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AN INSIGHT INTO GENETICS IN AYURVEDA

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ABSTRACT

Genetics is one of the topic of interest in the medical field. In *Ayurveda Samhitas* also we get the references related the genetics. Even though it is not mentioned directly as genetics in *Ayurveda Samhitas*, some of the concepts like *Beeja, Beejabhaga, Beejabhaga Avayava, Prakruti, Matrujadi Shad Bhava* etc can be analysed and understood in terms of genetics. *Acharya Susruta* opines that for the formation of good progeny, *Beeja (Shukra and Shonita)* should be of good quality and it should be devoid of any defects. *Charaka Samhita* also described different consequences taking place if *Beeja, Beejabhaga or Beejabhaga Avayava* is affected during the *Garbha* formation. Ayurveda not only explains the different entities for the formation of the universe but also emphasized on the different entities which forms the body. In *Susruta Samhita* it is told that *Garbha* is formed by the combination *Shukra* and *Shonita* in the *Garbhashaya*, in the presence of *Atma*, *Asta Prakruti* and *Shodasha Vikara*. Further it is described that the *Prakruti* of a person is formed by the predominance of the *Dosha* during the *Shukra Shonita Samyoga*. Even in other *Samhitas* of *Ayurveda* the references of formation of *Prakruti* is available. Development of different parts and features of the body also depends upon *Matrujadi Shad Bhava*. Some of the diseases affecting the body which are classified under *Adibala Pravritta Vyadhi* and *Janmabala Pravritta Vyadhi* can be included and discussed under this topic.

KEYWORDS: *Beeja, Beejabhaga, Beejabhaga avayava, Prakruti, Matrujadi Shad Bhava*, Genetics.

INTRODUCTION

The classical texts of Ayurveda dated thousands of years back proposed observations about genetics and genetic disorders. There are references about the inherited characters from the parents to off springs in the classical texts of Ayurveda.

Genetics is defined as a branch of bio science deals with study of underlying principles of heredity[1]. Further, heredity is nothing but the transmission of inherited characters (physical and biochemical) through generations[1].

The concepts like Prakruti, Matrujadi Shad bhava etc which are described in Ayurvedic classical texts give us an idea about the inherited characters of an individual. Also there are references regarding the diseases which are caused by the familial inheritance and congenital anomalies.

Chakrapanidatta commentary of Charaka Samhita explains that the human body in its entirety is represented in a Beeja[2]. Beeja is made up of many components called Beejabhaga and Beejabhaga is made up of different parts called Beejabhaga avayava.

In this article the above mentioned concepts related to genetics in Ayurveda is discussed, analysed and compared with contemporary views.

Understanding Beeja, Beejabhaga and Beejabhaga Avayava

Beeja:

The Shukra of male and Shonita of the female is Beeja. For the formation of Garbha, Beeja (gamates) of both male and female are necessary[3,4.]

Beejabhaga:

Chakrapanidatta while commenting on Charaka Samhita opines that Beejabhaga is the part of the Beeja which forms different parts of the body[5].

Beejabhaga Ayavaya:

Beejabhaga Avayava is defined as the portion of the Beejabhaga which is responsible for the production of particular part of an organ[6].

Determination of Prakruti

Determination of Prakruti depends upon the Dosha which is dominant when the combination of Shukra and Shonita. Further Susruta Samhita explains about the characteristic features observed in the individual of a particular Prakruti. Acharya Charaka is much more specific about the factors determining the Prakruti of an individual[7]. According to him Prakruti not only depends upon Shukra and Shonita but also on Kaala and Garbhaashaya, Ahara and Vihara of mother, Mahabhoota Vikara. Garbha gets afflicted with one or more Dosha which are dominantly associated with the above mentioned factors. So Prakruti of an individual is determined on the basis of these dominant Dosha during the Garbha formation. Prakruti of some is dominated Kapha, some by Pitta, some by Vata, some by combination of two Dosha and some others by Samaprakruti (equilibrium of Dosha)[8].

Matrujadi Shad Bhava in the Development of Garbha

Along with the Shukra and Shonita, there are six procreative factors mentioned in the Ayurvedic classics responsible for the development of different components of Garbha[9]-

Matrujabhava: Tvak, Lohita, Mamsa, Meda, Nabhi, Hridaya, Kloma, Yakrit, Pleeha, Vrikka, Basti, Pureeshadhana, Amashaya, Pakvashaya, Uttaraguda, Adharaguda, Kshudrantra, Sthoolantra, Vapa and Vapavahana.

