Male Fertility and Contraception: Challenges and Solutions to Men's Reproductive Health

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Introduction

"If the current global sperm count trend continues, it will reach zero by 2045" (Shanna Swan, Ph.D.). "The decline in male sperm count has been a common phenomenon worldwide. From 1973 to 2018, the mean sperm concentration and total sperm count among unselected men from all continents decreased by 51.6% and 62.3%, respectively. This large and sustained decline is now considered a major public health issue, and the relationship between sperm count and infertility has received widespread attention" (Li et al.). "Over the past 40 years, sperm counts worldwide have halved and sperm quality has decreased alarmingly with 1 in 20 men currently facing reduced fertility… the use of assisted reproductive technologies (ART) is therefore increasing at a rate of 5-10% per year, due to greater need" (Ravitsky and Kimmins). "Currently, more than 80 countries, including the U.S., have birth rates below the population replacement level of 2.1 births. By 2050, it is expected that 75% of all nations will have a birth rate lower than population replacement. At the same time, the number of births per person has declined from 5 in 1964 to 2.4 in 2018" (Phoenix Sperm Bank). The current state of male fertility is declining rapidly on a global scale. If Dr. Swan's warning, the most alarming of the four presented here, is accurate, artificial methods of procreation will be all that is left to humanity. Dr. Swan, along with a group of researchers, published a review of sperm concentration and total sperm count in 2017 (Levine et al.). They concluded that between 1970 and 2010, there was a 52.4% decline in sperm concentration and a 59.3% decline in total sperm count. Unfortunately, this appeared to be a conservative estimate as they excluded a significant number of factors that could dilute and confuse

their data. In 2021, she published a book on the crisis titled *Count Down: How Our Modern World Is Threatening Sperm Counts, Altering Male and Female Reproductive Development, and Imperiling the Future of the Human Race*.

The following is a collection of information, tools, and resources to facilitate better Men's Health, specifically through the lens of fertility. This is not designed to be a comprehensive, all-encompassing resource; rather, it is a primer on male reproductive anatomy, physiology, common issues that impact fertility, conventional and natural solutions to support fertility, and conventional and natural methods of contraception designed to put fertility back in his hands.

Anatomy (Physical and Etherical) and Physiology

The male reproductive system's function, at the physical level, is three-fold: produce, nourish, and transport sperm; deposit it within the female reproductive tract; and secrete hormones (Herlihy 496). This system is located at the base of the torso within the pelvis and is composed of glands, tubes, ducts, and spongy erectile tissues. All physical and etheric organs and structures appear in Appendix A.

The penis is one of two external components of this system. It consists of the shaft which is composed of spongy tissue, called erectile tissue, that fills with blood during arousal and is covered by soft, loose skin that stretches in order to accommodate the different states. The glans is located at the distal end of the penis and houses between 5000 and 8000 nerve endings that communicate pleasure to the brain during stimulation. The glans is covered naturally by the foreskin or prepuce that shields and protects the glans and the urethral opening at the tip of it. The foreskin also contains nerve bundles, to the tune of roughly 11000 nerve endings, that communicate pleasure during stimulation as well as other sensations just like the glans (Cox et al.). The foreskin is commonly removed surgically, most often at birth in the West. The purpose of the penis is to penetrate as far as possible into the vaginal canal; thereby, getting the ejaculate as close as possible to the cervix to maximize the sperm's chances of

implantation. The average penis is between 5.1 and 5.5 inches (King). Common perception is that the average length is 6 inches or longer; however, this is primarily due to self-reporting and public perception that “bigger is better.” This average is a result of 10 studies in a clinical setting where measurements were taken of stretched penis length for various reasons (King).

The other external component of the male reproductive system is the scrotum. The scrotum is a sac, or pouch of skin, that hangs loosely between the legs and contains the testes (Herlihy 500). This sac plays an important role in keeping the testes roughly 34-degrees Celsius or 93.2-degrees Fahrenheit in order for them to perform their function (Skandhan and Rajahariprasad). The scrotum is highly temperature sensitive and will contract and pull the testes into the pelvic cavity by way of the cremaster muscle to keep them warm when it is colder than the testes’ preferred range and then hang loosely when it is warmer (Waller 243).

The testes, housed within the scrotum, produce sperm and Testosterone as their two functions. The testes consist of an outer fibrous capsule that is divided into roughly 250 lobules, or compartments (Herlihy 498). Each lobule contains winding tubes called sertoli-cell-lined seminiferous tubules and leydig or interstitial cells (Herlihy 498). It is within these leydig cells that sperm cells are created, this process is called spermatogenesis. After traveling through the seminiferous tubules the sperm reach maturity in an external lobe of the testes called the epididymis which contains the final bundle of tubules roughly 20 feet in length (Herlihy 499). This then transitions to a single, larger tubule called the vas deferens which connects the testes and epididymis to the rest of the reproductive system.

Surrounding the testes is the Blood-Testis Barrier (BTB). This structure consists of gap junctions, tight junctions, and other highly specialized transport gates both within and surrounding the testicles. “It is one of the strictest tissue barriers found in mammals and divides the seminiferous epithelium into the basal part and an adluminal part” (Li et al.). The purpose is to segregate the seminiferous tubules from the general bloodstream and restrict access so that sperm can develop in a

specialized environment and avoid potential autoimmune issues. It is necessary for proper spermatogenesis (Li et al.). Fortunately for some and frustratingly for others, “the presence of this barrier also poses a challenge for the development of drugs that target the testicles” (Li et al.). See Figure 5 in Appendix A for a visual depiction of BTB activity.

Spermatogenesis is a joint operation between the leydig cells and the sertoli cells. Initially, sperm cells are undifferentiated and are called spermatogonia or germ cells. These undifferentiated cells contain 46 chromosomes and then undergo mitosis and split into identical cells (Herlihy 499). One cell remains within the seminiferous tubules as a stem cell while the other develops further. The next stage of sperm development is meiosis, or the imprinting of genetic information and the reduction of chromosomes from 46 to 23. It is at this stage that certain genetic characteristics are determined and the variety becomes apparent amongst the sperm cells. The final stage of spermatogenesis is spermiogenesis, which completes the physical structure of each sperm cell. Each sperm cell is composed of a head, body, and tail. The head and tail develop during spermiogenesis and finally become motile and become spermatozoa. This entire process from beginning to maturity takes nearly 72 hours. The head of the sperm contains all of the genetic information and is coated in a chemical layer called the acrosome. The acrosome is a collection of enzymes that assist the sperm in penetrating the egg to allow fertilization (Herlihy 499). The body contains mitochondria that feeds and powers the sperm so that it can swim to find and fertilize the egg. The tail, or flagellum, is a whip-like structure that allows the sperm to do the swimming.

During the maturation process, sperm cells take on one of three possible specializations. The process described so far is for the Sprinter sperm cells, or the ones that, once an ejaculation has occurred, race to be the first to fertilize the egg. There are also dud sperm that block the passage of future sperm from reaching the uterine tube where the egg is located during ovulation. Lastly, there are killer sperm that will remain in the vaginal canal and uterus in order to attack future sperm to prevent

them from reaching the uterine tube (Waller 243). The dud sperm and killer sperm develop for the sole purpose of maximizing the odds that one of the sprinter sperm can make it to the egg in the case that another male ejaculates inside the same female by interfering with that male's sprinter sperm.

The epididymis is the first pair of ejaculatory ducts, one next to each testicle. Mature sperm cells wait here to either be released via an emission or to expire and be replaced. During an emission, the walls of the epididymis contract and push the mature sperm cells into the tubule structure of the vas deferens, also paired, which ascends into the pelvic cavity, over the urinary bladder, and joins with the seminal vesicle, also paired, to form the ejaculatory duct (Herlihy 499). The seminal vesicles contribute to the formation of semen. Next, ejaculatory ducts pass through the prostate gland before finally emptying into the single urethra (Herlihy 499). To clarify, there is a left and right testicle, epididymis, vas deferens, seminal vesicle, and ejaculatory duct. It is only at the urethra, that both lines unite into one.

The Prostate gland, located beneath the bladder and behind the pubic bone is made from the same type of tissue that the uterus is composed of (Waller 244). This gland is roughly the size of a walnut and contributes to the formation of semen.

The Bulbourethral gland is the second to last gland that the sperm encounter before exiting through the urethral opening of the penis. This gland is located beneath and a bit behind the prostate and further contributes to the formation of semen in addition to lubricating the urethra to facilitate ejaculation (Waller 243).

The urethra is the tube that empties the bladder and provides the track for semen to leave the body. It begins immediately inferior to the bladder inside of the prostate and terminates with the urethral opening at the tip of the penis. The urethra can only serve one of these systems at a time (Herlihy 500).

Semen is the milky fluid, that exits the urethral opening at the tip of the penis as a result of an ejaculation. Semen, or ejaculate, is composed of 10% sperm, 60% fluid from the seminal vesicles, 20% fluid from the prostate gland, and 10% fluid from the bulbourethral gland. All together, semen, or seminal fluid, is a nutrient dense fluid containing citrate, calcium, magnesium, potassium, chlorine, sodium, fructose, glucose, lipids, amino acids and other proteins, fibrinogen, vitamin B, vitamin C, zinc, selenium, and more (Owen & Katz). There are roughly 179 compound amino acids including chemical variations of amino acids present in seminal fluid (Engel et al.). The prostate and bulbourethral glands also alkalize the semen to an average pH of 7.7 to combat the acidity of the vagina (Owen & Katz). It is a highly specialized solution that maximizes the chances of survival for the sperm. See Table 1 in Appendix A for Amino Acid breakdown of seminal fluid.

The pineal gland, or the composer of the endocrine system (Horne 3). It is regulated largely by the circadian or diurnal rhythm better known as the day-night cycle. The pineal gland produces Melatonin, a necessary hormone for the regulation of numerous functions throughout the body. It also produces Adrenoglomerulotropin, which communicates with the adrenal cortex to regulate Aldosterone.

The hypothalamus is the arranger of the endocrine system of both men and women (Horne 3). It receives hormone and other chemical signals from the pineal gland and the rest of the body. The hypothalamus then communicates with the pituitary gland using electrochemical signals and hormones by way of the infundibulum. The pituitary gland, anterior and posterior, is the conductor of the endocrine system (Horne 3). It receives signals from the hypothalamus that hormones are needed and then sends stimulating hormones to almost every gland in the body as needed to maintain proper function.

Testosterone is the dominant hormone of the male reproductive system and is also responsible for male sex characteristics, both primary and secondary (Herlihy 501). It plays a necessary role in the development of muscle, fat, and bone as well. Males feature greater bone density and larger muscle

mass than females due to the dominance of Testosterone. It, like all steroid hormones, is a product of Cholesterol. Proper Testosterone levels are necessary for the integrity and regeneration of the BTB (Li et al.). Testosterone is necessary for the maturation of sperm cells, without which, they do not form a flagellum and cannot swim. It also directly influences the proper expression of several genes necessary to male reproductive function including WNT5, Plzf, Igf3, and Rhox5 (Li et al.). Testosterone is produced throughout life, but production is prominent beginning at the age of around 11 years of age resulting in puberty, known clinically as adrenarche. Puberty for males is the rapidly increased growth of hair, the enlargement of the vocal cords, thickening of skin, increased activity of sweat glands, and musculoskeletal growth (Herlihy 501).

Anti-Müllerian Hormone (AMH) is secreted by fetal sertoli cells in order to stimulate regression of Müllerian ducts which prevents the development of a uterus and fallopian tubes (Li et al.). This hormone is secreted by the sertoli cells until puberty, where production declines sharply as the sertoli cells mature. There is an inverse correlation between the amount of AMH and androgen levels. As androgen production increases during puberty, AMH production decreases until it drops to nearly immeasurable trace amounts post puberty (Li et al.).

Insulin-Like Factor (INSL3) is produced in the leydig cells. Secretion begins during fetal development after the primary sex characteristics have been established and acts on the positioning of the testes. During development, INSL3 helps the testes remain in the inguinal region where they would float freely in abdominal cavity otherwise (Li et al.). INSL3 also works alongside Testosterone during puberty to stimulate the testes to descend into the scrotum.

Follicle Stimulating Hormone (FSH) is a gonadotropic hormone secreted by the anterior pituitary gland that is necessary for proper function of sertoli cells and sperm production. Once released by the anterior pituitary gland, it binds with FSH receptors on the sertoli cell wall where it then signals the cell to produce sperm cells (Li et al.).

Luteinizing Hormone (LH), sometimes referred to as Interstitial Cell-Stimulating Hormone (ICSH), is another gonadotropic hormone secreted by the anterior pituitary gland. LH acts on the leydig cells to stimulate the production of INSL3 and Testosterone (Li et al.).

Inhibin, both A and B variations, are produced by the sertoli cells of the testes. This peptide is necessary for the regulation of FSH secretion by the anterior pituitary gland. Inhibin A is primarily secreted up to puberty; after which, Inhibin B takes a dominant role through adulthood (Li et al.). It is an important hormonal indicator of proper function of sertoli cells in allopathic diagnosis.

Activin, specifically Activin A, is a stimulatory glycoprotein that communicates to the anterior pituitary gland to release FSH via serine / threonine kinase receptors (Li et al.). Activin A is necessary for the development of sertoli cells during fetal growth. It is also necessary for the proper development of the epididymis. Without Activin A, the production of sperm is almost completely halted. Chemically, Activin A is a direct precursor to Inhibin (Li et al.).

Estrogen, in the form of Estradiol, is part of the male reproductive system. Aromatase, an enzyme created by the leydig cells, converts Testosterone into Estradiol. Estrogen, generally, is necessary for the development of the epididymis and spermatogenesis. It is a delicate balance that must exist between the Androgens and Estrogens in order for male reproduction to function optimally. If there is not enough Estrogen, spermatogenesis cannot happen and infertility ensues. If there is too much Estrogen, it becomes antagonistic to Testosterone and adversely impacts the development of the prostate (Li et al.). Estradiol also contributes to the regulation of the HPG axis by inhibiting the secretion of Gonadotropin-Releasing Hormone (GnRH) by the hypothalamus. Estrogen also contributes to the regulation of libido and proper erectile function (Schulster et al.).

Prolactin, although most commonly associated milk production in mothers, serves a significant purpose in the way of regulating the number of LH receptors on leydig cells (Li et al.). As a result of its action on the leydig cells, Prolactin indirectly regulates Testosterone synthesis in males (Hair et al.). It

is known that Prolactin impacts libido and contributes to paternal behavioral patterns (Hashemian et al.).

Oxytocin is produced by the posterior pituitary gland in both males and females. While it is most commonly associated with motherhood and the connection between mother and baby, it is also plays a role in the proper function of the male reproductive system. Research on Oxytocin has demonstrated that it plays a role in spermatogenesis and sperm cell apoptosis as well even if the precise mechanism is still unclear (Li et al.). Other research has shown that Oxytocin helps to promote GnRH and Testosterone secretion (Li et al.).

Progesterone seems to be an elusive hormone to pin down in its precise role within male reproductive function. It has some influence on spermatogenesis, acrosome formation on the head of the sperm cell, and synthesis of Testosterone within the leydig cells (Oettel and Mukhopadhyay). It has also been tracked to influence the nervous system, sleep, LH and FSH secretion by the pituitary gland, and several other organ systems (Oettel and Mukhopadhyay).

To put it together, male fertility has much to do with the Hypothalamic-Pituitary-Gonadal Axis (HPG). This axis is the feedback loop between the hypothalamus, pituitary gland, and testes that is responsible for the production of sperm and Testosterone. The hypothalamus, regulated in part by the Melatonin produced from the pineal gland during the diurnal or circadian cycle, releases GnRH which tells the anterior pituitary gland to send FSH and LH to the testes. LH makes its way to the Leydig cell to stimulate production of Testosterone which combines with FSH in the Sertoli cells to produce sperm. Some Testosterone is broken down by 5-alpha-reductase enzyme to produce Dihydrotestosterone (DHT) which then goes on to serve the body as described previously and also makes its way to the Hypothalamus to help regulate further GnRH release (Kinter et al.). DHT plays its most significant roles leading up to and during adrenarche, after which, it recedes into trace levels (Kinter et al.). Aromatase, an estrogenic enzyme, breaks down some of the Testosterone and converts it into Estradiol,

contributing bone mass and further regulation of HPG activity (Korani). There are three chemicals that provide regulatory feedback in this axis: Inhibin, Testosterone, and Estradiol. Inhibin is secreted by the sertoli cells and communicates directly with the anterior pituitary gland to slow secretion of both FSH and LH. Estradiol communicates directly with the GnRH neurons within the hypothalamus to inhibit the release of GnRH to the pituitary gland. Testosterone communicates with the anterior pituitary gland and GnRH neurons directly or with the GnRH neurons by first converting to Estradiol (Li et al.).

The HPG axis is active throughout life; however, it is particularly active during fetal development, the first six months after birth, puberty, and in adulthood. During fetal development, specifically near day 42, the hypothalamus develops GnRH neurons and begins secretion. LH and FSH can be detected beginning near 12 weeks before dropping to trace levels nearing the end of pregnancy. This drop in LH and FSH is partially due to placental Estrogen acting on the fetal HPG axis. At roughly eight weeks, the testes begin secreting Testosterone, rising to near-adult levels during weeks 10-12. Testosterone levels drop nearing the end of pregnancy where its cumulative effect stimulates contraction of the gubernaculum, a fibrous connection linking the testes to the scrotum, and begins to pull them into place. AMH production begins during week eight as well and causes regression of the Müllerian ducts (Li et al.).

During the first six months of infancy following birth, the HPG axis resumes activity and the hormone cascade begins again in a phase called minipuberty. Increased secretion of AMH contributes to proliferation of AMH. Sperm cells begin development but do not reach full maturity during minipuberty. Testicular cells proliferate collectively in order to establish full potential for Testesterone and sperm development following puberty (Li et al.). After the six month mark, the HPG returns to relative dormancy until puberty at roughly the age of 11 years.

During puberty, the HPG axis ramps up to full activity, stimulating maturation of the testes and male reproductive system. Sperm cells are now able to reach full maturity due to increased levels of

Testosterone and FSH exerting their effect on the Sertoli cells. Also during this time, the volume of the testes increase and the diameter of the seminiferous tubules increases. As Testosterone levels increase, AMH levels decrease, resulting in an increase in Inhibin B initially. During the later stages of puberty, FSH and Inhibin B become more antagonistic of one another. INSL3 levels also increase during puberty as LH levels rise (Li et al.). It is at the completion of puberty that fertility reaches full capacity. Once in adulthood, the HPG axis continues to maintain the reproductive system in the way of libido, physical sexual function, and spermatogenesis. It also maintains muscle and bone mass as well as erythropoiesis, or the production of red blood cells (Li et al.). See Figures 8 and 9 in Appendix A for a visual depiction of HPG activity.

While it is well known that the female hormone cycle aligns roughly to the Lunar Cycle of 28 days, men also cycle. Male physiology aligns with the Solar Cycle of 24 hours as well as the seasonal cycle. During this time period, men experience highs and lows of their own hormones. Where Estrogen and Progesterone are the two primary hormones in the female cycle, Testosterone is the primary hormone in the male cycle. Testosterone peaks around 9AM and gradually declines as the day goes on until it eventually reaches its lowest point around 9PM and regenerates overnight. Seasonally, testosterone is highest between August and October and lowest in March (Zornitzki et al.). Interestingly, sperm attributes follow a different annual pattern. According to a study done at the Center for Reproductive Incapacity of the University Hospital of Parma in Italy on 5188 men, the research team discovered that sperm motility is highest in the summer months, sperm volume was highest in the winter, and sperm pH was highest in the spring (Giorgi et al.).

For the male reproductive system to perform its functions, the nervous system must be engaged and hormones must be properly in place. Physically, the nerves that supply the entire reproductive system originate from the sacral nerves from the spine (Waller 245). The parasympathetic nervous system allows arousal and the change in blood flow that facilitates the filling of the spongy erectile

tissue to form an erection. Chemically, this stimulation of the nonadrenergic/noncholinergic (NANC) cells in the penis initiates the production of nitric oxide. Nitric oxide is a messenger that signals the activity of guanylate cyclase to produce cyclic guanosine monophosphate (cGMP) (Green 129). cGMP stimulates the relaxation of smooth muscles within the penis to allow blood to flow into the blood vessels of the penis, causing an erection (Green 129). Stimulation communicates pleasure to the brain which triggers the sympathetic nervous system. The sympathetic nervous system initiates emission, the release of sperm from the epididymis and formulation of semen in the urethra. Once enough stimulation has occurred, the sympathetic nervous system triggers an orgasm, which in most cases also triggers ejaculation via spasms of the pelvic floor muscles; however, it is possible to separate the pleasurable muscle spasms of orgasm from the ejaculation. Once the orgasm *and* ejaculation are completed, the body enters what is referred to as a refractory period where the penis becomes overly sensitive, prohibiting further ejaculation. During this refractory period, the penis returns to a flaccid state due to the breakdown of cGMP by an enzyme called phosphodiesterase-5 (PDE-5). This stimulates the release of blood from the penis (Green 129). See Figures 2, 3, and 10 in Appendix A.

In the interest of simplicity, the terms “energy” and “etheric” will be used interchangeably with “electromagnetism” to describe the following functions. There are several non-physical aspects to the male reproductive system that intertwine with the rest of the body and their non-physical aspects at large. While certain aspects can be isolated and explained in-depth, the non-physical body interconnects with every other aspect of the person within the etherical body. The human energy field, or electromagnetic field consists of seven layers and seven major Chakras, each representing one aspect of the whole person. Representing the physical plane are the etheric body or lower etheric aspect, the emotional body or lower emotional aspect, and the mental body or lower mental aspect. The astral plane is represented by the astral body. The spiritual plane consists of the etheric template or the physical aspect, the celestial body or emotional aspect, and the ketheric body or the mental aspect. The

seven major Chakras penetrate and connect each of these layers. The root, sacral, solar plexus, heart, throat, brow, and crown Chakras correspond to the layers respectively (Brennan 47).

The male reproductive system is the physical center of the Sacral Chakra, specifically the prostate and testes despite being located at the navel. The color of this Chakra is commonly acknowledged to be orange with six vertices (Brennan 48). The Chakras of the energetic body serve three main functions according to Brennan: first, to vitalize each auric body and the physical body; second, to facilitate the development of the various aspects of self-consciousness; and third, to act as antennae, facilitating the movement of electromagnetic energy between the seven layers of the human biofield, commonly known as the aura (Brennan 47-48). The sacral Chakra is the center for creative energy in all aspects. Typically this is associated with sexuality, and physically this is true; however, it is also where creative thought and expression also originate. Painting, sculptures, literature, etc. become tangible through the sacral Chakra. There are two parts to the sacral Chakra. The first part is the anterior-facing pubic center which relates to the quality of love for the opposite sex and the capacity to enjoy engaging in sexual and physical, mental, and spiritual pleasure including orgasm (Brennan 72). The second part is the posterior facing sacral center which relates to the quantity of sexual energy or libido one has. The relationship between the two is the quality and quantity of sexual energy one has which translates directly to how much life force one possesses. When both the anterior pubic center and the posterior sacral center connect within the spine, “the life force exhibits its second most powerful physical urge and purpose—that of the desire for sexual union” (Brennan 73). Brennan goes on to explain that through orgasm, the body is bathed in energy and cleansed of waste and tension, making it important to the health of the whole person (Brennan 73).

The sacral Chakra corresponds directly to the emotional body or lower emotional aspect. This layer is between one and three inches from the body and is where emotions reside (Brennan 50). Emotions are neither good not bad; rather, they are neutral unless they are ignored or suppressed. When

this happens, they get pushed into the physical body and can create imbalances and dis-eases. The male reproductive system ties to feelings of masculinity. Both the prostate and testes correlate to the masculine principle (Hay 193, 202). This masculinity is tied to Yang energy. Yang, in Chinese traditional medicine, is the energy that repels through contraction. In other traditions, it is representative of the Sun and the action of giving. This is partnered with Yin, the expansive and inclusive energy, the moon, and the action of receiving. Both males and females contain both energies; however, males contain more Yang energy than Yin while females contain more Yin energy than Yang. The feeling of masculinity is the Yang concentration of energy. There are some sources that correlate the testes directly to the Root Chakra. This could be valid as they are positioned almost directly in the cone of the Root Chakra.

Reflex points for the prostate can be found on the medial ankle in the “valley” located roughly halfway between the ankle bone and the posterior-most point of the calcaneus. Laterally, this point connects to the testes (Byers 152). These reflex points are nerve endings that cross-communicate with the nervous circuits in and around these organs. These points correlate directly to the less physical vita flex points originating from Tibetan practices in ancient times (Essential Oils Desk Reference 293). Additional reflex points may be found along the arch of the foot on the anterior calcaneus. These points correlate to lumber 3 and 4 which connect to the reproductive glands and prostate respectively (Byers 62). Additional vita flex points can be located in the same region for sacrum 2 which connects to the genitals (Essential Oils Desk Reference 295). These points may also be found on the hands, wrists, and ears. Glandular points may be located on all of these structures as well.

Pathology (Common Fertility Issues)

There are a number of conditions that contribute to difficulties with fertility in males. According to the National Center for Biotechnology Information (*National Center for Biotechnology Information*),

male infertility is defined as “the inability of the male to effect fertilization of an ovum after a specified period of unprotected intercourse. Male sterility is permanent infertility.” Almost every dis-ease is a result of either malnutrition or toxic overload. The following list is by no means comprehensive; rather, it is a collection of the more common issues ranging from the physical to etherical in nature. The progression of dis-ease begins with an electromagnetic or energetic issue that is introduced into the human energy field either from an external vector or an internal problem. This disturbance then moves through the layers inward to the physical body where it enters a non-vital organ or structure. It then progresses to a vital organ and begins to affect the emotions, then the mental aspects of the individual until it penetrates so deep that it affects the DNA and genes of the individual. This can then be passed on as a genetic defect, also known as a miasm. What follows is a selection of dis-eases as defined by conventional medicine.

Erectile Dysfunction (ED), formerly known as Impotence, comes in two forms: organic and psychogenic. “Organic [ED] refers to the inability to obtain an erection firm enough for vaginal penetration, or the inability to sustain the erection until completion of intercourse” (Ende). Psychogenic ED is “caused by anxiety, guilt, depression, or conflict around various sexual issues” (Ende). Occasionally, the dysfunction is known as Priapism which is “a painful and harmful medical condition in which the erect penis doesn’t return to its flaccid state, despite the absence of both physical and psychological stimulation, within four hours” (*National Center for Biotechnology Information*). More commonly, ED goes the other way, where the male struggles to achieve and maintain erections at all. Conventional causes for organic ED include atherosclerosis, fibrosis, physical trauma, radiation, spinal cord disorders, multiple sclerosis, neuropathy (regardless of the cause), drug use, peyrionie’s disease, phimosis, etc. (Ende). It is generally accepted that the prevalence of ED, in both forms, increases with age; however, common pharmaceutical commercials and third party companies continue to market to younger demographics with increasing frequency. The estimated percentage of men globally that suffer

from ED range from 25% to 80% depending on which source is selected. In America, the estimated number of males that suffer from ED is between 18 million to 30 million. One reason for the wild variation in numbers is that most males will not self-report if they are having issues with achieving and maintaining erections because it is a sensitive emotional subject for most. Many men feel a sense of shame or lesser if they cannot achieve erections. Treatment for ED almost always takes the form of drugs, injections, medical devices, or surgical intervention.

There are several pharmaceuticals that can artificially create ED. Among these pharmaceuticals are antidepressants, antihistamines, diuretics, blood pressure medications, medications designed to treat Parkinson's disease, hormonal replacements, chemotherapy drugs, opiate painkillers, and anti-inflammatory over-the-counter drugs like ibuprofen (Stratton and Dugdale). Interestingly enough, the drugs that could be used to treat psychogenic ED can then cause organic ED. The same is true for hormone replacement drugs that could be used to treat hormonal causes of infertility. Similarly, in a 2016 review published on PubMed, there are 58 known drugs that impair spermatogenesis (Ding et al.). See Table 6 and Table 7 in Appendix B for both lists of drugs.

