

A literary review of *Shukra Dhatu* and its interpretation with respect to modern science

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ABSTARCT

The *Shukra Dhatu* present all over the body since childhood, it only appears when the person gets puberty. Ayurveda has described three basic physiological constituents of human body, viz., *Dosha*, *Dhatu* and *Mala*. Human body is made up of seven *Dhatus* (seven categories of tissues) out of this *Shukra* is the seventh and last (ending) *Dhatu*. *Shukra* is white, pure, exquisite *Dhatu*, which is considered as best among all seven *Dhatus*. Sperm along with spermatid fluid and male sex hormones are also one part of *Shukra dhatu*. It takes about one month to synthesize *Shukra Dhatu* from *Rasa Dhatu*. *Acharya Charak* classified *Shukra* under *Pitruja Bhava*. *Acharya Vagbhata* has considered *Shukra* as *Ashraya Sthan* of *Kapha*

Dosha. In this article we are intended to make a correlation of *shukra dhatu* with modern prospective to have a clearer view about the *shukradhatu*. For which the basic materials have been collected from the Ayurvedic classics with the available commentaries, as well as text books of contemporary modern medical science have been referred for better understanding of the concept and its comparison with contemporary science.

Keywords: *Shukra Dhatu*, *Stree Shukra*, Semen,

INTRODUCTION

In Ayurveda health is a state where the *Dosha*, *Dhatu*, *Mala* and *Agni*, all the physiological process are in homeostatic state and soul, sense

organ and mind are in a state of total wellbeing. Also *Dosha-Dhatu-Mala* are roots of the body. “*Saptadhatu*” are *Rasa* (plasma), *Rakta* (formed blood cells), *Mamsa* (muscle tissues), *Meda* (fatty tissues), *Asthi* (bone tissue), *Majja* (bone marrow and nervous tissues) and *Shukra* (reproductive tissues). The *Shukra Dhatu* present all over the body since childhood, it only appears when the person gets puberty^[1]. Secondary sexual characters manifest after. In children, the testis is not fully developed. Therefore, the spermatogenic cells are in primitive stage called spermatogonia. With the onset of puberty, spermatogonia develop into sperms through different stages^[2].

In women during the age of 12 to 15 years menarche marks the puberty which helps to further function of conception^[3]. *Shukra* is one of the basic factors required for initiation of life as *Garbha* (~fetus)^[4].

Semen is discharged during sexual act and the process of discharge of semen is called ejaculation. *Shukra* moving with the help of *Shukravaha Strotas* through whole body comes out of urinary passage (after friction caused by coitus, masturbation etc.) by sexual ecstasy and passionate determination^[5]. Also *Sushruta* in *Nidan Sthana* has explained the physiology of ejaculation along with the physiology of lactation. Here seeing, remembering, hearing a voice, touching, coitus are listed as reasons for seminal emission or ejaculation which is also stated as reason for *Suprasanna Mann* (fully satisfied mind)^[6]. *Shukra pravatana*

(ejaculation) is result of *Vata* and involves tactile sensation. This explains *Tvakgata Shukra* according to *Gangadhar* also.

In testes, Leydig, form 20% of mass which secretes androgens. Leydig cells are numerous in new born male baby and in adult male. But in childhood, these cells are scanty or non-existent. The secretion of androgens occurs in new born babies like unbloomed flower does not possess fragrance but fragrance appears when it blossoms^[7]. Likewise, the entire sugar cane plant is full of its juice within it; ghee is present in all parts of the curd, oil in sesame seed. Similarly, *Shukra Dhatu* is present in entire body which has the sensation of touch. Hence, *Shukra Dhatu* is not present in Hair, Nail, *Mala*, *Mutra* etc. where blood supply is absent^[8]. So the gonadotropin hormones according to modern science can be explanatory for this whole body presence of *Shukra* according to Ayurveda.

The main function of *Shukra* is production of *Garbha*^[9]. Gonads are the primary reproductive organs which produce the gametes (egg or ovum); a pair of testes (singular = testis) produces sperms in males and a pair of ovaries produces ovum in females these ensure the continuation of species by means of reproduction.

