

“Genetic determinants in ayurveda: a critical analysis of *beeja*, *beejabhaga* and *beejabhagavyava*.”

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ABSTRACT

Lifestyle-related disorders have become a growing concern for the present generation, leading to increased interest in achieving a healthy and balanced life. Modern biomedical science highlights the significant role of genetic factors in determining an individual's physical traits, mental attributes, and susceptibility to diseases. Although every individual differs in structure, appearance, and behavior, certain hereditary characteristics are transmitted from parents to their offspring. In contemporary science, this process is explained through the concept of genetics. Interestingly, *Ayurvedic* classical texts described similar concepts through the principles of *Beeja*, *Beejabhaga*, and *Beejabhagavyava*. Ayurveda places significant emphasis on understanding hereditary factors involve in fetal development. References related to hereditary principles are scattered throughout the *Ayurvedic Samhitas*, particularly in *Sharira Sthana*, often presented in an implicit manner. Ayurvedic science not only discusses the structural, functional, and pathological aspects related to heredity but also emphasizes preventive approaches to minimize the occurrence of genetic disorders. With the rising prevalence of hereditary diseases in modern times, the Ayurvedic concepts of *Beeja*, *Beejabhaga*, and *Beejabhagavyava* gain greater relevance in understanding genetic predisposition and disorders.

Keywords: *Beeja*, *Beejabhaga*, *Beejabhagavyava*, *Prakriti*, Genetics, Heredity,

How to cite this article: Bhoy L, Kumar K, Tiwari N, Sharma S, Singh VP, Deshmukh S. "Genetic Determinants In Ayurveda: A Critical Analysis Of Beeja, Beejabhaga And Beejabhagavyava." *Int J Drug Deliv Technol.* 2026;16(15s): 498-501. DOI: 10.25258/ijddt.16.15s.58

INTRODUCTION

Genetics is a branch of biological science that focuses on the mechanisms by which traits are inherited and expressed. Modern genetic research explains that hereditary information is carried through genes located on chromosomes within the cell nucleus. Interestingly, *Ayurvedic* literature described fundamental concepts related to heredity thousands of years ago. Classical texts such as *Charaka Samhita* and *Sushruta Samhita* provide explanations of fetal development, hereditary traits, and congenital abnormalities. *Ayurveda* explains that the embryo (*Garbha*) is formed through the union of *Shukra* (male

reproductive element) and *Shonita* (female reproductive element) along with the influence of *Atma*, nutrition, and maternal factors. The qualities of these reproductive elements determine the characteristics of the offspring. These concepts demonstrate that ancient *Ayurvedic* treatise recognized hereditary transmission long before the development of modern genetic science.

AIM

To review and analyse the concept of genetics described in Ayurveda and to evaluate its relevance in the context of modern genetic science.

OBJECTIVES

1. To explore Ayurvedic descriptions related to heredity.
2. To understand the concepts of *Beeja*, *Beejabhaga*, and *Beejabhagavyava*.
3. To correlate Ayurvedic genetic concepts with modern genetics.

MATERIALS AND METHODS

The present study is a conceptual review based on classical *Ayurvedic* literature and modern scientific publications. Relevant references were collected from classical *Ayurvedic* texts such as the *Charaka Samhita*, *Sushruta Samhita*, and *Ashtanga Hridaya*. In addition, modern textbooks and peer-reviewed journal articles related to genetics and *Ayurvedic* physiology were reviewed to correlate traditional concepts with contemporary scientific understanding.

METHODOLOGY

Relevant concepts were collected, analysed, and interpreted to identify similarities between *Ayurvedic* descriptions of heredity and modern genetic principles.

REVIEW OF LITERATURE

The sex of a child in twin or multiple pregnancies is explained in *Ayurveda* through the action of *Vayu* on the *Beeja* (zygote). When *Vayu* divides the *Beeja* into two parts in such a way that one portion contains predominance of *Shukra* and the other of *Artava*, the part dominated by *Shukra* develops into a male child, whereas the portion dominated by *Artava* results in the birth of a female child.

