

The curious case of Sudyumna: A tale of sex reversal from the Bhagavata Purana

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ABSTRACT

Tracking endocrine disease in mythology especially one as old and diverse as Indian mythology is a challenge. A curious case of sex reversal in the bhagavata purana is described and hunches about the disorder of sexual differentiation that manifested itself in the hapless Sudyumna the son of Manu is attempted. 5 alpha reductase deficiency appears to be the closest candidate but some twists in the tale are required to fill in the gaps.

Key words: 5 alpha reductase deficiency, Bhagavatha Purana, cyclical hormonal production, disorder of sexual differentiation, leydig cell tumor, persistent mullerian duct syndrome, Sudyumna

INTRODUCTION

Indian mythology is a treasure trove for the fertile mind. By sheer vastness, depth of imagination, richness of themes and subjectivity of interpretation - its a story hunter's dream. For the physician interested in picking syndromes from old yarns, Indian mythology offers a veritable journey of discovery. A bizarre cocktail of mutated genes and even more hormones (some still undiscovered) running amok stare out of books, wall paintings and temple towers. Chimeras of all sorts, xeno-transplants (Ganesha is a leading light here), several instances of *in-vitro* fertilization, (Agastya, Drona, the Kaurava hundred), pregnancy in men (Yuvanasva), and even a true hermaphrodite with the phenotype split into a sagittal half (ardhanaareswara) clamor for attention. The endocrine purist may be disappointed somewhat, for, there is seldom a direct mention of hormones or glands; this, despite the obvious location of each yogic chakra in the close proximity

of an endocrine organ (see a future article in this series).

The Puranas (a collection of ancient tales) contain amazing stories that can be an endocrinologist's delight. The most popular of the Puranas, the Srimad Bhagavatham retells this story of the son of Manu, the forebear of the human race. Manu had no sons for a long time. On his request, Vasishta, his teacher arranged for a sacrifice to please Mitra and Varuna and obtain a male child. Shradha, who was Manu's wife, desired a daughter and had entreated the officiating priest (rtvik-hota) for a daughter. At the moment of the final offering, the priest remembered her request and reversed the mantra. A daughter, Ila was born to them in due course. Manu, unhappy, watching the child growing up as a female takes his case to Vasishta. Vasishta, who had prayed for a male child in the first place and annoyed at being deceived by the queen, transforms Ila through the powers of his penance in to a male child - Sudyumna.^[1]

In the realm of the impossible, endocrinology finds possibilities. If you were to stretch the time line and believe that Vashishta didn't turn Ila into a man at the twitch of a brow and that nature took care of Manu's request as the child grew up into puberty, interesting possibilities open up.

What if Sudyumna had a disorder of sexual differentiation (DSD)? what if he did have a genotype that was 46 XY as Vashishta intended originally? and that

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he did have a female phenotype at a birth?

Swyer's syndrome doesn't make the cut because we do want Sudyumna to become develop a "male phenotype" at puberty. For obvious reasons true hermaphroditism, also does not fit the bill. A deficiency of enzymes of testosterone synthesis can cause virilization at puberty and is a close contender. Even more attractive (and somewhat exotic) is the idea that Sudyumna had 5 alpha reductase deficiency (5ARD).

An important reason to fix 5ARD to the hapless prince (ss) are reports of successful gender role change attributed to this condition in the literature. In a large extended kindred from the Dominican republic, 18 of 19 patients raised as females successfully changed gender roles to males at the time of puberty.^[2] This occurs in approximately 50-60% of patients.^[3] It is important to note that gender reversal is also known in patients with defects in testosterone biosynthesis but not in androgen insensitivity.^[4]

That would explain the female phenotype at birth and the development into a muscular male at puberty and the assumption of a male gender role in a patriarchal society almost magically.

If the story had ended here, it would have been a happy ending for Sudyumna, Manu and Vasishta; not to mention that the 5ARD theory would have been brilliant. Ironically and true to Indian mythology - there is a twist to this tale, that complicates matters further.

Sudyumna becomes a man and after Manu, becomes King. Now, at the foot of mount Meru, there is a very private and secluded grove called Sukumara, where Shiva and Parvati spend many an intimate moment. To allay Parvati's fear of trespassers, Shiva had decreed that any male who enters the grove would become female. One day, Sudyumna who was Ila at birth, riding a beautiful horse brought from Sindhuprasta goes hunting with a retinue in that very area and accidentally enters the grove. Sudyumna and his ministers instantly transform in to women; the horse becomes a mare.

After sometime, Sudyumna remembers that he (she) has a kingdom to run; he remembers Vashishta who propitiates Shiva for a solution. Shiva, torn between the promise he made to Parvati and the wishes of an ardent devotee decrees that Sudyumna will live on: As a male for a month and as a female for a month.

This is fantasy beyond the realm of day to day endocrinology; but warrants a diagnostic jab (albeit feeble) anyway.

Gynecomastia itself is well recorded in 5ARD at puberty but this is temporary; we therefore have to invoke a feminizing tumor to account for a post pubertal transformation. Did Sudyumna develop a (leydig (?) cell) feminizing tumor- and was the tumor cyclical in its production of estrogen?^[5] Periodic hormonal production in tumors is well known; the author is however, not aware of reports of estrogen producing tumors that are cyclical. Now what would be the proof for Sudyumna being a man a month and a woman the next? Wouldn't that require a menstrual period or at least a breakthrough bleed (in the absence of progesterone)?

To achieve this, we should confer Sudyumna a second mutation that preserves mullerian structures - the persistent mullerian duct syndrome (PMDS). PMDS is characterized by the persistence of mullerian duct derivatives, uterus, fallopian tubes and upper vagina. Approximately 85% of cases are due to mutations in anti-mullerian hormone (AMH) or the AMH receptor II gene.^[6] If poor Sudyumna did harbor a mutation in both 5 alpha reductase and in the AMH gene our story moves into the realm of the plausible: Retained mullerian structures, a female phenotype in a XY male and masculinization at puberty. A feminizing tumor that Shiva renders cyclical, shows up and causes breast development and periodic breakthrough bleeding: Improbable but not impossible. Of course there are no reports of these two mutations occurring together not to mention these plus a cyclical tumor in the literature.

To cap it all, Sudyumna does have three children through his wife. Can patients with 5ARD who maintain gender identity as male have children? Sperm counts were normal in 1 one of 9 nine patients in the Dominican republic cohort.^[7] Fertility in patients with 5ARD is clearly reduced but not unknown.^[8] Some of these patients can have children through intracytoplasmic sperm injection (ICSI). Remember that assisted reproduction was a cinch for the ancients.

Sudyumna would need a robotic throughput to pin the cause of his contorted course through life; since we can't do that now, this attempt will have to do, unless you, the reader have a better explanation. I look forward to a more simple explanation than the twisted one i have proffered. Fixing a disease on a yarn spun a millennia ago requires creative endocrine license and I have freely taken it.

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