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### Department: Nursing

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**Question**

Write short notes on the following

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

****Spermatogenesis****

The origin and development of the [sperm cells](https://www.britannica.com/science/sperm) within the male [reproductive](https://www.britannica.com/science/human-reproductive-system) organs, the [testes](https://www.britannica.com/science/testis). The testes are composed of numerous thin, tightly coiled tubules known as the **[seminiferous tubules;](https://www.britannica.com/science/seminiferous-tubule)** 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](https://www.britannica.com/science/Sertoli-cell)**, 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.****Spermatogonia**** are the initial pool of diploid cell that divide by mitosis to give two identical cells. One of these cells will be used to replenish the pool of spermatogonia – these cells are A1 spermatogonia. This replenishment of spermatogonia means that males are fertile throughout their adult life. The other cell –type B spermatogonium – will eventually form mature sperm.

Type B spermatogonia replicate by mitosis several times to form identical diploid cells linked by cytoplasm bridges, these cells are now known as primary spermatocytes. Primary spermatocytes then undergo meiosis.

* ****Meiosis I**** produces two haploid cells known as secondary spermatocyte.
* ****Meiosis II**** produces four haploid cells known as Spermatids.

The cytoplasmic bridges break down and the spermatids are released into the lumen of the seminiferous tubule - a process called **spermiation.** The spermatids undergo spermiogenesis (remodelling and differentiation into mature spermatozoa) as they travel along the seminiferous tubules until they reach the epididymis.

From the seminiferous tubule they travel to the rete testis, which acts to “concentrate” the sperm by removing excess fluid, before moving to the epididymis where the sperm is stored and undergoes the final stages of maturation.

Spermatogenesis takes approximately****70 days****, therefore in order for sperm production to be continuous and not intermittent, multiple spermatogenic processes are occurring simultaneously within the same seminiferous tubule, with new groups of spermatogonia arising every 16 days (spermatogenic cycle). Each of these populations of spermatogenic cells will be at different stages of spermatogenesis.

Note that once sperm leave the male body and enter the female reproductive tract, the conditions there cause the sperm to undergo****capacitation****, which is the removal of cholesterol and glycoproteins from the head of the sperm cell to allow it to bind to the zona pellucida of the egg cell.

**Male Orgasm**

The male orgasm is a complex system involving multiple hormones, organs, and nerve pathways.The hormone testosterone, produced in the testicles, plays a central role by enhancing the sexual desire (libido) that leads to arousal, erection, and ultimately orgasm. By contrast, low testosterone not only decreases a man's energy and mood, it makes him less responsive to sexual stimuli, both physical and mental. The male ejaculate, [semen](https://www.verywellhealth.com/facts-about-semen-an-indication-of-health-status-2328524), is comprised of sperm cells and seminal fluid, the latter of which contains phosphorylcholine (an enzyme that aids in fertility) and fructose (which provides fuel for sperm). The average volume of semen expelled by a healthy man is around a teaspoon.

There are 4 phases of the male orgasm:

### Arousal : Arousal is the stage in which physical, sensory, and emotional cues prompt the brain to release a neurotransmitter known as acetylcholine. This, in turn, triggers the release of nitric oxide into the arteries of the penis, causing them to expand and rapidly fill with blood. The resulting erection is generally accompanied by changes in respiration, increased overall muscle tension, and the retraction of the scrotal sac.

### Plateau: Plateau is the phase immediately preceding orgasm in which the voluntary thrusts of the body, specifically the pelvis, suddenly become involuntary, increasing both in intensity and speed. It is at this stage that the heart rate increases to between 150 and 175 beats per minute, accompanied by a marked rise in blood pressure and body temperature. Traces of seminal fluid ("pre-cum") may leak from the urethra. The release of pre-ejaculatory fluid is more than just incidental; it alters the pH of the urethra so that the sperm has a better chance of survival.﻿

All told, the plateau phase lasts between 30 seconds and two minutes.

### Orgasm : The orgasm phase is divided into two parts. The first, known as emission, is the stage where ejaculation is inevitable. This is immediately followed by the second stage, ejaculation, in which strong contractions of the penile muscle, anus, and perineal muscles help propel the semen from the body.During orgasm, the reward center of the brain (specifically the cerebellum, amygdala, nucleus accumbens, and ventral tegmental area) is flooded with neurochemicals, inciting the intense emotional response associated with an orgasm.

At the same time, the **[lateral orbitofrontal cortex](https://www.verywellhealth.com/the-frontal-lobes-2488715)** located behind the left eye shuts down entirely. This is the part of the brain that plays a central role in judgment and self-control. The effect explains why people often describe an orgasm as a state where "nothing else matters."

### Resolution and Refraction : Resolution is the phase following orgasm where the penis starts to lose its erection. This is often accompanied by feelings of extreme relaxation or even drowsiness.Refraction, also known as the refractory period, is the stage following climax when a man is unable to achieve another erection even with stimulation. In younger men, the refractory period may be as short as 15 minutes. In older men, it may last as long as an entire day.