REVIEW OF LITERATURE

The description of *Shukra Dhatu* available in Ayurveda texts can give crude summarization of structure and functions of *Shukra Dhatu*. To the

best of understanding, the term *Shukra* represents androgens, semen and sperm

1. **SHUKRADHATU UTPATTI**

According to Ayurveda *Sapta Dhatus* are stated to be formed in sequential manner in continuation process. *Rasa Dhatu* gives rise to *Rakta Dhatu*; *Rakta Dhatu* forms *Mamsa Dhatu* and so on. *Asthi Dhatu* (Bone) gives rise to *Majja Dhatu* (Bone Marrow) and *Maajja Dhatu* give rise to *Shukra Dhatu*^[10]. According to *Dalhana* while formation of *Dhatu dhatwagni* synthesis *Sukshma*, *Sthula* and *Mala* portion. As the process is in continuation, *Sukshma* portion formed from previous *Dhatu* produces next *Dhatu* whereas *Sthula* portion synthesizes the *Dhatu* itself. Similarly, *Shukra Dhatwagni* helps to synthesize *Shukra Dhatu* (male reproductive organs) from *Sthula* portion^[11].

Acharya *Charak* has stated that porosity of *Asthi* (Bones) because of *Vayu* and *Akasha Tatva* allows *Meda Sneha* to produce *Majja* (Bone Marrow). *Shukra* is formed from *Sneha* portion of this *Majja* which comes out of *Asthi* pores just as the water comes out of new earthen vessel. *Shukra* spread through the channels called *Shukravaha Strotas* all over the body. And on desire of intercourse this *Shukra* travels through body like ghee acts on heating to urethra and comes out like downhill movement of water^[12].

During development of the

embryo, the primordial germ cells transmigrate into the testes and become immature germ cells called spermatogonia which lie in two or three layers of the inner surfaces of the seminiferous tubules. The spermatogonia begin to undergo mitotic division, beginning at puberty, and constantly proliferate and differentiate through final stages of evolution to form sperm. The total period of spermatogenesis, from spermatogonia to spermatozoa, takes about 74 days^[13].

2. TIME REQUIRED FOR PRODUCTION OF SHUKRA DHATU

According to Acharya *Sushrut*, *Rasa* stays for three thousand fifteen *Kalas* (nearly five days) in each *Dhatu*. Therefore *Shukra* (Sperm) is produced in eighteen thousand ninety *Kalas* which is nearly a month^[14]. According to Acharya *Charak* it takes seven days to form *Shukra*. *Chakrapani* explains these variations in duration based on strength of *Agni* (Digestive strength)^[15]. The effect of virility and the like substance is promoting the strength quickly. Some are of opinion that it takes for their full assimilation a period of six days and nights; but the truth is there is continual circulation of the food-essence like a wheel^[16].

3. SHUDHA SHUKRA DHATU LAKSHANAS (PROPERTIES OF SHUKRA)

In Ayurveda classical text physical properties of *Shukra* are given. Detailed of *Shukra Lakshanas* given

by *Bhruhatayee* are compare below in

Table No.1.

Table No. 01: Shudha Shukra Lakshanas

SN	LAKSHANA	(Ch. Chi. 30/145) ^[17]	(Su.Sha. 2/11) ^[18]	(A.H. Sha. 1/17) ^[19]	MN ^[20]
1.	<i>Spatikabha</i>	+	+	-	+
2.	<i>Shukla</i>	-	-	+	+
3.	<i>Ghana</i>	+	-	-	+
4.	<i>Drava</i>	-	+	+	-
5.	<i>Guru</i>	+	+	+	+
6.	<i>Snigdha</i>	-	-	+	-
7.	<i>Bahula</i>	-	-	+	-
8.	<i>Avidahi</i>	-	-	-	+
9.	<i>Madhugandhi</i>	+	+	-	-
10.	<i>Picchila</i>	+	-	-	+
11.	<i>Tailanibha</i>	-	+	+	-
12.	<i>Kshoudranibha</i>	-	+	+	-
13.	<i>Ghrutanibha</i>	-	+	+	-
14.	<i>Madhura</i>	+	+	+	-