There is little question that if the raw materials are not present, nothing can be built. The same is true in the maintenance of the human body and in fertility. Malnutrition is a factor in the proper function of male reproductive function. As identified previously, there are a plethora of various nutrients needed to form sperm, semen, and hormones. Food lacking the necessary nutrients can quickly lead to malnutrition. According to MyPlate, created by Dietary Guidelines for Americans, developed by the United States Department of Agriculture and the United States Department of Health and Human Services, every plate should be roughly one-quarter whole fruits, one quarter vegetables, one-eighth grains, one-eight whole grains, and one-quarter protein. Recommendations also include low-fat or fat-free dairy or fortified soy alternatives. The recommendations specify that less sodium, saturated fat, and sugar are superior as well (*Current dietary guidelines*). In a world where these food

groups are allowed to grow without commercial intervention, this could be a viable diet for some; however, the systemic use of pesticides, herbicides, and genetic modification of all of these food groups is well-known to cause problems. While this particular topic is not the focus of this research, if there are any questions, please look into the history of Monsanto. The relevant piece of this topic is that the commercial tampering with food can result in diminished nutrient density and the chemicals like Atrazine and glyphosate-based chemicals have been linked to serious health and reproductive issues. Additionally, there is an obsession with cholesterol and keeping it low. It is well known that high cholesterol can be dangerous, but cholesterol is still necessary for several biological processes in the body. “In truth, cholesterol is an essential part of every cell structure in the human body, and is vital for proper brain and nerve function. It is also the basis for the manufacture of sex hormones. Most cholesterol is manufactured in the liver, then transported through the bloodstream to where it is needed in the body” (Balch 231).

Sugar is another common factor in issues with fertility even if it is indirectly. Sugar has little nutritional value outside of being a direct precursor to glucose, which is necessary for several vital functions including brain function; however, the problems with sugar are numerous. “Excess sugar consumption can suppress the immune system; upset the body’s mineral balance; produce an acidic stomach; and cause hyperactivity, anxiety, concentration difficulties, and heart disease (by raising insulin levels), as well as fatigue, weight gain, depression, and arthritis” (Balch 205). Balch continues to explain that sugar contributes to the deterioration of the endocrine system and is one of the primary contributing factors in degenerative disease development. Artificial sweeteners, while commonly heralded as the answer to sugar, are almost no better in that they have also been linked to serious health issues including cancer.

Further issues come in the form of recreational drugs like alcohol, tobacco, marijuana, and other illicit drugs. Alcohol is a known depressant, exerting its effects on the nervous system, liver, and

endocrine system. “Chronic heavy drinking impairs the male body’s supply of testosterone and increases the amount of estrogen. Chronic beer drinking causes even worse symptoms than chronic drinking of wine or hard liquor, possibly due to the chemical additives or fermentative impurities…” (Green 120). The combination of hops and yeast used in beer have an estrogenic effect on the male body leading to a temporary hormonal imbalance. Regular tobacco use, specifically its primary alkaloid, nicotine, can lead to blood vessel damage. Nicotine is a vasoconstrictor that diminishes the ability for blood to flow to the penis and, over time, starve the penis of nutrients creating lasting damage (Green 120). Marijuana, while it has tremendous therapeutic potential and has long been revered as a sacred plant medicine by many cultures, it can also create tremendous problems for male fertility. Regular use can suppress Androgen synthesis thereby lowering libido and contributing to ED (Green 120). Other drugs like “cocaine and amphetamines are parasympathetic blocking agents, but, concurrently, they are sympathetic stimulants” (Green 120). This leads most often to premature ejaculation rather than a proper erection.

Obesity can contribute to male infertility. It is defined as “excessive accumulation of fat in adipose tissue… a metabolic disorder resulting from behavioral, environmental, and heritable causes” (Liu and Ding). While obesity negatively impacts health overall, in the scope of male reproductive function, there is a correlation to oligospermia, asthenospermia, and teratospermia. The primary reason for this is that adipose tissue is known to convert Androgens into Estrogens, creating a disruption in proper hormonal balance to maintain proper function of sperm production and reproductive function (Liu and Ding). Additionally, the collection of adipose tissue can accumulate in and around the scrotum, leading to a rise in static temperature that prevents sperm from maturing. “A major effort to identify epigenetic determinants of obesity revealed that sperm DNA methylation and non-coding RNA modification are associated with BMI changes and proposed to inherit metabolic comorbidities across generations” (Liu and Ding).

Cystic Fibrosis “is a multisystem disease affecting epithelia of the respiratory tract, exocrine pancreas, intestine, peatobiliary system, and exocrine sweat glands” (*National Center for Biotechnology Information*). “Male infertility due to hypoplasia or aplasia of the vas deferens” is often also an issue with cystic fibrosis (*National Center for Biotechnology Information*). What this means is there is a severe underdevelopment or complete lack of a structure, the vas deferens in this case. There is also a buildup of catarrh within the body, creating a myriad number of other issues. This is often also diagnosed as obstructive azoospermia (*Male Infertility*). Assuming the testes are functioning properly, Testicular Sperm Extraction (TESE) could be a treatment.

Kartagener Syndrome, also known as primary ciliary dyskinesia, “is a genetically heterogeneous autosomal recessive disorder resulting from loss of function of different parts of the primary ciliary apparatus, most of dynein arms…” (*National Center for Biotechnology Information*). This can develop anywhere in the body that there are cilia necessary for proper cellular function, which includes a significant number of them. In the case that affects male fertility, it is the sperm which lose motility due to malfunctioning or absent flagellum (*Male Infertility*). What this means is that the affected sperm cannot reach the egg to fertilize it due to an inability to swim. Another common diagnosis either instead of or in combination with Kartagener Syndrome is Asthenospermia. Simply put, asthenospermia is the label used to identify sperm that either do not swim. There are at least 45 genes that have been recorded as having a direct impact on the development of Kartagener Syndrome. Please see Table 5 in Appendix B for a list of known genetic influences.

Klinefelter Syndrome, also known as 47, XXY, is defined as “a chromosomal condition that affects development in people who are assigned male at birth… individuals with [it] typically have small testes that produce a reduced amount of testosterone… undescended testes (cryptorchidism) resulting in delayed or incomplete puberty, breast enlargement (gynecomastia), decreases muscle mass

(hypotonia), decreases bone density, a reduced amount of facial and body hair, [fatigue], [infertility], are 2 to 3 inches taller than average, curved pinky fingers (fifth finger clinodactyly), flat feet (pes planus)" (*National Center for Biotechnology Information*). A number of other imbalances both physical and mental are also not uncommon. Testosterone replacement therapy (TRT), Intracytoplasmic sperm injection (ICSI), and Testicular Sperm Extraction (TESE) are the most common conventional treatments for Klinefelter Syndrome (Kanakis and Nieschlag). There are thousands of potential genes that could be affected to create Klinefelter Syndrome and as such, there is no chart included in Appendix B. The best option to see the entire list is to visit the National Center for Biotechnology Information website listed in the Bibliography and conduct a search within the ClinVar filter.

Azoospermia, according to NCBI is defined as "absence of any measurable level of sperm, whereby spermatozoa cannot be observed even after centrifugation of the semen pellet." It is often tied to single gene deletion or other issues like Klinefelter Syndrome. Roughly 40% of azoospermia cases result from obstruction between the testes and ejaculatory ducts. As of 2013, "the prospects for patients with [Obstructive azoospermia] are excellent given recent advances in microsurgical approaches and in vitro fertilization (IVF)/intracytoplasmic sperm injection (ICSI)" (Wosnitzer and Goldstein). The genetic influences on azoospermia can be can be found in Table 4 in Appendix B.

Oligospermia is the "decreased number of spermatozoa in the semen" (*National Center for biotechnology Information*). This is due to an increase in FSH and a decrease in Inhibin B secretion, (Li et al.). Digging deeper, this could be due to excess secretion of GnRH by the hypothalamus or an overreaction of the pituitary gland to its stimuli.

Teratospermia defined as a malformation of sperm structure. This can take the form of missing or misshapen structures on the sperm cell. In some cases the mutation occurs on the head of the sperm cell and can result in a missing acrosome, two heads, missing nucleus, etc. Mutations to the mid piece can result in abnormal attachment to the head, curvature to the mid piece, mutation to the mitochondria

or centriole, etc. Mutations on the tail can result in missing , doubling, elongation, or shortening of the flagellum.

Oligoasthenoteratospermia, also known as oligoasthenoteratozoospermia, is the combination of suppressed spermatogenesis alongside defects of the flagella and decreased motility of the sperm. Simply put, there is a low sperm count that cannot swim as they should and they have mutations to the structure.

Myotonic Dystrophy “is an autosomal dominant disorder characterized mainly by myotonia, muscular dystrophy, cataracts, hypogonadism, frontal balding, and ECG changes” (*National Center for Biotechnology Information*). It originates primarily from a defect in gene DM1. Hypogonadism being a characteristic of myotonic dystrophy indicates a strong connection to hormonal imbalance as a mechanism of this disease.

Hypogonadism is diagnosed as either primary or secondary. “Primary hypogonadism refers to abnormal testosterone production at the level of the testicle, and secondary hypogonadism refers to abnormal signaling from the pituitary gland” (*Male Infertility*). In the first case, there is an issue with the leydig cell in the testicle and how Testosterone is produced. In the second case, there is an issue with FSH and LH as a result of low GnRH. The GnRH neurons fail to develop to completion which leads to low signaling to the pituitary gland to secrete FSH and LH (*National Center for Biotechnology Information*). Either way the result is decreased Testosterone. As a result, the testes and penis do not fully develop, leading to micropenis, cryptorchidism, testicular atrophy, azoospermia, etc. (*National Center for Biotechnology Information*). Conventional treatment of hypogonadism is typically Testosterone Replacement Therapy. A study done on its effectiveness and found that after two years, the symptoms of hypogonadism, libido, and sexual activity all improved; however, erectile function did not (Pencina et al.). In cases of hypogonadism where there is no sense of smell, it is called Kallmann

Syndrome (*National Center for Biotechnology Information*). Hypogonadism can also be called or explained as Hypothalamic-Pituitary Dysfunction.

Both Hypothyroidism and Hyperthyroidism can impact male fertility. Hyperthyroidism is the lowered functioning of the thyroid while hyperthyroidism is the excess functioning of the thyroid leading to either and deficiency or excess in Thyroid Hormone respectively (*National Center for Biotechnology Information*). "[Both are] strongly associated with erectile and ejaculatory dysfunction" (Gabrielson et al.). Both also contribute to low libido. Hypothyroidism contributes to decreased sexual sensation and delayed ejaculation while hyperthyroidism contributes to over-stimulation and premature ejaculation (Gabrielson et al.). Prevalence of sexual dysfunction in men for hypothyroidism is 59-63% and hyperthyroidism is 48-77% (Gabrielson et al.). Pharmaceuticals are most commonly used to treat Thyroid disorders.

Diabetes Mellitus (Type I) "also called designated insulin-dependent diabetes mellitus, is a disorder of glucose homeostasis characterized by susceptibility to ketoacidosis in the absence of insulin therapy. It is a genetically heterogeneous autoimmune disease…" (NCBI). At the cellular level, the beta cells within the pancreas cease insulin production, resulting in hyperglycemia (NCBI). The major risk factor with type 1 diabetes is the development of ketoacidosis, which is life-threatening. There are thousands of potential genes that could be affected to create Diabetes mellitus and as such, there is no chart included in Appendix B. The best option to see the entire list is to visit the NCBI website listed in the Bibliography and conduct a search within the ClinVar filter. Erectile dysfunction occurs in roughly 43% of males with type 1 diabetes (Zhang et al.).

Diabetes mellitus (Type II) "is a disorder characterized by abnormally high levels of blood glucose… In this form of diabetes, the body stops using and making insulin properly. Insulin is… produced in the pancreas [and] helps regulate blood glucose levels. Specifically, insulin controls how much glucose is passed from blood into cells, where it is used as an energy source… Most people who

develop type 2 diabetes first have insulin resistance" (NCBI). As insulin resistance increases, the pancreas produces more insulin to keep up until production can no longer meet demand. Lack of physical exercise and excess weight gain increase pancreatic stress and the likelihood of developing type 2 diabetes (NCBI). There are thousands of potential genes that could be affected to create Diabetes mellitus and as such, there is no chart included in Appendix B. The best option to see the entire list is to visit the NCBI website listed in the Bibliography and conduct a search within the ClinVar filter. Erectile dysfunction occurs in over 50% of men with type 2 diabetes (Cayetano-Alcaraz et al.).

Ejaculatory Dysfunctions like premature ejaculation, anejaculation, and retrograde ejaculation are unfortunately fairly common causes of infertility. Premature Ejaculation is "the emission of semen and seminal fluid during the act of preparation for sexual intercourse, i.e. before there is penetration, or shortly after penetration" (*National Center for Biotechnology Information*). The regular consumption of pornography has been linked to premature ejaculation. Additionally, poor nutrition, nerve damage, and a number of other factors can contribute to premature ejaculation. Some within the Allopathic world argue that premature ejaculation is not a disease at all; rather, it was a manufactured issue. "Premature ejaculation must not be classified as a male sexual dysfunction. It has become the center of a multimillion dollar business: is premature ejaculation-and female sexual dysfunction-an illness constructed by sexual medicine experts under the influence of drug companies" (Puppo and Puppo)? Anejaculation is complete failure to ejaculate alongside orgasm. Typically this is because emission never occurs, usually due to nerve damage (*National Center for Biotechnology Information*). Retrograde ejaculation can also lead to anejaculation. Intentional anejaculation is not actually a problem at all; rather, it can be desirable as will be discussed later. Retrograde Ejaculation is "the emission of semen and seminal fluid into the bladder instead of through the penis during orgasm" (*National Center for Biotechnology Information*). This is most common with a failure of the urethral sphincter due to transurethral prostatectomy, retroperitoneal lymph-node dissection, and diabetic

neuropathy (Hershlag et al.). Treatment usually involves recovery of the sperm from urine if pharmaceuticals fail.

Epididymitis, orchitis, and epdidiymo-orchitis all involve inflammation of the respective structures. Inflammation can lead to impaired spermatogenesis, azoospermia due to occlusion of the vas deferens, and low libido and erectile dysfunction due to pain. Common causes for these types of inflammation are bacterial or fungal infection and are then commonly treated with antibiotics (*National Center for Biotechnology Information*). Physical trauma can also cause inflammation, the severity of which determines treatment. Circumcision, while commonplace in American conventional healthcare, can cause severe injury to the penis and even the surrounding structures to the point of impacting fertility.

Benign Prostatic Hyperplasia (BPH) is a condition that refers, simply, to the abnormal growth of the prostate. It carries the label “benign” because it is not usually seen as a major concern by most of the Allopathic community due to a lack of malignancy. Side effects of BPH include urethral obstruction, urine hesitancy, weak flow, urinary retention, painful urination, increased urination frequency including urgency (*National Center for Biotechnology Information*). This can not only be uncomfortable and even painful the individual, it can cause serious issues with fertility. This is because of the potential obstruction of the urethra it can cause. This could result in oligospermia, azoospermia, retrograde ejaculation, or anejaculation.

Infection of any kind along the genitourinary tract can cause infertility as well. A condition called pyospermia is the presence of white blood cells in the semen and is usually the indicator for infection (Caldecott). Deterioration of the BTB can contribute to infection since the testes are a highly specialized environment and overexposure to the contents of the blood stream can cause issues. Sexually transmitted diseases can also contribute to infertility. HIV, Syphilis, Gonorrhea, Herpes, etc.

can lead to pyospermia, oligospermia, azoospermia, and other forms of impaired spermatogenesis. Treatment is often conducted with antibiotics or other pharmaceutical therapies.

Temperature, as outlined previously is necessary for proper spermatogenesis. Either through lifestyle choices or pathology, occasionally, the scrotum becomes too hot for sperm to form and mature. Wearing tight clothing, specifically “skinny jeans” and brief underwear can inhibit the scrotum from relaxing and thereby inhibiting the testicles from maintaining their optimal temperature. Alternatively, a more serious issue is varicocele. Varicocele is “a widening of the veins along the spermatic cord, leading to enlarged, twisted veins in the scrotum, and manifested clinically by a painless testicle lump, scrotal swelling, or bulge in the scrotum” (*National Center for Biotechnology Information*). Pharmaceuticals are sometimes used to treat varicocele; however, surgical intervention appears to be more common.

Radiation from medical devices, drugs, and infrastructure can impact much more than just fertility. Chemotherapy and radiation therapy in the treatment of cancer are known to negatively impact spermatogenesis and the endocrine system including the HPG axis. Combined, they have a more significant gonadotoxic impact than alone and the current standard for “preserving” fertility in male cancer patients is to cryogenically preserve sperm samples for IVF use later if needed or desired (Vakalopoulos et al.). Both of these therapies either severely delay or completely destroy the capacity for spermatogenesis. This has been demonstrated in the diagnostic use of X-rays and ultrasound as well. Additionally, the prevalence of ionizing and non-ionizing radiation have been linked to impaired spermatogenesis as well. Common devices such as cell phones, laptops, Wi-Fi, microwave ovens, etc. emit harmful electromagnetic frequencies (EMFs) and radio frequencies (RF). These frequencies have been demonstrated to have “deleterious” effects on sperm count, morphology, and motility leading to oligo- and azoospermia, teratospermia, and asthenospermia (Kesari et al.). The methods by which these negative impacts occur is through oxidative stress, genotoxicity, and genomic instability (Kesari et al.).

Microwave ovens operate at roughly 2.45Hz, Wi-Fi routers operate at 2.45GHz and 5GHz, Laptops between 300Hz and 10MHz, and cell phones between 0.9GHz and 5GHz are the common culprits (Kesari et al.). In all cases, prolonged exposure usually results in apoptosis of sperm cells, genetic malfunction and destruction, and, ultimately, cancerous cell proliferation (Kesari et al.). See Figure 13 and 14 in Appendix B for RF and EMF impacts on male fertility.

Cancer (neoplasm) development anywhere in the body, especially the genitourinary system, can have catastrophic effects on male fertility. As described previously with radiation, X-ray, and EMFs, the treatments can severely impair and even destroy the testicular capacity for spermatogenesis. Cancer itself threatens male fertility due to the mechanism by which is appears. Cancer develops when cellular replication goes awry and the natural limitations disappear. Cell proliferation then spirals out of control and these abnormal cells can metastasize and spread to other areas of the body and destroy functionality. Conventional treatment of cancer is chemotherapy, radiation therapy, and surgical removal. Diagnosis is typically done with a biopsy of suspected tissue following diagnostic imaging. Specific cancers to the male reproductive system include bladder cancer, penile cancer, prostate cancer, testicular cancer, and epididymal cancer.

Penile length, even in most cases of micropenis, has no effect on fertility. Micropenis is defined as a stretched penis length of 3.67 inches or 9.32 centimeters (*Micropenis: Causes, symptoms, diagnosis & treatment*). Penis augmentation surgery, a high-risk procedure as determined by the American Urology Association, and hormone therapy are common treatments for micropenis. Its causes are almost always hormone imbalance during fetal development. Even in a study of 664 men where 161 were clinically diagnosed as infertile, penis length was shown to have no correlation to the reason for infertility (Slade et al.).

COVID-19 poses a major threat to male fertility. Serine Protease is one of the primary components of snake venom. Snake venoms have been isolated in the spike protein that is commonly

called the SARS-CoV-2 (COVID-19) virus (Ardis). Serine protease is allowed entry into the testes via ACE2 receptors (Olree). The Blood-Testis Barrier is suspected to be the point of entry, potentially indicating degradation of the BTB (Pourmasumi et al.). They are allowed into the prostate by theTMPRSS2 protein. “This protein was demonstrated to be up-regulated by androgenic hormones in prostate cancer cells and down-regulated in androgen-independent prostate cancer tissue” (*TMPRSS2 transmembrane serine protease 2 [homo sapiens (human)] - gene – NCBI*). Furthermore, “this protein also facilitates entry of viruses into host cells by proteolytically cleaving and activating viral envelope glycoproteins. Viruses found to use this protein for cell entry include Influenza virus and the human coronaviruses HCoV-229E, MERS-CoV, SARS-CoV and SARS-CoV-2 (COVID-19 virus) (*TMPRSS2 transmembrane serine protease 2 [homo sapiens (human)] - gene – NCBI*). COVID-19 interferes with HPG Axis by disrupting proper FSH and LH secretion resulting in decreased Testosterone production, increased Estradiol production, and systemic inflammation. “Evidence suggests that SARS-CoV-2 infection downregulates the expression of spermatogenesis-related genes… sperm viability, motility, and progressive motility were decreased…” (Dai et al.). The systemic inflammation demonstrated by COVID-19 as associated with oxidative stress, further impacting spermatogenesis (Dai et al.). Another study cited that DNA fragmentation was likely the cause of decreased sperm count, motility, and morphology (Pourmasumi et al.). Many studies indicate that the COVID-19 vaccine is safe and effective despite public concerns and hesitancy to participate. One review identified negative impacts on semen volume, sperm concentration, and sperm motility following injection. This evidence was collected from 37 sperm bank donor samples (Gat et al.). What is interesting about this study and all of the other studies is that they all claim that in cases where negative impacts were found, subsequent samples showed significant improvement, some even stating “spontaneous improvement.” See Figure 15 in Appendix B for COVID-19 impact on sperm and semen.

Allopathic Fertility "Solutions"

The options available to males within the scope of conventional Allopathy include a number of options depending on the mode of infertility ranging from surgery, device treatment, pharmaceuticals, and injection therapies. Figure 16 in Appendix C for allopathic ED treatment options.

In Vitro Fertilization (IVF) is a common laboratory procedure to facilitate pregnancy for couples who are mutually experiencing infertility. This process is requires intervention primarily on the female's part but, for males suffering infertility, it can be a significant procedure for them too. The egg is surgically removed from the ovary with a needle and placed in a liquid medium to preserve them until the fertilization can be completed (*In vitro fertilization (IVF)*). Sperm, a necessary component for fertilization to occur, must be collected from the male partner. This is usually done by collection at home or in the clinic by means of masturbation with ejaculation and then that sample is added to the egg solution. In cases where oligospermia, asthenospermia, teratospermia, or some combination of the three are a concern, Intracytoplasmic Sperm Injection (ICSI) may be necessary to continue the process. This involves the laboratory isolation of a viable sperm cell from the sample and injecting it directly into the egg to manually facilitate fertilization (*In vitro fertilization (IVF)*). In cases of azoospermia and anejaculation where there is no sample to collect, microsurgical testicular sperm extraction (TESE) or (microTESE) must be employed. This involves the manual extraction of sperm from the seminiferous tubules within the testes. This procedure can take several hours in order for a viable sperm cell to be located and usually takes place in an operating room under general anesthesia (*Microsurgical Testicular Sperm Extraction (microTESE) More Accessible for Couples Who Are Infertile*). The sperm collected by this method must be used in IVF or ICSI.

Androgen Replacement Therapy, almost always targeting Testosterone (TRT) can be used to treat low Testosterone. This is usually done with injection; however, alternatives such as patches, gels, and pellets are increasingly available and accessible. It only takes about 5 minutes of surfing the

internet or watching television to see an advertisement for “Low T.” In addition to being one of the primary treatments for hypogonadism, TRT can also be used for ED. It is generally not recommended for oligospermia, azoospermia, or other spermatogenic issues because it contributes to the negative feedback of the HPG by suppressing GnRH, FSH, and LH production.

Spermatogonial Stem Cell (SSC) transplantation is another option to restore fertility. “This technique involves the injection of a testicular cell suspension from a fertile donor into the testis of an infertile recipient. Spermatogonial stem cells are able to relocate onto the basement membrane and colonize the tubules during the first month after transplantation” (Tournaye and Goossens). This is commonly used following harsh cancer treatments in an effort to restore normal reproductive functionality.

Oral pharmaceuticals are primarily phosphodiesterase-5 (PDE5) inhibitors known as PDE5Is. Common drugs that inhibit PDE5 activity are known as Avanafil (Stendra), Vardenafil (Levitra and Staxyn), Tadalafil (Cialis), and perhaps most famous among them all is Sildenafil (Viagra). These drugs stop the degradation of cGMP by PDE5 to help males achieve harder and longer-lasting erections artificially. These can be available in other forms; however, they are almost always taken orally. Another medication is Alprostadil (Caverject, Edex, Muse, and Prostin). It is used in newborns to regulate heart function and in adult males to stimulate erection. This drug is available as an injection into the side of the penis or a urethral suppository that is inserted into the urethral opening at the tip of the penis.

Popular companies like Hims offers the common forms of PDE5Is as well as asprostadil injections. They also offer proprietary combinations to help with ED. “Other medical options include BiMix®, TriMix®, and QuadMix®. These are injectable medications that combine ingredients such as alprostadil, papaverine, phentolamine, and atropine in different combinations. Like the PDE5 inhibitors, these medications help increase blood flow to the penis through different mechanisms”

(Stahl). Interestingly, outside of alprostadil, none of these other medication are indicated for ED. According to Drugs.com, Papaverine, a peripheral vasodilator, is sometimes used to facilitate erections despite direction not to inject it into the penis; Phentolamine is a drug used to treat hypertension and skin irritations; Atropine is a medication used to treat severe poisoning, cardiac arrest, and bradycardia (*List of 12 erectile dysfunction medications compared*).

Vacuum pump devices are commonly used in cases where blood supply is an issue and either the male does not want or cannot take pharmaceuticals to stimulate circulation. In severe cases of ED, where pharmaceuticals have failed or there is physical injury, prosthetics may be employed to facilitate erection and allow males to engage in sex. Three types of prostheses may be used. First, a pair of semi-rigid rods are surgically inserted into the corpora cavernosa that may facilitate some change in size. They are positioned upwards to facilitate erection (Yafi et al.). A second style of prosthesis is a pair of inflatable cylinders implanted into the corpora cavernosa along with a pump into the scrotum. This style facilitates the use of fluid, by way of the pump, to fill the cylinders and facilitate an erection (Yafi et al.). A thirds style adds a fluid reservoir to the configuration of the second. The reservoir is placed adjacent to the bladder for the pump to transfer fluid from and to the cylinders (Yafi et al.). See Figure 17 in Appendix C.

Natural Fertility Solutions – Restoration of Natural and Proper Function

Before the advent of surgeries, petri dishes, and test tubes, was the Nature inherent to daily life. Humans have looked to Nature for answers for thousands of years and have discovered a cornucopia of ways to utilize the various plants, animals, minerals, and beyond in order to help reestablish proper health after injuries, sickness, and emotional turmoil. Outside of the physical injuries that result in the removal of a structure from the body, all of the diseases and conditions listed in Pathology are a result of malnutrition, toxic accumulation, or both. Genetic disorders involving deletion or improper

expression can even be looked at as miasmic from a homeopathic perspective. Miasms are the result of toxic accumulation that was suppressed long enough that it effected genetic expression. Toxic accumulation is chemical, heavy metal, or electromagnetic in nature. Heavy metal toxicity has been linked to several disorders including Autism, ADHD, and many musculoskeletal disorders. Chemicals like Atrazine and Round Up, as listed previously, have had disastrous effects on the reproductive development and adult expression in males and females and have destroyed the intestinal tract's ability to facilitate nutrient absorption respectively. With these factors considered, it is possible to address the actual root cause naturally. The channels of elimination need to be open. These include the bowels, urinary system, lungs, and skin. The Liver and kidneys, as the major filters in the body, also need to be operational for the body to be able to heal. "It is hard to fix a problem if you are swimming in garbage."

