Sukra Dhatu in female- An Ayurvedic perspective and it's scientific correlation

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Abstract-
Background: *Sukra* is described in Ayurveda as the terminal dhatu and the essence of all bodily tissues. Classical texts assert its presence in both males and females, though its reproductive role differs.
Objective: To critically review the Ayurvedic concept of Sukra in females and correlate it with contemporary scientific understanding, particularly endocrine physiology.
Methods: A narrative review of classical Ayurvedic texts (Bṛhattrayī and commentaries) and modern biomedical literature related to reproductive and endocrine physiology.
Results: Classical references confirm the presence of Sukra in females (Strī-śukra), which is not directly responsible for fertilization but governs sexual characteristics, vitality, and systemic functions. Modern correlates include the hypothalamo–pituitary–gonadal axis, adrenal and gonadal hormones, and glandular secretions involved in female sexual physiology.
Conclusion: Sukra in females can be conceptually correlated with the integrated endocrine system rather than gametogenesis alone. This integrative interpretation bridges Ayurvedic principles with modern reproductive endocrinology, supporting a gender-inclusive understanding of Sukra dhatu.

Keywords: **Sukra dhatu, Strī-śukra, Artava, Ayurveda, Endocrine system, Hypothalamo–pituitary–gonadal axis**

I. INTRODUCTION

Ayurveda describes seven dhatus constituting the human body, with Sukra as the final and most refined tissue element. While often emphasized in male reproduction, classical authorities clearly acknowledge Sukra in females. *Sukra* is produced as a result of the successive evaluative metamorphosis of *ahara* rasa.[1]. It is present in both male and female. Understanding this concept is essential for integrative interpretations of reproductive and systemic physiology.

Grammatical Considerations: *"Shocati Anena, Shocayati va iti Sukram, shukre sarjane tyaja"* (Amarakosa). Etymological origin of the word 'Sukra' in Sanskrit is from the root *'Suk Soce*' (Amorkosha), which means cleanliness (Sa.Kal.Dru)."*Shuc Klede"*- applying the aphorism '*suc,'* which implies the meaning of purity. Both derivations are made by adding the suffix '*ran'*.
Synonyms: The term sukra found in different references show its wide spectrum of utilization. The final tissue element '*Sukra'* has a number of synonyms as below: (Raja Nighantu, Dhanwantari Nighantu)

- *Beejam* (Sperm), *Viryam* (Potency), *Retah* (Semen), *Pumsatyam* (Manliness), *Paurusham*(Virility), *Atmaja, Roopadravya* (Reproductive Identity), *Indriyajam, Tejah* (Activeness), *Annavikara* (Food Derivative),*Anandsamudhbhav* (Born out of Pleasure), *Majjasarah* (Essence of marrow),*Balam* (Strength), *Kittavivarjitam* (No waste materials), *Dhatus Sara, Dhatus Sneha– Tissue* essence (S.K.D. / A.K.)

II. AIM AND OBJECTIVES

Aim: To elucidate the presence and role of Sukra in females as described in Ayurveda and correlate it with modern science.
Objectives:
- To review classical descriptions of Sukra in females
- To analyze functional attributes of Strī-śukra
- To correlate Ayurvedic concepts of sukra in female with modern endocrine physiology

III. MATERIALS AND METHODS

This study is a qualitative narrative review based on:
- Classical Ayurvedic texts (Charaka Samhita, Sushruta Samhita, Ashtanga Hridaya) and their commentaries
- Standard textbooks of human physiology and endocrinology
- Peer-reviewed secondary literature

IV. REVIEW OF LITERATURE

4.1 Formation and Origin of Sukra

The formation of *dhatus* take place in the following orders – Rasa, Rakta, Mansa, Meda, Asthi, Majja and Sukra, the uttarotra *dhatus* will formed by the previous dhatus. Ayurvedic doctrines such as Kṣīra–Dadhi Nyāya, Kedāra–Kulyā Nyāya, Khale–Kapota Nyāya and *Ekkala dhatu poshana karma* explain the progressive formation of Sukra from Ahāra rasa. Susruta suggest that food gets converted into *sukra* with in one month.[2] Vagbhata opinions that *sukra* is formed after 24 hours, 6 days or after one month by undergoing a series of *paka*.[3](As.Hri. Sa. 3/65).Chakrapani data opinions sukra produced in 8 days with speed of *Archi* (light), in a few days with speed of *Sabda* (sound), and in 1 month with speed of *Jala* (water).[4]

Discussion: Here we can say sukra is formed by the *ksheeradadhi* method of transformation within one month, by the *kedarikulya* method within six days and by the *khalekapota* method, suddenly, maybe within one day.

