



Title of Article

**Quantum Mechanics of Grabhavridhhi (Embryonic Development) According to Ayurved w. s. r. to SuśrutaSaṁhitā****Kshirsagar M.V¹., Mehta Tarak^{2*}**

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* Corresponding Author: E-mail: drtarakmehta@gmail.com**ABSTRACT:**

Śarīra or human body and its formation is a beautiful concept explained in *Āyurvedicembryology* i.e. *GarbhaŚārīra*. The whole process including the ingredients needed to create a new life has been explained in an exemplary way. It's understood by using analogies, like for making a pot, mud, wheel, water, fire, stick and potter are needed, for making a cloth, threads, weaving machine, dyes and weaver are needed. Four factors or ingredients are needed to form *Garbha*. They are explained by using four terms, *ṛtu*, *Kṣetra*, *Ambu* and *Bīja*. 1) *ṛtu* - proper and compatible climatic period, 2) *Kṣetra* - umbworld and fertile land, 3) *Ambu* - moisture and necessary nutrients and 4) *Bīja* - good quality seed. Similarly, there are some essential and mandatory elements needed to form a human body too.

KEYWORD: *Garbha, ṛtu, Kṣetra, Ambu, Bīja, Dhātu.*

INTRODUCTION:

In the current era, fertility has become a key issue. The relationship between the mental, physical and metaphysical health of men and women has been considered vital to promote fertility. Infertility has become a challenge to the medical science. Four factors on which *Garbha*(foetus) develops and stands are explored in *SuśrutaSāṃhitā* [1]. They should be regarded as four pillars of conception. Any lacuna in this leads to the difficulties in conceiving, the conceptus born will not be at the best of health. Thus the physical preparedness of man and woman along with timing of copulation and nutrition of pregnant lady has been stressed in this part of *Āyurvedic* embryology. A particular methodology for accomplishment of pregnancy etc; through which the body along with the Soul is manifested is described in *Śārīrasthāna's Atulyagotrīya Adhyāya* of *CarakaSāṃhitā*[2]. Further *Ācārya* has discussed the causes along with various factors responsible for the growth of *Garbha*[3]. The whole process including the ingredients needed to create a new life, the involvement and amalgamation of *Prakṛti*, *Vikṛti* and *Ātmā*(life element or soul) [4], the qualities adorned by *Ātmā*, the factors involved in the development of *Garbha* and the monthly growth, maturation and birth of the child (*Māsānumāsika Garbha Vṛddhi*) [5] has been explained in an exemplary way. The *Garbha* and *Śārīra* concepts explained in the *Āyurvedic* texts might be the first ever references of human embryology explained in a scientific, systematic and comprehensive way. Salutations to the ancient wisdom of *Āyurvedic* medical

science for having passed on these basics through many generations!![6]

Review of Literature and Discussion

Essential Elements for Conception – *GarbhaSambhavaSāmagri*

While enumerates components essential for the formation of *GarbhaŚārīra* conducive to the understanding of the body *Caraka* says, the combination of the factors derived from following sources - *Mātrja*, *Pitrja*, *Ātmaja*, *Sātmyaja*, *Rasaja* and *Satvajaja* is essential. [7].

In *SuśrutaSāṃhitāŚārīrasthāna* it is called as *Sāmagri* (*GarbhaSambhava / UtpattiSāmagri*) - elements needed for formation of *Garbha* or foetus) [8]. The essential components needed for the formation of *Garbha* has been explained with an example of a plant (sapling). For the plant to come into existence four factors are essentially necessary. They are,

- 1) *ṛtu* - proper and compatible climatic period
- 2) *Kṣetra* - umbworld and fertile land
- 3) *Ambu* - moisture and necessary nutrients
- 4) *Bīja* - good quality seed

Similarly, four factors or ingredients are needed to form *Garbha*. They are explained in same terms i.e. *ṛtu*, *Kṣetra*, *Ambu* and *Bīja*. There are four essential factors needed for the formation of the *Garbha*,

- 1) *ṛtu* – Ideal season, in terms of fertile period in woman (ideal for conception)
- 2) *Kṣetra* – Fertile land, in terms of healthy and conducive mental and physical environment.
- 3) *Ambu* – Adequate nutrients, moisture, water or fluids necessary for the development of *Garbha*.