As outlined previously with tight-fitting clothing and varicocele, restriction can affect spermatogenesis. Fabric choice can also impact this. An experiment done with 14 men using a polyester sling for 12 months demonstrated that consistent exposure to polyester over the course of the study created complete azoospermia lasting at least 75 days. This is due to the electrostatic field generated by friction between the scrotum and the polyester fabric and the thermal increase due to lack of breathability of polyester. The final results were that semen levels returned to pre-test levels after 75-135 days making it "safe, acceptable, inexpensive, and reversible" (Shafik). While this could be used, other research indicates that the resonance frequency of polyester can have much longer and more significant effects on overall health and that wool or linen should be used instead. Additionally, loose-fitting underwear and pants allow the cremaster muscle to function properly to regulate testicular temperature for proper spermatogenesis.

Food and water are foundational to health. Before herbs, therapies, and beyond, it is a basic survival necessity to eat and drink. Food is something that nearly all humans engage with at least once

per day and, for many, multiple times per day. By mastering true understanding of the individual's needs, many fertility issues resulting from malnutrition can be rectified with real food. Unfortunately, while food and clean water are foundational to true health, the toxic load and tampering with GMOs and other chemicals in the food supply mean that additional support is almost always needed.

Implementation of the Blood Type Diet popularized by Dr. Peter D'Adamo can serve useful because it helps to mitigate lectins from creating unnecessary inflammation and facilitates absorption of nutrients. A simple and affordable blood type test is used to determine the broad category to help facilitate this diet. A detailed blood test is used to determine secretor status to hone in more accurately. In a broader scope, the Metabolic Type Diet created by William Wolcott based on the work of Dr. Weston Price. This broader system takes many genetic factors based on heritage into consideration to facilitate nutrition for optimal genetic expression. A genotype analysis is typically done to determine the best foods for the individual. In either case, most Naturopaths can facilitate these directly or can make a recommendation to one that specializes in these systems.

Vitamin A is important for the overall health of the male reproductive system and for spermatogenesis. Deficiency has been linked to reproductive system atrophy (Green 149). Vitamin A is available in dandelion green, bitter greens, carrots, apricots, and dairy products (Green 149).

Arginine (L-Arginine) is necessary for the regulation of the prostate and for normal sperm count and libido (Sahley and Birkner 230).

Pyridoxine (B6) is necessary for all amino acids to convert to their other forms (Sahley and Birkner 17). It is also necessary for carbohydrate, protein, and fat metabolism, making it essential for nutrient assimilation. It is available in brewer's yeast, carrots, chicken, eggs, fish, meat, peas, spinach, sunflower seeds, walnuts, and wheat germ (Balch 8). Amino acids are needed in abundance for hormone synthesis and for semen production.

Folate (B9) aids in amino acid metabolism and DNA synthesis (Herlihy 454). As outlined previously, amino acids are needed in abundance for proper semen composition.

Cobalamin (B12) is a key component for proper functioning of the nervous system and DNA synthesis. It is also necessary for red blood cell synthesis. B12 is a cofactor for the assimilation of iron as well (Balch 269).

Vitamin C is not only important for genetic function and a chief antioxidant, it is also important for the regulation of Testosterone in the male body (Balch 281).Vitamin C is available citrus, green leafy vegetables, broccoli, berries, black currants, horseradish, rose hips.

Vitamin D is necessary for calcium absorption and aids in cholesterol maintenance (Pedersen 13). Cholesterol is necessary for the synthesis of gonadotropins and many other hormones. Vitamin D can be obtained from a supplement; however, the best source is directly from the sun on exposed skin, the eyes, and the brow. Exposure should be limited to a few minutes at a time to avoid burns.

Boron is a necessary trace mineral that is necessary for the proper upkeep of DNA and genetic expression as a means of redirecting radiation from the body and regeneration of the heart meridian (Walters 146). Additionally, Boron-40, a naturally occurring form of boron found in dandelions creates a natural faraday cage that helps to shield the body from a large number of toxins. It is also found significantly in curcumin, one of the primary attributes of turmeric (Olree). Boron is the most significant mineral in the Cerebral Spinal Fluid and the second most abundant mineral in the brain (Olree). For this reason it is of great significance to the proper function of the nervous system and as a method of eliminating heavy metals. It is also available from corn salad / lamb’s lettuce, plumb, quince, strawberry, peach, red and white cabbage (Walters 189).

Calcium is necessary for muscle contraction, in the case of male fertility, the ability for the body to constrict the smooth muscles to release an erection. Calcium is also a necessary mineral for the activity of the Sympathetic N.S. activation necessary for muscle contraction and orgasm. It is available

in tomato leaf, cauliflower leaf, white peony, lamb's quarter leaf, stinging nettle, black cherry, and peanut plant (Walters 192).

Carnitine facilitates proper sperm motility. It is a nonessential amino acid produced by the body in the presence of balanced nutrition (Green 151-152). Carnitine is also prevalent in seminal fluid, forming the basis for at least 42 amino acid components (Engel et al.).

Chromium is the "master regulator of insulin, a potent metabolic hormone involved in protein, carbohydrate, and fat metabolism" (Walters 120). Signs of possible deficiency include Diabetes, hypoglycemia, aortic cholesterol, peripheral neuropathy, thyroid dysfunction, obesity, depression, and arteriosclerosis (Walters 120). It is available in sorrel, dandelion leaf, oats, stevia, lemongrass, wheatgrass, juniper berries, red clover, safflower, cardamom, cilantro or coriander, and dulse (Walters 197).

Copper is classified as an essential mineral. It is necessary for many enzyme reaction and is balanced with Zinc. Copper is necessary for the proper formation of RNA (Walters 121). Copper is available in black cherry stem, persimmon stem, sassafras leaf, tomato, red and white cabbage, hazelnut, cauliflower, and most beans (Walters 200).

DHEA is the "mother hormone" because it is the precursor for all steroid hormones including Testosterone (Sahley and Birkner 228). It is produced primarily by the adrenal cortex and is the most abundant steroid in humans (Sahley and Birkner 106).

Essential Fatty Acids "aid in the formation of sperm and seminal fluid in the prostate" (Balch 281).

Glutathione is the chief amino acid antioxidant and is necessary for DNA synthesis and repair (Sahley and Birkner 236). As an antioxidant, it is useful for mitigating the effects of radiation and environmental toxins. Glutathione is synthesized by the body from Cysteine, Glycine, and Glutamate (Sahley and Birkner 236).

Iodine is necessary for proper thyroid function (Walters 102) Iodine is the master mineral and governs the function of all other minerals in the body, showing at the top of most genetic sequences. It is also the foundational piece for Glutamine, the most abundant amino acid in the blood stream (Walters 103). It can be obtained from pistachio seeds, soybeans, seaweed, black walnut, cinnamon, sorrel, pineapple, and most beans (Walters 203-204).

Iron is responsible for transportation of oxygen throughout the body as the basis for red blood cells. It is also necessary for proper food metabolism (Walters 121). Good sources of iron are dandelion leaf, tomatillo, ginger root, safflower, corn salad, lamb's lettuce, red and purple clover, thyme, burdock root (Gobo), black and wild cherry, beef, beets, and beef liver (Walters 205).

Lecithin is one of the nutrients that forms brain, nerve, endocrine gland, and gonad tissues. It is one of the major components of semen and is useful for preventing ED. Lecithin is also useful in keeping cholesterol from collecting in places it should not (Green 151). It may be found in egg yolks, seeds, grains, nuts, soybeans, and many meats and plants (Green 151).

Lycopene is a phytonutrient found in tomatoes and watermelon and is an important antioxidant for the male reproductive system. The highest concentration of lycopene is in the testes (Balch 281).

Magnesium is necessary for nervous system regulation by facilitating proper neurotransmitter function, blood pressure regulation, proper cell growth, and tissue elasticity (Walters 138). It is also the mineral that facilitates the balance between Sympathetic and Parasympathetic Nervous system activity. Magnesium is necessary for proper prostate function and production of seminal fluid (Green 150-151). Magnesium sources are most beans, yellow corn, oats, spinach, licorice root, black and wild cherry, cilantro, and coriander (Walters 218).

Manganese helps to govern the nervous system, is necessary for the health of connective tissue, and hastens the body's ability to recuperate from imbalance. Signs of possible deficiency include mental confusion, depression, convulsions, infertility, impatience, cracking joints, loss of libido, carpal

tunnel, gout, anxiety, schizophrenia, and nightmares (Walters 121). Manganese can be found in fennel and cinnamon (Walters 230).

Molybdenum is a trace mineral that is necessary for proper cell function. It is a key component for the synthesis of key enzymes that metabolize waste products from other cellular functions or from the metabolism of nutrients (Institute of Medicine (US) Panel on Micronutrients). These enzymes include xanthine oxidase, sulfite oxidase, and aldehyde oxidases (Institute of Medicine (US) Panel on Micronutrients). Excess molybdenum can negatively impact spermatogenesis; however, it is functionally difficult outside of exposure to molybdenum as a heavy metal. Sources of molybdenum are most beans, most bell peppers (fruit and seed), parsley, red and white cabbage, corn, tomato, buckwheat, soybeans, cauliflower, peas, cucumbers, onions, shallot, potato, lettuce, asparagus, and plumb (Walters 233).

Phosphorus is necessary for the structural integrity of the DNA double helix (Walters 132). It is also the basis of Phosphodiesterase-5 which is needed to relax the penis into a flaccid state after sex (Green 129). Phosphorus can be obtained from beets, tomatillo, flax seed, watermelon seed, lettuce, most beans, and pumpkin seed (Walters 236).

Potassium activates the parasympathetic nervous system responsible for arousal and erection. It is necessary for heart function and is an important electrolyte due to its alkalinity. It supports the muscular structure as well, necessary for the smooth muscle function of the penis (Walters 127). Potassium is available in potato peels, lettuce, radish, oats, dill, cucumber, bok choy, mustard greens, spinach, and rhubarb (Walters 245).

Selenium is the most important mineral for stability at the genetic level, particularly in preventing neoplasmic growth (Walters 115). “A recent study performed by Larry Clark at the University of Arizona showed that the essential trace element Selenium may reduce the incidence of and mortality from cancers in several sites in the body. In the *Nutritional Prevention of Cancer Trials*,

Clark and colleagues found that the incidents of prostate cancer was decreased by 63% in a group of participants who took 200 micrograms of Selenium each day as compared to a group of participants who did not take Selenium. Decreased incidents of lung and colorectal cancers were also found in participants who took Selenium" (Walters 115). Selenium also neutralizes the AIDS virus (Walters 97). Selenium is also one of the major minerals found in semen and is necessary for sperm motility (Walters 116). Selenium is also the primary mineral of both the head and tail of the sperm cell (Olree). Due to its roles in sperm production, it is no surprise that it is concentrated in the testes (Green 151). Selenium is available from brazil nut, Sorrel, wheatgrass, and lemongrass (Walters 257).

Silicon is found in all tissues within the body including most genes. It is also the "cement" that helps the brain maintain its shape and function. Signs of possible deficiency include: sexual dysfunction, nerve sensitivity, depression, fatigue, and more (Walters 134). Silicon can be obtained from diatomaceous earth, stinging nettle, brazil nut, pistachio, parsley, cashew, horsetail, turnips, most beans (Walters 259).

Sodium is a vital electrolyte in the proper form. It helps to keep calcium in solution and runs the kidney which is a necessary component of reproductive health (Walters 140). Beyond a quality unprocessed and uniodized salt, stinging nettle, olives, dulse, bok choy, mustard greens, lettuce, celery, beets, turnips, spinach, carrots, oats, watercress, and licorice root are also good sources (Walters 262).

Sulphur is an important mineral in proper cellular function, and is a major chelator for mercury. It is important to the function of the reproductive organs both physically and neurologically (Jensen 347-348). Deficiency in sulphur can lead to infertility (Jensen 356-357). Sulphur is also one of the terminal codons for DNA mRNA connection which is important for the stability and proper synthesis of DNA (Walters 130). Sulphur can be obtained from cruciferous vegetables like cauliflower, broccoli, dill, onion, cabbage, and brussels sprouts (Walters 270-271).

Yttrium is a trace mineral that is found primarily in the Bifidobacteria that are part of the menagerie of bacteria that colonize the intestinal tract. It is a cofactor for selenium absorption, thereby making it necessary for reproductive health (Walters 109-110). Yttrium can only be obtained from Bifidobacteria fed by red and white cabbage, and tomatoes (Walters 279).

Zinc is necessary for proper cell division, synthesis, and DNA function overall (Walters 121). Zinc is found in all bodily fluids including semen and is the key mineral for proper prostate function (Walters 122). Deficiency of zinc results in low Testosterone, failure to enter puberty, ED, and various prostate dis-eases (Green 150). Sources of zinc include tomatoes, red and white cabbage, hazelnut, cauliflower leaf, most beans, collard greens, cucumbers, cashews, plumbs, and coconut (Walters 280). An additional source is pumpkin seeds (Balch 281).

Special foods for men include papaya juice, pineapple, and pumpkin seed. Papaya juice contains arginine and vitamin C (Balch 38). Like papaya juice, pineapple is a “male superfood” in that it contains many of the nutrients listed previously. It also helps with protein metabolism due to its bromelain content (Balch 68). Pumpkin seeds contain more iron than liver by weight, is a great source of essential fats necessary for prostaglandin secretion, and is specifically indicated for the prostate gland in addition to containing many of the nutrients listed previously (Balch 128).

Herbal support for male fertility comes in the form of all herbs that have an affinity for the genitourinary system. The urinary system and reproductive systems are one in the same and cannot easily be separated within the scope of herbalism. As such, many of the following herbs also help to balance the bladder and kidneys.

Michael Tierra offers a number of herbal formulas that can help to rebuild male reproductive function. The first is “Formula 4” for the prostate designed to clear heat, remove dampness, and tonify the prostate: Saw palmetto (chief herb), Echinacea root (assisting), Goldenseal (assisting), Gravel root (assisting), True Unicorn Root (assisting), Uva ursi (assisting), Marshmallow root (supporting), and

Cayenne (conducting). This formula is designed to detoxify the prostate and strengthen male potency and reproductive health (Tierra 120-121).

Formula 27: (Chyavanprash) is intended to warm and tonify the spleen and stomach chi. It is made of high quality fresh Indian gooseberries (Emblic myrobalans) and is also known as amlakis or amla (Tierra 133). Similarly to rose hips, Amlakis is a potent source of vitamin C. It also contains mild tannins and other cofactors that maintain the potency and bioavailability of the vitamin C even after processing (Tierra 133). Chyavanprash is a tedious preparation to make, involving the reduction of the berries, multi-step processing, then adding at least 34 herbs with a variety of properties in order to achieve a highly nutritious, highly medicinal, and reportedly delicious concoction. Chyavanprash is highly prized in Ayurvedic tradition (Tierra 133-134).

Formula 30: (Tai Chi) is designed to tonify chi and the spleen, pancreas, and stomach: Panax ginseng (chief herb), American ginseng (chief herb), Siberian ginseng (chief herb), Codonopsis (chief herb), Tienchi ginseng (chief herb), Astragalus (chief herb), Atractylodes (assisting), Poria mushroom (assisting), Fo-ti (supporting), Dong quai (supporting), Licorice (supporting). This builds yang and blood, tonifies spleen chi, and builds energy over time, something that is useful for a male that suffers from ED. This combination can be taken each day in the AM in order to gradually build. In cases where there is a distinct deficiency of chi, four tablets can be added to a bowl of soup up to three times per day (Tierra 136-137).

Formula 33 is for tonifying yang energy: Ashwagandha (chief herb), Cornus berries (chief herb), Psoralea bean (chief herb), Cuscutae seed (chief herb), Cistanches (chief herb), Morindae (chief herb), Epimedium (chief herb), Aconitum praeparata (chief herb), Cinnamon bark (chief herb), Moutan peony (assisting), Schizandra berries (assisting and supporting), Poria (assisting), Alisma (assisting), Rehmannia, cooked (supporting), Dioscorea (supporting), Saw palmetto berries (supporting), Lycii

berries (supporting), Dong quai (supporting). It is useful for a number of imbalances including ED, kidney atrophy, nephritis, diabetes, lower back pain, and more. It can increase libido (Tierra 138).

Ashwagandha (Withania somnifera) is bitter, sweet, warm, and has an affinity for the lungs, kidneys, musculoskeletal, and nervous systems. Its root has been used for nerve pain, impotence, infertility, weakness of the back and knees, and is the primary strengthening herb in Ayurveda (Tierra 309). It has an affinity for the nervous system and musculoskeletal system, making it useful for neurological conditions and building yang energy (Green 227). "[Ashwagandha] is a paramount tonic in the process of recuperation from exhaustive burnt-out stages of life" (Green 133).

Astragalus (Astragalus mongolicus, Astragalus membranaceus, Astragalus hoantchy) is a sweet, gently warming herb with an affinity for the spleen and lungs (Tierra 294). It is a chi tonic, diuretic, and anhydrotic. Astragalus is a potent immune stimulant and has been used to strengthen digestion, metabolism, and accelerate healing of wounds (Green 133, Tierra 294). Additionally, it has been used for chronic weakness, prolapse, nephritis, and shortness of breath associated with lung weakness (Tierra 294). As it relates to male fertility, astragalus has been shown to be highly effective in increasing sperm motility (Green 133).

Burdock (Arctium lappa) root and seed are cool, bitter, and slightly sweet. They are useful for the skin, blood, digestive, genitourinary, and musculoskeletal systems. Burdock is high in inulin which increases the kidneys' ability to filter toxins and removing excess fluid from the body. It also has anti-inflammatory effects on the joints, and helps the body remove toxins through the skin as well if used for long periods at a time. The aspect that cements its position in this list is its ability to enhance metabolic processes, particularly of the reproductive organs, thereby eliminating sluggishness (Green 232-233).

Deer Antler (Cornu cervi) is the antler from the Chinese Sika red deer traditionally; however, other deer and elk my be used. Typically, it taken from the young deer in the spring when the antlers

are four to six inches long. It is sweet, salty, and warm with an affinity for the liver and kidneys. Pantocrinum is the active constituent alongside its mineral content that give it the properties it has. It is good for general weakness, impotence, infertility, hormonal deficiency in both men and women, premature ejaculation, and many more conditions. Caution should be used if there is yin deficiency though since it is such a potent yang tonic (Tierra 310).

Dodder Seeds (Cuscuta europaea, Cuscuta japonica) is a sweet and neutral herb. It has an affinity for the kidney and liver. Dodder is a yin and yang tonic, diuretic, opthalmic, and aphrodisiac in addition to other properties. It has been used for ED, prostatitis, and to support proper spermatogenesis (Tierra 306).

Garlic (*Allium sativum*) enhances the efficacy of nitric oxide which is necessary for erections. It has also demonstrated great affinity for restoring systems that would be affected by hypertension, heart disease, and atherosclerosis (Green 125). Garlic is also spicy and hot, affecting nearly all structures in the body with its allyl sulfide, allicin, alliin, vitamins a and c, as well as nicotinic acid. Garlic is a yang tonic, stimulant, alterative, and parasiticide (Tierra 305). It has been used historically for genitourinary diseases.

Gecko Lizard (Gekko gekko, Phrynosoma cornuta) is a small gecko lizard that is salty, neutral, and mildly toxic if not prepared properly. Both the male and female lizard used after removing the head and feet due to their toxic contents. They are a yin and yang tonic as well as a stimulant used historically to treat ED (Tierra 310).

Both Chinese and American Ginseng (Panax ginseng, Panax quinquefolium) are both similar enough to cover combined; however, classical herbalists would rightfully argue that, while they are similar in function, Panax ginseng or Chinese ginseng is more potent (Tierra 291-293). Both share sweet and bitter energetics, and a propensity for the lungs and spleen. With respect to male fertility,

both ginsengs are energizing, are useful for ED and increasing seminal volume (Green 132, Tierra 293-294).

Gokshura (Tribulus terestris) (contains a steroidal saponin shown to stimulate sperm production and increase quality, motility, and survival time of sperm in male fertility" (Green 132). Gokshura has been shown to stimulate secretion of LH; thereby, increasing Testosterone (Green 126).

Horny Goat Weed (Epimedium sagittatum, Epimedium grandiflorum) is acrid, sweet, and warm with a propensity for the liver and kidneys. The leaves are useful as a yang tonic, antirheumatic, and aphrodisiac Tierra 307-308). This herb has been used traditionally for aches and pains, numbness, forgetfulness, menstrual irregularity, and many more issues (Tierra 308). With respects to male fertility, it is useful for neuropathy by increasing nerve sensitivity, increasing sperm production, and increasing Testosterone secretion (Green 132, Tierra 308).

Ho Shou Wu (Polygonum multiflorum), also known as Fo-ti, and He Shou Wu supports the liver and kidneys (Green 132). It has been used for nocturnal emissions, involuntary emissions of semen, ED, and many other conditions. It has also been shown to increase sperm count, motility, and, when used for prolonged periods, sperm quality (Green 132).

Maca (Lepidium meyenii, Lepidium peruvianum) has been a treasured herb in Peru for its adaptogenic and fertility enhancing qualities for both males and females. For males, it has demonstrated the ability to facilitate an increase in seminal volume, increase sperm count, quality, and motility (Green 132).

Saw Palmetto (*Serena repens*) berries are pungent, sweet, and warm (Tierra 305).. Like pumpkin seeds, saw palmetto berries have an amazing affinity for the prostate. They nourish and strengthen the prostate while also combating hyperplasia of the prostate as a result of DHT. DHT has an enhanced potency on the negative feedback loop of the HPG axis due to its additional work on the androgen receptors. Saw palmetto inhibits the conversion of Testosterone to DHT while also facilitating

proper prostate size and function (Green 127). It has also been used historically for atrophy of the testes and ovaries, organic ED, senility in males, and a nutritive tonic for the entire male and female reproductive system (Green 132).

Schizandra berries (Schizandra sinensis) are sweet, sour, warm and have an affinity for the kidneys, lungs, and heart (Tierra 346). It is a highly versatile herb with a reputation as an adaptogenic in the West and an astringent tonic in the East. It has been used for a wide array of dis-eases including diabetes, tuberculosis, asthma, nocturnal emissions, insomnia, and low energy (Tierra 346). It is also known to increase glycogen and enzymes to the kidneys and gonads as well as increasing RNA and spermatogenesis (Green 133).

Shilajit, while not an herb, is used like one. It is actually an exudate of specific rocks in the Himalayas that looks and smells like asphalt (Tierra 136). It is prized in the Ayurvedic tradition as the "urinary tonic par excellence," improving the state of the entire genitourinary system (Green 133, Tierra 136). It has been demonstrated to facilitate recovery following injury and strenuous exercise due to its dense nutrient content. With regards to male fertility, its nutritive content and affinity for the genitourinary system, shilajit "increases the core energy responsible for sexual health and power" (Green 133).

Essential Oils are the distilled volatile aromatic oils of plants and are the life essence of the plant. As such, they have a potent effect and only 1 drop at a time is all that is often necessary. Due to their potency, there are specific guidelines for safe use. Certain oils may be used neat, or undiluted, while others need to be diluted to varying degrees for topical use. In the following list, dilution will be addressed individually. Most commonly, essential oils are diffused via an ultrasonic or nebulizing diffuser; however, they may be diffused from a simple dish with a bit of water. A small number of oils may even be used internally. These oils must be diluted and this use case is usually reserved for special circumstances (*Essential Oil Desk Reference* 53-58). In general, avoid contact with sensitive skin, out

of the eyes, away from mucus membranes, and away from the genitals. Commonly used base oils are single-source olive oil, cold-pressed coconut oil, apricot kernel oil, and sesame seed oil.

EndoFlex is a blend available from Young Living. It contains spearmint, sesame seed oil, sage, geranium, myrtle, matricaria or german chamomile, and nutmeg. It was formulated specifically for cellular metabolism and to facilitate hormonal balance (*Essential Oil Desk Reference* 151). It is indicated for overall prostate health, benign prostate hyperplasia, hypothyroid, hyperthyroid, endocrine imbalance, and urinary tract infections. This blend should be diluted 1:1 with a suitable base oil for topical use (*Essential Oil Desk Reference* 146).

Frankincense (Boswellia carterii) is a famous essential oil sometimes referred to as olibanum. Its name is derived from medieval French, meaning "real incense" (*Essential Oil Desk Reference* 91). It has been used as a holy anointing oil in the Middle East and is one of the oldest recorded plant medicines. It is useful for benign prostate hyperplasia, radiation exposure, ED, infertility of any cause, male hormone balance, neuropathy, and overall endocrine balance. It is the only known essential oil that is completely metabolized by the liver with no waste and as such, it may be used neat (*Essential Oil Desk Reference* 67).

Idaho Blue Spruce (Picea pungens) is native to the Northwestern U.S. and Canada. It was prized by the native populations for its utilitarian uses and its medicinal properties. It is a potent anti-inflammatory, antiseptic, and antiscorbutic (*Essential Oil Desk Reference* 99). With respect to male reproductive health, it is useful for ED, general infertility, low libido, hyperthyroid, male hormone balance, neuropathy, parasympathetic nervous system engagement, and overall endocrine function. This oil may be used neat (*Essential Oil Desk Reference* 67).

Lemon (Citrus limon) is one of the most versatile essential oils that are commonly available. It is highly antiseptic and has been studied extensively for its ability to help dissolve tumors. It is good for hypertension, obesity, parasites, and urinary tract infections. It should be diluted 1:1 with a suitable

base oil for topical use (*Essential Oil Desk Reference* 67). 1 drop may be taken internally; however, it should be well diluted and only used occasionally or it can stress the kidneys. Lemon is also photosensitive, so it should not be exposed to direct sunlight or to UV rays (*Essential Oil Desk Reference* 67).

Mister is a blend available from Young Living. It contains sesame seed oil, sage, fennel, lavender, yarrow, and peppermint. It was formulated specifically to aid in prostate decongestion and to facilitate proper male hormone balance (*Essential Oil Desk Reference* 160). It is also indicated for benign prostate hyperplasia, prostatitis, ED, infertility, and low libido. Mister may be used neat (*Essential Oil Desk Reference* 146). This may be used rectally in a bolas made from coconut or mango butter.

Myrrh (Commiphora myrrha) is also an ancient remedy. It is known as a potent antioxidant, antimicrobial, analgesic, and antitumoral (*Essential Oil Desk Reference* 115). Specifically for male fertility concerns, it is good for overall prostate health, benign prostate hyperplasia, ED, low libido, hypothyroid, hyperthyroid, and urinary tract infections, and the endocrine system overall. Myrrh may be used neat if used topically (*Essential Oil Desk Reference* 67).

Peppermint (Mentha piperita) is another highly versatile essential oil among those that are commonly available. It has been used historically for digestive complaints and as an anti-inflammatory. Specifically for the male reproductive system, it is useful for the prostate, hypothyroid, neuropathy, and as a sympathetic nervous system stimulant. This is a potent oil, and if used topically, it should be diluted 1:4 with a suitable base oil (*Essential Oil Desk Reference* 67).

Rosemary (Rosmarinus officinalis) is famous as part of the “Four Thieves Vinegar.” It has a storied history as a disinfectant, anti-inflammatory, antidepressant, and stimulant for cognitive function. Within the scope of male fertility, it is useful for prostatitis, male hormone balance, stimulating the

sympathetic nervous system, and for urinary tract infections. Rosemary should be diluted 1:1 with a suitable base oil (*Essential Oil Desk Reference* 67).

Sacred Frankincense (Boswellia sacra) differs from Boswellia carterii in that it is specifically from Oman where the frankincense trees have been specially cultivated for their potency and sacred history. In addition to the properties of Boswellia carterii, sacred frankincense has a more pronounced effect on the nervous system and human biofield (*Essential Oil Desk Reference* 130). It is specially suited for benign prostate hyperplasia, radiation exposure, ED, infertility of any cause, male hormone balance, neuropathy, and the endocrine system at large. This may be used neat (*Essential Oil Desk Reference* 67).