- Production of *sukra* from *ahara rasa*:

Sukra dhatu is the final tissue element produced from the progressive metabolic transformation of *annarasa*. Metabolic transformation in the different tissues happens in two ways: *kittapāka and prasada bhaga* (transformation of nourishing material). The bifold metabolic transformation of all the dhatus is justifiable, even though *sukra,* the seventh dhatu, does not have *kitta paka* at all. The tissue element nourished from the nutrient portion of *sukra* is *garbha*. All three laws, *ksheeradadhi nyaya* (law of transformation), *kedarikulya nyaya* (law of transmission) and *khale kapota* (the law of selectivity) can be attributed to the formation of *sukra*.[1, 5, 6]

- Origin according to *mahabhuta* and six rasas:

Sukra originates from the *soma* or the *jala mahabhuta*. [7,8,9] It is composed of *Vayu, Agni, Jala and Pruthvi* in the state of their excellence. All these factor individually shares ¼ of the attributes of each of *Mahabhuta*; this also shares *Madhuradi shad rasas.* Chakrapani comments over that, *Sukra* is made of five *Mahabhuta,* but this concept is concerned with the functional aspect of *Sukra*, which is the movement of the *Sukra*. (In *Akash Mahabhuta Gamanabhavata* is there).

- Production of *sukra* from *majja*:

Sukra is the seventh dhatu and is produced through the *datavagni pacana* of *majja dhatu.* About the production of *Sukra*[6, 10, 11], *Agnivesa* raises a question: if Sukra is formed from *Majja*, then how can it be explained as it is pervading the whole body, as wise men advised earlier? *Punarvasu Atreya* clarifies this query as follows. The unctuous substance of the *majja* gives rise to *sukra*. Porosity of *asthi* is caused by *Vayu and akasa,* etc., and through these pores exudation of *sukra* takes place. This happens on the analogy of the exudation of water from the porous walls of the new earthen pot. Fine channels carrying sukra pervade the entire body. When a person gets sexually excited, semen comes out from the entire body and is ejaculated.[12]

Discussion: Based on the references of Dalhana's commentary on Susruta that *mastishka* or *mastulunga* is also *majja*, the well-known scholar Prof. V. J. Thakar opines that the brain and pituitary gland can be taken as a functional representative of majja. The production of *sukra,* as well as *smasru* (secondary hair growth) at a particular age, can be understood in this way.

4.2 Presence of *sukra* in females:

i. The human body is made up of seven dhatus and the last being the sukra dhatu; therefore, women should also possess sukra dhatu in their body. According to classics, sukra in females is not capable of garbhottpadana, as in males, but stri also ejaculate sukra during the act of coitus."*Beeja stripumsa artava sukre."* According to Dalhana *beeja* in female is the *artava,* and in male *sukra*.[13]

Discussion: According to modern science, the only fluid sequestered forcibly at the onset of orgasm, which fills the glandular vestubularis major (bartholien glands) when these glands begin to secrete, immediately sexual excitement manifests. (A. C. Guyton and J. E. Hall, Textbook of Medical Physiology).

ii. According to Acharya Sushruta appearance of axillary and pubic hair and breast changes in females is due to sukra. [14]
Discussion: Androgens are continuously secreted by the adrenal cortex in both males and females. Much of the growth of the public and axillary hair in the female probably results from the action of these hormones. From the above discussion, we can understand strisukra as some glandular secretions along with hormones.

iii. In the Kasyap samhita it is mentioned that sonita and sukra are formed at age 16, and before that, it remains the same as a fruit which is situated inside the flower. Dalhana clarifies that Artava is known as sukra in female which is formed in the same parlance as sukra dhatu, charak a mentioned srtisukra which is not capable of fertilization.[15]
Discussion: Here we can say fertilization function in the female is governed by artava, but other function of sukra is governed by strisukra. In female sukra dhatu is equal to the strisukra along with artava.

