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NURSING

Write short notes on the following:

* Spermatogenesis
* Testosterone
* Semen
* Male orgasm
* Male infertility

**Spermatogenesis**

Spermatogenesis is the process involved in the formation of spermatozoa(mature sperm cells) from spermatogonium in the testes especially in the semiferous tubule. Spermatogenesis, the origin and development of the sperm cells within the male reproductive organs, the testes. The testes are composed of numerous thin, tightly coiled tubules known as the seminiferous tubules; the sperm cells are produced within the walls of the tubules. Within the walls of the tubules, also, are many randomly scattered cells, called Sertoli cells, that function to support and nourish the immature sperm cells by giving them nutrients and blood products. As the young germ cells grow, the Sertoli cells help to transport them from the outer surface of the seminiferous tubule to the central channel of the tubule. The temperature of the testes is lower than the normal temperature of the body which increase spermatogenesis. The normal temperature of the testes is 32oc. in the seminiferous tubule, the sprematogonium is locates around the basal layer and it is differentiated firtsly into primary spermatocytes due to maturation and then secondary spermatocyte by the first meiotic division then early spermatid by second meiotic division.

Sperm cells are continually being produced by the testes, but not all areas of the seminiferous tubules produce sperm cells at the same time. One immature germ cell takes as long as 74 days to reach final maturation, and during this growth process there are intermittent resting phases.

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.

The process of Spermatogenesis occurs to create mature male gametes, which then fertilize female gametes to create a zygote, a single-celled organism. This results in cell division and multiplication to create a fetus. For a healthy offspring, the number of chromosomes must be maintained properly across the body as failure can lead to some abnormalities.

Processes of Speermatogenesis

* Stage 1: The Diploid spermatogonia is situated in the seminiferous tubules which include twice the total number of chromosomes. This replicates mitotically in interphase before the method of meiosis 1 to create 46 pairs of sister chromatids.
* Stage 2: In this, the chromatids allow the exchange of genetic information through the synapsis process. It is done before dividing into haploid spermatocytes through meiosis.
* Stage 3: In this division, the new two daughter cells will further divide into 4 spermatids, having unique chromosomes that are approximately half in number to the original spermatogonium.
* Stage 4: In this stage, the cells move from the lumen of the testes to the epididymis. They get mature and developed into four sperm cells with the growth of microtubules on the centrioles to develop an axoneme. The remaining centrioles elongate and develop into sperm tail.

Factors Affecting Spermatogenesis

The process of spermatogenesis is very sensitive, and can be affected by the slightest change in the levels of hormones such as testosterone produced by the hypothalamus, pituitary gland, and Leydig cells.

* The process is also very sensitive to changes in temperature.
* Deficiencies in diet, exposure to strong drugs, alcoholism, and presence of diseases can adversely affect the rate of sperm formation.
* Stress of oxidation can cause DNA damage to the sperms, leading to problems in fertilization and pregnancy.

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.

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. The prostatic secretion, influenced by dihydrotestosterone, is a whitish (sometimes clear), 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.

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.

The semen travels through the ejaculatory ducts and mixes with fluids from the seminal vesicles, the prostrate, and the bulbourethral glands.The seminal vesicles produce a viscous, fructose-rich fluid forming around 65-70% of the semen base.The white color of the semen is due to secretion from the prostate glands containing enzymes, citric acid, lipids, and acid phosphatase. This forms around 25-30% of the semen base.At each ejaculation around 200-500 million sperms are released by the testes. This forms about 2-5% of the semen composition.Apart from these, the bulbourethral glands produce a clear secretion. This helps in mobility of the sperm cells in the vagina and cervix. The glands’ secretion contribute less than 1% to the overall semen composition.

The semen comprises of:

* fructose
* ascorbic acid
* zinc
* cholesterol
* protein
* calcium
* chlorine
* blood group antigens
* citric acid
* DNA
* Magnesium
* vitamin B12
* phosphorus
* sodium
* potassium
* uric acid
* lactic acid
* nitrogen
* other nutrients

It is composed of spermatozoa in a semi-viscous fluid. Structures within the male reproductive tract that are involved in the production of semen include:

* Testes and epididymis
* Prostate
* Seminal vesicles
* Bulbourethral gland

Semen is produced as a combination of secretions from the different regions of the male reproductive tract. Each fraction differs in chemical composition and function. The combination of these fractions during ejaculation results in the optimal environment for transporting sperm to the endocervical mucus in the female.

* Spermatozoa are produced in the testes. They mature in the epididymis. The testes also produce testosterone and inhibin.
* Fluid from the seminal vesicles accounts for approximately 70% of semen volume. The seminal vesicles are the source of fructose in semen. Fructose is used by the spermatozoa as an energy source.
* The prostate gland supplies about 20% of the volume of semen. Its fluids include acid phosphatase and proteolytic enzymes that lead to coagulation and subsequent liquefaction of semen. The prostate also contains most of the found in semen.
* The bulbourethral gland produces mucoproteins that make up about 5% of the volume of semen.

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