Sage (Salvia officinalis) is also known as “herba sacra” by the Romans. It was highly prized throughout history for its medicinal properties and is well known for its benefits to the females; however, it is also quite useful for male fertility issues as well. Sage helps to stimulate Estrogen, Progesterone, and Testosterone balance (*Essential Oil Desk Reference* 132). It is indicated for use with overall prostate health, infertility mostly due to hormone imbalance, engaging the parasympathetic nervous system, and overall endocrine balance. Sage should be diluted 1:1 with a suitable base oil for topical use (*Essential Oil Desk Reference* 67).

SclarEssence is a blend available from Young Living. It is composed of clary sage, peppermint, spanish sage, and fennel (*Essential Oil Desk Reference* 164). It was formulated initially for women’s hormone health; however, it has proven to be useful for male hormone balance as well. It is useful for ED, hormone-based infertility, low libido, and male hormone balance generally. Because it stimulates the production of Estrogen, it can be used for situations where Testosterone production is too high. SclarEssence is photosensitive and should be kept away from UV light exposure. It should be diluted 1:1 with a suitable base oil for topical use (*Essential Oil Desk Reference* 146).

Shutran is a blend available from Young Living. It contains idaho blue spruce, ylang ylang, ocotea, hinoki, davana, cedarwood, lavender, coriander, lemon, and northern lights black spruce (*Essential Oil Desk Reference* 164). It was specially formulated to increase androgen production, helping with ED, low libido, and facilitating male endocrine balance. Shutran is photosensitive and should be kept away from UV light exposure; however, it may be used neat (*Essential Oil Desk Reference* 146).

Valor is a blend available from Young Living. It is composed of caprilic and capric trygliceride, black spruce, camphor, blue tansy, frankincense, and geranium (*Essential Oil Desk Reference* 168). It was formulated to facilitate self-esteem, confidence, and courage. Specifically for male reproductive health, it is helpful for addressing radiation exposure, ED, low libido, and parasympathetic nervous system engagement. Valor may be used neat (*Essential Oil Desk Reference* 146).

James Green offers a couple essential oil recipes for prostatitis. Full recipes may be found in Tables 8 and 9 in Appendix C. First is a combination of ground flaxseed, distilled water, and lavender essential oil. Second is a combination blue chamomile, lavender, and / or blue malle (Eucalyptus polybractea) combined with a suitable base oil. The first recipe is injected into the rectum while the second is applied to the perineum, or the area between the scrotum and anus (Green 100-101).

Flower Essences are an extraordinarily gentle remedy. They function on the same principles as homeopathic remedies; however, they are specially suited to supporting emotional balance. As outlined previously, emotional imbalance can quickly lead to a physical problem. By addressing the emotional root of dis-ease, it has been recorded to dissipate on its own, often leading to a major shift towards recovery.

Aloe Vera (Aloe barbadensis) flower is best for those who “burn the candle at both ends.” This are the men who have a strong constitution and creative energy that work ceaselessly to accomplish their goals, often at the expense of their own well-being. Like the Sacral Chakra, this remedy corresponds to the creative powers of the Water element. “Aloe Vera helps the soul and body aspects to

come into greater harmony, by bringing the nourishment which comes from the water polarity of life – the flowing qualities of renewal and rejuvenation. When the soul learns to balance the fiery forces of the will with the fountain of feeling from the heart, a tremendous outpouring of positive creativity and spirituality can be realized" (Kaminski and Katz 166). These men likely want to be sexually active but have no energy to do so and as a result, experience organic ED and oligo- or azoospermia. The body is likely reabsorbing the sperm in order to continue to fuel the physical and mental exertion.

Calendula (Calendula officinalis) specializes in facilitating healing around the use of words for those that have a history of the violent use of them. Words are the gateway of bringing intangible ideas into the physical world. While this remedy is feminine in nature, directly corresponding to the "[birthing] through the receptive feminine matrix…," it can be especially healing for men. This remedy can help men learn how to be gentle with their words and how to receive the healing potential of gentleness (Kaminski and Katz 181).

Calla Lily (Zantedeschia aethiopica) is a flower for the confusion and turmoil surrounding one's sexual identity. In particular, this remedy helps to bring balance of the inherent masculine and feminine energy to achieve true expression of oneself. (Kaminski and Katz 185). This is poignant in the case of male fertility. Societal expectations of men can feel incongruous of what he feels is true about himself, leading to dissonance between his brain and heart.

Crab Apple (Malus sylvestris) is an original flower essence discovered by Dr. Bach. It is specially indicated for those who feel unclean and impure, usually accompanied by a great deal of shame and disgust. "Such individuals are obsessively preoccupied with impurities, whether real or imagined. These feelings are also projected onto the environment, with an aversion to anything dirty or out of perfect order. It follows that such souls are prone to allergies and many forms of psychosomatic illness, because the body feels overwhelmed by the soul's impossibly high standards of perfection" (Kaminski and Katz 199). This remedy is one of the premier remedies for those who have suffered

sexual abuse. Particularly for men, those who would need this remedy were abused as children or by a partner. Due to prevalent societal views on men, many men feel they are unable to receive- or are undeserving of help with this immense emotional burden. “This flower essence instills a balanced relationship of the soul to the body and to life on Earth, helping one to realize that it is only through suffering the pain of imperfection that the soul is afforded the possibility of true evolution, rather than static perfection” (Kaminski and Katz 199). Due to the shame and disgust associated with the need for this remedy, this man may have low or no libido and become asexual.

Dogwood (Cornus nuttallii) is similar to Crab Apple; however, instead of feeling shame unclean, the man hardens himself to emotions completely, resulting in a physical stiffness and uncoordination as well. These men suffered repeated violation of the physical body which caused the etheric body to shrivels. This lack of coordination leads to low Emotional IQ and these men find themselves in similar relationships as the ones that lead to their current condition. Dogwood Flower “helps to expand the etheric body and soften the physical body. The [man] is able to feel more gentleness and inner sanctity, as the soul regains its state of grace through harmonious communion with the life or etheric body” (Kaminski and Katz 203). In addition to the emotional implications addressed by this remedy, the physical ramifications could result in nerve deafness or the inability for the nervous system to switch between sympathetic and parasympathetic dominance necessary for sexual function. Additionally, this could lead to both organic and psychogenic ED.

Fairy Lantern (Caochortus albus) is indicated where a childish immaturity persists into adulthood. During childhood, either self-expression was suppressed, or some sort of trauma was experienced that locked the emotional maturity in that moment and was not allowed to mature with his physical and mental aspects. Sometimes this occurs at an age where they can “fake it” into adulthood and other times it happens so early that fully physically matured men act like they are a young child. “They play the role of the puer eterna (eternal child) who needs to unconsciously repeat childhood

throughout adult life, hoping to somehow transform this arrested stage of development. Fairy Lantern can also be used during childhood and adolescence for retarded phases of physical or emotional development. Fairy Lantern helps souls to move through these emotional blocks in the maturation process by maintaining a healthy relationship to the inner child, but as a fully functioning adult" (Kaminski and Katz 207). This could be indicated for hypogonadism and other genetic and hormonal dis-eases where full physical maturity is never achieved. This could also be indicated for the asthenospermia and azoospermia where either maturation of sperm is abnormal or completely absent.

Impatiens (Impatiens glandulifera) is strongly indicated for men who are impatient. "Their overabundance of fiery force flares up easily into irritation, impatience, intolerance, and anger. Although quite mentally agile and extremely capable, the great inner tension and excitability of such souls leads to various physical disease states or premature aging due to 'burnout'" (Kaminski and Katz 225). This could be indicated in cases of adrenal and liver stress and could be turned on himself. If he is stressed and frustrated with himself, his partner, and everyone around him, psychogenic ED could become a serious issue.

Iris (Iris douglasiana) flower is representative of "inspired artistry, soulful creativity in touch with higher realms; radiant, iridescent vision in all aspects of life" (Kaminski and Katz 228). These men are stuck in the material haze of daily minutia. There is no spark of creativity. He either works to exhaustion or has come to feel that he needs to keep his head down and do as he is told in order to survive – beaten into submission. Iris helps to reestablish creativity where it was lost for whatever reason. Men who need Iris may not feel that they can express themselves creatively, either in the broader sense, or sexually. This lack of expression could lend itself to psychogenic ED or the failure to maintain hormonal balance.

Larch (Larix decidua) is indicated for "developing true self-confidence despite shyness and low self-esteem; for blockages to self-expression that may manifest as throat affliction, also for adolescent

boys during voice change" (Kaminski and Katz 113). Due to the pressures of society, many young men feel conflicted or constricted in their ability to express and assert themselves. Etherically, this inhibits proper Throat Chakra function which can turn into a physical thyroid issue. This could lead to hormonal imbalance as adrenarche progresses and could lead to a "secondary hypogonadism" in which the secondary sex characteristics could be delayed in development.

Mimulus (Erythanthe guttata) is among the original flower essences discovered by Dr. Bach and is specially indicated for the man who experiences fears and phobias of known things. "Those needing this essence are hypersensitive and live with a great many small fears of ordinary and everyday events. They are especially afflicted in the solar plexus, which churns with great anxiety and unease" (Kaminski and Katz 240). At its core, this is a courage remedy to address fears associated with the physical body or life and can sometimes be traced to hesitation at the moment of incarnation (Kaminski and Katz 240). This hesitation could manifest itself in any number of ways regarding male infertility but most likely in ejaculatory dysfunctions or delayed hormonal development.

Mountain Pride (Penstemon newberryi) is a flower that teaches one to take a stand and make positive change, invoking the archetype of the spiritual warrior and positive masculinity. "It is an especially important remedy for those persons who confuse peace with passivity. Such individuals must learn that positive activity is an important healing agent, not only for personal strength and soul development, but also for real peace in the world" (Kaminski and Katz 243). Not unlike Larch, this remedy could be indicated for men who need help asserting themselves in the world. The larger societal and global aspects aside, this remedy could be useful for men who struggle with personal growth - men who want to heal but have been unwilling or unable to motivate themselves to make the changes necessary to facilitate it. Mountain Pride seems to have a distinct Mars influence.

Oak (Quercus robur) "addresses many positive masculine soul traits of endurance, strength, and perseverance. These are the admirable qualities of the Mars-like hero, but they become a source of

illness and dysfunction when they are not balanced with Venusian grace and gentle surrender" (Kaminski and Katz 249). Men who resemble Oak are strong, capable, and compassionate; however, they can become buried under the pressure of caring for others and fall into illness. "Through Oak the naturally strong capacities of the soul are balanced with the inner feminine Self, which learns to yield and to receive help from others when necessary" (Kaminski and Katz 240). These men would rather die the hero than allow others to witness "weakness" in them. As such, these men are likely to suffer alone and are unlikely to ask for help. It seems likely that these men are those that develop cancers due to their persistence in stuffing down their own needs.

Oregon Grape (Berberis aquifolium) is for men who suffer from "paranoid or defensive behavior; expectation of hostility from others; antagonistic projection" (Kaminski and Katz 251). Somewhere in life, these men learned that they should be defensive and suspicious of all around them, that if they are not vigilant, they will be taken advantage of or worse. This pattern of behavior becomes toxic to those they interact with. "They fester in the soul and go on to infect all human relationships and social situations. Unfortunately, the soul who is gripped by this paranoid state creates the very reality [he] projects, for those who are treated in a hostile or mistrustful manner usually respond with an equal measure in return" (Kaminski and Katz 251). The relationship to male fertility could possibly be that these men could turn sexually violent against their partners in an attempt to exact some false sense of justice for some transgression that could very likely be manufactured by his own imagination.

Penstemon (Penstemon davidsonii) is a theme of perseverance and acceptance. "Those who need Penstemon seem to have been dealt and unfair blow in life" (Kaminski and Katz 252). Whether the cause of this feeling stems from a disability, injury, lost love or possessions, he feels like a victim. This can then lead to a feeling of futility, which could lead to incontinence as the bladder is acutely impacted by feelings of futility. Left unresolved, incontinence could lead to organic ED or even neoplasmic growth in the bladder or genitourinary system.

Poison Oak (Toxicodendron diversiloba) is a flower especially indicated for men. “Many souls have difficulty coping with their softer, more vulnerable feelings. This can be especially true for men, who are culturally influenced to display little intimacy or emotion” (Kaminski and Katz 257). Many men are taught that they need to show no emotion in order to retain their masculinity and then when they engage in this behavior, they are engaging in “toxic masculinity.” Societal expectations of men are fickle. They erect negative barriers between themselves and others by showing hostility, anger, and irritability, thus keeping a ‘safe’ emotional distance. At the deepest levels, such [men] are afraid of the inner feminine or of being engulfed by feminine values” (Kaminski and Katz 257). These men may have entertained the thought of using anabolic steroids to enhance Testosterone production. Whether or not they actually have is nearly irrelevant as they likely have higher levels of Testosterone anyway and as such, are contributing to the negative HPG feedback loop and may experience oligo- or azoospermia as a result. Organic and psychogenic ED are likely also a factor.

Sage (Salvia officinalis) flower is especially indicated for the man that is experiencing “manopause” and entering the “Wise Elder” phase of life. This remedy aids in the transition from virile champion to the sage elder. “The Sage remedy can be helpful during various life phases and transitions, when [he] needs to step back and consider the unfolding events of life. However, it is particularly indicated for advanced stages of the life biography, when the Self must learn to survey life experience, and to glean wisdom and insight” (Kaminski and Katz 270). This remedy could serve men who are advancing in age that may be experiencing issues with libido, ED, less energy, etc.

Scarlet Monkeyflower (Erythranthe cardinalis) “treats a particular state of fear within the human soul: the soul’s fear of its own ‘shadow self’ or lower emotions. Those who need this remedy often keep a ‘lid’ on unpleasant emotions. These feelings remain bottled up in the psyche, subject to increasing levels of tension and pressure, until the individual explodes in blind rage or other raw emotions” Kaminski and Katz 274). Furthermore, there is a sense of powerlessness to control any of

this. This sense of powerlessness would likely result in ejaculatory disorders and either organic or psychogenic ED. These men also would likely benefit from EMDR, N.O.T., or learning an outlet for these suppressed emotions until strategies can be learned for controlled release while the underlying causes are addressed.

Self Heal (Prunella vulgaris) flower is strongly indicated for men with the "inability to take inner responsibility for one's healing, lacking in spiritual motivation for wellness, overly dependent on external advice for health choices" (Kaminski and Katz 277). This remedy could be especially indicated for those men who are brought to a Naturopath by their partner and are passive or reluctant to be there altogether. This remedy helps him come to the realization that he holds all of the power to take charge of his own health – the power to empower himself. This lack of responsibility could be indicated for psychogenic ED as well.

Shooting Star (Primula hendersonii) flower is for men who have always felt they did not belong, even to the point of feeling like they are not human. It is for "profound feeling of alienation, especially not feeling at home on Earth, nor a part of the human family; disturbed birth trauma" (Kaminski and Katz 279). Additionally, this could extend to Pineal Type men or men who have been ungrounded long enough that they no longer feel they are completely in their own body. This type of disconnected feeling could easily lead to psychogenic ED and malnutrition, leading to oligo- or azoospermia.

Sunflower (Helianthus annuus) is a massive flower that stands several feet tall and reaches towards the Sun. This helps remedy issues with "distorted or vacillating sense of Self; inflation or self-effacement, low self-esteem or arrogance; poor relation to father or solar aspects of Self" (Kaminski and Katz 285). He is uniquely qualified to be himself and deserves to realize himself. He has something to offer in a way that only he can offer it. This is not a remedy to develop the ego; rather, it helps him to learn to honor himself and his power. "When the soul learns how to harness this great sun force within

[himself], [he] is truly able to bless and heal other human beings and the Earth" (Kaminski and Katz 285). This remedy could be indicated for both organic and psychogenic ED as well as astheno- and teratospermia. Additionally, this speaks directly to the Solar Plexus Chakra which has much to do with assertion of self in a constructive way.

Trillium (Trillium chloropetalum) flower specially indicated for Root Chakra imbalance. The Root Chakra is is tied to survival instinct and keeping humans grounded. Trillium in its indications is "fear due to materialistic emphasis, greed for possessions and power; poverty consciousness that leads to overly-materialistic focus" (Kaminski and Katz 290). Many "Traditional Values" men identify that they serve three basic functions in life – to be a leader for their family, to protect their family, and to provide for their family. This remedy correlates directly to the latter two and especially the last one. These functions may be considered primitive by some, but they are no different than the relationship between yang organs and their yin counterparts. The liver, yin or feminine, and gallbladder, yang or masculine, are a classic example of this. The liver serves well over 500 functions and the gallbladder is "simply" responsible for storing and then releasing the bile she produces. In Traditional Chinese Medicine and in classical Homeopathy, the yang or non-vital organ will always suffer first in cases of dis-ease. This is the body's way of protecting the vital yin organs. The testes also hang within the cone of the Root Chakra. Men who suffer issues with the testes or the Root Chakra often feel like they are lesser or incapable. Trillium is strongly indicated for this, promoting a "secure sense of personal welfare and financial well-being; ability to serve and give to others" (Kaminski and Katz 290). Nearly every dis-ease affecting male fertility could indicate a need for Trillium.

Homeopathics & Cell Salts can offer much to the way of strengthening male fertility. While this system can be quite complex and unapproachable to the layperson, a skilled practitioner will have a strong chance of discerning the most effective remedy. There are some rules to Homeopathy: it is best to only use one remedy at a time except in special circumstances. It is often best to take a single dose of

a remedy especially since most male fertility issues are chronic. Additionally, since Homeopathy has extremely low risk of side-effects or negative outcome, it can be used with a greater peace of mind than most modalities. What follows is a small selection of what Homeopathy has to offer.

Constitutional Homeopathy has much to offer males. It is known that the constitutional application of homeopathy has helped numerous individuals recover from serious illness. Erectile Dysfunction, issues with sperm quality and volume, etc. are well within the capability of the lexicon of homeopathic remedies to address in the hands of a skilled practitioner and the individual who truly wants to improve. Even neoplasmic growths have been successfully turned around with the constitutional application of Homeopathy. There are many authors who have offered guidance on this application and Rajan Sankaran should be among the first that guidance is sought from. *The Soul of Remedies* is an excellent place to start. Perhaps one of those remedies will be found among the following remedies.

Agnus castus (Chaste Tree) is indicated for low libido and low sexual stamina. It is useful for organic and psychogenic ED, orchitis, and anejaculation with other types of discharge usually accompanying infection. “Yellow discharge from urethra. No erections. Impotence. Parts cold relaxed. Desire gone. Scanty emissions without ejaculation. Loss of prostatic fluid on straining. Gleety discharge. Testicles, cold, swollen, hard, and painful” (Samaran and Panbalan; Boericke 23-24).

Argentum nitricum (Silver nitrate) is indicated for organic and psychogenic ED but with normal libido. Arousal and sex are both painful for him as well. Testicular swelling or orchitis usually accompanies suppression of ejaculation. This remedy is also good for gonorrhea as well. There is also a shriveling of the scrotum and penis; “always think of argentum nitricum on seeing withered, dried up, old looking patient” (Samaran and Panbalan; Boericke 74).

Caladium seguinum (American Arum) Is indicated for the redness of the glans as well as inflammation and “thickness” of both the penis and scrotum; however, they are cold and sweaty.

Erectile Dysfunction occurs with states of extreme arousal but when arousal fades, an erection occurs. Erection also occurs when he is half asleep but fades upon fully waking. Additionally, anejaculation and depression are also indicators for Caladium seguinum (Samaran and Panbalan; Boericke 141-142).

Calcarea carbonicum (Calcium carbonate) is indicated for men with high libido with premature ejaculation followed by fatigue and irritability (Singh; Boericke 146). Homeopathic or Cell Salt may be used.

Calcarea fluorica (Calcium fluoride) is indicated for depression and hydrocele or fluid collection in the scrotum. (Boericke 149-150). Homeopathic or Cell Salt may be used.

Calcarea sulphurica (Calcium sulphate) is indicated for swelling of glands and purulent discharge. Cystic tumors and dry, itchy skin are also indicators for calc sulph (Boericke 154). Homeopathic or Cell Salt may be used.

Conium (Poison Hemlock) is indicated for excitement leading to depression and apathy. “Desire increased; power decreased. Sexual nervousness, with feeble erection. Effects of suppressed sexual appetite. Testicles hard and enlarged” (Singh; Boericke 230-231).

Graphities (Graphite) is characterized by high libido with ED but an aversion to intercourse. Premature ejaculation or anejaculation is common. Genital herpes is common (Boericke 310-311).

Kali Phosphoricum (Potassium Phosphate) is indicated with nocturnal ejaculation or “wet dreams.” Organic and psychogenic ED negatively effect stamina and he is exhausted after sex (Boericke 378). Homeopathic or Cell Salt may be used.

Lycopodium clavatum (Club Moss) is useful for ED, premature ejaculation, and enlargement of the prostate. He falls asleep during sex and when the ED gets worse from more sex. “Abused himself of secret vice and has become tired of in his spine, brain, and genitals. Moist [warts] on his penis” (Samaran and Panbalan; Boericke 409-411).

Natrum muriaticum (Sodium chloride) is for men who continue to ejaculate or “leak” semen even after the orgasm is finished and sex is over with. Additionally, there is often ED and delayed ejaculation (Boericke 461). Homeopathic or Cell Salt may be used.

Selenium has “marked effects on the genito-urinary organs , and often indicated in elderly men, especially for prostatitis and sexual atony” (Boericke 581). Additionally, he dribbles semen and prostatic fluid during sleep. He is often irritable after sex, suffers ED, has frequent thoughts of a lewd nature, and hydrocele. He has high libido but loses his erection at the attempt to engage in intercourse. His semen is thin and odorless and he has decreases sensation. When he is not aroused, he has an erection to the point of priapism with his testes drawn up (Samaran and Panbalan; Boericke 581-582). Homeopathic or Cell Salt may be used.

Silicea (Silica) is indicated for men whose genitals are sore and burn with lesions on the inner thighs. “Chronic gonorrhea with thick, fetid discharge. Elephantiasis of scrotum. Sexual [overstimulation]; nocturnal emission. Hydrocele” (Boericke 592). Homeopathic or Cell Salt may be used.

Staphysagria is for high libido with ED. Additionally, there is “sexual sins and excesses… especially after self-abuse; persistent dwelling on sexual subjects. Spermatorrhea, with sunken features; guilty look; emissions, with backache and weakness and sexual neurasthenia. Dyspnea after coition” (Samaran and Panbalan; Boericke 607-608).

Turnera (Damiana) is indicated for Erectile Dysfunction, incontinence, and neuropathy negatively impacting sexual sensation (Samaran and Panbalan; Boericke 569).

X-Ray (Alcohol exposed to X-Rays) is indicated for oligo- and azoospermia as a result of impaired spermatogenesis. It is also indicated for atrophy of the testes, frequent dreams of sex, and a resurfacing of previously suppressed gonorrhea (Singh; Boericke 681).

Miasms, or the generational suppression of dis-ease to the point that it affects the DNA and genetic expression must be addressed in the case of male fertility as well. Miasms like syphilis, gonorrhea, etc. can have disastrous consequences for male fertility. While constitutional homeopathy conducted by a skilled practitioner can be effective with a single remedy, a more generalized approach is more accessible and can be done with few contraindications. With most homeopathic remedies, this should be done standalone with no other remedies, supplements, coffee, alcohol, etc. Due to the potential severity of the process, it is best that only one person at a time participate. This protocol may be used during pregnancy beginning at month 4, no sooner. See Table 10 in Appendix C for the full protocol with notes.

Color, sound, and other subtle vibrational remedy systems include the use of crystal gemstones and Feng Shui. The connecting thread between them all is the shared ability to affect the waveform patterns and photon behavior that underlies all atomic and subatomic behavior. For clarification, the use of color refers to the use of colored light as specified by Ghadiali Dinshah in the use of Spectro-Chrome Therapy. To use a musical comparison, color is a higher octave of sound. Sound is a higher octave of crystals. All three of these systems resonate at octave frequencies, measured in Hertz (Hz) to minerals and all three systems can often be used simultaneously. Feng Shui is the most subtle in that it adjusts the environment in order to facilitate change internally. This system uses color, sound, and the manipulation of room layouts to achieve an environment that nourishes the human biofield to facilitate healing.

While the Sun hold the frequency of all of the colors combined and can be amazing for maintenance of overall health, it is not so useful for targeted therapeutic use. Ghadiali Dinshah, the originator of Spectro-Chrome Therapy offers the following protocols to be use for the following situations based on the attributes of single colors. Each step is intended to be a 60-minute session with

only one session per day. It is best to for a qualified practitioner to facilitate these sessions in order to maximize benefit potential.

For hypothyroid issues, apply orange and lemon on the systemic front, meaning the head, torso, and genitals for one session. Then apply green on the head afterwards (Dinshah 57).

Hyperthyroid calls for lemon and indigo on the systemic front, then green on the head, then purple on the system front (Dinshah 57).

For low libido, ED, infertility, and sterility, apply green and orange on the systemic front. Then magenta on the systemic front and lower back. Finally, scarlet is applied to the lower abdomen and genitals (Dinshah 66).

Hypersexuality indicates for turquoise on the systemic front, then purple on the lower abdomen, genitals, and lower back. Finally, apply magenta to the systemic front (Dinshah 66).

For benign prostatic hyperplasia, Dinshah recommends lemon on the systemic front followed by orange and indigo on the genitals and sacrum (Dinshah 67).

Prostate inflammation of an acute nature indicates the use of turquoise on the systemic front followed by blue on the genitals and sacrum (Dinshah 67). For chronic prostate inflammation, use lemon on the systemic front, genitals, and sacrum (Dinshah 68).

Sound Tonation is a useful for stabilizing the human biofield and creating resonance with structures within the body as well. Solfeggio Frequencies were originally identified in Medieval Europe; however, they are theoretically much older. Additional healing tones have been used throughout India , Egypt, and China for thousands of years. Research is ongoing to better understand what these ancient cultures understood. A full tuning fork sound session can help to realign the energetic fields, Chakras, and facilitate swift changes in physical health; however, it requires a significant amount of work beforehand in order to be of any effect.

Specific frequencies can be used to facilitate male fertility. The Note of C=256Hz has been recorded to resonate with the Root Chakra (Saraswati and Mohan). The Root Chakra is physically correlated to the adrenal glands. The adrenal glands have been recorded to resonate with B=492.8Hz ((Saraswati and Mohan). The adrenals rest on the superior surface of the kidneys which are connected invariably to the male reproductive genitourinary system. The kidneys resonate at Eb=319.88Hz. The bladder, directly superior to the prostate, resonates at F=352Hz (Saraswati and Mohan). The brain, home to the hypothalamus and pineal glands resonates at Eb=315.8Hz. Muscle cells, some of which are necessary for erection and ejaculation, resonate at E=324Hz (Saraswati and Mohan). While the prostate, penis, and testes are not specifically listed by Saraswati and Mohan, they are part of the larger genito-urinary and endocrine systems. By stimulating the related structures with frequency, proper function can be facilitated either through the clearing of toxins or amplification of proper function in order to "catch up" to other functions.

Crystals & Stones are useful because they can be used discreetly in a pocket or as jewelry. They can also be added to more elaborate therapies and bodywork sessions to enhance effect. They are a favorite for practitioners using tuning forks because the combination can facilitate expedited nutrient delivery at the cellular level. While crystals resonate at the same frequencies as many minerals, they function similarly to batteries and sponges and eventually need to be recharged or cleansed. Placing them in the Sun- or Moonlight can be used to do both, making crystals simple to maintain (Hall 31). Additionally, some may be maintained with ceremonial smoke from white sage and others may be maintained by placing them in water (Hall 31). Some other stones may never interact with water for safety reasons and should be placed in salt instead.

Carnelian is small translucent pebble, commonly available stone from Britain, India, Czech Republic, Slovakia, Peru, Iceland, and Romania. Its color varies between red, pink, orange, and even brown (Hall 94). This stone is useful for facilitating release of emotional trauma specifically from

abuse including that of a sexual nature. It is indicated for regulation of fluids and the kidneys and ED (Hall 94-95). Hall specifically indicates Carnelian for overall health of the testes (Hall 368).