Table No. 02: Physical characteristics of Shukra

Characteristics	Observations	Meaning	According to Modern Science
01. VARNA (Colour)	<ul style="list-style-type: none"> <i>Shukla</i> 	<ul style="list-style-type: none"> White in Colour 	<ul style="list-style-type: none"> The prostatic fluid gives the Semen a milky appearance.
02. SWAROOP (Appearance)	<ul style="list-style-type: none"> <i>Sphatika sannibham</i> <i>Bahal, Ghana</i> (Dense), <i>Guru</i> (Heavy) 	<ul style="list-style-type: none"> Like crystal /quartz / camphor Thick 	<ul style="list-style-type: none"> The seminal vesicle and mucous glands gives the semen a mucoid consistency. Each spermatozoon is composed of a head and a tail. On the outside of the anterior two-thirds of head is a cap called the acrosome. The tail of The sperm called flagellum.

03. GANDHA (Odour)	<ul style="list-style-type: none"> • <i>Avistram</i> • <i>Madhura m</i> 	<ul style="list-style-type: none"> • Not having bad odour • Sweet Smell 	<ul style="list-style-type: none"> • Each seminal vesicle secretes a mucoid entity containing a copiousness of fructose, citric acid and other nutrient substance, as well as large amounts of prostaglandins and fibrinogen. The normal fructose content of semen is 2-7mg/ml.
04. DRAV (Fluidity)	<ul style="list-style-type: none"> • <i>Drav</i> • <i>Snigdha</i> • <i>Pichcchil am</i> 	<ul style="list-style-type: none"> • Fluidity • Unctuous • Slimy 	<ul style="list-style-type: none"> • Semen is composed of the fluid and sperm from the vas deference (about 10% of the total), fluid from the seminal vesicle (almost 60%), fluid from prostate gland (about 30%) and small amounts from the mucous gland, especially the bulbourethral glands.
05. MATRA (Semen volume)	<ul style="list-style-type: none"> • <i>Bahu</i> 	<ul style="list-style-type: none"> • Abundant in quantity 	<ul style="list-style-type: none"> • Volume ~3.5mL(16.5mL), Number of sperms ~35-200million/mL (>15million is Normal).
06. FUNCTIONS	<ul style="list-style-type: none"> • <i>Beejarth</i> 	<ul style="list-style-type: none"> • Invariably helps in procreation 	<ul style="list-style-type: none"> • Due to testosterone, a main character may be property to viability, motility, no. of sperms and normal morphology of Semen.

Semen is composed of - 1. Sperm + Secretions or fluid from vas = 10%.

2. Fluid from seminal vesicles = 60%

3. Fluid from prostate gland = 30%

4. Small amounts from mucous glands and Bulbourethral.

Table No. 03: Normal Semen values as suggested by W.H.O

PARAMETERS	CUT-OFF VALUES
Volume	> 1.5ml (2-6 ml)
pH	> 7.2 (7.2 – 8.2)

Liquefaction	(15 – 20 mins)
Sperm count/ Concentration	> 15 million / ml
Total sperm count	> 39 million
Progressive Motility	> 32%
Morphology	> 4%
Leucocytes	< 1 million / ml
Vitality (live spermatozoa %)	58% (55% – 63%)

4) FUNCTIONS OF SHUKRA DHATU

Shukra Dhatu is present in both male and female. The function of *Shukra Dhatu* mentioned by Acharya *Susruta*; *Dhairya* (Courage), *Chayvanam* (Ejaculation), *Priti* (Affection), *Dehabala* (Body Strength), *Harsh* (exhilaration), *Bijarth* (Procreation) ^[21]. In modern medical science, *Shukra Dhatu* cannot be correlated with a single entity, however on the basis of its functions described in Ayurveda, few structure and chemicals

(hormone) can be correlated on the basis of similar functions. In intra uterine life, primordial cells are formed and migrate into the testes and become immature germ cells called spermatogonia. At puberty, these spermatogonia undergo meiotic division and develop to form sperm. Ayurveda is a science based on the functional understanding of body, by considering its functions, the entities in the body representing same functions can be correlated with *Shukra*.

