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1. Male Orgasm

The male orgasm and ejaculation are two separate physiological processes. An orgasm is an intense transient peak sensation of intense pleasure creating an altered state of consciousness associated with reported physical changes. The male orgasm is a complex experience, men achieve orgasm through a series of steps involving a number of organs, hormones, blood, vessels, and nerves working together. The major function of the male orgasm is to ejaculate sperm through strong muscle contractions, although not all men ejaculate during orgasm.

The male orgasm involves multiple hormones, organs and nerve pathways. The hormone testosterone, produced in the testicles, plays a central role by enhancing the sexual desires (libido) that leads to arousal, erection and ultimately an orgasm. In essence, low testosterone not only decreases a man's energy and mood, it makes him less responsive to sexual stimuli both physical and mental. The testosterone following through a man's body, along with psychological factors, determines the strength of his desire for sex. The libido is key in kicking off the process that will lead to orgasm. The route to ejaculation in men is described in four distinct phases, of which orgasm is the third phase. These phases include:

- **Arousal:** The man perceives something or someone that prompts sexual interest. That perception prompts the brain to send a signal down the spinal cord to the sex organs, causing an erection. The penis becomes erect when blood fills spongy tissue inside its shaft, brought by arteries that have expanded to allow blood to race in at up to 50 times normal speed. The veins in the penis that normally drains blood out squeeze shut so that more blood remains inside, producing a firm erection. The scrotum pulls towards the body, and muscles throughout the body increase in tension.
- **Plateau**: The male body prepares for orgasm in this phase, which can last from 30 second to 2 minutes. Muscle tension increases and involuntary body movements, particularly in the pelvis begin to take over. The heart rate of the man also increases to 150 and 175 beats per minute. A clear fluid may begin to flow from the urethra. This pre-ejaculatory fluid is meant to change the pH balance of the urethra, to improve the chances of sperm survival.

- **Orgasm:** Orgasm occurs in two phases, emission and ejaculation. In emission, the man reaches ejaculatory inevitability. Semen is disposed near the top of the urethra, ready for ejaculation. Ejaculation occurs in a series of rapid contractions of the penile muscles and around the base of the anus. Involuntary pelvic thrusting occurs and the nerves causing the muscle contractions sends messages of pleasure to the man's brain.
- **Resolution and Refraction**: After ejaculation, the penis loose its erection and the rest fades soon after. Muscle tension fades, and the man feels relax or drowsy. Men usually must undergo a refractory period or recovery phase, during which they cannot achieve another erection. This period varies in men, in youths its about 15 minutes but in the elderly it can be up to 10 to 20 hours. The average refractory period is about half an hour.

There are men whom have problems in achieving orgasms which may stem from psychological factors, by certain medications, a neurological or cardiovascular disease or as a result of nerve damage through surgery or injury.

2. Spermatogenesis

Spermatogenesis is male gametogenesis which is the production of spermatozoa. Males start producing sperm at puberty which is usually 10 to 16 years old. Sperm are produced in large quantities approximately 200 million a day, this is to maximise the odds of sperm reaching the egg. Sperm are continually produced so as to ensure that the male utilize the small window of fertility of the female.

Spermatogenesis occurs in testes of the male specifically in the seminiferous tubules. This tubules are kept separate from the systemic circulation by the blood-testes barrier. The blood-testis is formed by Sertoli cells and its important in the prevention of hormones and constituents of the systemic circulation from affecting the developing sperm and it also prevent the immune system of the male from

recognizing the sperm as foreign (as the sperm are genetically different from the male and will express different surface antigens). Sertoli cells also support the developing spermatozoa.

Spermatogonia are the intial pool of diploid cell which divide by mitosis to give two identical cells. One of these cells called the A1 spermatogonia will be used to replenish the pool of spermatogonia. This implies that the male are fertile throughout their adult life. While the 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. The primary spermatocytes then undergo meiosis. Meiosis I produces two haploid cells known as **secondary spermatocytes.** 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. This process is called **spermiation.** The spermatids undergo spermiogenesis (which is the 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 fluids, before moving to the epididymis where the sperm is stored and undergoes the final stage of maturation.

Spermatogenesis takes approximately 70 days therefore in order for sperm production to be continuous, multiple spermatogenic processes occurs simultaneously within the seminiferous tubules, with new group of spermatogonia arising every 16 days (spermatogenic cycle). Each of these spermatogenic cells will be at different stages of spermatogenesis. Once the sperm leaves the male body and enters the female reproductive tract, the conditions causes the sperms 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 zonal pellucida of the egg cell.