Chrysoprase is apple green to lemon in color and often opaque and flecked in appearance (Hall 113). It facilitates proper Sacral Chakra function and is indicated for infertility as a result of infection, ED, and hormone balance (Hall 114). It is also indicated specifically for the overall health of the prostate gland (Hall 368).

Hessonite is a type of garnet. Garnet is common, found globally in a variety of colors and translucencies (Hall 135). Hessonite is specifically useful for hormone balance, infertility as a result of imbalanced hormones, and psychogenic ED (Hall 138).

Jadeite / Nephrite are both types of Jade. Jade is famously found in China; however, it has also been found in Russia, Myanmar, Italy, America, and the Middle East. It is host to a spectrum of colors including the famous green and white, orange, blue, blue-green, cream, and lavender (Hall 151). Nephrite is cream-like in translucency and is specially tuned to the kidneys, facilitating proper function (Hall 151, 369). Jadeite is a highly translucent jade that is specially indicated for both the kidneys and testes, facilitating proper function fluid regulation (Hall 151-152, 368).

Rutilated Quartz, also known as angel hair, is a type of quarts found worldwide in a number of colors. It earns its names from the long thin “threads” found in the stone (Hall 237). Rutilated Quartz has been used to evacuate parasites from the body, facilitate thyroid balance, and uplift the individual out of depression (Hall 238). Specifically for male health, it is indicated for chronic erectile dysfunction and infertility (Hall 238).

Thulite is found exclusively in Norway. It is pink, rose, white, red, or gray in color and is a fairly granular stone (Hall 287). This stone is indicated for overall reproductive health for males and females. It has been useful for dis-eases of the reproductive system, infertility, weakness, and nervous exhaustion as they relate to male fertility (Hall 287). This stone is especially useful when placed on the

pubic bone. Low libido may also be indicated for Thulite as this stone has shown promise in facilitating sexual expression as part of a healthy routine (Hall 287).

Topaz is found in North America, India, Australia, South Africa, Sri Lanka, and Pakistan. Topaz is a transparent stone often found in colors of golden-yellow, brown, blue, clear, red-pink, and green (Hall 292). Specifically as it relates to male reproductive health, golden topaz, also known as imperial topaz, is most useful. It has been used to facilitate proper cellular function and endocrine balance (Hall 294-295). It is specifically indicated for the testes, lending itself to proper spermatogenesis (Hall 368).

Variscite is an opaque stone often with veins of other material. It is most often gray, green, and white and is found in America, Germany, Austria, Czech Republic, and Bolivia (Hall 314). Variscite has been used for depression and chronic fatigue. It facilitates proper nervous system function, vasoconstriction, and blood vessel integrity (Hall 315). Variscite is also useful for pH balance by helping to alkalize the body when it is too acidic. Variscite as it relates to male fertility is particularly well suited for overall health of the tests, organic, and psychogenic ED (Hall 315, 368).

Zincite is a “grainy mass, although some striking transparent crystals are available,” available from Poland, Italy, and America. It is most often found as red, orange-yellow, green, and sometimes colorless (Hall 320). Zincite has shown promise for weakened systems in the body and stimulating the lower Chakras. This stone is useful for facilitating overall prostate health, immune regulation, infertility of various causes (Hall 321). Zincite has been known to stimulate what is called a “healing crisis” and should be used with caution (Hall 321). A healing crisis, more commonly known as a healing challenge is when the body releases more toxins than it can process resulting in great discomfort and occasionally new problems.

Feng Shui is an ancient Chinese system based on the much older Indian system of Vaastu Shastra. Again, it is the system of making adjustments within a space to facilitate proper electromagnetic energy flow through the space in order to create an environment conducive to healing

and optimal health. In Black Hat Sect Feng Shui (BTB), the Wealth / Abundance Gua correlates directly to the Root or Survival Chakra. Within the scope of BTB Feng Shui, this Gua relates to the health and function of the genitals, blood, and sexuality in relation to procreation (SantoPietro 220). The Family Gua ties to the Sacral or Social Chakra. This Gua maintains sexual energy, intimacy, and health of the reproductive organs (SantoPietro 221). Corrections that may be needed in order to facilitate proper energy flow through these Guas depend on a great number of factors and a skilled practitioner should be consulted. Some general recommendations that can apply broadly are: clearing clutter from rooms and doorways, repairing leaky faucets and burned out light bulbs, closing doors to bathrooms nearby, positioning furniture to facilitate flow of energy and people through the space, mitigating EMFs wherever possible, and making sure the space is generally clean and tidy (SantoPietro 100).

There are a number of therapies and styles of bodywork that can facilitate proper function of the male reproductive system. Affirmations, Sungazing, CranioSacral an Chiropractic, Reflexology, Meridian Work and Acupuncture / Acupressure, Polarity Therapy, Kegel exercise, and even specialized masturbation can be useful. Many of these are highly specialized and should be performed by a skilled practitioner while others can be done in the privacy of the home.

Affirmations and the use of specific language can facilitate healing. They operate on the principle of reprogramming the subconscious mind to influence quantum field behavior. Dr. Bruce Lipton does an excellent job of explaining the underlying mechanics of quantum influence on the subconscious mind in his book *The Biology of Belief*. Louise Hay does an excellent job of explaining how to execute this change through affirmations. Affirmations often need to be repeated several times per day for several days to weeks in order to be effective. As it relates to male reproductive health, there are a few affirmations that she has recommended. For prostate problems: “I accept and approve of myself. I accept my own power. I am forever young in spirit” and for overall prostate health: “I accept

and rejoice in my masculinity" (Hay 193). For the testes: "It is safe to be a man" (Hay 202). For impotence: "I now allow the full power of my sexual principle to operate with ease and with joy" (Hay 178). For sterility: "I trust in the process of life. I am always in the right place, doing the right thing, at the right time. I love and approve of myself" (Hay 200).

Sungazing is the practice of gazing at the sun for brief periods of time during immediate sunrise or sunset. The Sun is necessary for Vitamin D synthesis and regulation of the Circadian Rhythm governs the production of Melatonin by the pineal gland. Melatonin, as outlined previously, helps to govern the HPG axis and thereby, hormonal factors of male fertility. Overexposure to the Sun can be harmful. Exercise caution.

CranioSacral was developed based on the work by Dr. William Garner Sutherland, the first Osteopath (Gilchrist 13). It is a system that uses extraordinarily light touch in order to palpate the subtle pulse of the cerebral spinal fluid (CSF) along the spine and around the cranium. Skilled practitioners are able to palpate the separate but related electromagnetic pulse as well (Gilchrist 23). The CSF delivers nutrients to the nervous system and facilitates waste removal as well. This modality functions based on the gentle stimulation of the small musculature surrounding the skeletal system in order to facilitate a natural return to proper alignment. This functions similarly to Chiropractic and Applied Kinesiology; however, it is gentler still. The lumbar and sacrum supply all of the nerves into the male reproductive system. Additionally, specialization of CranioSacral can be performed in the mouth in order to facilitate proper positioning of the sphenoid bone with the goal of relieving pressure on the pituitary gland. Pressure on the pituitary gland can disrupt its role in the endocrine system and pull secretion of LH and FSH out of balance. CranioSacral can be helpful for ED, hormone imbalance, and neuropathy.

Reflexology focusing on the endocrine system and prostate can be useful in facilitating proper male fertility. Again, stimulating these reflex points can facilitate proper nervous system function. The

pituitary gland is located on the planar surface of the great toe, directly in the center. The prostate is located medially between the ankle bone and the heel. The testes are located laterally between the ankle bone and heel (Byers 152-153). Stimulating all of these points and the neighboring structures can facilitate better nervous system communication to all of these organs. Additional reflex points for the Chakras, adrenals, kidneys, and thyroid may be stimulated to facilitate proper function of these organs and systems as well. Reflexology can be helpful for ED, hormone imbalance, and neuropathy. While it is possible to perform Reflexology on oneself, a skilled practitioner will be able to facilitate better results with greater accuracy. The primary difference between CranioSacral and Reflexology is the part of the nervous system engaged. CranioSacral has a direct impact on the parasympathetic nervous system while Reflexology has a more direct influence on the sympathetic nervous system. Further explanation is offered through Polarity Therapy.

Meridians have been traced by ancient Chinese health practitioners thousands of years ago and were measured and mapped by modern science within the last century using sensitive measuring equipment. While all meridian pathways should be clear at all times, the ones that have the most direct impact on male fertility are the Triple Warmer and Circulation / Sex meridians. The Triple Warmer meridian impacts the thyroid, pancreas, and adrenals. It is located on the nailbed of the lateral fourth finger and traces all the way up to the lateral end of the eyebrow. The Circulation / Sex or Pericardium meridian runs from the medial third finger to the lateral edge of the areola. These meridians, respectively, are responsible for healthy endocrine function and proper reproductive function. Meridian work can be done in the form of acupuncture, acupressure, or tracing on the physical body or in the biofield. Acupuncture would need to be facilitated by a skilled practitioner. Acupressure uses varying pressure on the meridian points in order to facilitate positive change and can be done at home; however, like Reflexology, better results can be achieved with a skilled practitioner. Meridian tracing,

with some initial guidance for accuracy, can be done in the privacy of the home and is recommended for overall health as part of a daily routine anyway.

Polarity Bodywork is a complex system of techniques combining different types of therapeutic touch, medical astrology, the five elements indicated in Ayurveda and some western systems, the subtle energies of the human biofield, yin and yang, and the electromagnetism of the various structures within and without the body. It was originally “discovered” by Dr. Randolf Stone, doctors of chiropractic and osteopathic. The five elements are Ether, Air, Fire, Water, and Earth. While it is important that all be in balance for overall health, Water governs the pelvic region that is home to all of the reproductive structures. It is when Water is in its pure form and in balance, the body is able to properly produce semen (Burger 12). “The Water element energy patterns are critical in the functioning of the lymphatics and glands, the sexual organs, the bladder,… The Water element governs the balance of the endocrine system at the subtle level” (Sills 120). It is highly recommended, due to the complexity of the polarity system, that only a skilled practitioner perform this type of work for the individual.

Kegel Exercises (KE) are important to both male and female reproductive health. Gynecologist Arnold Kegel initially recommended the exercise for women who struggled with urinary continence (Green 94). “It was soon discovered that these exercises not only created good pelvic health, facilitating control of bowels and bladder, but also helped develop and nourish the entire genital system in men as well as women” (Green 94). The pelvic floor (PC) muscle spans from the pubic bone to the coccyx. Strengthening the PC muscle also tones the prostate gland and helps to prevent atrophy and atony of the structures of the genitourinary system. Green indicates that kegels may be performed anywhere due to their discreet nature and recommends doing them either before sleep or in situations where patience would normally be required (Green 95). A full outline of the exercise may be found in Table 11 in Appendix C.

Penis-Root Masturbation (PRM) has shown promise in helping to correct the physical mechanisms of premature ejaculation. One small study done with nine males demonstrated that after three months of practice, the time between stimulation and ejaculation or the intravaginal ejaculatory latency time (IELT), increased from 60 seconds to 180 seconds (Ma et al.). A larger, semi-randomized study with 37 males compared the efficacy of PRM compared to KE. The conclusion of this study were that "The IELTs of patients who performed PRM and KE were significantly prolonged before treatment, and the difference after treatment was statistically significant" (Jiang et al.). This study further concluded while both were effective, PRM was more effective than KE (Jiang et al.). PRM is performed by placing the thumbs on the 1/3 of the erect penis closest to the body with the fingers ventrally. Then, using a comfortable level of pressure, rubbing the thumbs along the first third of the penis and then in circular motions towards the mid-line (Ma et al.). See Figure 18 in Appendix C.

Conventional Contraception

There are several conventional options available to both men and women to prevent fertilization and pregnancy. In the modern era, most of these options used a barrier or female hormone manipulation to either prevent the sperm and egg from uniting or to prevent implantation of the fertilized egg into the uterine wall.

Commercially available mechanical male contraceptive devices are condoms. When used properly, modern condoms are 98% effective; however, many couple fail to use them as intended, resulting in a more accurate 87% effectiveness rate (Planned Parenthood). Condoms are typically coated with a spermicidal lubricant, which either kills the sperm cells or slows them enough that they cannot reach the egg in time. Spermicidal lubricants are roughly 80% effective when used alone (Planned Parenthood). Historically, condoms were made from sheep stomachs or skin. Today, they are made of latex, polyurethane, and other synthetic membranes. Common ingredients in commercial

condoms and their lubricants are parabens, glycerin, nonoxynol-9 (N-9), benzocaine, and fragrances. Parabens are used to increase shelf life by inhibiting microbial growth on the condoms (Antoniadou, Stacey). Parabens are known endocrine disruptors and have been linked to the development of breast cancer in women and impaired spermatogenesis and sperm quality in men (Antoniadou) Glycerin is a preservative made from sugar alcohol and is commonly used in lubricants (Stacey). Instead of facilitating safer sex, it has been shown to disrupt vaginal pH and contribute risk of yeast infection (Stacey). It has also been linked to increased risk of contracting HIV (Antoniadou). Nonoxonyl-9 is a spermicidal detergent that causes inflammation of the vagina, cervix, and rectum (Antoniadou). Benzocaine is a topical anesthetic commonly included in the inside of condoms decrease penile sensation with the goal of delaying ejaculation (Antoniadou). Benzocaine is a common irritant of the skin. Fragrances are added to mask the latex odor or to provide a specific taste or smell. Fragrances are known endocrine disruptors and have been linked to skin irritation, allergic reactions, and disruption of vaginal pH (Stacey). While there is likely no “perfect” condom, there are many better options available from a number of companies. Antoniadou offers an updated list on her website.

Chemical / Hormonal contraception is being researched currently by a number of groups. Oral contraceptives that disrupt the HPG axis in an attempt to suppress spermatogenesis by way of Testosterone disruption have had minimal success. Testosterone undecanoate (TU), a modified form of Testosterone, has been approved for use in several countries with an efficacy rate of 95%. This contraceptive functions by inhibiting LH and FSH from binding to androgen receptors in the testes (Li et al.). Another, Dimethandrostenolone undecanoate (DMAU), functions similarly and is “safe and well tolerated without serious side effects and reversibly inhibit the [HPG]” (Li et al.). A subcutaneous implant using 7-alpha-methyl-19-nortestosterone (MENT) has shown more promise in inhibiting LH and FSH action (Li et al.). A combination of Testosterone and Nestorone has demonstrated efficacy of 88.5% in inhibiting spermatogenesis when applied topically as a transdermal gel. This combination

featured “minimal adverse effects” (Li et al.). An oral option for male hormonal birth control is also in trials currently. “Dimethandrolone undecanoate is a new testosterone-like medicine… Side effects are weight gain, raised hemoglobin, and blood lipid disturbances” (Mehta and Sheikh). RISUG is a non-hormonal spermicidal injection into the vas deferens that causes medically-induced obstructive azoospermia (Mehta and Sheikh). This is effectively chemical castration that must be “washed out” surgically. Perhaps most interesting of them all is a “birth control vaccine.” “Eppin is a protein found in sperm. A vaccine to target this protein has been successful in lessening sperm counts. Other potentials for a birth control vaccine are GnRH and FSH” (Mehta and Sheikh). Mehta explains that the vaccine is likely to be irreversible but would require frequent boosters.

Intra-Vas Device (IVD) is currently being studied to before it is released for public access. This is an implant device into the vas deferens with the goal of filtering sperm to achieve azoospermia (Mehta and Sheikh). Vasectomy is the most common surgical form of male contraception and has an effectiveness rate of 99%. It is the blockage or severing of the vas deferens to create azoospermia. It is designed to be irreversible; however, it can be reversed in special circumstances (Planned Parenthood).

Natural Contraception

There are few natural options for male contraception outside of the cleaner selection of barriers, withdrawal, outercourse, and abstinence. Thermal Contraception is easily the most accessible but the most effective and longest lasting is intentional anejaculation.

Thermal contraception is the process of increasing the temperature of the testes so that spermatogenesis cannot be initiated. This is repeated usually for several weeks until testing indicates that there is severe oligospermia or complete azoospermia. The effects last for months and then research indicates that in almost every case, complete fertility was restored at the end of the several months. The methods used are either manual suspension of the testes within the scrotum and held near

the inguinal cavity close to the body by a device or clothing, referred to as “Artificial Cryptorchidism,” or the submersion of the scrotum and testes into a heated water, sometimes referred to as “Artificial Varicocele.”

One study published in 1994 on the non-surgical suspension method examined nine couples around 30 years of age for nearly 10 years. All males had clinically adequate semen according to World Health Organization parameters. The goal of both techniques was to raise testicular temperature by 1-2 degrees Celsius (35-36 degrees C), or 1.8-3.6 degrees Fahrenheit. “With technique 1, immobilization was achieved by passing the penis and the empty scrotum through a hole made in close-fitting underwear” (Mieusset and Bujan). They found that among the three couples that participated in this method, one man discontinued use after seven weeks and pregnancy was achieved. “With technique 2, immobilization was achieved by adding a ring of soft material surrounding the hole in the underwear” (Mieusset and Bujan). This method demonstrated that even after 117 months, there was no pregnancy in the remaining six couples. There are a few devices for sale as well as instructions for homemade devices. Thoreme has developed a silicon ring called the Andro-Switch, awaiting approval from the French Government for official sale, that fits the same as what was used in the experiment. Jemaya Innovations, a Chinese company, offers a product called Smart Seeds which is a heating pad that can be inserted into most men’s underwear. It is powered by a battery pack. Figure 19 in Appendix D shows their reported effectiveness and return to full fertility following the end of use. There is always some concern with using electronics near the body as outlined previously; however, their research seems to indicated minimal or no effect. So far, all studies and products have reported a full recovery of complete spermatogenesis following cessation of the suspension method of thermal contraception. Another study conducted on 28 couples during 252 cycles of exposure concluded that not only was it 100 percent effective with no resulting pregnancies, it was also completely safe with every man returning to pre-study sperm functionality and concentration (Soufir and Mieusset).

There is one self-published report of a man that did not see full recovery. Chris created his own device at first by using a rubber band, then by fastening a piece of string with a cinch loop in order to achieve suspension. He later switched to a pad of material that wet-suits are made of. He began his self-study on November 17, 1998 and measured his sperm concentration using the Medical Center at UC Davis. He discontinued use on May 6, 2010, 12 years later. He was successful in created severe oligospermia using his homemade device; however, further measurements indicated that his sperm concentration did not return to normal. He continued measuring until December 3, 2014 after using 250mg oral ursolic acid daily for 14 weeks in an attempt to regain proper sperm morphology, motility, and number (Chris *Experimental Method of Male Contraception*). While this is a valuable cautionary tale in using dry heat thermal contraception, there exists the possibility that he may have caused physical injury that went unnoticed. Additionally, he may also have developed an issue with spermatogenesis somewhere in the 12 years of use. There is simply more information needed that is unavailable from his account. Male thermal contraception is contraindicated for men with cryptorchidism, inguinal hernia, and testicular cancer (Soufir and Mieusset).

The “wet heat” or submersion method is conducted by submerging the scrotum and testicles into a small vessel of water or by taking a sitting or sitz bath. Research conducted by Dr. Martha Voegeli in India between 1930 and 1950 demonstrated 100 percent effectiveness with non of the potential side effects of artificial cryptorchidism. Dr. Voegeli’s submersion method was conducted by “A man sits in a [shallow or testes-only] bath of 116 degrees Fahrenheit for forty-five minutes daily for three weeks. Six months of sterility results, after which normal fertility returns. For longer sterility, the treatment is repeated” (*Heat Method*). 116 degrees Fahrenheit, or 46.7 degrees Celsius was determined to be reliable for creating severe oligospermia or complete azoospermia for at least six months. Water at 110 degrees Fahrenheit produced four months of sterility. After discontinuation at the three week mark, fertility returned to normal after the six months with no effects on the children. “Children born

later were normal, and because Dr. Voegeli practiced in one place for several decades, she was able to confirm that they developed normally as well" (*Heat Method*). Her study eventually grew to include several hundred men during her time in India as a method to maintain sexual activity during famine in southern India (Voegeli). She ultimately concluded that: "1. It is for men, not for women. 2. It is reliable, for it has proven effective in all observed cases. 3. It is cheap and therefore suited for application on a large scale. Its cost is no more than a bucket of hot water. The poorest individual and the poorest government can afford it. 4. It is simple; the least educated can understand it. 5. It requires no periodic check-up by doctors in clinics or health centers. 6. It can be 'timed' at will. 7. It does not sterilize permanently. Fertility returns after the desired period of sterility is over. 8. Children born after that period are normal in every respect. 9. The method is non-injurious to health. 10. It does not interfere with normal marital relationship. 11. It does not destroy 'Life' at any stage of development" (Voegeli).

Non-ejaculatory orgasm is a highly unorthodox and challenging approach to natural contraception; however, when it is mastered, it is most likely the highest form contraception. The retention of sperm and seminal fluid is valued by Ayurvedic and Chinese medicine for maintaining male health and sexual function (Green 102). In Chinese medicine, "sperm is the physical manifestation of *jing*, or essence. To understand *jing* deeply is to understand the principal which imbues the body with a true sense of being alive… When there is abundant *jing*, the individual's energy is exuberant, the hair is luxurious, the eyes sparkle and glisten, there is a spring in the person's gait, all the senses are sharp, and a long and healthy life ensues" (Green 102). Through the retention of ejaculate, an enormous number of nutrients is able to be retained by the body that may be used to maintain other tissues and processes. "Women usually live longer because men spend their lives giving their Zinc and Selenium to women" (Walters 120). Kegel exercises, breath exercises, controlling the energy flow through the Chakras and biofield, and mastering control over the muscles used in the

ejaculatory reflex make non-ejaculatory orgasm difficult; however, it is possible to do. Tantra or Tantric yoga teaches how to achieve non-ejaculatory orgasms as well. This yoga also teaches some rewarding ways to use all of that increased vitality.

Conclusion

The state of male fertility, while currently dire, does not have to remain so. Nothing is permanent, including a diagnosis. Nothing is impossible, there are miracle stories everywhere if one simply had the awareness to look. There are numerous tools, natural and otherwise, available to support male fertility, many more than are outlined here. Be it herbs, essential oils, flower essences, homeopathics and cell salts, color, sound, crystals, subtle energy practices like Feng Shui, affirmations, bodywork, or other therapies, the state of male reproductive health can swiftly be changed for the better with adequate education and the support of skilled practitioners. Furthermore, contraception does not have to contribute to infertility. The choice to build fertility and still plan procreation is important. Women have done amazing work at understanding themselves and taking charge of their health. It is time men do the same.

It is safe to be a man.

-Louise Hay

Appendix A – Anatomical / Physiological References

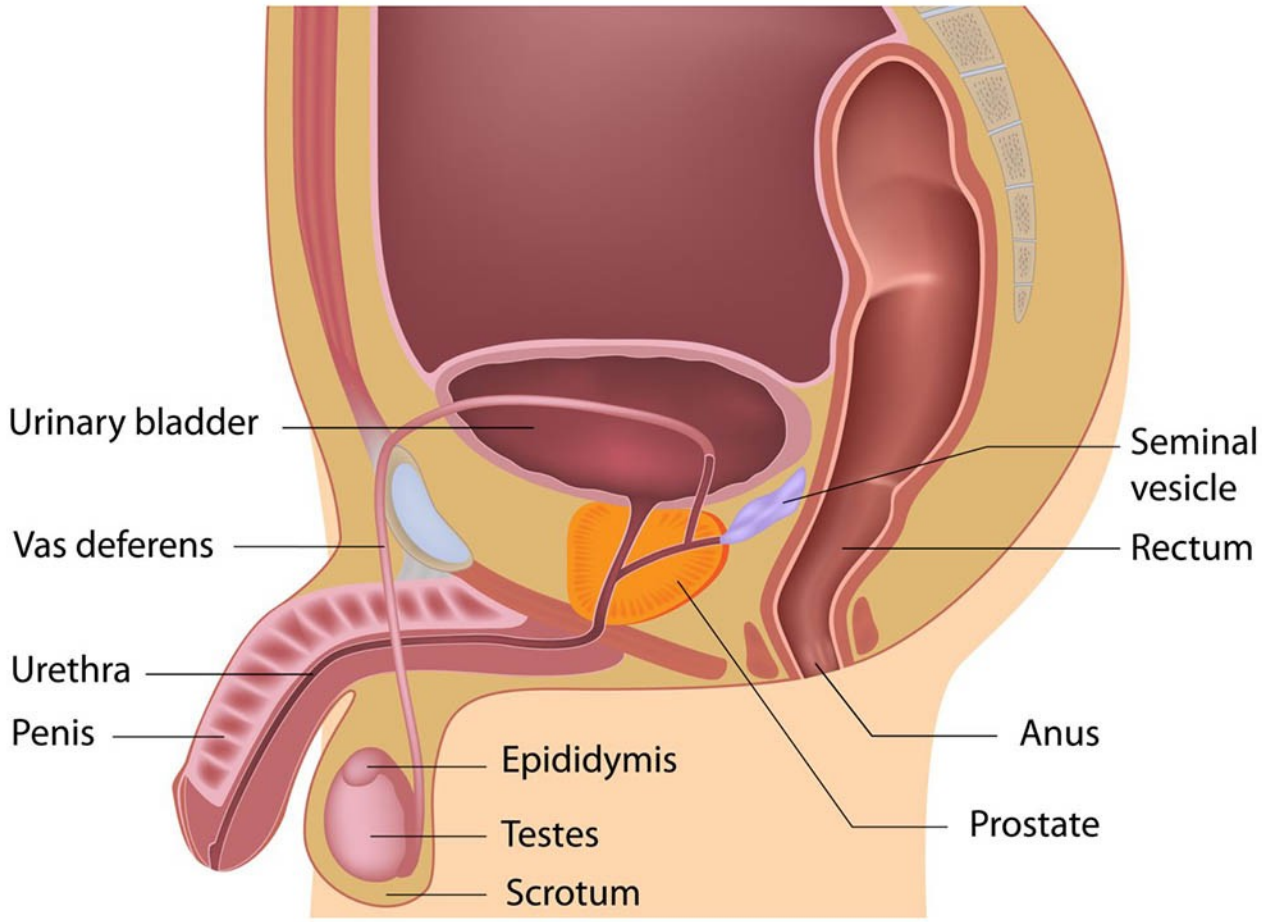

Figure 1: Male Reproductive System (*Male reproductive system*)

