



Concept Of Genetics In Ayurveda

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ABSTRACT

Medical genetics refers to the application of genetics in medical care. Though this branch has been flourished from last 70 - 80 years only, seeds of genetics were deeply rooted in *ayurvedic* classical texts dating the several centuries before, which have not been adequately examined or considered as contributions to the genetics. There are vivid accounts in *ayurvedic samhitas* about the pattern of inheritance, concept of *prakruti* and *shad garbhakar bhavas*, concept of basic unit of genetics like *beeja*, *beejabhag* and *beejbhagavayav*; description of hereditary and congenital diseases, concept of fertilization and gender formation which can be related with basic concepts of genetics. Ayurvedic classical scholars have also advised measures like preconceptional cleansing (*shodhana*) of both the partners and rejuvenation therapy for healthy progeny. The present study focuses on the various concepts and clinical applications of genetics in *ayurveda*.

KEYWORDS: *Ayurveda*, Genetics, *Prakruti*, *Shadgarbhakarbhava*.

INTRODUCTION

In *ayurvedic* classical texts different concepts of genetics are described much before the modern genetic scientists. *Prakruti* is one of the outstanding contributions of *ayurveda* in the field of genetics. *Prakruti* has a genetic flavor that can provide knowledge for classifying human population on phenotype characteristics. According to *ayurveda* there are three basic genetic unit as *beej* (chromosome), *beejbhag* (gene), *beejbhagavayav* (part of gene) [1]. *Ayurveda* not only emphasizes on preventive and promotional health but also for getting the healthy progeny. Presence of *Shadgarbhakarbhavas* (six procreative factors - *matruj*, *pitruj*, *atmaj*, *satvaj*, *satmyaj* and *rasaj*) is must for the formation of healthy progeny. Each procreative factor is related with a certain organogenesis / functional / psychological traits in the forthcoming baby, during its intrauterine life [2]. Any alteration in these normal procreative factors can lead to physical, functional or psychological defects. Sushruta has counted genetic disease separately while classifying the diseases in seven groups. Pathogenesis of genetic defect in child like lameness or blindness, formation of gender in twin or multiple pregnancy, hereditary disorders like *kushtha*, *prameha*; prevention of birth of child with structural and functional abnormalities, concept of fertilization and formation of gender in twin or multiple pregnancy etc. are undoubtedly *ayurvedic* contributions in the field of modern genetics.

Concept of prakruti

Prakruti is considered as qualitative and quantitative unchangeable *doshika* predominance from birth to death [3]. *Prakruti* includes the physical constitution, mental status and fundamental form which are specific for every individual. *Prakruti* of an individual is not only dependent on *shukra* and *shonita* but also upon the time of conception and environment inside the uterus (*kala - garbhashaya prakruti*), dietetic regimen and behaviour of mother (*matu aharvihar prakruti*), and the nature of *mahabhutas* (*mahabhuta vikara prakruti*) comprising the fetus [4]. *Doshas* dominating the environment inside the uterus and *doshas* which are aggravated by dietetic regimen of mother mainly determines the physical constitution of fetus. Once a *prakruti*

of an individual is determined at the time of conception is remained unchanged during his lifetime. Thus *prakruti* is not but a sum of unique traits which differs one individual from another which is an important genetic component.

Concept of fertilization and gender formation

Shukra and *shonita* are *ayurvedic* terms which resembles to male and female gamete. When pure *shukra* and pure *shonita* unites with each other inside the *garbhashaya* in association with *satva* and *jivatma*, *garbha* is formed [5]. Charak clearly stated that dominance of *shonita* during conception resulting birth of female child and dominance of *shukra* results in male child [6,7]. As per modern concept of genetics fertilization of an ovum by X- bearing sperm results in female offspring and by Y- bearing sperm results in a male offspring [8]. Explanation of 8 *shukra* and *shonita vikrutis* due to *vitiated doshas*[9] and the treatment of all curable problems are available[10]. Vata is consider as main factor for the formation of twins.

