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Comprehensive Study of *Beej*, *Beejbhag* and *Beejbhagavyav* w.s.r Genetics – A Review Article.

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ABSTRACT:

Genetics is the science of genes, genetic variation and heredity in the organism. Genetics is thought to be a new branch of science evolved during 19th century. Gregor Mendel was the first who developed principle of inheritance and had described the transmission of genetic traits from generation to generation. Although some concepts of genetics have been described in Ayurveda which is *Upaveda* of Atharvaveda and thousands of years old texts. Ayurveda has been cited the concepts of *Beeja*, *Beejbhag*, *Beejbhagavyava* which influence the prakriti of individual and vitiation of these units cause deformity in the progeny. Acharya Charaka, Sushrut and Vagbhata all have described many genetic deformities in *Sharir sthan*. All three Acharyas of our *Brihatraye* have brief description about formation of foetus, growth of foetus, foetal deformity, disorders of pregnancy, *Adibalapravritta* disease etc.

Keywords :- Genetic, *Beej*, *Beejbhag*, *Beejbhagavyav*, *Vyapad*.

INTRODUCTION

Ayurveda is one of the world's oldest medical system that define the life in very meticulous manner. Thousands of years old ayurveda encompasses that the variation in prakriti is due to variation in genetic component. Ayurveda emphasize that the physical and mental health of progeny depends not on physical appearance of parents rather it depends on ovum (*Artava*) and sperm (*Shukra*) which undergo union to form embryo¹. Determining the sex of child, various physical and mental deformities, transmission of traits in progeny are the subjects of molecular genetics and have well described in various texts of ayurveda in that time when there was lack of

technological instruments like microscopes etc. and also there was no concept of genes and chromosomes. In *Mahatigarbhavkranti adhyay* of *Sharirsthan* acharya Charak has manifested three genetic units *Beej*, *Beejbhag* and *Beejbhagavyav*. Ayurvedic scholars resembles *Beeja* with germinal cells like *Shonita* (ovum) in females and *Shukra* (sperm) in male. *Beejbhag* is part of the *Beej* and is compared to the chromosomes in today's scenario. These are responsible to carry out the trait from one generation to another. *Beejbhagavyav* is the most fundamental entity carrying hereditary characters and compared with the genes and DNA material. At molecular level, concept of *Beeja*,



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Beejabhaga and *Beejabhagavyava* are introduced by acharya and have been well explained by Ayurveda scholars. According to Acharya *Charak* aggravated doshas may afflict the ovum and sperm which is responsible for the production of particular organ². Thus vitiation of *Beeja*, *Beejbhag* results in deformation of related organs of progeny (somatic as well as genetic anomalies of progeny). Advanced age, premature age, marriage in same *Gotra* (consanguineous marriage), parent suffering from chronic diseases, environmental factors are some reasons behind the vitiation as per ayurveda³.

Charak Samhita also manifests that vitiated *Beeja*, *Beejbhaga*, *Beejbhagavyav* results in sexual and reproductive dysfunction in offspring, *Putipraja* and *varta* under *Streevyapad*. Similarly sterile child, *Putipraj* and *Trinputrika* under *Purushvyapad*⁴.

AIMS & OBJECTIVES

To elucidate the concept of genetics cited in Ayurvedic classical texts.

METHODS

It is purely literary review done after thoroughly studying classical texts like *Charak samhita*, *Sushrut Samhita* and articles of different scholars with modern genetics.

DISCUSSION

As per ayurveda all phenomenon has explained through *pramana*. Development of plant have one of the compulsory causative factor i.e seed, with this relevant reference acharya explains development of embryo in mother's womb takes place after union of male gamete *Shukra* (sperm) and female gamete *Shonita* (ovum)⁵. Ayurveda is the pioneer medical system and have explained many years ago the phenomenon of inheritance. The *Beeja*, *Beejabhaga* and *Beejabhagavyava* are considered responsible factors for hereditary diseases along with other factors. My present article describes ayurveda perspective of genetics with special description of *Beejabhaga* and *Beejabhagavyava*.

.Bija: *Bija* are of two types, viz *Matruja* (female gamete or ovum or oocyte) and *Pitruja* (male gamete or sperm or spermatozoa) *Bija* carries one set of genetic material necessary for formation of the offsprings. *Dushti* of either *Matruja* or *Pitruja Bija* due to vitiated *Dosha*, causes formation of defects in the foetus. In *Shukra-shonita-shuddhi adhyay* Acharya *Susrut* has described 11 *Shukra* and *Shonita* doshas.⁶

Acharya *Charak* has brief description about 8 *Shukra dushti*⁷. When *Beeja* is completely vitiated there is gross defects in *Garbha* and maybe spontaneous abortion of *Garbha* i.e. *Garbhasrava* or *Garbhapata*.

As per ayurveda *Shonita* term has used for *Streebeej* that creates a dilemma whether it is a menstrual blood or ovum. To overcome this confusion *Shonita* has divided into two parts. One part is normal vaginal bleeding that occurs as part of a women's monthly cycle and prepares body for pregnancy. If no pregnancy occurs the uterus or womb sheds its lining. Ayurveda denotes it as *Bahih pushp*^[8]. The menstrual blood is partly blood and partly tissue from inside the uterus. It passes out through the vagina. Other part is that which directly play role in pregnancy. This part is denoted by *Antah pushp*⁸ which is female reproductive cell, an egg or ovum. An individual ovum is visible to the naked eye and is one of the largest cell of the body.