Pitrujabhava: Kesha, Smashru, Nakha, Loma, Danta, Asthi, Sira, Snayu, Dhamani and Shukra.

Atmajabhava: Taasu Taasu Yonishu Utpatti, Ayu, Atmajnana, Mana, Indriya, Prana, Apana, Prerana, Dharana, Akriti, Swara and Varnva, Sukha, Dukha, Icha, Dwesha, Chetana, Dhriti, Budhi, Smruti, Ahamkara and Prayatna.

Satmyajabhava: Arogyam, Analasyam, Alolupatvam, Indriya Prasadanam, Svara Varna Beeja Sampat, Praharshabhuyastva.

Rasajabhava: Shareesyabhinivrutti and Abhivruddhi, Prananubandha, Trupti, Pusthi and Utsaha.

Satvajabhava: Bhakti, Sheela, Saucha, Dvesha, Smriti, Moha, Tyaga, Matsarya, Shourya, Bhaya, Krodham, Tandra, Utsaha, Taikshnya, Mardava, Gambhirya, Anavasthitatva.

If there is defect in the above mentioned factors responsible for the formation of the

Garbha then there will not be birth of the child[10].

Susruta Samhita also describes Matrujadi Shad Bhava. It adds that Mrudu Bhava of the body is derived from mother and Sthira Bhava from the father[11.]

DISCUSSION

Beeja, Beejabhaga, Beejabhaga Avayava and genetics

Beeja is the gamate, Beejabhaga is the part of the gamate which forms different parts or organs of the body and Beejabhaga avayava is portion of the Beejabhaga forming particular fraction of that organ which is derived from Beejabhaga. By considering these definitions it can be understood as the Beeja as the pronucleus of male and female gamates, Beejabhaga as the chromosome and Beejabhaga Avayava as the gene. The articles published in some of the international journals written by Indusree.C.Susheelan et.al[12], Vijendra et al[13] and Budruk Pramod Appasaheb[14] also opines Beeja, Beejabhaga and Beejabhaga Avayava as nucleus of gamates, chomosomes and genes respectively.

Chakrapanidatta, commentator of Charaka Samhita explains the concept of inheritance as human seed is comprised of many Beejabhaga corresponding to particular organ/organs and such Beejabhaga will develop a physical copy of that organ / organs[15].

Prakruti and genetics

The physical character of a person depends upon Prakruti. Prakruti is determined by the dominance of Dosha during the formation of Garbha. This can be understood under genotype and phenotype of an individual. Genotype is the genetic makeup of an individual and phenotype is the observable structure, function or behaviour of an organism or the expression seen outside, determined by both genetic make-up and environmental influences[16]. Acharya Charaka has explained the other factors responsible for the formation of Prakruti along with predominant Dosha during Shukra Shonita Samyoga. So by considering Acharya Charaka's opinion it is clear that Prakruti is the phenotype of an individual. But Acharya Susruta has mentioned only predominant Dosha responsible for the Prakruti formation. So by considering his opinion it can understood as Prakruti is the genotype of a person.

Understanding Matrujadi Shadbhava under genetics

Classical texts of Ayurveda has mentioned the six factors responsible for the growth of the Garbha. These factors are called as procreative factors by the recent scholars[17]. The factors are Matruja, Pitruja, Satvaja, Rasaja, Satmaja & Atmaja. Out of the above factors the Matruja Bhava and Pitruja Bhava can be considered as the genetic factors because the genetic materials are directly transferred from the maternal side and paternal side to the offspring.

The other four factors can be taken as the epigenetic factors. Modern genetics also believe that not only the maternal and paternal chromosomes are responsible for the phenotype, but also epigenetic factors are involved. Epigenetics refers to changes in phenotype (appearance) or gene expression caused by mechanisms other than changes in the underlying DNA sequence, hence, the name epi (in Greek: over; above) genetics. These changes may remain through

cell divisions for the remainder of the cell's life and may also last for multiple generations. However, there is no change in the underlying DNA sequence of the organism; instead, epigenetic factors cause the organism's genes to behave (or 'express themselves') differently. Epigenetic mechanisms are influenced by several factors and processes including development in utero and in childhood, environmental chemicals, drugs and pharmaceuticals, aging and diet[17].

