

NAME: AFABOR MARIAN OGHENERUME

MATRIC NO: 18/MHS07/002

DEPARTMENT: PHARMACOLOGY

COURSE CODE: PHS 212

COURSE: RENAL PHYSIOLOG, BODY FLUID&TEMPERATURE REGULATION
AND AUTONOMIC NERVOUS SYSTEM.

ASSIGNMENT: MALE REPRODUCTIVE FUNCTIONS

DATE: 23/04/2020

QUESTION-Write short notes on the following:

1. Spermatogenesis
2. Testosterone
3. Semen
4. Male orgasm
5. Male infertility

ANSWERS

1. **SPERMATOGENESIS:** Spermatogenesis is the process by which haploid spermatozoa develop from germ cells in the seminiferous tubules of the testis. This process starts with the mitotic division of the stem cells located close to the basement membrane of the tubules. These cells are called spermatogonial stem cells. The mitotic division of these produces two types of cells. Type A cells replenish the stem cells, and type B cells differentiate into primary spermatocytes. The primary spermatocyte divides meiotically (Meiosis I) into two secondary spermatocytes; each secondary spermatocyte divides into two equal haploid spermatids by Meiosis II. The spermatids are transformed into spermatozoa (sperm) by the process of spermiogenesis. These develop into mature spermatozoa, also known as sperm cells. Thus, the primary spermatocyte gives rise to two cells, the secondary spermatocytes, and the two secondary spermatocytes by their subdivision produce four spermatozoa and four haploid cells.

Normal Spermatogenesis, Testis Biopsy

High-power view of a seminiferous tubule with normal spermatogenesis. Spermatozoa are the mature male gametes in many sexually reproducing organisms. Thus, spermatogenesis is the male version of gametogenesis, of which the female equivalent is oogenesis.

In mammals it occurs in the seminiferous tubules of the male testes in a stepwise fashion. Spermatogenesis is highly dependent upon optimal conditions for the process to occur correctly,

and is essential for sexual reproduction. DNA methylation and histone modification have been implicated in the regulation of this process. It starts at puberty and usually continues uninterrupted until death, although a slight decrease can be discerned in the quantity of produced sperm with increase in age.

Spermatogenesis starts in the bottom part of seminiferous tubes and, progressively, cells go deeper into tubes and moving along it until mature spermatozoa reaches the lumen, where mature spermatozoa are deposited. The division happens asynchronously; if the tube is cut transversally one could observe different maturation states. A group of cells with different maturation states that are being generated at the same time is called a spermatogenic wave.

Spermatogenesis produces mature male gametes, commonly called sperm but more specifically known as spermatozoa, which are able to fertilize the counterpart female gamete, the oocyte, during conception to produce a single-celled individual known as a zygote. This is the cornerstone of sexual reproduction and involves the two gametes both contributing half the normal set of chromosomes (haploid) to result in a chromosomally normal (diploid) zygote.

To preserve the number of chromosomes in the offspring – which differs between species – one of each gamete must have half the usual number of chromosomes present in other body cells. Otherwise, the offspring will have twice the normal number of chromosomes, and serious abnormalities may result. In humans, chromosomal abnormalities arising from incorrect spermatogenesis results in congenital defects and abnormal birth defects (Down syndrome, Klinefelter syndrome) and in most cases, spontaneous abortion of the developing foetus.

Spermatogenesis takes place within several structures of the male reproductive system. The initial stages occur within the testes and progress to the epididymis where the developing gametes mature and are stored until ejaculation. The seminiferous tubules of the testes are the starting point for the process, where spermatogonial stem cells adjacent to the inner tubule wall divide in a centripetal direction—beginning at the walls and proceeding into the innermost part, or lumen—to produce immature sperm. Maturation occurs in the epididymis. The location [Testes/Scrotum] is specifically important as the process of spermatogenesis requires a lower temperature to produce viable sperm, specifically 1°-8 °C lower than normal body temperature of 37 °C (98.6 °F). Clinically, small fluctuations in temperature such as from an athletic support strap, causes no impairment in sperm viability or count.

2. TESTOTERONE: Testosterone is the primary male sex hormone and anabolic steroid. In male humans, testosterone plays a key role in the development of male reproductive tissues such as testes and prostate, as well as promoting secondary sexual characteristics such as increased muscle and bone mass, and the growth of body hair. In addition, testosterone is involved in health and well-being, and the prevention of osteoporosis. Insufficient levels of testosterone in men may lead to abnormalities including frailty and bone loss. Testosterone is a hormone produced by the human body. It's mainly produced in men by the testicles. Testosterone affects a man's appearance and sexual development. It stimulates sperm production as well as a man's sex drive. It also helps build muscle and bone mass.

