvedic compendium one is the positive Eugenic principles are. Pumsavan prakriya, Regimen from pregnant woman, regimen for achieving excellent progeny and measure before cohabitation. Negative Eugenic principles are. Consanguineous marriage and age of conception etc.

## CONCLUSION

Ayurvedic scholars had a fundamental knowledge on genetics much before modern geneticists. Though Ayurveda does not implicated the pure and literary aspect of genetics in much details but has taken up its applied aspect scientifically under the following heads i.e. concept of Prakriti and its utility in clinical medicine, genomic concept in perspective of Tridosa, evolution theory and outstanding work on eugenic principles. In order to create acceptable scientific evidence on genetics described in Ayurved, a scientific and systemized approach is needed for scientific validation on the subject.

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