

## Shukrajanana and Spermatogenesis-A Comparative Review

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### Abstract

Shukra is among the seven rasadi dhatus mentioned in Ayurveda. It is the essence of all the dhatus as per Ayurveda. Shukra is often compared with sperm, semen or testosterone. When we look inside Ayurvedic classics regarding the concept of shukra we can find that shukra can not be simply compared with sperm, semen or testosterone but semen or sperm or testosterone may be the part of Ayurvedic shukra and thus spermatogenesis may also be a part of shukrajanana.

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## INTRODUCTION

### *Ayurvedic Review*

The word Shukra is derived from Shuc dhatu with rak pratyaya.<sup>1,2</sup>

Shukra is among the seven dhatus.<sup>3</sup> Shukra is formed from the sneha amsa of majja.<sup>4</sup> According to Acarya Charaka and Sushruta, just as there is rasa in ikshu/sugarcane ghrita/ghee in dadhi/curd or milk, taila/oil in tila/sesame; similarly, shukra is said to be present in whole body.<sup>5</sup> After the formation of shukra, it comes out through the pores of asthi (porosity is caused by vayu and akasha) just as exudation of water through the porous walls

of earthen pot. When the person indulges in sexual act, the shukra is liquified due to the heat produced in sexual act and comes out from the entire body through vasti.<sup>6</sup> After maithuna/coitus, for garbha utpatti, the thing which is placed in yoni/vagina of female is called as shukra.<sup>7</sup> The dravyas which increases shukra, harsha and maithuna shakti is called vajikarana. For e.g. Nagabala and kapikacchu bija<sup>8</sup> - It can either be ahara, vihara or aushadha and by intake of this, the person can copulate like a horse or copulate multiple times.<sup>9</sup> It also provides pushti and oja.<sup>10</sup> It is synonymous with vrishya.<sup>11</sup>

These dravyas can be divided into four types viz shukrajanana, shukrashrutikara, shukrashrutivridhdikara, and shukrastambhan.<sup>12</sup>

The dravyas that increase shukra is known as shukrajanana. For eg, ashvagandha, musali, sakkar and shatavari. It is synonymous with shukrala and shukravivardhana.<sup>13</sup> Those dravyas that directly do not increase shukra but increase kamottejana only are shukrashrutikara.

For e.g. Akarkara etc. Those dravyas that are both shukrajanaka and pravartaka are shukrashrutivridhdikara. Dugdha, masha/black gram, bhallataka phala majja, amalaki

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are shukrapravartaka and shukrajanaka.<sup>14</sup> The dravyas doing stambhana of shukra are called shukrastambhana. For example Jatiphala.

### *Sarvadaihikta of shukra*

The shukradhara kala is present in all pranis and pervades all over the body<sup>15</sup> hence shukra is also present all over the body.

### *Formation of shukra*

Rasa forms rakta, rakta to mamsa, mamsa to meda, meda to asthi, asthi to majja and majja to shukra. Shukra forms garbha.<sup>16</sup>

### *Guna/Qualities, svarupa/form and parimana (quantity) of shukra*

Bahala, madhura, snigdha, avisra, guru, ghana, picchila, shukla, bahu, avidahi, sapatika sannibham, drava, snigdha, madhura, madhugandhi, tailakshaudranibham, shveta, ghrita makshika tailabham.<sup>17,18,19</sup> It is composed of vayu, agni, prithvi and jala. It is formed due to combination of six rasas.<sup>20</sup>

The quantity of shukra is ardhanjali.<sup>21</sup> The commentator of Charaka samhita, Cakrapani opines the parimana of shukra as told by Acarya Charaka to be utkrishta parimana. This amount fluctuates in the healthy body and can be known by anumana/inference.<sup>22</sup> As per Acharya Sushruta, due to vilakshaya (difference in measurement) of the body and change in doshadi with time, season etc., the quantity of shukra can not be told.<sup>23</sup> Dalhana is also of the same opinion as that of Acarya Sushruta.<sup>24</sup>

### *Karma (Functions) of shukra dhatu:*

Shukra is the param sara of ahara. This is the reason why the protection of shukra should be done. Also, the kshaya/decrement of shukra leads to diseases and death.<sup>25</sup> The main karma of shukra is utpatti of garbha<sup>26</sup>, dhairya, cyavana, priti, dehabala, harsha and bijartha (provide bija for garbhautpatti).

