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1**] Spermatogenesis**

Spermatogenesis is the process by which haploid spermatozoa develops from germ cells in the seminiferous tubles of the testis . This process starts with the mitotic division of the stem cells located close to the basement membrane of the tubules.[1] These cells are called spermatoginal cell of the sperm 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 into two secondary spermatocytes; each secondary spermatocyte divides into two equal haploid spermatids by Meiosis II. The spermatids are transformed into spermatozoa 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 four haploid cells two secondary spermatocytes by their subdivision produce four spermatozoa and. 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 asynchronically; 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. Hormonal control of spermatogenesis varies among species. In humans the mechanism is not completely understood; however it is known that initiation of spermatogenesis occurs at puberty due to the interaction of the

hypothalamus, pituitary gland and Leydig cells. If the pituitary gland is removed, spermatogenesis can still be initiated by follicle stimulating hormone (FSH) and testosterone In contrast to FSH, luteinizing hormones(LH) appears to have little role in spermatogenesis outside of inducing gonadal testosterone production.

2] Testosterone : is the hormone responsible for the development of male sexual characteristics. Hormones are chemical messengers that trigger necessary changes in the body. Females also produce testosterone, usually in smaller amounts.

It is a type of androgen produced primarily by the testicles in cells called the Leydig cells.

In men, testosterone is thought to regulate a number of functions alongside sperm production. Testosterone belongs to a class of male hormones called androgens, which are sometimes called steroids or anabolic steroids. In men, testosterone is produced mainly in the testes, with a small amount made in the adrenal glands. The brain's hypothalamus and pituitary gland control testosterone production. The hypothalamus instructs the pituitary gland on how much testosterone to produce, and the pituitary gland passes the message on to the testes. These communications happen through chemicals and hormones in the bloodstream.

3] Semen : **Semen**, also known as **seminal fluid**, is an organic fluid that contains spermatozoa. It is secreted by the gonads and other sexual organs of male or hermaphroditic animals and can fertilize The female ovum. In humans, seminal fluid contains several components besides spermatozoa: proteolytic and other enzymes as well as fructose are elements of seminal fluid which promote the survival of spermatozoa, and provide a medium through which they can move or

"swim". Semen is produced and originates from the seminal vesicle, which is located in the pelvis. The process that results in the discharge of semen is called ***ejaculation*** . During the process of ejaculation, sperm passes through the ejaculatory ducts and mixes with fluids from the seminal vesicles the prostate and the bulbourethral glands to form the semen. The seminal vesicles produce a yellowish viscous fluid rich in fructose and other substances that makes up about seventy percent of human semen .The prostatic secretion, influenced by dihydrotestosterone, is a whitish thin fluid containing proteolytic enzymes, citric acid, acid phosphatase and lipids. The bulbourethral glands secrete a clear secretion into the lumen of the urethra to lubricate it.

4] Male orgasm : is the discharge of semen from the male reproductory tract The fuel for the process leading to orgasm is testosterone, a hormone produced in steady supply by the testicles. The testicles also make millions of sperm each day, which mature and then are mixed with whitish, protein-rich fluids. These fluids nourish and support the sperm so they can live after ejaculation for a limited time.

5] Male infertility : 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. Male infertility is commonly due to deficiencies in the semen, and semen quality is used as a surrogate measure of male fecundity. Some infections can interfere with sperm production or sperm health or can cause scarring that blocks the passage of sperm. These include inflammation of the epididymis or testicles and some sexually transmitted infections, including gonorrhea or HIV. Although some infections can result in permanent testicular damage, most often sperm can still be retrieved. Anti-sperm antibodies are immune system cells that mistakenly identify sperm as harmful invaders and attempt to eliminate them.