According to *Charaka*, several factors are responsible for abnormalities in the developing foetus. Defects in the reproductive seeds (sperm and ovum), the influence of karma associated with the soul, the condition and environment of the uterus, the timing of conception, and the diet and lifestyle followed by the mother may lead to vitiation of *Doshas*. Such vitiated *Doshas* can affect the normal development of the foetus, resulting in impairment of sensory and motor functions in the offspring.

It is further described that aggravated *Doshas* may vitiate the *Beeja*, *Beejabhaga*, and *Beejabhagavyava*, which are responsible for the formation of specific organs. Disturbance in these fundamental units may therefore lead to structural deformities and congenital anomalies in the progeny. In addition, vitiation of these elements may manifest

as reproductive or sexual disorders in the offspring, described in classical texts as conditions such as *Bandhya*, *Putipraja*, and *Varta* in *Stree-vyapad*, and *Bandhya*, *Putipraja*, and *Trunaputrika* under *Purusha-vyapad*.

Beeja

The term *Beeja* literally means seed and represents the reproductive element responsible for the formation of the embryo. In *Ayurveda*, *Beeja* includes both male and female reproductive factors (*Shukra* and *Artava*). *Beeja* plays a crucial role in determining the physical and physiological characteristics of the offspring. If *Beeja* is healthy and free from defects, normal development of the embryo occurs. Any abnormality in *Beeja* may lead to congenital deformities or hereditary diseases.

Beejabhaga

Beejabhaga refers to subdivisions of *Beeja* responsible for the development of specific organs or structures. Each *Beejabhaga* controls the formation of a particular body part. If a defect occurs in a specific *Beejabhaga*, the organ related to that part may develop abnormally, resulting in the birth of **Bandhya** (infertile) child.

Beejabhagavyava

Beejabhagavyava represents the smallest structural unit of *Beejabhaga*. It is responsible for the minute structural and functional characteristics of the body. When *Beejabhagavyava* become defective or vitiated at the time of conception, it may lead to abnormal development of the fetus, resulting in conditions such as **Putipraja** or **Varta** Child. Modern science often correlate *Beejabhagavyava* with DNA or gene segments, as defects at this level may produce hereditary abnormalities.

Beejabhagavyava, which governs the development of the foetus, and the specific portion of *Beejabhaga* responsible for the formation of female characteristics such as breasts, genital organs, and body hair in the maternal ovum become severely vitiated, the resulting offspring may not develop as a fully formed female. Instead, the child may exhibit predominantly feminine traits without complete female reproductive development. In *Ayurvedic* literature, such a condition is described as *Varta*.

Factors Responsible for Healthy Progeny

Ayurveda describes four essential factors necessary for the formation of a healthy embryo:

Ritu – Appropriate time for conception

Kshetra – Healthy uterus and reproductive organs

Ambu – Adequate nourishment

Beeja – Healthy reproductive elements

Any disturbance in these factors may lead to defective fetal development or congenital anomalies.

Hereditary Disorders in Ayurveda

Ayurvedic texts describe diseases that originate due to defects in reproductive elements. These are broadly categorized as:

Adibala Pravritta Roga – Disorders caused by defects in sperm or ovum.

Sahaja Roga – Conditions present since birth.

Kulaja Roga – Familial or hereditary diseases transmitted through generations.

These classifications indicate that classical *Ayurvedic* authorities recognized hereditary transmission of diseases.

Concept of Prakriti and Genetic Variation

Ayurveda explains individual variations through the concept of *Prakriti*. *Prakriti* is the inherent constitution of an individual determined at the time of conception. It depends on the dominance of *Vata*, *Pitta*, and *Kapha* doshas and remains stable throughout life. Differences in *Prakriti* explain variations in physical features, metabolism, disease susceptibility, and psychological traits. This concept is comparable to genetic constitution and phenotypic variation described in modern biology.