### *Shukra vridhhi lakshana (symptoms of shukra increment)*

Shukrashmari, shukraatti pravritti and ati strikamata.<sup>27,28,29</sup>

### *Shukrodaya kala (age of manifestation of shukra)*

Just as there is no sugandha/fragrance in mukula pushpa (bud) but eventually as the flower blossoms, fragrance appears. Similarly the shukra also manifests in dehadhari/one possessing the

body.<sup>30</sup> The use of vrishya dravyas should be taken in between 16-70 years of age.<sup>31</sup>

### *Shukravaha srota (Pathways of Shukra)*

The root of shukravaha srotas are vrishana, shepha and stana.<sup>32,33</sup> The shukra pravritti in males occurs from mutra srota located two angulis below the vastidvara.<sup>34</sup>

## SHUKRA IN FEMALE

Rasadi seven dhatus are present in all pranis/beings so, shukra is also present in females. When two kamatura stri involve in sexual act, and secrete shukra in each other, it results in fetus devoid of bones<sup>35</sup>. The women also secrete shukra during sexual act but it is useless for conception.<sup>36</sup>

### *Gunas and use of Shukrajanana Dravya*

Madhura rasa is shukrotpadaka (helps in production in shukra) and amladi rasa is shukra vighataka (destroys shukra).<sup>37</sup> The gunas/qualities of vrishya dravyas are madhura rasa, snigdha, jivana, brimhana, guru and they impart harsha<sup>38</sup>. The shukrala varga, jivaniya varga, brimhaniya varga and balya varga are also vrishya when taken with godhuma/wheat, milk, ghee and sharkara/sugar<sup>39</sup>. These vrishya dravyas should be used after shodhana/biopurification.<sup>40</sup>

## MODERN REVIEW

### *Semen*

Semen is the fluid that is ejaculated at the time of orgasm. It is composed of sperm and secretions of the seminal vesicles, prostate, cowpers gland and urethral gland.<sup>41</sup> This secretion contains sperm which unites with ovum to form progeny. The normal quantity per ejaculate of the is around 2 ml in humans.<sup>42</sup> The semen comes out through the urethra with the closure of the bladder neck.<sup>43</sup>

### *Testosterone*

It is one of the androgens which are formed by the interstitial cells of leydig that lies in the interstices between the seminiferous tubules and in small amount through adrenal glands<sup>44</sup>. It is present in general circulation and has androgenic and anabolic effects.<sup>45</sup> It stimulates the function of bones, muscles, erythropoietin, mood and cognition centres in the brain. It also stimulates libido and penile erection.<sup>46</sup> The testosterone is present in women also but it functions via conversion to estradiol.<sup>47</sup> Excess of testosterone leads to low sperm counts, shrinking

of the testicles, impotence etc.<sup>48</sup>

### *Spermatogenesis*

It is the process of production of sperm from the primordial germ cells.<sup>49</sup> In this process the haploid spermatozoa develops from germ cells in the seminiferous tubules of the testis.<sup>50</sup> It starts at puberty, when the Leydig cells in the testes start to produce androgens under the influence of the Follicle-Stimulating Hormone (FSH) and the Luteinizing Hormone (LH), which are in turn controlled by the Gonadotrophin-Releasing Hormone (GnRH) produced by the hypothalamus. Spermatogenesis takes 65 to 75 days and takes place simultaneously at different times in different regions of the testis for an even production and availability of mature sperm.<sup>51</sup>

### **PURPOSE OF SPERMATOGENESIS**

The main purpose of spermatogenesis is to produce a genetically unique male gamete for the fertilization with an ovum and produce offspring.<sup>52</sup>