Testosterone production typically decreases with age. According to the American Urological Association, about 2 out of 10 men older than 60 years have low testosterone. That increases slightly to 3 out of 10 men in their 70s and 80s. Men can experience a range of symptoms if testosterone decreases more than it should. Low testosterone, or low T, is diagnosed when levels fall below 300 nanograms per deciliter (ng/dL).

A normal range is typically 300 to 1,000 ng/dL, according to the Food and Drug Administration. A blood test called a serum testosterone test is used to determine your level of circulating testosterone. A range of symptoms can occur if testosterone production drastically drops below normal. Signs of low T are often subtle. Here are 6 signs of low Testosterone in men.

1. Low sex drive

Testosterone plays a key role in libido (sex drive) in men. Some men may experience a decline in sex drive as they age. However, someone with low T will likely experience a more drastic drop in their desire to have sex.

2. Difficulty with erection

While testosterone stimulates a man's sex drive, it also aids in achieving and maintaining an erection. Testosterone alone doesn't cause an erection, but it stimulates receptors in the brain to produce nitric oxide. Nitric oxide is a molecule that helps trigger a series of chemical reactions necessary for an erection to occur. When testosterone levels are too low, a man may have difficulty achieving an erection prior to sex or having spontaneous erections (for example, during sleep). However, testosterone is only one of many factors that aid in adequate erections. Research is inconclusive regarding the role of testosterone replacement in the treatment of erectile dysfunction.

In a review of studies that looked at the benefit of testosterone in men with erection difficulties, nearly half Trusted Source showed no improvement with testosterone treatment. Many times, other health problems play a role in erectile difficulties. These can include:

Diabetes

Thyroid problems

High blood pressure

High cholesterol

Smoking

Alcohol use

Depression

Stress

Anxiety

3. Low semen volume

Testosterone plays a role in the production of semen, which is the milky fluid that aids in the motility of sperm. Men with low T will often notice a decrease in the volume of their semen during ejaculation.

4. Hair loss

Testosterone plays a role in several body functions, including hair production. Balding is a natural part of aging for many men. While there is an inherited component to balding, men with low T may experience a loss of body and facial hair, as well.

5. Fatigue

Men with low T have reported extreme fatigue and decrease in energy levels. You might have low T if you're tired all of the time despite getting plenty of sleep or if you're finding it harder to get motivated to exercise.

6. Loss of muscle mass

Because testosterone plays a role in building muscle, men with low T might notice a decrease in muscle mass. Studies ^{Trusted Source} have shown testosterone affects muscle mass, but not necessarily strength or function.

3. SEMEN

Semen, also called seminal fluid, fluid that is emitted from the male reproductive tract and that contains sperm cells, which are capable of fertilizing the female eggs. Semen also contains other liquids, known as seminal plasma, which help to keep the sperm cells viable.

Semen Analysis

In the sexually mature human male, sperm cells are produced by the testes (singular, testis); they constitute only about 2 to 5 percent of the total semen volume. As sperm travel through the male reproductive tract, they are bathed in fluids produced and secreted by the various tubules and glands of the reproductive system. After emerging from the testes, sperm are stored in the epididymis, in which secretions of potassium, sodium, and glycerylphosphorylcholine (an energy source for sperm) are contributed to the sperm cells. Sperm mature in the epididymis. They then pass through a long tube, called the ductus deferens, or vas deferens, to another storage area, the ampulla. The ampulla secretes a yellowish fluid, ergothioneine, a substance that reduces (removes oxygen from) chemical compounds, and the ampulla also secretes fructose, a sugar that nourishes the sperm. During the process of ejaculation, liquids from the prostate gland and seminal vesicles are added, which help dilute the concentration of sperm and provide a suitable environment for them. Fluids contributed by the seminal vesicles are approximately 60 percent of the total semen volume; these fluids contain fructose, amino acids, citric acid, phosphorus, potassium, and hormones known as prostaglandins. The prostate gland contributes about 30 percent of the seminal fluid; the constituents of its secretions are mainly citric acid, acid phosphatase, calcium, sodium,

zinc, potassium, protein-splitting enzymes, and fibrolysin (an enzyme that reduces blood and tissue fibres). A small amount of fluid is secreted by the bulbourethral and urethral glands; this is a thick, clear, lubricating protein commonly known as mucus.