DISCUSSION

The present review highlights that the concept of heredity was well recognized in classical *Ayurvedic* literature long before the emergence of modern genetics. Although the terminology used in *Ayurveda* differs from contemporary biological language, the fundamental principles demonstrate remarkable conceptual similarities.

Classical *Ayurvedic* texts described the origin of the embryo (*Garbha*) as the result of the union of *Shukra* (male reproductive element) and *Artava* (female reproductive element) along with the contribution of *Atma*, maternal nutrition, and environmental factors. Classical texts such as *Charaka Samhita* and *Sushruta Samhita* emphasize that the qualitative integrity of reproductive elements determines the physical and physiological characteristics of the offspring. This explanation closely resembles the modern understanding that genetic material inherited from parents influences the phenotype of the individual.

The *Beej* in Ayurveda corresponds to gametes in modern science. *Artava* is comparable to the ovum (ova), while *Shukra* is equivalent to spermatozoa. When *Beej* becomes vitiated, it leads to reproductive disorders. Vitiating of *Artava* results in *Bandhya*

Yonija, which can be correlated with female infertility, whereas vitiation of *Shukra* results in *Bandhya Purusha*, which is comparable to male infertility.

The *Beejbhaga* in Ayurveda can be correlated with chromosomes in modern genetics. When *Beejbhaga* becomes vitiated, it leads to abnormalities in the offspring, such vitiation resulting *Putipraja* in both *Stree* (female) and *Purusha* (male). In modern science, this can be compared to chromosomal abnormalities, which may be numerical or structural in nature. Numerical abnormalities include monosomy and trisomy, while structural abnormalities include deletion, inversion, ring chromosomes, isochromosomes, and translocation. These chromosomal defects can lead to various genetic disorders such as Down syndrome, Edwards syndrome, Patau syndrome, Turner syndrome, Klinefelter syndrome, and Cri du chat syndrome.

The *Beejbhagavyava* in Ayurveda can be correlated with the gene or specific part of chromosomes in modern genetics. When *Beejbhagavyava* becomes vitiated, it may lead to abnormalities in the offspring such as *Varta* and *Trunaputrika* described in *Ayurvedic* texts.

In modern science, this vitiation can be compared with gene defects or mutations, which may occur through different patterns of inheritance. These include autosomal inheritance (autosomal dominant and autosomal recessive) and sex-linked inheritance. In sex-linked inheritance, X-linked disorders include conditions like Color blindness, Hemophilia A, and Duchenne muscular dystrophy. Y-linked inheritance may cause conditions such as hypertrichosis of the ears, webbed toes, and the rare condition historically referred to as porcupine man.

Thus, *Beejbhagavyava* represents the minute genetic components responsible for the development of specific organs and traits, and its vitiation may lead to hereditary abnormalities in the progeny. The concept of *Beeja Dosha* explains how abnormalities in sperm or ovum may result in defective development of specific organs. This concept is comparable to genetic mutations or chromosomal abnormalities described in modern medicine. Similarly, the classification of diseases into *Adibala Pravritta Roga*, *Sahaja Roga*, and *Kulaja Roga* indicates an understanding of hereditary and congenital conditions transmitted across generations.

Another important aspect discussed in *Ayurveda* is the concept of *Prakriti*, which represents the inherent constitutional type of an individual. *Prakriti* is determined at the time of conception based

on the predominance of *Vata*, *Pitta*, or *Kapha doshas*. This constitutional framework explains variations in morphology, metabolism, disease susceptibility, and psychological traits among individuals. Modern biomedical research increasingly recognizes the importance of genetic polymorphism and individualized medicine, which conceptually aligns with the *Ayurvedic* principle of *Prakriti*-based variation.

Ayurveda also emphasizes preventive strategies to ensure healthy progeny. Preconceptional purification therapies (*Shodhana*), proper diet and lifestyle of parents, and antenatal care (*Garbhini Paricharya*) are recommended to maintain the quality of reproductive elements. These recommendations reflect a preventive approach that parallels modern concepts of genetic counseling, prenatal care, and epigenetic influences on fetal development.

