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1. Spermatogenesis:**Spermatogenesis** is the process by which haploidspermatozoa develop from germ cells in the seminiferous tubules of the testis. This process starts with the mitotic division of the stem cellslocated close to the basement membrane of the tubules.[1] 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.

Purpose

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.

Location in Human

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.

Duration

For humans, the entire process of spermatogenesis is variously estimated as taking 74 daysl(according to tritium-labelled biopsies) and approximately 120 days(according to DNA clock measurements).

Influencing factors

The process of spermatogenesis is highly sensitive to fluctuations in the environment, particularly hormones and temperature. Testosterone is required in large local concentrations to maintain the process, which is achieved via the binding of testosterone by androgen binding protein present in the seminiferous tubules. Testosterone is produced by interstitial cells, also known as Leydig cells, which reside adjacent to the seminiferous tubules.Seminiferous epithelium is sensitive to elevated temperature in humans and some other species, and will be adversely affected by

temperatures as high as normal body temperature. Consequently, the testes are located outside the body in a sack of skin called the scrotum.

Hormonal control :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 hormone (LH) appears to have little role in spermatogenesis outside of inducing gonadal testosterone production. FSH stimulates both the production of androgen binding protein (ABP) by Sertoli cells, and the formation of th

2. Semen : **Semen**, also known as **seminal fluid**, is an organic fluid that contains spermatozoa. It is secreted by the gonads (sexual glands) 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*. Semen is also a form of genetic material. In animals, semen has been collected for cryoconservation. Cryoconservation of animal genetic resources is a practice that calls for the collection of genetic material in efforts for conservation of a particular breed.

Human semen

Composition

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 70% of human semen.[3] The prostatic secretion, influenced by dihydrotestosterone, is a whitish (sometimes clear), thin fluid containing proteolytic enzymes, citric acid, acid phosphatase and lipids.[3] The bulbourethral glands secrete a clear secretion into the lumen of the urethra to lubricate it.[4]

Sertoli cells, which nurture and support developing spermatocytes, secrete a fluid into seminiferous tubules that helps transport sperm to the genital ducts. The ductuli efferentes possess cuboidal cells with microvilli and lysosomal granules that modify the ductal fluid by reabsorbing some fluid. Once the semen enters the ductus epididymis the principal cells, which contain pinocytotic vessels indicating fluid reabsorption, secrete glycerophosphocholine which most likely inhibits

premature capacitation. The accessory genital ducts, the seminal vesicle, prostate glands, and the bulbourethral glands, produce most of the seminal fluid.

Seminal plasma of humans contains a complex range
of organic and inorganic constituentsThe components in the seminal plasma attempt to compensate for this hostile environment. Basic amines such
as putrescine, spermine, spermidineand cadaverine are responsible for the smell and flavor of semen.

Appearance and consistency

Semen is typically translucent with white, grey or even yellowish tint. Blood in the semen can cause a pink or reddish colour, known as *hematospermia*, and may indicate a medical problem which should be evaluated by a doctor if the symptom persists.

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- Maintaining optimal frequency of coital activity: sperm counts can be depressed by daily coital activity and sperm motility may be depressed by coital activity that takes place too infrequently (abstinence 10–14 days or more).
- Wearing a protective cup and jockstrap to protect the testicles, in any sport such
as baseball, football, cricket, lacrosse, hockey, softball, paintball, rodeo, motorcross, wrestling, soccer, karate or other martial arts or any sport where a ball, foot, arm, knee or bat can come into contact with the groin.

    - Diet: Healthy diets (i.e. the Mediterranean diet rich in such nutrients as omega-3 fatty acids, some antioxidants and vitamins, and low in saturated fatty acids (SFAs) and trans-fatty acids (TFAs) are inversely associated with low semen quality parameters. In terms of food soups, fish, shellfish and seafood, poultry, cereals, vegetables and fruits, and low-fat dairy products have been positively related to sper