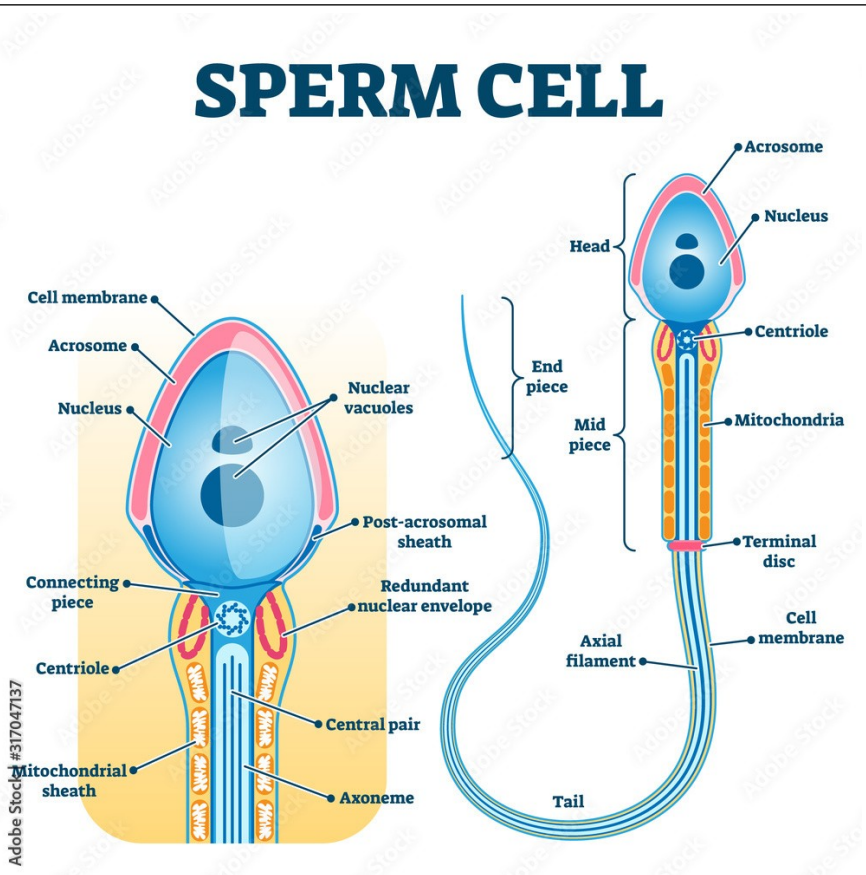

Figure 2: Sperm Cell Anatomical Chart Adobe Stock 317047137

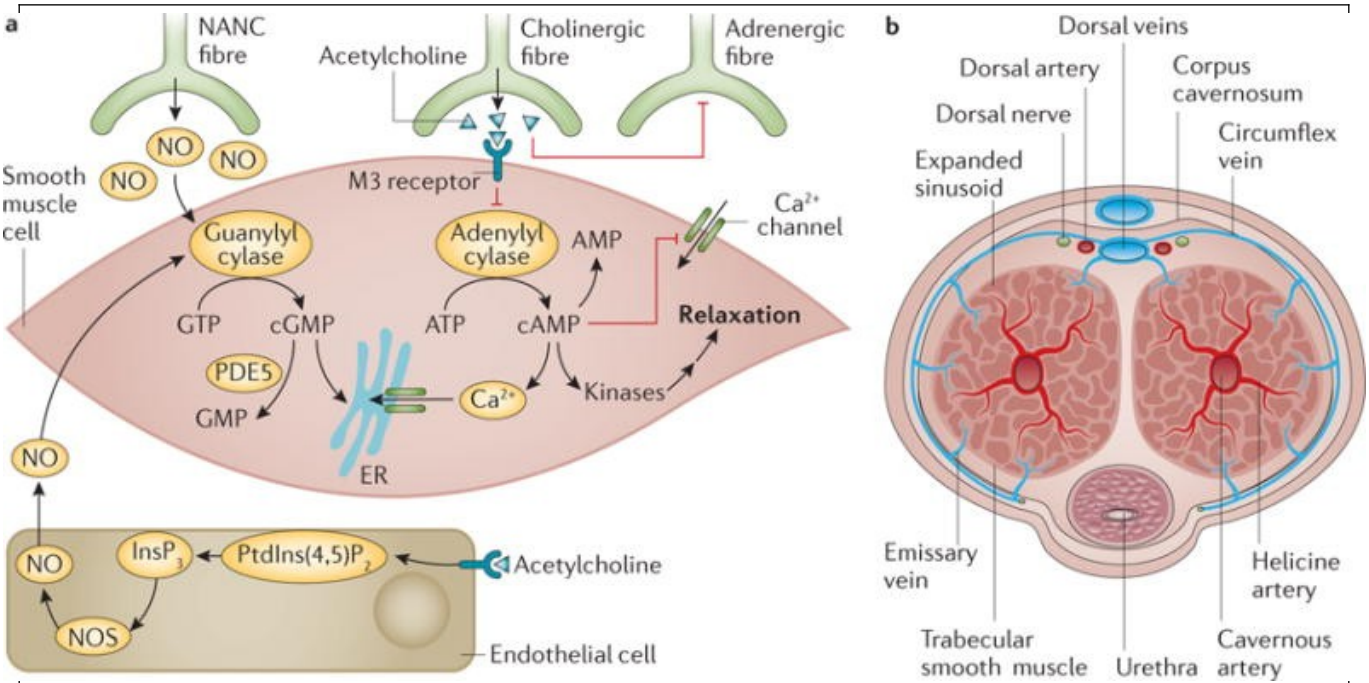

Figure 3: Penis Smooth Muscle Relaxation (Yafi et al.)

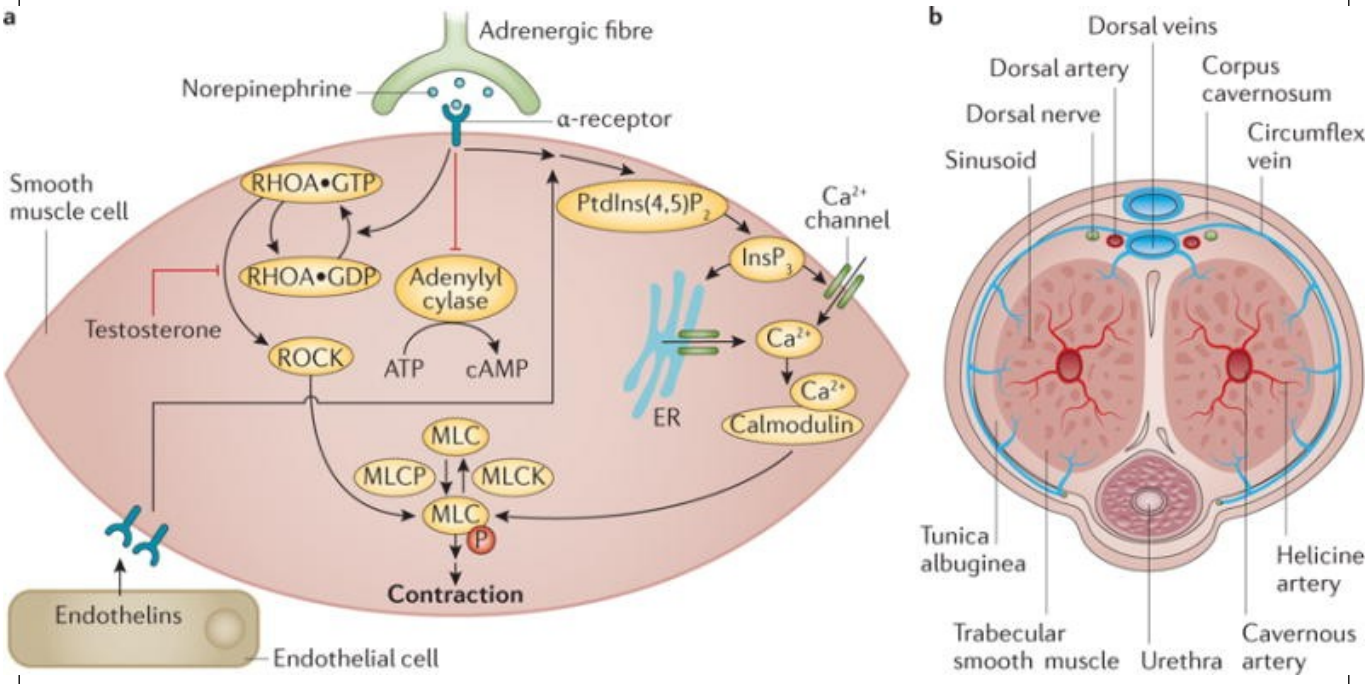

Figure 4: Penis Smooth Muscle Contraction (Yafi et al.)

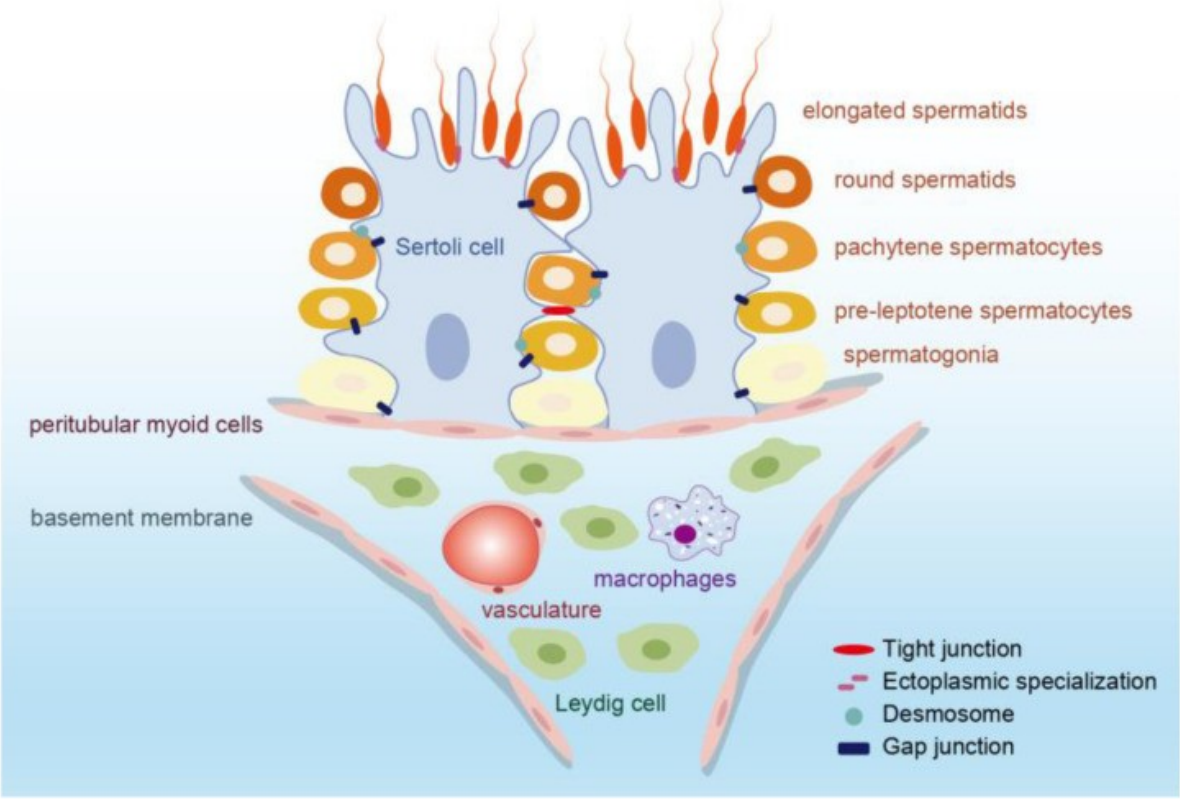

Figure 5: Seminiferous Tubules (Li et al.)

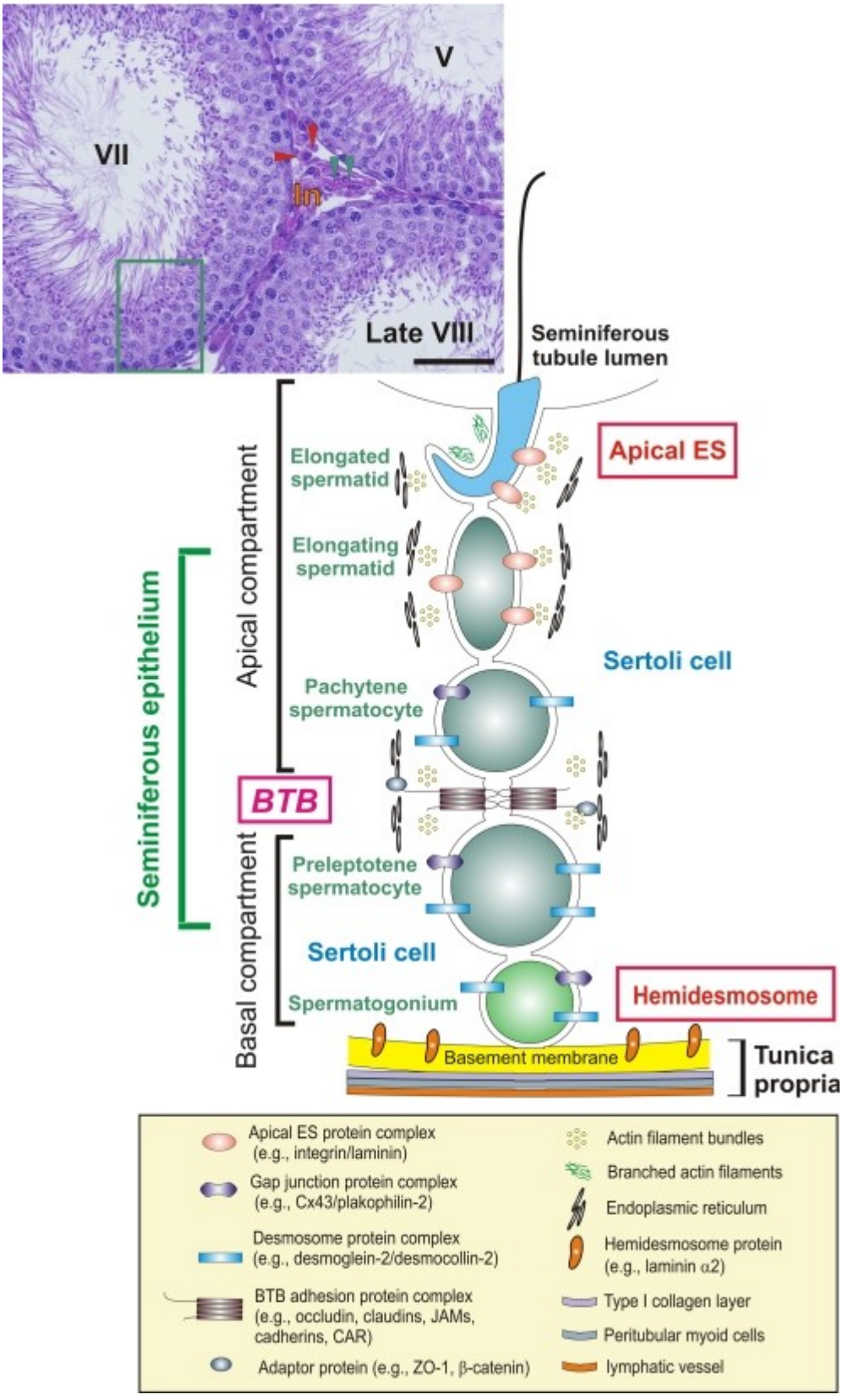

Figure 6: BTB Barrier (Cheng and Mruk)

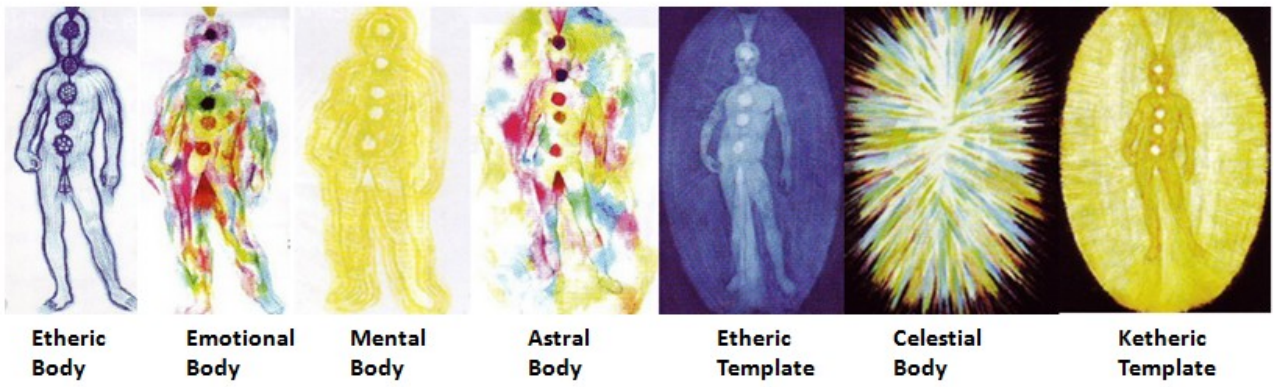

Figure 7: 7 Layers of the Human Energy Field (Brennan)

Table 1: Amino Acid Composition of Sperm and Semen (Engel et al.)

Amino Acid	Sperm	Seminal Plasma
Alanine	4.09 ± 4.86	634 ± 314
Arginine	1.84 ± 3.22	895 ± 114
Asparagine	1.18 ± 1.92	1333 ± 496
Aspartate	0.31 ± 0.40	980 ± 494
Citruline	0.29 ± 0.94	0.99 ± 0.91
Glutamine	21.1 ± 24.4	2893 ± 664
Glutamate	4.27 ± 2.22	3535 ± 1316
Glycine	1.97 ± 3.01	2182 ± 607
Histidine	0.32 ± 0.94	467 ± 106
Isoleucine	2.15 ± 2.85	1349 ± 235
Leucine	2.12 ± 4.93	1543 ± 270
Lysine	0.82 ± 1.95	1860 ± 465
Methionine	0.015 ± 0.061	25.7 ± 10.4
Ornithine	0.11 ± 0.46	53.8 ± 16.8
Phenylalanine	0.62 ± 1.02	617 ± 117
Proline	1.39 ± 1.55	266 ± 116
Serine	7.60 ± 8.22	2438 ± 370
Threonine	2.62 ± 3.20	2063 ± 664

Tryptophan	0.061 ± 0.204	47.5 ± 24.4
Tyrosine	3.59 ± 5.18	1412 ± 176
Valine	1.31 ± 2.09	1264 ± 359
Biogenic Amines	Sperm	Seminal Plasma
Acetylornithine (Ac-Orn)	0	0.15 ± 0.21
Asymmetrically Dimethylated Arginine (ADMA)	0.18 ± 0.24	0.32 ± 0.19
(Alpha-aminoadipic Acid (Alpha-AAA)	0	4.89 ± 3.07
Carnosine	0	7.50 ± 3.10
Creatinine	0	253 ± 67
Histamine	0	0
Kynurenine	0-101 ± 0.201	0.176 ± 0.061
Methionine sulfoxide (Met-SO)	0	0
Nitrotyrosine (Nitro-Tyr)	0	0
Hydroxyproline (OH-Pro)	0	0.112 ± 0.086
Phenylethylamine (PEA)	0	0.021 ± 0.047
Putrescine	0.087 ± 0.106	95 ± 131
Sarcosine	0.24 ± 0.34	6.16 ± 2.29
Serotonin	0.040 ± 0.054	0.071 ± 0.039
Spermidine	0.20 ± 0.40	104 ± 35
Spermine	2.19 ± 4.20	1227 ± 184
Taurine	1.96 ± 2.50	357 ± 46
Total Dimethylamine (DMA)	0.041 ± 0.136	0.70 ± 0.63
Acyl Carnitines	Sperm	Seminal Plasma
DL-carnitine (C0)	8.51 ± 6.26	244 ± 135
Acetyl-L-Carnitine (C2)	32.4 ± 26.4	190 ± 80
Propionyl-L-Carnitine (C3)	0.84 ± 0.60	12.4 ± 3.9
Malonyl-L-Carnitine (C3-DC)	0.061 ± 0.047	3.47 ± 1.10
Hydroxypropionyl-L-Carnitine (C3-OH)	0.025 ± 0.032	0.038 ± 0.022
Propenyl-L-Carnitine (C3:1)	0.010 ± 0.015	0.040 ± 0.005
Butyryl-L-Carnitine (C4)	0.109 ± 0.075	42.2 ± 18.8
Butenyl-L-Carnitine (C4:1)	0.015 ± 0.018	0.119 ± 0.029
Valeryl-L-Carnitine (C5)	0.18 ± 0.12	8.62 ± 2.69

Glutaryl-L-Carnitine (C5-DC)	0.014 ± 0.015	1.33 ± 0.41
Methylglutaryl-L-Carnitine (C5-M-DC)	0.021 ± 0.029	0.33 ± 0.23
Hydroxyvaleryl-L-Carnitine (C5-OH) / Methylmalonyl-L-Carnitine (C3-DC-M)	0.072 ± 0.058	1.55 ± 0.50
Tiglyl-L-Carnitine (C5:1)	0.035 ± 0.034	0.71 ± 0.22
Glutaconyl-L-Carnitine (C5:1-DC)	0.013 ± 0.018	0.72 ± 0.40
Hexanoyl-L-Carnitine (C6) / Fumaryl-L-Carnitine (C4:1-DC)	0.017 ± 0.016	1.89 ± 0.70
Hexenoyl-L-Carnitine (C6:1)	0.011 ± 0.014	0.18 ± 0.04
Pimelyl-L-Carnitine (C7-DC)	0.035 ± 0.048	0.57 ± 0.21
Octanoyl-L-Carnitine (C8)	0.086 ± 0.12	0.35 ± 0.08
Nonayl-L-Carnitine (C9)	0.016 ± 0.021	0.30 ± 0.26
Decanoyl-L-Carnitine (C10)	0.042 ± 0.061	0.169 ± 0.036
Decenoyl-L-Carnitine (C10:1)	0.029 ± 0.037	0.074 ± 0.022
Decadienyl-L-Carnitine (C10:2)	0.16 ± 0.21	0.37 ± 0.04
Dodecanoyl-L-Carnitine (C12)	0.031 ± 0.038	0.18 ± 0.07
Dodecanedioyl-L-Carnitine (C12-DC)	0.097 ± 0.131	0.18 ± 0.01
Dodecenoyl-L-Carnitine (C12:1)	0.043 ± 0.056	0.086 ± 0.012
Tetradecanoyl-L-Carnitine (C14)	0.053 ± 0.062	0.120 ± 0.025
Tetradecenoyl-L-Carnitine (C14:1)	0.045 ± 0.053	0.116 ± 0.020
Hydroxytetradecenoyl-L-Carnitine (C14:1-OH)	0.042 ± 0.049	0.23 ± 0.09
Tetradecadienyl-L-Carnitine (C14:2)	0.060 ± 0.080	0.105 ± 0.021
Hydroxytetradecadienyl-L-Carnitine (C14:2-OH)	0.036 ± 0.050	0.128 ± 0.031
Hexadecanoyl-L-Carnitine (C16)	0.045 ± 0.044	0.27 ± 0.09
hydroxyhexadecanoyl-L-Carnitine (C16-OH)	0.018 ± 0.018	0.055 ± 0.008
Hexadecenoyl-L-Carnitine (C16:1)	0.034 ± 0.048	0.155 ± 0.030
Hydroxyhexadecenoyl-L-Carnitine (C16:1-OH)	0.018 ± 0.020	0.061 ± 0.014
Hexadecadienyl-L-Carnitine (C16:2)	0.010 ± 0.011	0.043 ± 0.010
Hydroxyhexadecadienyl-L-Carnitine (C16:2-OH)	0.013 ± 0.018	0.112 ± 0.033
Octadecanoyl-L-Carnitine (C18)	0.025 ± 0.027	0.085 ± 0.052
Octadecenoyl-L-Carnitine (C18:1)	0.013 ± 0.015	0.046 ± 0.027
Hydroxyoctadecenoyl-L-Carnitine (C18:1-OH)	0.018 ± 0.024	0.064 ± 0.029
Octadecadienyl-L-Carnitine (C18:2)	0.014 ± 0.020	0.028 ± 0.009

Lysophosphatidylcholines (LPC)	Sperm	Seminal Plasma
LPC 14:0	0.72 ± 1.00	5.54 ± 2.29
LPC 16:0	0.39 ± 0.36	13.6 ± 8.2
LPC 16:1	0.081 ± 0.140	0.116 ± 0.039
LPC 17:0	0.028 ± 0.039	0.183 ± 0.106
LPC 18:0	0.114 ± 0.108	2.52 ± 1.49
LPC 18:1	1.03 ± 1.85	2.01 ± 0.93
LPC 18:2	0.096 ± 0.120	0.132 ± 0.046
LPC 20:3	0.141 ± 0.201	0.119 ± 0.032
LPC 20:4	0.027 ± 0.030	0.061 ± 0.033
Phosphatidylcholines (PC)	Sperm	Seminal Plasma
PC 24:0	0.082 ± 0.102	0.039 ± 0.014
PC 26:0	0.63 ± 0.75	0.58 ± 0.16
PC 28:1	3.01 ± 3.90	4.87 ± 0.76
PC 30:0	0.31 ± 0.30	1.33 ± 0.56
PC 30:2	0.014 ± 0.014	0.015 ± 0.018
PC 32:0	0.73 ± 0.47	4.51 ± 1.92
PC 32:1	0.28 ± 0.23	0.55 ± 0.29
PC 32:2	0.074 ± 0.078	0.044 ± 0.030
PC 32:3	0.048 ± 0.052	0.021 ± 0.008
PC 34:1	1.70 ± 1.29	27.8 ± 12.7
PC 34:2	1.94 ± 1.55	4.76 ± 2.41
PC 34:3	0.167 ± 0.197	0.117 ± 0.061
PC 34:4	0.026 ± 0.022	0.020 ± 0.008
PC 36:0	0.56 ± 0.46	0.34 ± 0.24
PC 36:1	0.39 ± 0.30	11.0 ± 5.1
PC 36:2	1.02 ± 0.73	4.73 ± 2.26
PC 36:3	2.30 ± 1.97	2.79 ± 1.23
PC 36:4	0.47 ± 0.40	0.722 ± 0.33
PC 36:5	0.118 ± 0.114	0.052 ± 0.028
PC 36:6	0.074 ± 0.056	0.072 ± 0.039
PC 38:0	0.24 ± 0.17	0.43 ± 0.20

PC 38:1	0.077 ± 0.081	0.15 ± 0.15
PC 38:3	0.70 ± 0.46	1.67 ± 0.75
PC 38:4	0.31 ± 0.23	0.61 ± 0.23
PC 38:5	0.35 ± 0.27	0.39 ± 0.24
PC 38:6	3.25 ± 2.39	1.64 ± 1.26
PC 40:1	0.28 ± 0.39	0.26 ± 0.06
PC 40:2	0.046 ± 0.056	0.053 ± 0.037
PC 40:3	0.101 ± 0.067	0.138 ± 0.068
PC 40:4	0.085 ± 0.056	0.142 ± 0.068
PC 40:5	0.082 ± 0.075	0.112 ± 0.064
PC 40:6	0.90 ± 0.67	0.92 ± 0.42
PC 42:0	0.057 ± 0.088	0.036 ± 0.010
PC 42:1	0.022 ± 0.023	0.099 ± 0.015
PC 42:2	0.031 ± 0.035	0.036 ± 0.015
PC 42:4	0.091 ± 0.071	0.083 ± 0.046
PC 42:5	0.079 ± 0.059	0.078 ± 0.048
PC 42:6	0.36 ± 0.46	0.32 ± 0.08
1-acyl,2-alkyl phosphatidylcholines	Sperm	Seminal Plasma
GPCe 30:0	0.20 ± 0.21	0.18 ± 0.04
GPCe 30:1	0.068 ± 0.070	0.023 ± 0.021
GPCe 30:2	0.037 ± 0.040	0.026 ± 0.006
GPCe 32:1	0.117 ± 0.092	0.36 ± 0.20
GPCe 32:2	0.096 ± 0.103	0.060 ± 0.022
GPCe 34:0	0.091 ± 0.073	0.42 ± 0.18
GPCe 34:1	0.173 ± 0.127	0.91 ± 0.40
GPCe 34:2	0.102 ± 0.076	0.39 ± 0.04
GPCe 34:3	0.073 ± 0.071	0.097 ± 0.042
GPCe 36:0	0.101 ± 0.148	0.23 ± 0.06
GPCe 36:1	0.174 ± 0.167	0.81 ± 0.38
GPCe 36:2	0.111 ± 0.096	0.25 ± 0.12
GPCe 36:3	0.057 ± 0.043	0.133 ± 0.056
GPCe 36:4	0.064 ± 0.050	0.131 ± 0.045