#### *Process of Spermatogenesis*

The process of spermatogenesis starts with adolescence. The primitive germ cell next to the basal lamina of the seminiferous tubules, mature into primary spermatocytes. The meiotic division of primary spermatocytes leads to the reduction of the number of chromosomes. In this process consisting two stage, they divide into secondary spermatocytes and then into spermatids. The spermatids contain the haploid number of 23 chromosome. The spermatids mature into spermatozoa (sperm). So, this is the process of spermatogenesis of a mature sperm from a primitive germ cell.<sup>53</sup>

#### *Causes of Male Infertility*

Mechanisms of impaired fertility include direct effects on germ cells or their supporting cells, effects on the delicately balance HPG (hypothalamic - pituitary- gonadal) axis, effects on erectile or ejaculatory function, and effects on libido.<sup>54</sup>

#### *Drugs that cause male infertility*

Immunosuppressive drugs, anti inflammatories, antiandrogens, alpha blockers, diuretics, anti infective agents, antidepressants, antipsychotics, antihypertensives etc. can cause infertility.<sup>55</sup>

#### *Some examples of Spermatogenic Drugs*

The medications for male infertility are Clomiphene citrate, Anastrozole and hCG (Human chorionic gonadotropin) or hMG (human

menopausal gonadotropin). They have potential side effects also<sup>56</sup>. The common side effects of these drugs are gastrointestinal distress, dizziness, gynecomastia, and visual disturbances etc.

#### *Different Views Regarding Shukra*

Various authors opine that shukra is semen and/or seminal fluid which is one of the macrostructures of male reproductive system or male reproductive.<sup>57,58,59,60,61</sup> Similarly some authors opine that shukra is testosterone.<sup>62</sup> Some authors also opine that shukra to be secretions of all the hormones from entire endocrine organs especially hypothalamo-pituitary axis.<sup>63</sup> [263].

### **COMPARISON BETWEEN SHUKRA, SEMEN AND SPERM**

1. Shukra is the dhatu which is pervades in the whole body.<sup>64</sup> The shukra has been correlated to semen. The semen is an organic fluid that contains spermatozoa.<sup>65</sup> Similarly, Spermatozoa are the male gamete.<sup>66</sup> So, According to Ayurveda, it is something that is generalised but localised according to modern.
2. Shukra is produced from the sneha amsa of majja when acted upon by majjagni.<sup>67</sup> Semen is formed as the combination of secretions of the seminal vesicles, prostate, Cowper's gland and urethral gland with sperm.<sup>68</sup> Similarly, spermatozoa are produced inside the testes.<sup>69</sup>
3. Shukra comes out when the person indulges in sexual act due to the heat produced in sexual act, the shukra is liquefied from the entire body, collects in vasti and comes out through mutramarga.<sup>70</sup> The semen comes out through the urethra with the closure of the bladder neck which suggests that it does not collect in urinary bladder before excretion.<sup>71</sup> The sperm comes out along with the semen.
4. Shukra is present in both male and female.<sup>72</sup> Semen and sperm is only found in males.

#### *Comparison between Shukra and Testosterone*

1. If shukra were testosterone, the increased level would cause shukrashmari, shukrati pravritti and ati strikamata.<sup>73</sup> The increased level of testosterone is associated with low sperm counts, shrinking of the testicles, impotence, suppression of spermatogenesis, azoospermia etc.<sup>74,75,76</sup>
2. The amount of Shukra is ardhanjali as per

Ayurveda and present in both males and females.<sup>77</sup> The concentration of testosterone is less in female (4-22 ng/dl) in comparison to males (30 - 85 ng/dl).<sup>78</sup>

3. Testosterone is produced by the interstitial cells of leydig and adrenal glands but as per Ayurveda shukra is formed from the sneha amsha of majja.<sup>79</sup>

## RESULT AND CONCLUSIONS

Hence it is clear that shukra cannot be correlated with sperm or semen or testosterone only. However, semen or sperm or testosterone may be the part of Ayurvedic shukra and thus spermatogenesis may also be a part of shukrajanana.

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