Concept of basic unit of genetics in ayurveda

Beej, *beejbhaga* and *beejbhagavayav* are three basic *ayurvedic* genetic units. Whereas *beej* can be correlated with male or female gamete i.e. sperm or ovum, *beejbhag* to chromosome and *beejbhagavayava* to a part of chromosome and that is gene. What so ever part of *beej* is defective, the body part developing from that portion of *beej* will be abnormal. This *ayurvedic* concept resemble with the genetic concept of coding of characters in gene and diseases results due to abnormality of part of gene or chromosome.

Charak explained some genetic disorders cause morbidity in fetus due to vitiation of these basic units by *doshas*. For example when ovum gene (*beejbhag*) concerned with uterus is damaged the progeny become sterile; when a part of this gene (*beejbhagavayav*) get affected *putipraja* (dead fetus) child is born. When along with latter abnormality a portion of gene concerning the female character relating to body is also affected, the progeny will be predominantly female shaped but not female actually named as *varta*. Similar morbidities due to affection of the male gamete are also described as sterile, *putipraj* and *trunaputrik*.

Concept of pattern of inheritance in ayurveda

The six procreative factors are essential for the formation of *garbha* called as shadgarbhakar bhavas (*matruja*, *pitruja*, *atmaj*, *satmyaja*, *satvaja* and *rasaja*). Formation of all organs, physical and psychological traits are dependent upon these procreative factors. Also they play key role as causative factors of hereditary, genetic diseases and congenital anomalies if present in abnormal form.

Matruja bhava

The factors derived from mother - soft organs like skin, blood, flesh, fat etc. In *Atulyagotriya adhyaya* it has been clearly mentioned that marriages in two similar *gotras* should be strictly avoided [11]. It shows their basic understanding of the genetic diseases due to consanguineous marriages as in families transmitting a recessive disease, majority of normal persons are likely to be heterozygous rather than normal homozygous [12]. If a woman below 16 years is impregnated by a man below 25 years of age, either she will not conceive or will have an intrauterine death of fetus. Younger women give birth to majority of children with Down syndrome.

Pitruja bhava

The factors derived from father - hair, nail, teeth, bones, veins, ligaments etc. *Acharya Bhavamishra* has also mentioned the abnormality of *shukra* as a cause of congenital blindness, and so on.[13].

Atmaj bhava

The factors derived from *atma* - desire for happiness, courage, intellect, memory, voice etc. As a sprout cannot come up without seed, similarly birth cannot take place without *atma*. The effects of the previous life deeds carried by soul to his next life [14] and this is the reason for why same pathological process produce different disease manifestation in different people, though siblings are the product of same parents but they differ in their physical and mental traits, such unexplained or idiopathic factors are due to *atmaj bhava*.

Satmyaja bhava

The factors derived from *satmya* - longevity, strength, absence of greed etc. *Satmya* is such thing which does not harm the body due to habituation of it. Without the use of *asatmya* (noncongenial) articles neither the couple become sterile nor does fetus have any abnormality. *Kalasatmya* is important hence advised *Garbhadhana samskar* [15] for achieving a healthy progeny. The early environment of a developing child can affect its genome by epigenetic means.

Satvaja bhava

The factors derived from *satva* - devotion, piousness, hatred, memory, sacrifice, good temper, anger etc. *Manas* factor (psyche) determines a sense of living conscious and controlled life in human being. Following factors determine the *satva* of the fetus.

- The psychic nature of parents

- Frequent acquisition of information by mother during pregnancy
 - Impact of particular psyche due to deeds in previous life
- Saumanasya* (good psychic temper during conception) is essential for the good psycho make up of fetus.

Rasaja bhava

The factors derived from - origin of body and manifestation of different body parts, nourishment, enthusiasm, health, complexion [16] etc. Nutrition of mother not only affects her unborn child but her grandchildren and subsequent generations also.

- If a pregnant women indulges constantly in foods vitiating *vata*, her child may become inactive, deaf, mute, of nasal speech, stammering, lame, hunchback, dwarf, of deficient organs (in number) or of extra organs or any other *vata* diseases [17].
- Just like *vata*, even *pitta* (undergoing increase) will produce baldness, grey hairs, absence of mustache and beard, and brown color of the skin, nail and hairs [18] etc.
- Similarly *kapha* will produce *kushtha*, *kilasa* (skin disorders), leucoderma, teeth even at birth [19] etc.