iv. All the Brihatrayis have mentioned Sukra vaha Srotas moola.[16,17]. Acharyas have differently opined aboutthe moola sthana (root) of Sukra vaha Srotas. According to Acharya Caraka, vrishanya (both testicles) and sepha (penis). According to Acharya Susruta, stanaya (both breasts) and vrishnya (both testicles). According to Acharya Vagbhata, stanaya (both breasts), mushkya (both testicles), and majja (bone marrow)
Discussion: Breast tissue (nipples and mammary glands) develops from mammary ridges, a thickened ectoderm extended from axilla to groin on each side in the mammalian embryo, also called “milk lines” or “Hughes lines” or “mammary lines”. Normally, most of these ridges (all except two) regress. This can be correlated with the Susrutas view of mula sthana as stanaya and vrisana. For clinical correlation, we can see in testosterone deficiency, gymacomastia occur, as mula is the prabhava sthana, so stanya get affected.

v. *Sukra dhatus* are present all over the body like the juice is present in sugarcane, *ghee* is present in curd, and oil is present in Tila; similarly, *Sukra* is present in an inconceivable manner in the whole body.[18]. Sukra dusti lakshana are klaibya, apraharsha, gharbasrava, gharbapatha, rogi praja utpanna, napugshak praja utpanna, alpayu praja utpanna, virupa praja utpanna.[19]

Discussion: It also indicates that the hormones present in female which are responsible for implantation, nutrition and development of the baby comes under sukra. Sukra function in femele is mainly related to the sexual characteristic where secondary sexual characteristics appear at puberty include: Female: enlarged breasts, widened hips; Male: beard, deep voice. Puberty is associated with the secretion of gonadotropin-releasing hormones (GnRH). GnRH, in turn, induces secretion from the anterior pituitary of Follicle-stimulating hormone (FSH), Luteinizing hormone (LH). FSH and LH are secreted in females (develop the ovum) and males (stimulate the development of sperm, secrete testosterone). Estradiol secreted by the gonads induces breast development. Androgens stimulate facial hair, lowered voice, and muscle development

- Normal Puberty: The normal onset of puberty is between 11-15 years, and the mean age of menarche in Western populations is 12-13 years. Puberty occurs because of rising levels of sex hormones. FSH and oestradiol levels may be fairly high in the neonatal period (and may even cause isolated breast development in some infant girls), but are then seen during childhood till the onset of puberty.
- Normal sequence and timing of puberty: Breast development may be the earliest manifestation of puberty and is due to the conversion of adrenal androgens to oestrogens. Increased secretion of adrenal steroids (adrenarche), especially DHEA, results in increased sex hair and apocrine sweat odour. Ovarian maturation (gonadarche) normally follows adrenarche. Menarche usually follows 2-3 years after the onset of breast development, and cycles are usually irregular for about a year, varying between 21 to 45 days. Most cycles are regular by 2-4 years post menarche.
- Initiation of Puberty: Puberty is triggered by the initiation of pulsatile release of GnRH from the hypothalamic pulse generator (approximately 10000 neurons derived from the olfactory bulb), which then stimulates FSH and LH release and consequent ovarian development. It is thought that increasing insulin resistance in childhood initiates pulsatile GnRH release; this view is supported by the findings that

obese girls experience puberty sooner than normals, that menarche occurs at a critical body weight rather than age, and that the age of menarche is now younger than in previous generations. Apart from the influence of body weight, genetic factors account for much of the variation in age of puberty, both in a familial and ethnic context (e.g. African Americans enter puberty a year before Caucasian girls). Hormones and fluids that are present in both male and female, which govern the functions of sukra, can be corrected with the components of strisukra. Below are a few examples as below.

- Role of FSH and LH: In men, FSH and LH bind to receptors in the testis and stimulate production. Stimulating testicular growth and production of a protein that causes a high local concentration of testosterone near the sperm, which is an essential factor in the development of normal spermatogenesis. FSH and LH are essential for the maturation of spermatozoa. In female these control the development of ovarian follicles and the secretion of gonadal hormones from the ovaries.
- Role of Estrogen: In men, it regulates certain functions of the reproductive system important to the maturation of sperm and necessary for healthy libido. Regulate restoration of luminal fluid in the head of epididymis. In female it promotes the development of breasts, is involved in thickening of the endometrium and other aspects of the menstrual cycle, increase uterine growth.
- Role of Androgen: In men, it is responsible for masculine structures of males, libido, sexual functions and helps in spermatogenesis. In female it is responsible for pubic and axillary hairs during puberty. It is essential for normal follicle development.
- Role of Progesterone: Opposes and balances the effects of estrogen in both sexes. In male it raises the level of androstenedione in the prostate gland in male. In female it helps in the preparation of the endometrial bed for implantation.