Despite these conceptual similarities, it is important to acknowledge that *Ayurvedic* descriptions are largely philosophical and observational in nature, whereas modern genetics is based on molecular and experimental evidence. Therefore, direct equivalence between *Ayurvedic* terms and modern genetic structures should be interpreted cautiously. However, the integrative study of these concepts may provide valuable insights into personalized medicine, preventive healthcare, and the role of lifestyle factors in gene expression.

Overall, the *Ayurvedic* perspective on heredity demonstrates an advanced conceptual framework that anticipated several principles of modern genetics. Further interdisciplinary research integrating classical *Ayurvedic* knowledge with contemporary molecular biology may help bridge traditional wisdom and modern biomedical science.

CONCLUSION

Ayurveda provides fundamental knowledge on genetics much before modern genetic science. Classical *Ayurvedic* literature describes the principles of inheritance through the concepts of *Beeja*, *Beejabhaga*, *Beejabhagavyava*. These concepts suggest that congenital or hereditary abnormalities arises due to defects or vitiation in these fundamental reproductive elements rather than solely due to the mother or father.

From a contemporary perspective, *Beeja*, *Beejabhaga*, and *Beejabhagavyava* may be conceptually correlated with male and female gametes, chromosomes, and genes respectively. Furthermore, the concept of *Shadgarbhakarabhavas* highlights the multifactorial

determinants responsible for the proper formation, growth, and development of the fetus. Thus, *Ayurvedic* principles provide a comprehensive framework for understanding heredity and fetal development, which shows remarkable conceptual similarity with modern genetic understanding.

REFERENCES:

1. <http://en.wikipedia.org/wiki/Genetics> last assessed on Date 10/06/2021.
2. Shastri k, Charaka Samhita. "Vidyotini" Hindi Commentary Part I. Sharira sthana 2/28-29, Chaukhambha Bharti Academy, Varanasi, Ed. Reprint, 2005. P.P. 846.
3. P. V. Sharma, Charaka Samhita Vol-1, Sharir sthan, Adhyay 4 Sutra 30, Choukhamba orientalia Varanasi, Reprint edition 2008; Page 434.
4. Sharma R.K. Charaka Samhita Sharir sthan 4/30; Varanasi, Chaukhambha Sanskrit series office, Reprint edition 2012. p.p. 402.
5. Saxena S, K Dawre M, Voikos CD, Borkar BE. www.ijrap.net.
6. Shastri A D, Susruta Samhita, "Hindi Commentary "Ayurveda Tatva Sandipika" Part I, Sharira sthana 2/3-4 Chaukhambha Sanskrit Sansthan Varanasi, Ed. Reprint, 2008. P.p. 9.
7. Sharma R.K, Charak Samhita Chikitsa Sthan 30/139-144: Varanasi, Chaukhambha Sancknt series office, Reprint edition 2012. P. P. 86.
8. Singh M. Rachana sharir vigyan Chaukhambha Orientalia Varanasi. 2012. P. P. 63.
9. Kumari P., Mishra V. Guddu BK, Gupta S.S. "Comprehensive study of Beej, Beejbhag & Beejbhagavyav W.S.R. Genetics - A Review Article", IRJAY. [Online] 2023;6(7);94-97.
10. Acharya YT, Charaka Samhita of Agnivesa, elaborated by Charaka & Dodhbala with the "Ayurved Dipika" Commentary if Chakrapanidatta. Sharira Sthana 4/30 Shloka Chaukhambha Sanskrit Sansthan, Varanews Ed Reprint 2005. P.P.322.
11. Shastri K, Charak Samhita "Vidyotini" Hindi Commentary Part I, Sharira Sthana 4/2, Chaukhmbha Bharti Academy, Varanasi, Ed Reprint, 2005.