Hence *ayurveda* has given month wise dietetic regimens [20] to compensate the requirement of mother and fetus both, *ayurveda* also advised to fulfill her dietetic desires (*dauruda*) otherwise it will lead to congenital abnormalities of the child.

Modern genetics also believe that maternal and paternal chromosomes are not responsible for the phenotype, but epigenetic factors are mainly involved. Most of the genetic diseases cause by the factors that are inheritance from parents and the environmental stresses. The above mentioned *matruja*, *pitruja* and *atmaj* bhavas cannot be changed as they are inherited and result of *poorvajanmakruta karma* but the remaining three factors *satmyaj*, *satvaj* and *rasaj* can be modified for the sake of healthy progeny.

Concept of genetic diseases in ayurveda

seven types of diseases on the basis of *trividha dukha* is mentioned by *Sushruta*. Line of demarcation between hereditary and congenital diseases been well identified by him as those are mentioned under separate headings of *adibala pravrutta* and *janmabala pravrutta vyadhi* respectively. Diseases which are caused due to the morbidity of sperm or ovum are called *adibala pravrutta vyadhi*. The hereditary diseases fall under this category and are inherited from parents. There are also other terms like *kulaja roga* (by *charak*), *sahaj* and *garbhaj roga* by (*vagbhata*). *Kulaj roga* means that which runs in families. *Sahaj roga* means due to abnormalities of *shukra* and *artava*. Diseases like *arsha* (piles), *kushtha* (skin disease) and *prameha* (diabetes) are mentioned as hereditary diseases. *Garbhaj roga* refers to the birth defect due to improper activities of pregnant woman. Whereas birth defects (congenital diseases) are considered as *janmabala pravrutta vyadhi* by *sushruta* such as hunchback, lameness, blindness, dumbness, deafness etc. Four types of *klaibya* are described by *charak* due to genetic defects. Maternal genetic defects results into *suchimukhi yonivyapad*. There are also many anomalies at birth which have been traced to have genetic origins in *ayurveda*. Eight disorders by birth that are giant and dwarf, obese and thin, hirsute and hairless, albinic and melanoid etc. described by *charak*.

Prevention of genetic diseases

Ayurvedic scholars were well aware about the gravity of congenital and hereditary disorders as they mentioned it incurable, though they advised preventive aspect in detail.

- *Ayurveda* emphasized on marrying outside the *gotra* (male and female should be of a different clan). It has genetic basis now that *gotra* system prevents consanguineous marriages and decreases the mortality and morbidity due to all recessive defective genes from the DNA.
- Female below the age of 16 and father below 25 does not allow conceiving to avoid abnormalities in fetus and also advised to avoid conception in a female who is very old according to *ayurveda* which can be seen in case of Down syndrome.
- *Ayurveda* always emphasized on healthy nutrition and environment to mother throughout the reproductive years as *rajaswala paricharya* (specific daily routine during menstruation), diet and position of couple just before the coitus, psychological aspect to give birth of a desirable quality of a child.
- *Ayurveda* has given more importance to monthly dietetic regimen of *garbhini*. Advised *pumsavan karma* for healthy progeny, also advised that *garbhini* should avoid factors which will lead to harm (*garbhopaghatkar bhavas*) her fetus.
- *Vayu* is main cause of happiness, enthusiasm, controller of mind, *vayu* only gives shape and form to the embryo, thus all structural and functional abnormalities also related with vitiation of *vata*; hence in *ayurveda* cleansing measures for *vata shudhi* and also rejuvenation therapy before planning to have a child is described.

Conclusion

The scholars of *ayurveda* have successfully put forth the theory that the entire genetic information representing each and every part of the human body was transmitted from parents to the progeny. It is very appreciating that the divisions of the genetic material by ayurvedic *acharyas* into *beej*, *beejbhag* and *beejbhagavayav* reflects their understanding of the molecular basis of genetics as known to science today. The concept of genetic basis of diseases and their classification are very beautifully described in *ayurvedic* texts like *charak* and *sushruta* samhita. As *ayurveda* has eternal science of life it seems that the goal was to prevent genetic diseases by application of the methods of rejuvenation and reproductive medicine. Though the interesting observations and concepts provided by *ayurveda* have not acknowledged as contribution in medical genetics but *ayurveda* can play a vital role in preconception counseling and achieving a goal of healthy progeny.

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