Essential to sperm motility (self-movement) are small quantities of potassium and magnesium, the presence of adequate amounts of oxygen in the plasma, proper temperature, and a slightly alkaline pH of 7 to 7.5. Sulfate chemicals in semen help prevent the sperm cells from swelling; and fructose is the main nutrient to sperm cells. The total volume of semen for each ejaculation of a human male averages between 2 and 5 ml (0.12 to 0.31 cubic inch); in stallions the average ejaculate is about 125 ml (7.63 cubic inches). In human beings each ejaculation contains normally 200 to 300 million sperm. Semen frequently contains degenerated cells sloughed off from the network of tubules and ducts through which the semen has passed.

4. MALE ORGAMS

During an orgasm, hormones called endorphins are released into the bloodstream, causing intense pleasure and relaxation. People may feel flushed or warm, and may experience rapid muscle spasms all throughout their bodies, but mainly concentrated in the genital and anal areas. Orgasm is the peak of sexual arousal when all the muscles that were tightened during sexual arousal relax.

A guy's orgasm is usually accompanied by the release of ejaculatory fluid, and about 10 percent of women also ejaculate during an orgasm. Women's experience with orgasm is more varied than men's, and not all women experience orgasm in the same way. It is often the case that a woman or a man won't have an orgasm during sex. That's perfectly normal. But some women are less likely to have orgasms than men.

With men, you can usually tell if they have an orgasm because they usually ejaculate. With women, it is not so simple because there is often no physical evidence. If you're concerned about knowing when and if your partner has an orgasm, talk about how you can let one another know before you have sex. Letting partners know you care about making them feel good is a great way to show that their pleasure and enjoyment is important to you.

5 MALE INFERTILITY

Up to 15 percent of couples are infertile. This means they aren't able to conceive a child, even though they've had frequent, unprotected sexual intercourse for a year or longer. In over a third of these couples, male infertility plays a role. Male infertility is due to low sperm production, abnormal sperm function or blockages that prevent the delivery of sperm. Illnesses, injuries, chronic health problems, lifestyle choices and other factors can play a role in causing male infertility.

Symptoms

The main sign of male infertility is the inability to conceive a child. There may be no other obvious signs or symptoms. In some cases, however, an underlying problem such as an inherited disorder, a hormonal imbalance, dilated veins around the testicle or a condition that blocks the passage of sperm causes signs and symptoms. Although most men with male infertility do not notice symptoms other than the inability to conceive a child, signs and symptoms associated with male infertility include:

1. Problems with sexual function — for example, difficulty with ejaculation or small volumes of fluid ejaculated, reduced sexual desire, or difficulty maintaining an erection (erectile dysfunction) pain, swelling or a lump in the testicle area.
2. Recurrent respiratory infections
3. Inability to smell
4. Abnormal breast growth (gynecomastia)

Decreased facial or body hair or other signs of a chromosomal or hormonal abnormality

A lower than normal sperm count (fewer than 15 million sperm per milliliter of semen or a total sperm count of less than 39 million per ejaculate)

When to See a Doctor

See a doctor if you have been unable to conceive a child after a year of regular, unprotected intercourse or sooner if you have any of the following:

1. Erection or ejaculation problems, low sex drive, or other problems with sexual function
2. Pain, discomfort, a lump or swelling in the testicle area
3. A history of testicle, prostate or sexual problems
4. A groin, testicle, penis or scrotum surgery

Causes

Male fertility is a complex process. To get your partner pregnant, the following must occur:

You must produce healthy sperm. Initially, this involves the growth and formation of the male reproductive organs during puberty. At least one of your testicles must be functioning correctly, and your body must produce testosterone and other hormones to trigger and maintain sperm production.

Sperm have to be carried into the semen. Once sperm are produced in the testicles, delicate tubes transport them until they mix with semen and are ejaculated out of the penis.

There needs to be enough sperm in the semen. If the number of sperm in your semen (sperm count) is low, it decreases the odds that one of your sperm will fertilize your partner's egg. A low sperm count is fewer than 15 million sperm per milliliter of semen or fewer than 39 million per ejaculate.

Sperm must be functional and able to move. If the movement (motility) or function of your sperm is abnormal, the sperm may not be able to reach or penetrate your partner's egg.