GPCe 36:5	0.066 ± 0.058	0.080 ± 0.029
GPCe 38:0	0.22 ± 0.32	0.31 ± 0.07
GPCe 38:1	0.034 ± 0.040	0.052 ± 0.056
GPCe 38:2	0.055 ± 0.052	0.069 ± 0.039
GPCe 38:3	0.084 ± 0.067	0.123 ± 0.059
GPCe 38:4	0.084 ± 0.062	0.117 ± 0.049
GPCe 38:5	0.176 ± 0.173	0.168 ± 0.095
GPCe 38:6	1.36 ± 0.97	1.38 ± 0.97
GPCe 40:1	0.057 ± 0.066	0.040 ± 0.025
GPCe 40:2	0.062 ± 0.062	0.139 ± 0.056
GPCe 40:3	0.044 ± 0.035	0.054 ± 0.021
GPCe 40:4	0.060 ± 0.063	0.069 ± 0.018
GPCe 40:5	0.051 ± 0.039	0.065 ± 0.028
GPCe 40:6	0.159 ± 0.120	0.148 ± 0.079
GPCe 42:0	0.34 ± 0.43	0.31 ± 0.06
GPCe 42:1	0.074 ± 0.097	0.072 ± 0.015
GPCe 42:2	0.039 ± 0.045	0.038 ± 0.010
GPCe 42:3	0.090 ± 0.078	0.098 ± 0.029
GPCe 42:4	0.008 ± 0.012	0.009 ± 0.008
GPCe 42:5	0.28 ± 0.40	0.26 ± 0.03
GPCe 44:3	0.057 ± 0.073	0.137 ± 0.060
GPCe 44:4	0.077 ± 0.121	0.092 ± 0.014
GPCe 44:5	0.074 ± 0.112	0.043 ± 0.018
GPCe 44:6	0.039 ± 0.048	0.032 ± 0.010
Sphingomyelins hydroxylated (SM)	Sperm	Seminal Plasma
SM (OH) 14:1	0.23 ± 0.18	1.82 ± 0.97
SM (OH) 16:1	0.113 ± 0.095	1.32 ± 0.70
SM (OH) 22:1	0.082 ± 0.079	2.14 ± 0.93
SM (OH) 22:2	0.069 ± 0.059	0.60 ± 0.29
SM (OH) 24:1	0.026 ± 0.028	0.55 ± 0.20
SM 16:0	4.44 ± 3.97	104 ± 54
SM 16:1	0.34 ± 0.27	2.43 ± 1.27

SM 18:0	0.55 ± 0.52	14.9 ± 8.5
SM 18:1	0.184 ± 0.152	1.63 ± 0.97
SM 20:2	0.011 ± 0.016	0.030 ± 0.015
SM 22:3	0.009 ± 0.018	0.020 ± 0.015
SM 24:0	0.36 ± 0.33	18.6 ± 9.6
SM 24:1	0.78 ± 0.64	10.6 ± 5.3
SM 26:0	0.021 ± 0.021	0.61 ± 0.27
SM 26:1	0.177 ± 0.143	0.59 ± 0.31
Sugars	Sperm	Seminal Plasma
hexoses	77.6 ± 87.2	31436 ± 15287

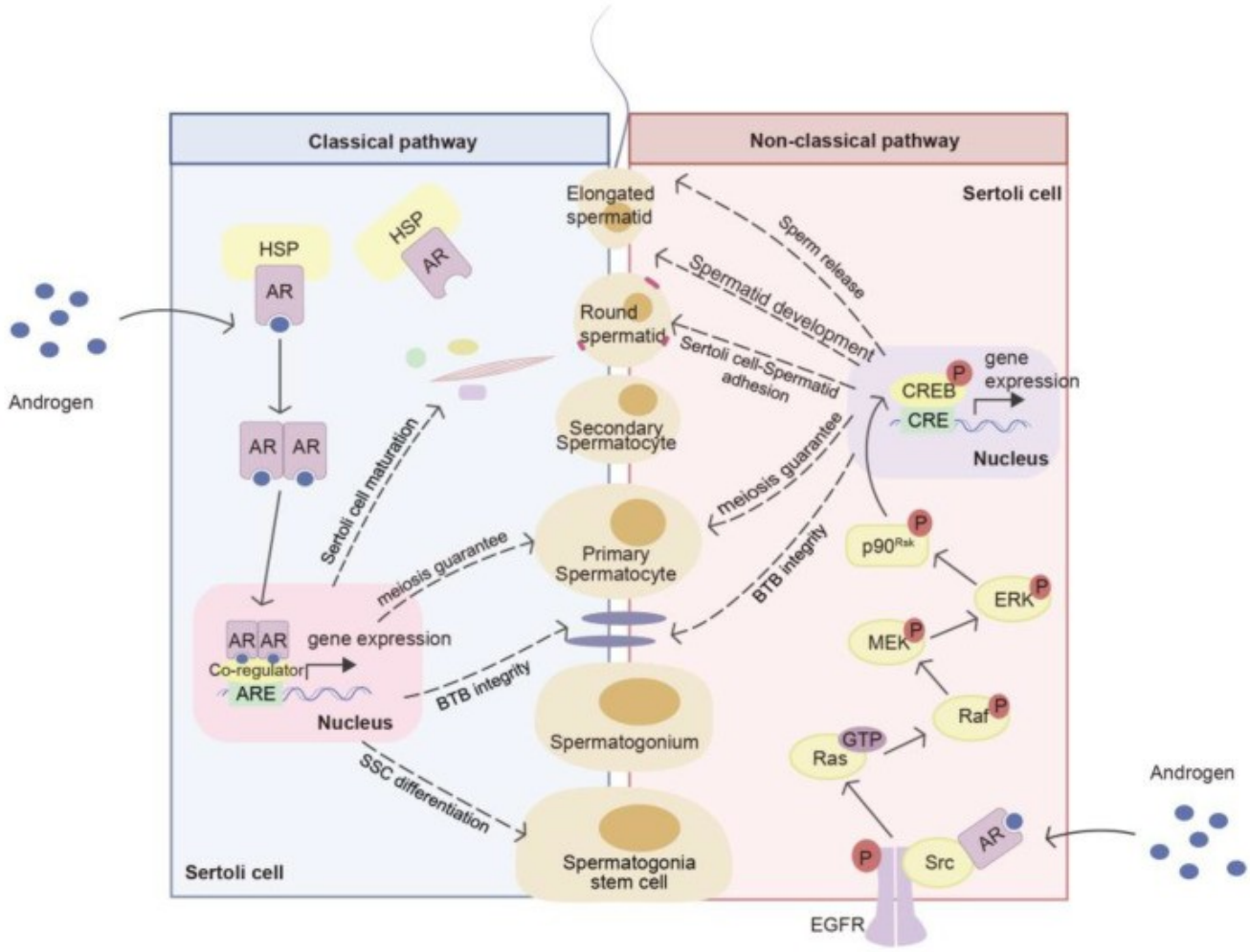

Figure 8: Androgen Pathways – Sertoli Cells (Li et al.)

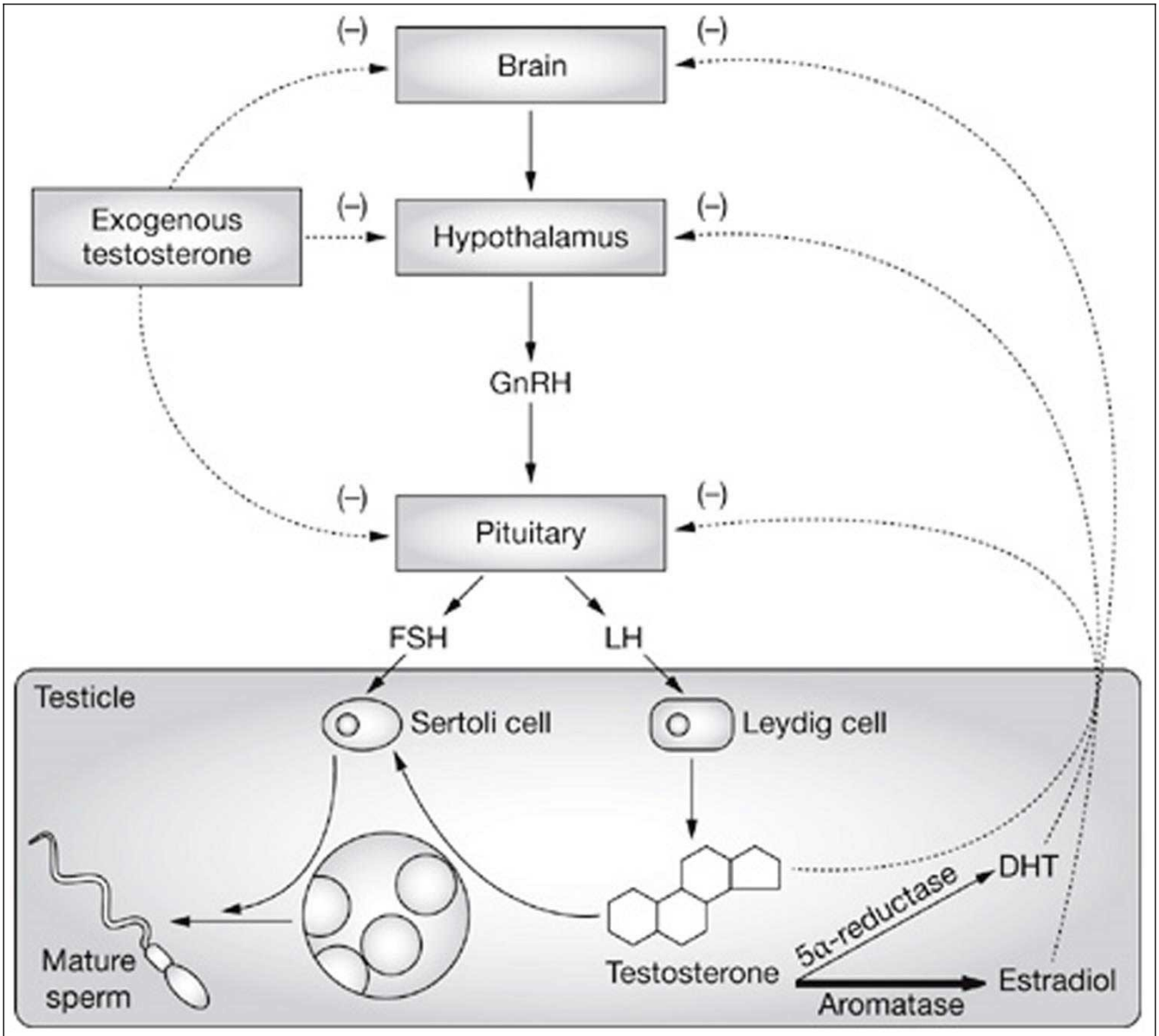

Figure 9: Male HPG Axis 1 (AUA)

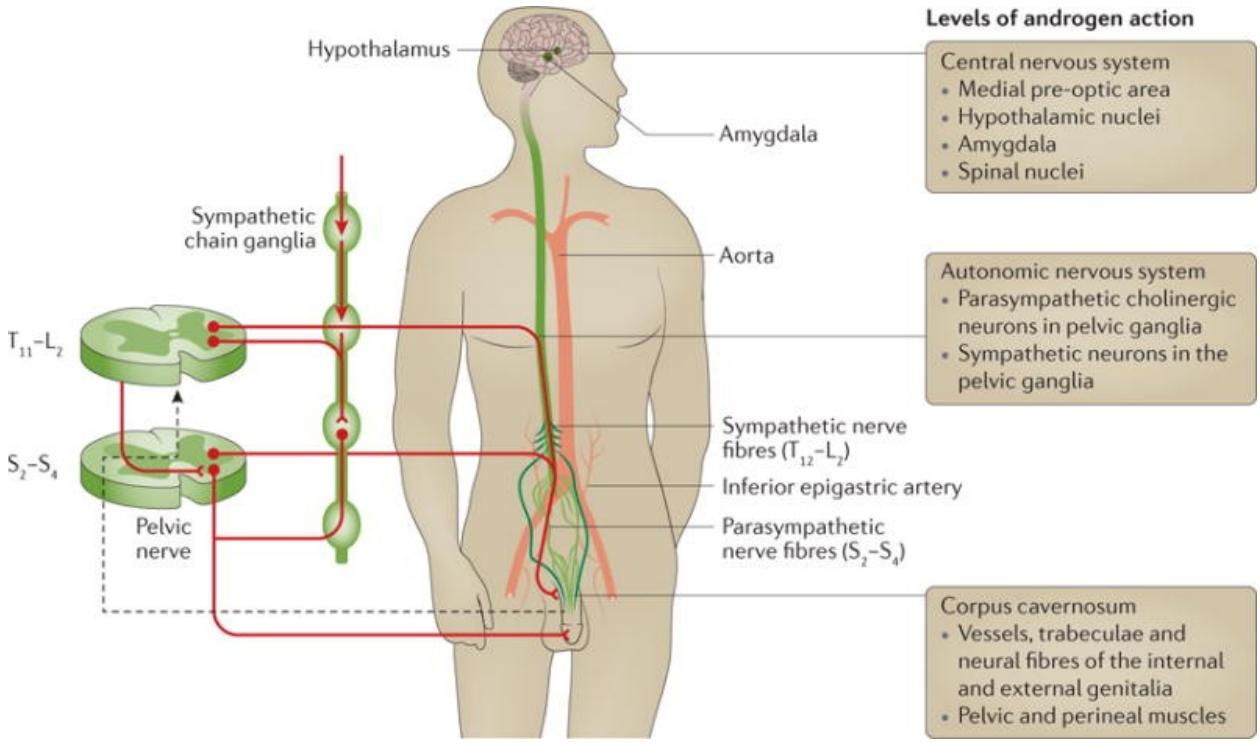

Figure 11: Levels of Androgen Action in the Control of Sexual Response (Yafi et al.)

Table 2: Hormone Secretory Regions and Target Cells (Li et al.)

Hormone	Secretory Regions	Target Cells	Disordered Diseases
GnRH	Hypothalamic neurosecretory cells	Pituitary Gonadotrophs	Precocious puberty, hypogonadism, Kallmann syndrome, oligospermia
LH	Pituitary gonadotrophs	Leydig cells	Hypogonadism
FSH	Pituitary gonadotrophs	Sertoli cells, pertibular myoid cells, Spermatogoniums	Hypogonadism
T	Leydig cells, Sertoli cells	Germ cells, Sertoli cells, PMCs	Testicular Dysgenesis syndrome (TDS), micropenis
AMH	Sertoli cells	Müllerian ducts, mesenchymal cells	Persistent Müllerian duct syndrome (PMDS)
Inhibin B	Sertoli cells	Pituitary gonadotrophs	Spermatogenesis disorder
INSL3	Leydig cells	Leydig cells	Cryptorchidism

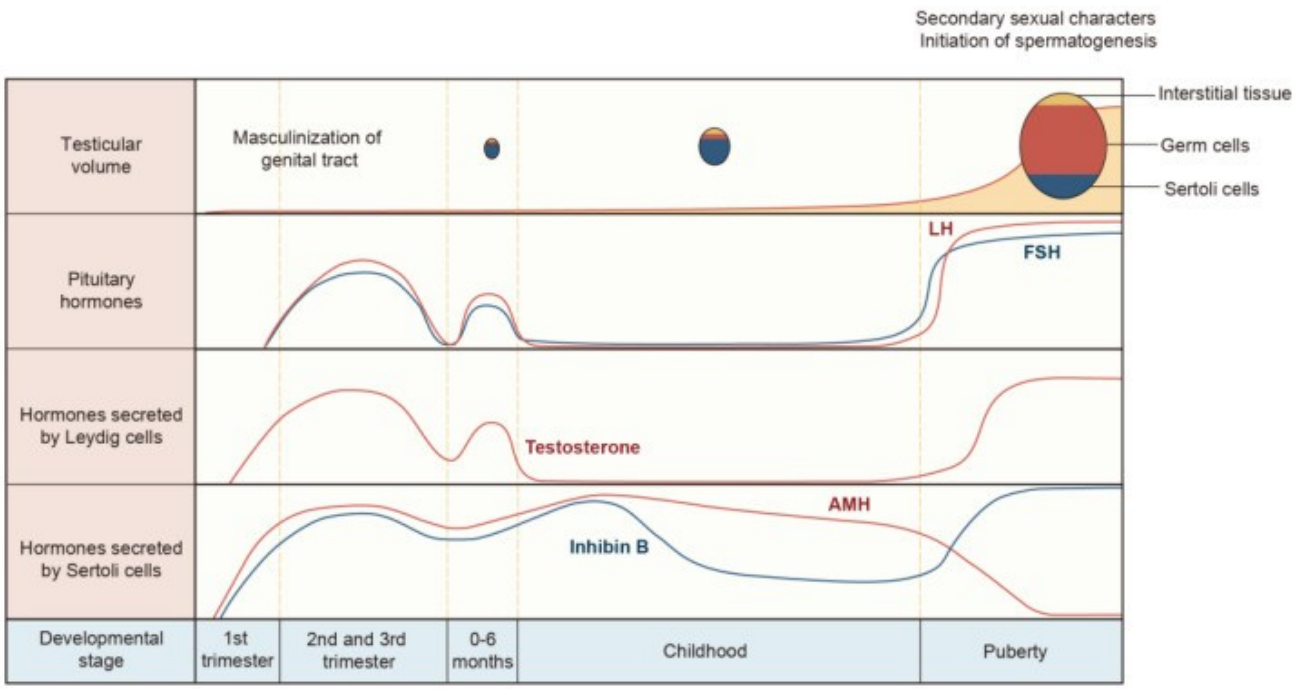

Figure 12: Male Hormones During Development (Li et al.)

Table 3: The Characteristics and Function of Hormones in Different Life Stages (Li et al.)

Hormone	Fetal Life	Minipuberty	Puberty
GnRH	Serum LH and FSH levels in the second trimester are independent of GnRH and then GnRH gradually controls the release of LH and FSH	Stimulates Sertoli cells to secrete Inhibin B and AMH, and Leydig cells to produce	Increases gradually, triggering the secretion of LH and FSH
LH	Replaces HCG to promote the secretion of Testosterone by Leydig cells	Stimulates Leydig cells to release Testosterone	Stimulated the differentiation of Leydig cells and their ability to produce Testosterone
FSH	Stimulates Sertoli cell proliferation and increases AMH and Inhibin B	Stimulates Sertoli cell proliferation and increases AMH and Inhibin B	Stimulates the proliferation fo immature Sertoli cells and spermatogonia
T	Induces the differentiation and development of the mesenephric duct into	Promotes the conversion of germ cells into spermatogonia	Initiation of spermatogenesis

	seminal vesicles, epididymis, and spermaduct		
AMH	Causes fallopian tube regression in [males], preventing the formation of the uterus and fallopian tubes	As a diagnostic indicator of male fertility-related disorders	As a diagnostic indicator of male fertility-related disorders
Inhibin B	Regulates FSH secretion and acts as a marker for Sertoli cell function	Regulates FSH secretion and acts as a marker for Sertoli cell function	Inhibits FSH secretion and markers of sperm production in [males]
INSL3	The regulation of intra-abdominal testicular descent by regulating the growth and differentiation of the gubernaculum	As an accurate measure of Leydig cell functional capacity	As an accurate measure of Leydig cell functional capacity

Appendix B – Pathology Correlations

Table 4: Azoospermia Gene Correlations (*National Center for Biotechnology Information*)	
MCM8	MSH5 (MSH5-SAPCD1)
FAHD1, MEIOB	TDRD9
TERB1	KASH5
HENMT1	MOV10L1
TDRKH	DDX25
MCMDC2	DMC1
REC8	HFM1

Table 5: Kartagener Syndrome Gene Correlations (*National Center for Biotechnology Information*)		
CCDC39	DNAH11	NME8
CCDC40	DNAH5	ODAD1
CCDC65	DNAH8	ODAD2 (ARMC4)
CCNO	DNAH9	ODAD3 (CCDC151)
CFAP221	DNAI1	OFD1
CFAP298	DNAI2	PIH1D3
CFAP300 (C11orf70)	DNAJB13	RSPH1

DNAAF1	DNAL1	RSPH3
DNAAF11 (LRRC6)	DRC1	RSPH4A
DNAAF19 (CCDC103)	FOXJ1	RSPH9
DNAAF2	GAS2L2	SPAG1
DNAAF3	GAS8	SPEF2
DNAAF4	HYDIN	STK36
DNAAF5	LRRC56	TTC25
DNAH1	MCIDAS	ZMYND10

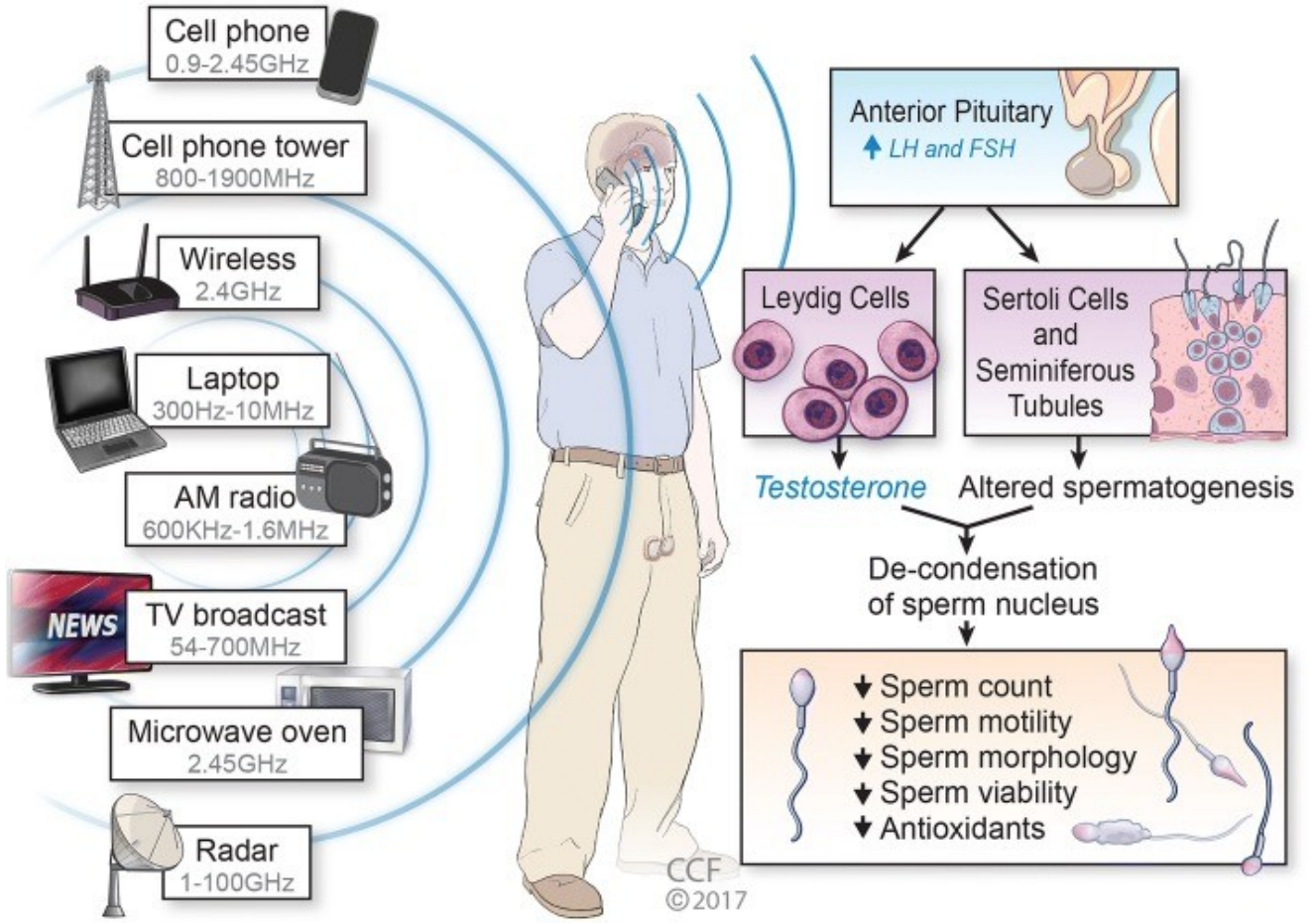

Figure 13: RF EMF Exposure and Male Fertility (Kesari et al.)

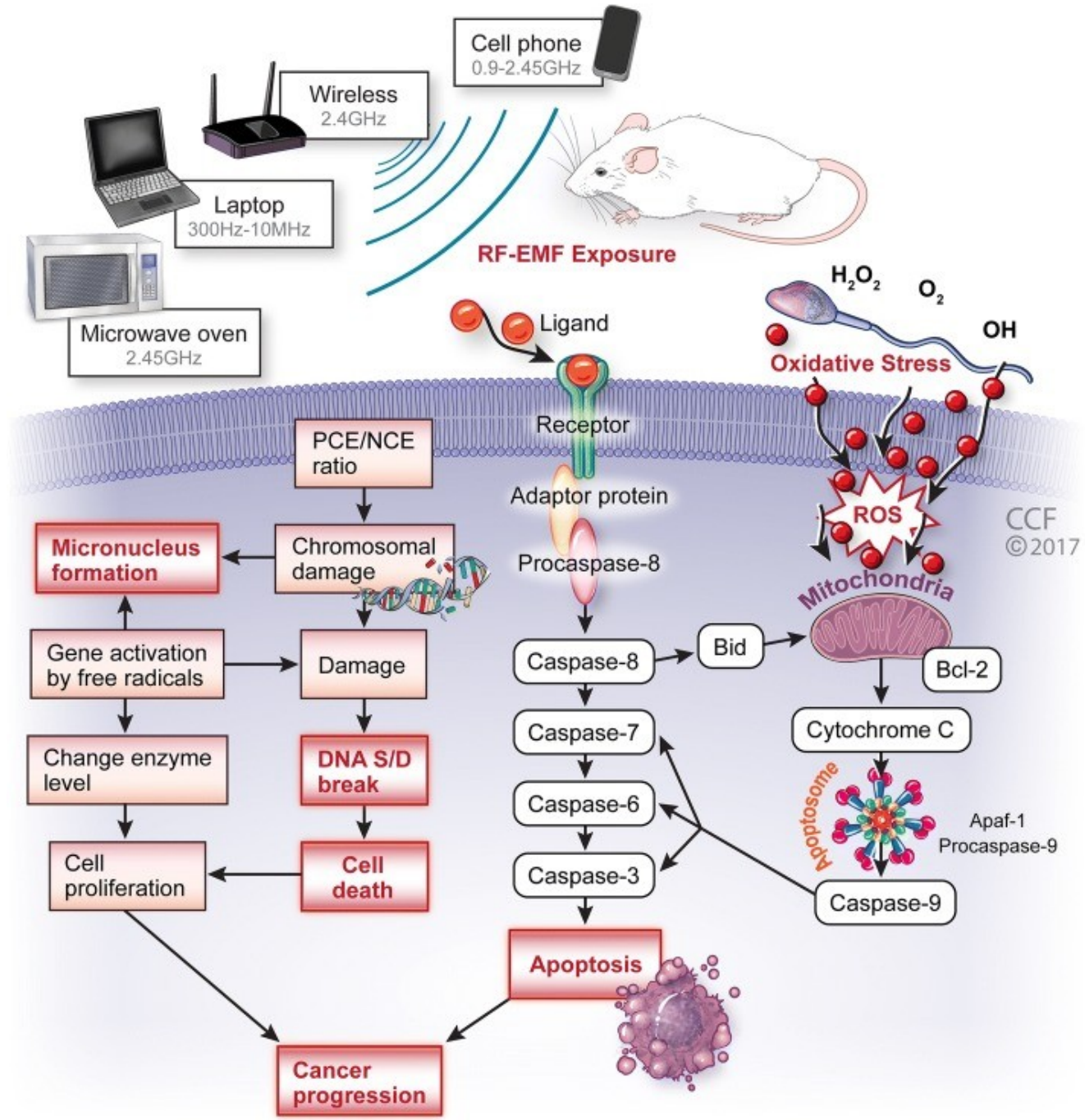

Figure 14: RF EMF Genotoxic Parameters (Kesari et al.)