4) *Bīja*– Healthy seed, male and female gametes.

GarbhaSambhavaSāmagri in comparison with the factors needed to form a plant can be elaborated as under,

1. *ṛtu*

ṛtu means an ideal climate for seeding and for the plant to grow. The seeding and cultivation of a plant should be done in an appropriate climate or season, compatible enough for the plant to grow. If the climate or season is not favourable for the plant to grow, one cannot expect the seed to break open into a beautiful plant.

The same rule is applicable to the *Garbha* also. For the *Garbha* to be formed,

an ideal climate should prevail in the *Garbhāshaya* for the sperm to fertilize the ovum. This coincides with the fertile period of the female.

ṛtu (ideal time and period for conception) in terms of GarbhaUtpattiSāmagri

The menstrual cycle of a woman comprises of fertile phase and non-fertile phase. The conception doesn't take place on all days. Timing is important. The sperms should enter the uterus a couple of days before ovulation (release of egg or ovum from the ovary in woman). The sexual intercourse should be planned accordingly. 4th to 15th day of menstruation (after the female menstrual periods have stopped - stoppage of bleeding) is the ideal

kāla for conception.

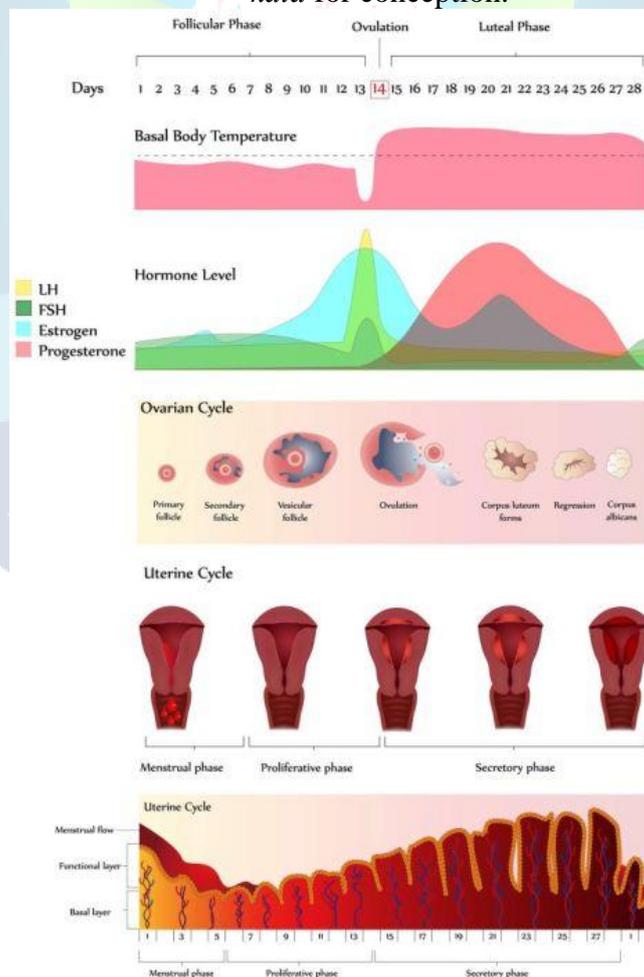


Fig. - Basal Body Temperature, Hormonal level, Ovarian and Uterine Cycle [9]

According to modern science, the day of ovulation in women is 14th day and conception period is 12th to 16th day. This is called fertile period. When the husband and wife have intercourse on these days, there will be strong chances that the woman conceives. The sperms, in the availability of suitable environment within the uterus (as created by hormonal changes before ovulation), can stay active for couple of days, whereas the ovum has a lifespan of 24 hours after ovulation. If it is not fertilized by a sperm within this time, the ovum gets destroyed. So it is important that the sperms are available in the uterus to fertilize the egg at the time of ovulation. This shows the timing of sexual act and the need of plan to beget a child. Knowing the menstrual cycle, its length and time of ovulation is essential for both man and woman planning to have a child.