Rasaja Bhava are the qualities coming from food. Ahara Rasa that is taken by the pregnant woman helps in the formation of Sapta Dhatu, in the required amount, in the fetus. Ancient scholars have described specific month-wise dietetic regimens for a pregnant woman, to compensate the requirements of a mother as well as the growing fetus at the particular time period of intrauterine life18. A great amount of emphasis has been given by the classical texts of Ayurveda on the diet of the pregnant women, to avoid any untoward effects on the growing fetus.

Satmyaja Bhava (habituation) is the use of such things which do not cause harm to the body, even though they are different from (qualities of) one's own constitution, habitat, time, caste (family), season, disease, exercise (physical activities), water (foods and drinks), day sleep, tastes (substances of different tastes) etc[18].

Atmaja Bhavas comes from Atma. Effects of the actions of the previous life are carried by the soul to his next life, which are the results of good or bad actions[17].

Satvaja Bhava means qualities related to manas[14]. Satva of the foetus is molded by three factors, namely;

1. Satva of parents - Genetic derivatives
2. Garbhini Uparjita Karma - Gestation derivatives
3. Janmantara Vishesha Abhyasa – Environmental derivatives[18].

Genetic abnormalities mentioned in Ayurveda.

In Sushruta Samhita it is told that if Shukra Dusti is there then that Shukra is not capable of producing Garbha and so also the Artva Dusti[19]. Acharya Charaka mentions the factors which causes abnormalities in the Garbha – defects in Beeja, Atma Karma, Ashya, Kala and Maturahara Vihara (food and regimen) of the mother[20].

If the part of the Beeja responsible for the formation of a particular is vitiated, this will lead into vitiation of respective organs. If it is not vitiated, there will not be defect[21,22].

If a women get conceived when her Shonita(gamate) and Garbhashaya get afflicted by aggravated Dosha but not completely vitiated then it will lead into deformed organs of the garbha which are derived from Matruja Avayava. The vitiated Dosha may afflict the Beeja or Beejabhaga. When Beejabhaga of Shonita (female gamate) responsible for production Garbhashaya is vitiated, then she will give birth to Vandhya (sterile child). If Beejabhaga Avayava is vitiated Putipraja (dead foetus) will be born. When Beejabhaga Avayava which is responsible for the production of the Garbhashaya and also portions of Beejabhaga which are responsibe for the production of organs that characterize a female is excessively vitiated

in Shonita, then the born child will be Varta(child who is not a complete female but only having the feminine characteristics)[23,24].

If in Purusha the Beejabhaga, Beejabhaga Avayava or Beejabhaga Avayava responsible for the production of Beeja and also portions of the Beejabhaga which are responsible for the production of organs that characterize the male, are excessively vitiated, then child born will be Vandhya, Putipraja or Trinaputrika/Trinamukhi respectively[25,26].

There are some diseases mentioned in Ayurveda Samhitas, which are inherited. The disorders which are classified as Adibala pravritta Vyadhi such as Kusta and Arshas which are due to Shukra-Shonita Dosha, Janmabala Pravritta Vyadhi like Pangu, Jatyandha, Badhira, Mooka, Minmina, Vamana which are due to improper conduct of mother, are the examples[27]. The other examples are Jataprameha[28], Atisthoola[29], Atikrisha[30], Suchimukha Yonivyapat[31], Shandhi[32], Klaibya[33] etc. The causes of some of the sexual abnormalities mentioned in the classics are also due to Beejadosha[34].

CONCLUSION

The concept of inheritance is discussed in the Ayurveda Samhita itself. Prakruti of the person is nothing but the phenotype of that person which is clearly understood by Charaka Samhita description.

Matrujadi Shadbhava is the genetic and epigenetic factors which are necessary for the formation, growth and development of the Garbha. The concept of Beeja, Beeja Bhaga and Beejabhaga Avayava looks similar to the contemporary view of pronucleus of the gamates, chromosome and gene respectively.

The inherited diseases and anomalies are also discussed in Ayurvedic classics, which gives the reasons for the disorders for which the causes are unknown. Ayurveda also gives importance to genetic counseling. The advices are given in classics for Atulyagotreeya Vivaha, appropriate age for marriage for both male and female, medications for Shukra and Artava Shodhana, avoid Garbhopaghatakara Bhava and follow Garbhini Charya for each month, to get good progeny.

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