4.3 Morphophysiological status of *Sukra*:

- *Mahabhautika* configuration of *Sukra*: *Sukra* is considered as *saumya*, which is derived from *soma* or *jala mahabhuta*. Acharya Charaka attributed the *pancha mahabhutik* configuration to *sukra*, with the predominance of all four *mahabhutas* except *akasa*.
- *Doshik* configuration of *Sukra*: *Sukra* is considered under *kapha* vargiya dravya, and also Sukra is one of the asryasthana (*dhatu*) of *kapha* dosha. Sukra is saumya[20], where it is defined as the origin as well as characteristic identical with kapha, which is derived from "*kena jalena phalena it kapha"* and all the sukra vardhaka drugs having the *madhura*, *snigdha* properties, which are also identical in character with the *kapha*.
- *Rasa* of *Sukra*: *Sukra dhatu* possesses *shadrasa*.[8]. *Chakrapani* commented that though it is considered as having *shadrasa*, the excessive intake of *amla, katu, and lavana rasa* causes *sukrakshaya*.
- *Sukra* as one of the vital spots of life: *Sukra dhatu* is one of *pranayatanas* of *sarira*. [21]
- *Upadhatu* of *Sukra dhatu:* Sarangadhara has mentioned *Ojas* as upadhatu of Sukra.
- *Sukra mala: Ojas, smasru*,[22] and *vaktra snigdhata* (sebum of face), *pidika* (acne) are malas as per Sarangadhar.

Discussion:

- Sukra, representing the Androgen and Hypothelamogonadal Axis: Androgens and hypothelamogonadal are the substances having masculinising properties. They are produced mainly from the interstitial cells of the testes and from the adrenal cortex. They are responsible for the growth of sex organs, the development of male secondary sex characters, facilitating spermatogenesis, muscular development, etc. Its activity and production are controlled by the pituitary and hypothalamus.

- Sukra can be represented as an androgen:
- Synonyms: pauruhsam, veerya,bala, teja,pumsatvam.
- Location: The *sukra*dhara kala is said to pervade the whole body.[23] and hence, the *sukra* is spread throughout the body just as ghee in milk and jaggery in sugarcane juice.[24]

- Functional characteristics: Classifications of the functions can be done like Specific functions i.e. *garbhodpadana* done by *sukra* in males and *artava* in females. Functions related to sexual act are *harsha, preeti, cyavana,* etc. Psychological functions like *dhairya, soumyata*. General body functions as *bala, upacaya, utsaha, ojoposaha,* etc.
- *Sukra sara purusha lakshanas*: *Sarvasariragatasukra saumya* (gentleman), *saumyapreksinaha* (gentlelook),*ksirapurnalocana*(eyes appearing fillled with milk), *praharsha bahula* (cheerfulness), *snigdha-vrittasamhata- dasanaha*(teeth which are unctuous, round, strong, dense, even), *prasanna-snigdha-varnasara (*pleasant - unctuous voice and complexion), bhrajisnuta (dazzling appearance), *mahaspik* (large buttocks), *stri-priya* (loved by women), *upabhoga balavana* (virile), *sukha* (endowed with happiness), *aishwarya* (prosperity), *arogya* (health), *vittya* (money), *sammana* (honour), *apatyabahula* (many offspring) [25]

V. CONCLUSION

Sukra dhatu is a systemic functional entity present in both sexes. In females, it operates through endocrine and neuro-hormonal mechanisms rather than direct fertilization. Conceptualizing Strī-śukra as an integrative endocrine phenomenon allows meaningful correlation between Ayurveda and modern biomedical science. Modern physiology recognises the role of gonadotropins, estrogen, progesterone, and adrenal androgens in female reproductive and sexual health. Sukra, being a dhatu besides its reproductive function in male, it also does functions in both male and femalelike maintenance of dehabala, dhairya, varna, upacaya and ojo-posana. These functions parallel the Ayurvedic attributes of Sukra, suggesting that Strī-śukra corresponds to the endocrine orchestra regulating growth, reproduction, and psycho-somatic balance.

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