Apart from this, the *kāla* or ideal period also includes the physical and mental preparedness of the woman to receive the spermatozoa, to conceive.

Thus *ṛtu* covers – an ideal environment provided by the uterus so as to welcome the sperms and have them in active state until ovulation, the days around ovulation, the timing of planning coitus and the preparedness of the woman to receive the sperm.

2)Kṣetra

Kṣetra means umbworld and fertile land, ideal for the plant to grow. Umbworld is the surrounding or the environment. Though the seed is essential for the plant to grow, we cannot Female Reproductive System [10]. *TryāvartāYoni*[11]

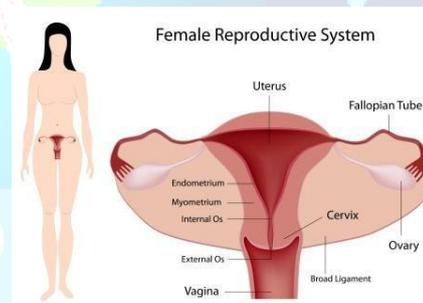
expect the seed to take the form of a plant anywhere and everywhere. An ideal and fertile land is needed for this process to

happen. Only if the seed is sown in a fertile land which is healthy, the seed breaks up into a beautiful plant or sapling.

The same rule is applicable for the formation of *Garbha* also. Here the land correlates to a disease free and healthy uterus, the womb of the woman or *Garbhāshaya*. The environment should be conducive, contributing for mental and physical development. It should be supportive to motivate the growth of *Garbha* and its mother.

Kṣetra (ideal land) in terms of GarbhaUtpattiSamagri –

Kṣetra in terms of *Garbha* formation should be taken as the place where the fertilized ovum gets adhered and grows. This happens in the womb or uterus of the woman. After the semen has been



ejaculated into the vagina of the woman (following sexual intercourse), the containing sperms swim into the uterus (organ which holds the growing foetus until it is delivered at full term) and move towards the fallopian tubes or ovarian tubes (tubes carrying the ovum or egg from the ovary towards the uterine cavity, after ovulation). The ovum which is coming towards the uterus following ovulation meets the sperm. The sperm enters the ovum and fertilizes it. The fertilized ovum now comes into the uterine cavity and gets adhered into the wall of the uterus. This process is called implantation.

After implantation, the uterus becomes home for the embryo and growing foetus until it gets matured enough to reach the term, i.e. the period of delivery (being born). This according to Ayurveda is the *Kṣetra* for *Garbha*. The future of the child after its birth depends on how well it was brought up and nourished in the mother's womb. Therefore, from the *Garbha* perspective, *Kṣetra* becomes very important. It is the first home for all living beings.

For healthy implantation and growth of the *Garbha*, the *Kṣetra* or uterus should be in a healthy condition. It should be devoid of any disease or infection. An unhealthy womb will not allow proper implantation and growth of the child. The point of caution is to find out any disease related to uterus and treat it before conception [12].

Garbha, though develops in the uterus still Umbworld vis-à-vis environment is the most essential factor necessary for the formation of *Garbha* and for this health of *Garbhinī* is at the centre [13], this concept can be further elaborated as,

a) *SārvadehikaKṣetra*— it includes the health of entire body. It should not be suffering from any major disease and should have good immunity with complete development of all body tissues and thus should be above 18 years of age.

b) *MānasikaKṣetra*— Thoughts have their effect on the *Garbha*. For positive thoughts to flow in the mind the female she should remain in the company of good and pious people avoiding anger, grief etc. and remaining happy.

c) *SthānikaKṣetra*— local structures - mainly involving all the structures of

reproductive system should be fully developed and without any deformity [14]

3. *Ambu*

Ambu means water. For a plant to sprout from its seed and for the seed to shape into a plant, the most essential element or ingredient needed is water. If the water supply to a plant is cut off or if water is not provided to the fields in which seeds are sown, one cannot expect to see the uprising of plants. In fact, the seeds shrink and die out in the soil. The other nutrients which support the growth of plant or expression of a seed in the form of plant are also included under this topic.