Table 6: The FDA-Approved Drugs That Have The Potential To Impair Human Spermatogenesis (Ding et al.)			
Drug category*	Generic name of drug	Adverse impact on human spermatogenesis	Supported/refuted by PubMed publications**
Analgesic	Methadone hydrochloride	Decrease in sperm motility and seminal vesicle secretions, abnormal sperm morphology	Supported in humans [12,13]
	Pregabalin	Epididymitis (rare)	Refuted in humans [14]
	Gabapentin	Epididymitis (rare)	Refuted in rats [15], no data for humans
Anti-arrhythmic agent	Amiodarone hydrochloride	Epididymitis (rare)	Supported in rats [16], no data for humans
Anti-bacterial agent	Lomefloxacin hydrochloride	Epididymitis, orchitis (<1% of patients)	No data published for animals or humans
	Nitrofurantoin	Spermatogenic arrest/decreased sperm count (high doses)	Supported in humans [17]
	Dapsone	Orchitis, male infertility	Supported in rats [18], no data in humans
Anticonvulsant	Lamotrigine	Epididymitis (rare)	Supported in humans [19]
Antidepressant	Clomipramine hydrochloride	Epididymitis (infrequent)	Supported in humans [20]
	Levomilnacipran hydrochloride	Epididymitis, seminal vesiculitis (∼4% of males)	No data published for animals or humans
	Paroxetine mesylate/paroxetine hydrochloride	Decreased sperm quality, epididymitis	Supported in humans [21,22]
	Fluvoxamine maleate	Hematospermia	Supported for human sperm in vitro [21]
	Venlafaxine	Orchitis (rare)	No data published for animals or humans
Antihypertensive agent	Nifedipine	Reversible reduction in ability to fertilize ova	Supported in humans [23]
Anti-infective agent	Voriconazole	Epididymitis (<2% of	No data published for

		all patients)	animals or humans
Anti-inflammatory agent	Colchicine	Azoospermia or oligozoospermia	Refuted in humans [24,25], supported in animals [26](stage-specific)
	Cortisone acetate	Changes in the motility and number of spermatozoa	Refuted in humans [27]
	Dexamethasone/ dexamethasone sodium phosphate	Changes in the motility and number of spermatozoa	Refuted in humans [28], supported in several animals [29]
	Methylprednisolone/ prednisone	Changes in the motility and number of spermatozoa	No specific data published for methylprednisone, prednisone is supported in humans [30]
	Sulfasalazine	Reversible oligozoospermia and infertility	Supported in humans [31]
	Triamcinolone hexacetonide	Changes in the motility and number of spermatozoa	No data published for animals or humans
Antineoplastic agent	Busulfan	Damage to spermatozoa and testicular tissue, azoospermia, testicular atrophy	Supported in humans [32]
	Chlorambucil	Azoospermia (prolonged or permanent)	Supported in humans [33]
	Cyclophosphamide	Interferes with spermatogenesis, testicular atrophy, azoospermia, oligozoospermia	Supported in humans [34]
	Dabrafenib mesylate	Impaired spermatogenesis, decreased sperm count	No data published for animals or humans
	Degarelix	Testicular atrophy	No data published for animals or humans
	Fludarabine phosphate	Damage to spermatozoa and testicular tissue	Supported in humans [35]

	Mercaptopurine	Oligozoospermia	Refuted in mice [36] and humans [37](both used AZA)
	Methotrexate sodium	Oligozoospermia (reversible)	Supported for rodents [38,39], conflicting data for humans ([40](-) vs. [41](+))
	Procarbazine hydrochloride	Azoospermia	Supported in mice [42], unclear for humans (all trials have used combination therapy [43])
	Triptorelin pamoate	Testicular atrophy	Supported in humans [44]
	Vinblastine sulfate	Azoospermia	Supported in rats [45] and in vitro for humans [46]
	Vinorelbine tartrate	Damage to spermatozoa	No data published in animals or humans
	Thalidomide	Orchitis	Supported in rabbits [47], no data for humans
Anti-Parkinson agent	Pramipexole dihydrochloride	Epididymitis, orchitis	No data published for animals or humans
Antipsychotic agent	Quetiapine fumarate	Orchitis (infrequent)	No data published for animals or humans
Anti-rejection drug	Everolimus	Azoospermia or oligozoospermia (∼1% of patients)	No data published for animals or humans
Antiviral agent	Delavirdine mesylate	Hematospermia, epididymitis	No data published for animals or humans
	Ganciclovir/ganciclovir sodium	Testicular hypotrophy, aspermatogenesis (dose-dependent)	Supported in rats [48], no data in humans
	Valganciclovir	Inhibition of spermatogenesis	No specific data published, but is expected to result in the same effects as ganciclovir
Cardiovascular agent	Bosentan	Decreased sperm count	No data published for animals or humans

Hormones, hormone substitutes and hormone antagonists	Clomiphene citrate	Testicular tumors	Supported in humans [49], but used to treat infertility (improves sperm parameters; [50])
	Danazol	Decreased spermatogenesis, abnormalities in semen volume, viscosity, sperm count, and motility	Supported in humans [51]
	Dutasteride	Decreased sperm count, semen volume, and sperm motility	Supported in humans [52]
	Finasteride	Decreased ejaculate volume and total sperm per ejaculation (reversible)	Supported in humans [52]
	Flutamide	Interference with testosterone, decreased sperm count	Supported in mice [53], supported in combination with other agents in humans [54]
	Histrelin acetate	Testicular atrophy	Supported in rats [55] and rhesus monkeys [56], no data for humans
	Leuprolide acetate	Suppressed testicular steroidogenesis, testicular atrophy	Supported in humans [57], also may be useful for protecting/restoring fertility following toxic insults [58,59]
	Methyltestosterone	Oligozoospermia, suppressed spermatogenesis	Supported in dogs [60] and rats [61], no data for humans
	Nandrolone decanoate	Inhibition of testicular function, testicular atrophy and oligozoospermia, epididymitis	Supported in humans [62]
	Nilutamide	Testicular atrophy	No data published for animals or humans
	Oxandrolone	Suppressed spermatogenesis, inhibition of testicular	Supported in rats [63] and in a human case report [64]

		function, testicular atrophy, oligozoospermia, epididymitis	
	Oxymetholone	Inhibition of testicular function, testicular atrophy, oligospermia, decreased seminal volume, epididymitis	Supported in mice [65] and rats [66], no data for humans
	Testosterone/ testosterone cypionate/testosterone enanthate/testosterone undecanoate	Suppressed spermatogenesis/oligozoospermia, testosterone undecanoate may also cause spermatocele formation	Supported in humans [67–69], but dose-dependent and variable results
Immunosuppressant	Sirolimus	Azoospermia (reversible)	Supported in humans [70]
PDE5 inhibitor	Tadalafil	Decreased sperm concentration	Refuted in humans [71,72]
Peripheral nervous system agent	Cevimeline hydrochloride	Epididymitis	No data published for animals or humans
Radioactive compound	Sodium iodide I 131	Impairment of testicular function/transient infertility	Supported in humans [73]
*Some drugs can be classified into multiple categories. They have been classified here on the basis of their most common indication/target			
**Although the drugs noted to support the DailyMed labels were all found to affect some aspect of human spermatogenesis, the effect was not always the same as that listed in the drug label			

Table 7: Drugs That May Cause Erection Problems
(*Drugs That May Cause Erection Problems: Medlineplus Medical Encyclopedia)*

Drug Category	Drug Name
Antidepressants & Mental Health	Amitripyline (Elavil)
	Amoxapine (Asendin)
	Buspirone (Buspar)
	Chlordiazepoxide (Librium)
	Chlorpromazine (Thorazine)
	Chlomipramine (Anafranil)
	Clorazepate (Tranxene)

	Desipramine (Norpramin)
	Diazepam (Valium)
	Doxepin (Sinequan)
	Fluoxetine (Prozac)
	Fluphenazine (Prolixin)
	Imipramine (Tofranil)
	Isocarboxazid (Marplan)
	Lorazepam (Ativan)
	Meprobamate (Equanil)
	Mesoridazine (Serentil)
	Nortriptyline (Pamelor)
	Oxazepam (Serax)
	Phenelzine (Nardil)
	Phenytoin (Dilantin)
	Sertraline (Zoloft)
	Thioridazine (Parnate)
	Tranylcypromine (Parnate)
	Trifuoperazine (Stelazine)
Antihistamine	Cimetidine (Tagamet)
	Dimenhydrinate (Dramamine)
	Diphenhydramine (Benadryl)
	Hydroxyzine (Vistaril)
	Meclizine (Antivert)
	Nizatidine (Axid)
	Promethazine (Phenergan)
	Ranitidine (Zantac)
High Blood Pressure & Diuretics	Atenolol (Tenormin)
	Bethanidine
	Bumetanide (Bumex)
	Captopril (Capoten)
	Chlorothiazide (Diuril)
	Chlorthalidone (Hygroton)

	Clonidine (Catapres)
	Enalapril (Vasotec)
	Furosemide (Lasix)
	Guanabenz (Wytensin)
	Guanfacine (Tenex)
	Haloperidol (Haldol)
	Hydralazine (Apresoline)
	Hydrochlorothiazide (Esidrix)
	Labetalol (Normodyne)
	Methyldopa (Aldomet)
	Metoprolol (Lopressor)
	Nifedipine (Adalat, Procardia)
	Phenoxybenzamine (Dibenzyline)
	Phentolamine (Regitine)
	Prazosin (Minipress)
	Propranolol (Inderal)
	Reserpine (Serpasil)
	Spironolactone (Aldactone)
	Triamterene (Maxzide)
	Verapamil (Calan)
Parkinson’s Disease Medicines	Benztropine (Cogentin)
	Biperiden (Akineton)
	Bromocriptine (Parlodel)
	Levodopa (Sinemet)
	Procyclidine (Kemadrin)
	Trihexyphenidyl (Artane)
Chemotherapy and Hormonal Medicines	Antiandrogens (Casodex, Flutamide, Nilutamide)
	Busulfan (Myleran)
	Cyclophosphamide (Cytoxan)
	Ketoconazole
	LHRH agonists (Lupron, Zoladex)
	LHRH antagonist (Firmagon)

Other	Aminocaproic acid (Amicar)
	Atropine
	Clofibrate (Atromid-S)
	Cyclobenzaprine (Flexeril)
	Cyproterone
	Digoxin (Lanoxin)
	Disopyramide (Norpace)
	Dutasteride (Avodart)
	Estrogen
	Finasteride (Propecia, Proscar)
	Furazolidone (Furoxone)
	H2 blockers (Tagamet, Zantac, Pepcid)
	Indomethacin (Indocin)
	Lipid-lowering agents
	Licorice
	Metoclopramide (Reglan)
	Nonsteroidal anti-inflammatory drugs (NSAIDs, ibuprofen, etc.)
	Orphenadrine (Norflex)
	Prochlorperazine (Compazine)
	Pseudoephedrine (Sudafed)
	Sumatriptan (Imitrex)
Opiate Analgesics	Codeine
	Fentanyl (Innovar)
	Hydromorphone (Dilaudid)
	Meperidine (Demerol)
	Methadone
	Morphine
	Oxycodone (Oxycontin, Percodan)
Recreational	Alcohol
	Amphetamines
	Barbituates
	Cocaine

	Marijuana
	Heroin and other opioids
	Nicotine

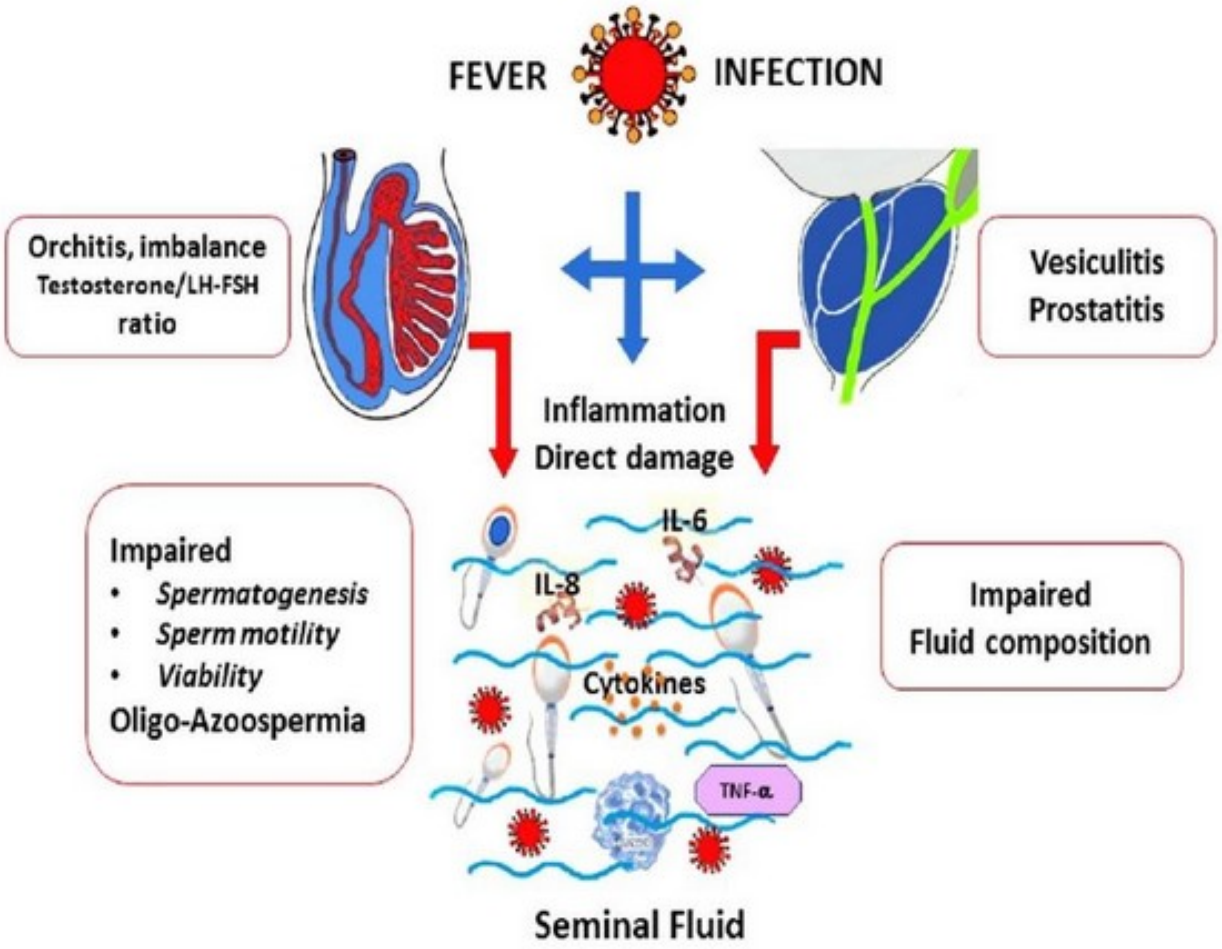

Figure 15: COVID-19 Infection Impact on Sperm and Semen (Pourmasumi et al.)

Appendix C – Fertility Solutions

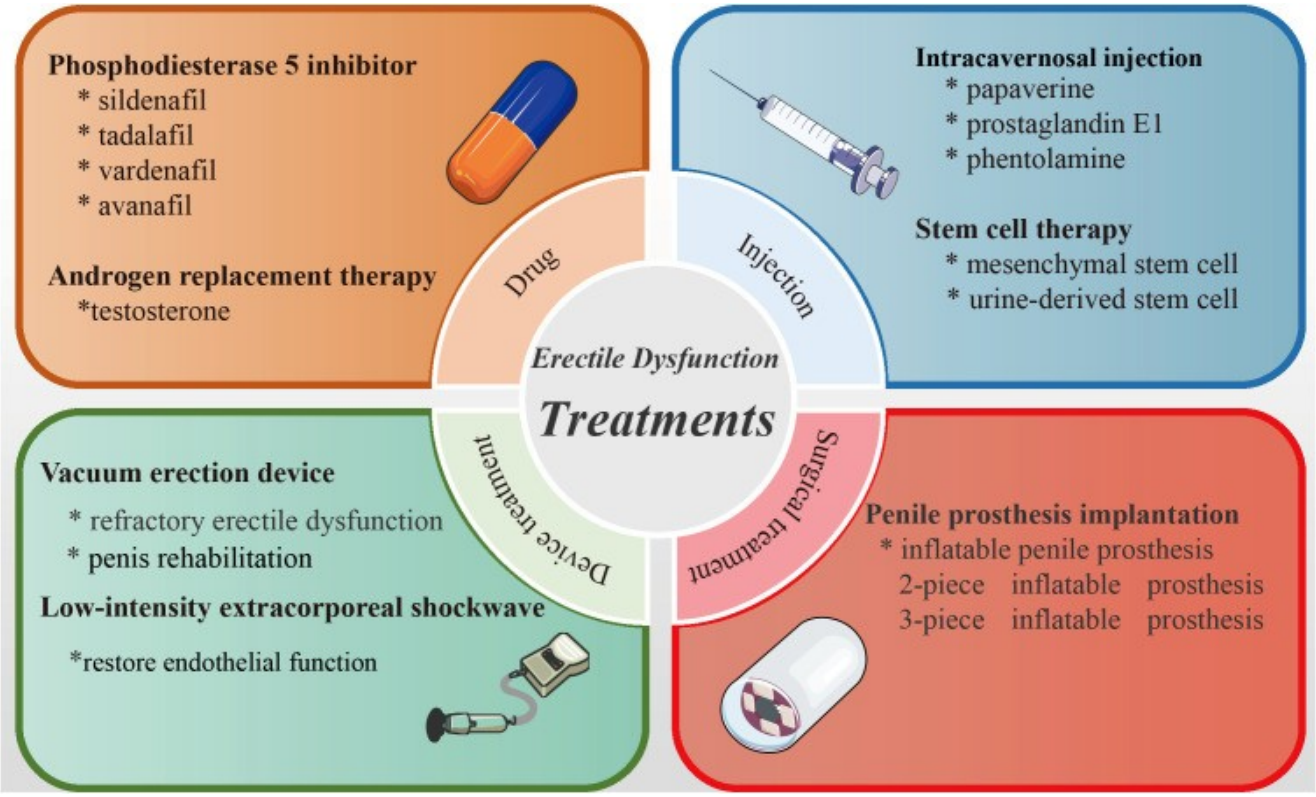

Figure 16: Erectile Dysfunction Treatments (Wang et al.)

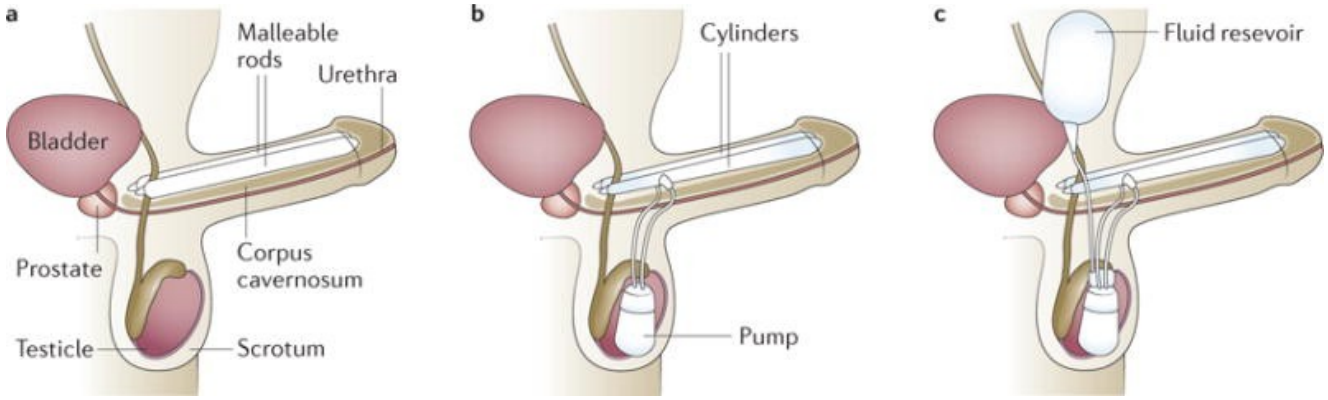

Figure 17: Penile Prostheses (Yafi et al.)

Table 8: Prostatitis Recipe 1 (Green 100-101)	
<u>Ingredients:</u> • 2 oz ground flaxseed • 1 Q distilled water • ¼ tsp lavender EO (Lavandula angustifolia)	<u>Instructions:</u> 1. Combine ground flaxseed and distilled water. 2. Simmer combination for 10 minutes. 3. Strain and cool until finger can remain in mixture for 10 seconds without pain. 4. Squeeze mucilage into a glass vessel.

	5. Add lavender EO to mucilage. 6. Seal glass vessel tightly and shake vigorously to combine. 7. Lie down on side. 8. Using a baby syringe or rubber bulb, insert between 6oz to 16oz of the mixture

Table 9: Prostatitis Recipe 2
(Green 101)

Ingredients:	Instructions:
• 50 drops total of any combination of the following: ◦ Blue chamomile () ◦ Lavender (Lavandula angustifolia) ◦ Blue Mallee (Eucalyptus polybractea) • 2 oz hazelnut / almond / wheat germ / olive / suitable base oil	1. Combine ingredients. 2. Apply combination to perineum, lower back, and lower abdomen. 3. Repeat 3-4 times per day. Notes: • Blue chamomile and blue mallee should be a 5% dilution. • Avoid use of alcohol, nicotine, caffeine, and white sugar.

Table 10: Miasm Clearing Protocol
(Naturopathic Institute of Therapies and Education)

Week	Homeopathic Remedy	Number of Doses
1	Sulphur 30X	1
2	Sulphur 30X	1
3	Sulphur 30C	1
4	Sulphur 30C	1
5	Calcarea carbonica 30C	1
6	Calcarea carbonica 30C	1
7	Calcarea carbonica 30C	1
8	Calcarea carbonica 30C	1
9	Lycopodium clavatum 9C	1
10	Lycopodium clavatum 9C	1

Purpose:

1. This protocol opens the channels of elimination and clears the genetic defects homeopathically.
2. This protocol is designed to impact the relatives directly preceding, directly following, and laterally in the family tree.
3. This protocol may be performed up to twice annually.

Notes:

1. Only *one* person per household should attempt the miasm clearing at a time. A wide number of symptoms may manifest and it is often strenuous on the household for more than one person to undertake the clearing.
2. Allow the symptoms to unfold in their natural order *uninterrupted*.
   a. Do not take additional remedies unless absolutely necessary. If unavoidable, use homeopathic remedies.
3. During pregnancy, begin this protocol at the beginning of month 4, no sooner or later. If this opportunity is missed, the protocol can be done postpartum.

Table 11: Kegel Exercises (Green 95)

Full Set:	Program:
1. Slow Clench a. Squeeze and clench the PC as if stopping urine flow. Hold it clenched for a slow count of 3 and relax. 2. Rapid Clench a. Repeatedly clench and relax the PC as rapidly as possible. 3. Pushing Out a. Bear down with moderate pressure as if forcing urine or bowel movements. (Simultaneously engages some abdominal muscles)	• Week 1: 5 sets of 10 reps each • Week 2: 5 sets of 15 reps each • Week 3: 5 sets of 20 reps each • Week 4: 5 sets of 25 reps each • Week 5: 5 sets of 30 reps each Notes: • Locate the muscle by stopping urine mid-stream. • Exercises should stop just before the muscle tires out completely. • Break up the exercises throughout the day at first to avoid tiring.

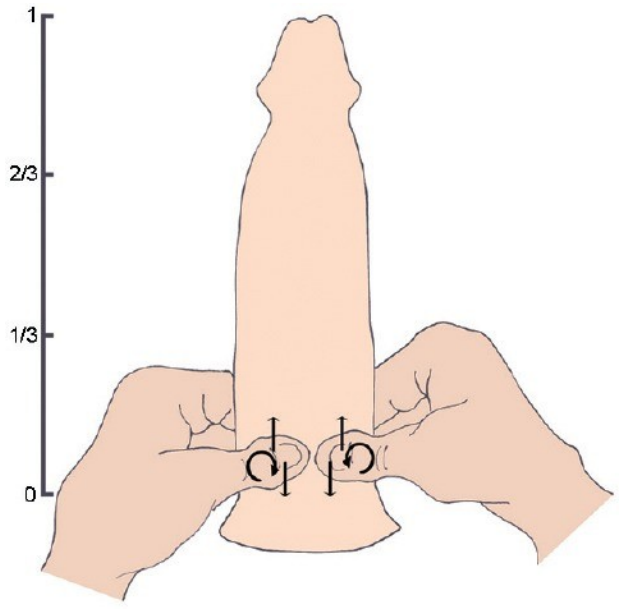

Figure 18: Penis-Root Masturbation (Ma et al.)

Appendix D - Contraception

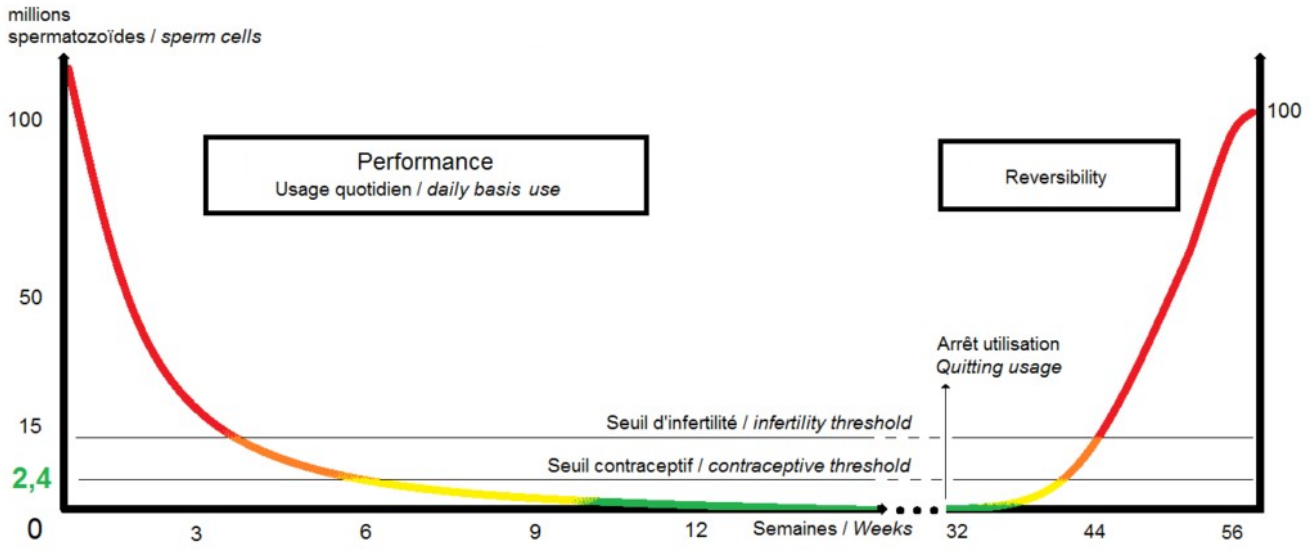

Figure 19: Smart Seed – Efficiency and Reversibility

Table 12: Heat Tolerance And Safety Are Temperature Dependent As Follows (*Heat Methods*)			
Fahrenheit	Celsius	Typical usage	Safety/Sensation on skin
140°	60°	commercial water heater temp.	burns in 1 to 6 seconds; very painful
125°	51.7°	top recommended home temp.	burns child in 2 minutes; painful
120°	48.9°	recommended home faucet temp.	uncomfortable; can burn in 10 minutes
118°	47.8°	—	pain threshold for adults
116°	46.7°	testes-only bath for contraception	very hot but not painful
110°	43.3°	hot shower	very warm but not hot
105°	40.5°	maximum tolerable bath temp.	warm
101°	38.3°	comfortable bath or hot-tub temp.	warm

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