Table No. 04: Correlation of Structure or Entities as per Ayurvedic Text with Modern Physiology^[21]

Structure or Entities as per Ayurvedic text	Correlation of structure or Entities as per Modern Physiology on the basis of its functions
<i>Shukra Dhatwagni</i>	Gonadotropic releasing hormone (GnRH), Follicular stimulation hormone (FSH) & Luteinizing hormone (LH)
<i>Shukra Dhatu</i> in men	In Men: - Sperm, Testosterone, Phenylethylamine Dihydrotestosterone, & Androstenedione, adrenaline, Dopamine, serotonin etc.

5) SHUKRA IN WOMEN

Human body is composed of

seven *Dhatus* irrespective of gender. *Chakrapani* while comments on *Su. Su.* 14/14 has explained that there is *Shukra* in *Stree* which is not useful for conception or procreation. Whereas *Aartava* is the reason for fertilization in women. *Acharya Vagbhata* has clarified that even though woman secrete *Shukra* during coitus, it doesn't participate in fertilization^[22]. *Stree Shukra* in women can be correlated with Secretions of Bartholin, Cervical and Endometrial glands. Hence the *Shukra* in women said to have role in sexual activity and not the conception. *Artava* is menstrual blood and after fertilization portion of *Artava* moving in upward direction is Estrogen, Progesterone, Oxytocin and human chorionic gonadotropic hormone. *Stree Shonita* is ovum which is essential for conception^[23].

DISCUSSION

According to Ayurveda *Dosha-Dhatu-Mala* are root of *Deh* i.e. body. If body is consider being the building then *Dhatus* are columns and walls and *Dhatus* are *Dosha*, *Dhatu* and *mala* are the root of life. *Shukra* is the *Param Sara* of *Ahara Rasa*. The function attributed to *Shukra Dhatu* as well as the semen is *Garbhotpadana*. Because of the similarities in the qualities as well as the functions of both *Shukra* and the semen, as explained below, the *Shukra* mentioned in Ayurveda can be compared easily to that of semen of modern medicine. *Sphatikabham* indicates the colour of semen which is white and translucent. *Bahala* and

Bahu indicate the adequate volume of semen and the sperm count respectively. In Modern Medicine also, it is told that the sperm count should be more than 20

millions with adequate volume and motility to get a progeny. *Madhugandhi* is the special odour imparted to *Shukra*. *Madhura Rasa* of *Shukra* is due to fructose of the seminal plasma. pH of the semen may be referred to the term *Avidahi* of *Shukra* i.e., not causing burning sensation during ejaculation indicating neither acidic pH, nor highly alkaline. Normal consistency of *shukra* is indicated by the characters like *Drava* (Liquid), *Picchila* (Viscous), *Snigdha* (Unctuous) and *Sara* (Fluid) due to various constituents of seminal plasma. *Majja Dhatu* is responsible for *Shukrotapatti*, this may be justified by Erythropoiesis, which takes places in Red Bone Marrow along with Leucopoiesis; this is having same bearing on the *Shukrotapatti*. The cells of the sertoli or substentacular cells of seminiferous tubules may be getting some stimulus from the *Majja Dhatu*. Thus the latter may be responsible for the production of *Shukra*. The sperm and semen are produced in the testes and accessory sexual glands. They are transported to the vagina through the penis. Thus *Shukra Vaha Srotas* can be correlated with the Sperm- Semen producing and transporting system.

CONCLUSION

Shukra is the substance which is responsible for all systemic body activities including metabolic functions and part of which comes out

of the body at the time of sexual act and performs specific functions of reproduction. It is considered as essence of all *Dhatus*. And contains all *Panchaboutika* components, it is *Sarvadaihika*. Hence its level in body has to be maintained very carefully by consuming nourishing foods, leading a healthy life and practicing healthy sexual life.

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