A developing egg is called an oocyte. It's differentiation into a mature egg (or ovum) involves a series of changes whose timing is geared to the steps of meiosis in which the germ cells go through their final, highly specialized cells. In male *Shukra* is denoted as male reproductive cell as per ayurvedic classics which gets developed in male sex organ testis. It is generated by all six rasas and all *Mahabhutas*. At the time of fertilization *Shukra* is constituted with *Vayu*, *Agni*, *Prithvi* and *Jala*. Basic element “*Akash Mahabhuta*” is excluded and reason behind this is given that all “*Gaman process*” excludes *Akash Mahabhuta* because of its broad and extensive nature. Four *Bhutas* are derived from past deeds which having merged with the self enters into the foetus because the self with seed like character (*Beejdharma*)⁹ always transmigrates himself from one body to the other.

Sperm cell nucleus interact with the egg cell nucleus to produce a zygote. It occurs in the ampulla of uterine tubes within 24 hours after ovulation and this fusion process is called fertilisation. Various hormones are involved in this process. Further cell division and cellular differentiation takes place to develop a multicellular, multiorgan foetus.

Beejbhag

A *Beeja* consists of small units, *Beejabhaga*. *Beejbhaga* is responsible for the various organs of the body. According to *Charak* distortion occurs in those organs whose responsible *Beeja* and *Beejabhaga* are contaminated. If there is no vitiation in responsible *Beeja* and *Beejabhaga* then there will be no any abnormality like blindness, limpness etc. Progeny will occur even from blind or lamb ancestors.

Beejabhag is compared to the chromosomes. A chromosome is a long DNA molecule with part or all of the genetic material of an organism. Chromosomes are passed on as units from generation to generation one from each of the parents. Different chromosomal abnormalities and aberration are well established in genetics. Chromosomal disorders are due to alteration in the structure or number of chromosomes. Changes maybe in autosomes or sex chromosomes. The most common chromosomal disorder in human is aneuploidy in which the person has abnormal no. of chromosomes due to extra or missing chromosomes. Down syndrome, Turner syndrome, Klinefelter syndrome, Cri du chat syndrome, Rett syndrome etc. are the examples of chromosomal abnormalities. Many children with chromosomal abnormalities have mental or physical defects or both. Some chromosomal abnormalities result in miscarriage and stillbirth. 50% of spontaneous abortion are due to chromosomal abnormalities.

Beejbhagavyava

Beejbhagavyav should be taken as further more subtle stage of *Beejbhaga* carrying hereditary characters. The transmission of genes to an organism's offspring is the basis of the inheritance. Different DNA sequences called genotypes. Genotypes along with environmental factors determine what phenotypes will be obtained. Most biological traits are under the influence of genes as well as gene-environment interactions. Some genetic traits are instantly visible, such as number of limbs, height, complexion etc and some are not, such as blood type, the risk for specific diseases, or biochemical processes that constitute life. A gene can acquire mutations in their sequence, leading to different phenotypical traits.

Outcome of vitiation in *Beeja*, *Beejabhag* and *Beejabhagavyava* mentioned in ayurveda and its relation with modern aspects.

Ayurveda scholars suggested that quality of *Beeja* play important roles towards the formation and development of normal or malformed offspring. *Charak Samhita* manifests that impaired *Beeja*, results in sexual and reproductive disfunction. In case even if they succeed in producing offspring that will be *Bandhya santati* (sterile child).¹⁰

In modern aspect it is clear that any deformity in ovum leads to a sterile woman, similarly deformity in number or quality of sperms leads to sterile male.

According to ayurvedic texts If *Beejbhaga* is affected of

either male or female then the resulting progeny will be *Putipraja*^[11]. *Beejbhaga* carrying hereditary characters are compared with the chromosomes is mainly responsible for a particular trait in an individual. *Putipraja* possesses chromosomal abnormalities.

In modern aspects chromosomal abnormalities can occur when the egg or sperm is formed or during early foetal stage. Those abnormalities may be Numerical like monosomy, trisomy etc. or may be Structural disorders like Deletion, Inversion, Ring chromosomes, Isochromosomes, Translocation etc. Produced children will have a range of anomalies mostly Down syndrome, Edward syndrome and Patau's syndrome.

When abnormalities occur in *Beejbhagavyav* of female (a portion of the genes concerning the female germinating cell), the progeny will be predominantly female shaped but not female actually named as “*Varta*”¹⁰. Likewise genetic defects in male *Beejbhagavyav* will produce offspring predominantly male-shaped but not male actually and named as “*Trunputrika*.”¹¹

In modern aspects X-linked disease refers to genetic conditions associated with mutation in the genes on x chromosome. Usually males are affected because they have a single copy of X. female usually carrier. Female also become affected when X- linked diseases are dominant. X-linked disorders in human are colour blindness, haemophilia A, Duchenne muscular dystrophy. Likewise Y-linked disease refers to abnormalities in genes of Y chromosome. Examples are Hypertrichosis of the ears, webbed toes, porcupine man.

CONCLUSIONS

Ayurveda is not pioneer only in medical science but also in genetic and embryology. Whatever ayurvedic classical texts have talked about genetics are now scientifically validated worldwide. Reason for congenital defect is primarily vitiated *Beejbhag*, *Beejbhagavyav* and Ayurveda Scholars were very much aware of the six procreative factors (*Shadgarbhakarabhavas*) such as *Matrija* (maternal), *Pitrija* (paternal), *Atmaja* (Soul), *Rasaja* (Nutritional), *Satmyaja* (wholesomeness) and *Sattvaja* (Psych/Mind), the consortium of these procreative factors is a necessary thing for healthy offspring & *Shodhana* of the male and female body before planning for a child is advised to avoid abnormality in offspring. It can be concluded that *Beeja*, *Beejbhaga*, and *Beejabhagavyav* can be compared with male/female gametes, chromosomes, and genes respectively and

Shadgarbhakarabhavas are responsible for a healthy growing life.

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