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TESTOSTERONE

Testosterone is A "male hormone" -- a sex hormone produced by the testes that encourages the development of male sexual characteristics, stimulates the activity of the male secondary sex characteristics, and prevents changes in them following castration. Chemically, testosterone is 17-beta-hydroxy-4-androstene-3-one.

Testosterone's effects are first seen in the fetus. During the first 6 weeks of development, the reproductive tissues of males and females are identical. At around week 7 in uterus, the SRY (sex-related gene on the Y chromosome) initiates the development of the testicles. Sertoli cells from the testis cords (fetal testicles) eventually develop into seminiferous tubules. Sertoli cells produce a Mullerian-inhibiting substance (MIS), which leads to the regression of the fallopian tubes, uterus, and upper segment of the vagina (Mullerian structures normally present in females). Fetal Leydig cells and endothelial cells migrate into the gonad and produce testosterone, which supports the differentiation of the Wolffian duct (paramesonephric duct) structures that go on to become the male urogenital tract.

Testosterone also gets converted to dihydrotestosterone (DHT) in the periphery (discussed below) and induces the formation of the prostate and male external genitalia. Testosterone is also responsible for testicular descent through the inguinal canal, which occurs in the last 2 months of fetal development. When an embryo lacks a Y chromosome and thus the SRY gene, ovaries develop. Fetal ovaries do not produce adequate amounts of testosterone, thus the Wolffian ducts do not develop.

Testosterone may be given to treat medical conditions, including female (but not male) breast cancer, hypogonadism (low gonadal function) in the male, cryptorchism (nondescent of the testis into the scrotum), and menorrhagia (irregular periods).

Testosterone is the most potent of the naturally occurring androgens. The androgens cause the development of male sex characteristics, such as a deep voice and a beard; they also strengthen muscle tone and bone mass.

High levels of testosterone appear to promote good health in men, for example, lowering the risks of high blood pressure and heart attack. High testosterone levels also correlate with risky

behavior, however, including increased aggressiveness and smoking, which may cancel out these health benefits.

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What Does Testosterone Do?

- Fuels the sex drive
- Adds muscle mass
- Regulates mood
- Regulates bone strength

Testosterone and Aging

Testosterone levels decrease as men age. Sometimes this lower level of testosterone is termed "andropause" or "male menopause." Symptoms of male menopause may not be caused by low testosterone, but additional research is needed. Many men do not show any symptoms of decreasing levels of testosterone.

Symptoms of Male Menopause include:

Irritable mood, Decreased interest in sex, *Hot flashes, Fatigue, Weakness, Depression*

Body Changes Caused by Low Testosterone

How Low Testosterone Can Change the Male Body

- Less muscle mass (atrophy of muscles)
- Obesity
- Loss of body hair
- Smaller testicles
- Softer testicles

- Larger breasts

SEMEN

Semen is a greyish white bodily fluid that is secreted by the gonads of male animals. It carries sperm or the spermatozoa and fructose and other enzymes that help the sperm to survive to facilitate successful fertilization.

The whitish opalescence is due to the large amount of protein that it contains and its slightly turbid appearance is due to the spermatozoa contained within it.

Process of ejaculation

Semen is released during the process of ejaculation and is processed in the seminal vesicle in the pelvis, which is where it is produced.

How does ejaculation occur?

Ejaculation is controlled by the central nervous system and occurs when there is friction on the genitalia and other forms of sexual stimulation. The stimuli lead to impulses that are sent up the spinal cord and into the brain.

Two phases of ejaculation

Ejaculation has two phases:

Phase 1: emission in which the vas deferens (the tubes that store and transport sperm from the testes) contract to squeeze the sperm toward the base of the penis through the prostate gland and into the urethra. The seminal vesicles release their part of the semen that combine with the sperm. The ejaculation is unstoppable at this stage.

Phase 2: ejaculation in which the muscles at the base of the penis and urethra contract. This leads to forcing the semen out of the penis (ejaculation and orgasm) and this phase also has a bladder neck contraction. The bladder neck contracts to prevent the back flow of the semen into the urinary tract. Dry orgasm can occur even without delivery of semen (ejaculation) from the penis. Erection declines normally following ejaculation.

Semen composition

The semen travels through the ejaculatory ducts and mixes with fluids from the seminal vesicles, the prostate, 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

Semen per ejaculation

Ejaculation is a complex process and the compositions of the final semen come together in the posterior urethra and only become mixed after ejaculation is complete.

The volume of semen released per ejaculate varies. Approximately an average around 3.4 milliliters is ejaculated at one time. It can be as high as 4.99 milliliters or as low as 2.3 milliliters.

If there is a prolonged gap between ejaculations, the number of sperm in the semen increases but there is no overall increase in the semen.