The same rule is applicable for the *Garbha* also. For the *Garbha* (*Śukra - Śoṇita* or fertilized ovum) to grow properly nutrition is needed. This nutrition is compared to the *Ambu* or water (in terms of its correlation to the plant) [15].

Ambu (Adequate nutrients, moisture, water or fluids necessary for the development of Garbha.) in terms of GarbhaUtpattiSamagri –

Nourishment to the foetus is offered through the *Āhāra Rasa* (essence of nutrition) of mother through the foetal circulation. This nutrition is essential for the foetus to develop and grow in the womb properly and proportionally [16]. The mother and growing child is single unit. This also contributes to the *RasajaBhāva* (or qualities due to the nutritive essence obtained from mother in intra-uterine life) in the child (could be seen after child birth), which is unique for each child. If this nutrition to the embryo is cut off, the foetus doesn't grow properly or one can find stunted growth or malformations. As mentioned in *RasavahaSrotoDuṣṭiLakṣṇa*

Various secretions of the fallopian tube should be considered under the term *Ambuas* without these secretions the gametes could not fertilise, be transported or survive. The lining mucous membrane of fallopian tube is made up of columnar epithelium, which contains many secretory cells and few ciliated cells [17]. The secretions of these cells too plays important role in the development of adequate environment for proper nourishment and development of *Garbha*. Thus, basic material of *kapha*, *Rasa Dhātu* etc. should be collectively considered under *Ambu*.

4. *Bīja*

Bīja means seed (seeds). Most plants grow from their seeds. It is essential that a healthy seed be sown in a fertile soil (land) and be nourished with good water supply, essential nutrients and supportive climate to beget a healthy plant from a seed [18].

The same rule is applicable for the *Garbha*. For a healthy *Garbha* to be formed, its seeds i.e. *Śukra* and *Ārtava* (sperm, ovum, various hormones etc.) from which it is derived should be healthy in terms of quality and quantity, enriched with good qualities. A diseased, contaminated or mutilated *Bīja* cannot produce a healthy offspring. *Bīja* covers both the male and female gametes [19] [20].

Bīja (healthy seed, in terms of healthy semen and sperms of man) in terms of Garbhautpattisamagri –

Semen or sperm is the most important component helpful in the formation of *Garbha*. It is the contribution of man towards formation of *Garbha*. *Śukra* is the 7th *Dhātu* (tissue) formed in the sequence of formation of tissues (according to *Āyurvedic* chronology of tissue formation). It carries vital components and memories of the previous

6 *Dhātus* i.e. *Rasa* (digestive essence, lymph, and plasma), *Rakta* (blood), *Māmsa* (muscle), *Meda* (fat), *Asthi* (bones) and *Majjā* (bone marrow). Thus it helps in the formation of the same tissues in the body which it creates after its union with *Ārtava*. Of course, the *Ārtava* too contributes towards the formation of body and body parts.

Thus, *Bīja* (the seed, sperm of man), healthy and disease free sperm and semen in adequate quantity and exemplary quality is necessary to seed the ovum and beget a healthy foetus.

Conclusion

ṛtu, *Kṣetra*, and *Bīja* are the factors responsible for initial formation of the embryo and ***Ambu* helps mainly in the subsequent growth of the foetus. *Ambu* can manifest its action only when the other factors are in in good condition. Right from fertilization they perform and control the development of *Garbha*.** It seems that *Āyurvedic* medical science has clearly documented the basic substances required to be present for conception and begetting a healthy child in few axioms. This not only allows us to know the ingredients needed for pregnancy, but also helps us to understand the areas which should be focused upon when infertility or fertility related issue is being discussed. A seemingly necessary truth based on proposition which cannot actually be proved or disproved is forwarded by *Āyurved*.

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