

HUMAN ANATOMY & PHYSIOLOGY-II- BP201T

UNIT: 5 (REPRODUCTIVE SYSTEM)

CLASS: 2

TOPIC: Male Reproductive System

Seminal vesicles are the paired glands situated in lower abdomen on either side of prostate gland behind urinary bladder. Epithelial cells of the mucous membrane are secretory in nature and secrete seminal fluid. Duct of seminal vesicle from each side joins with ampulla of vas deferens to form ejaculatory duct. Thus seminal fluid is emptied into ejaculatory ducts, which open into urethra. Seminal fluid is mucoid and viscous in nature. It is neutral or slightly alkaline in reaction. It adds to the bulk of semen as it forms 60% of the total semen.

Functions of seminal fluid**Nutrition to sperms**

Fructose and other nutritive substances in seminal fluid are utilized by sperms after being ejaculated into the female genital tract.

Clotting of semen

Immediately after ejaculation, semen clots because of the conversion of fibrinogen from seminal fluid into fibrin.

Fertilization

Prostaglandin of seminal fluid enhances fertilization of ovum by: 1. Increasing the receptive capacity of cervical mucosa for sperms 2. Initiating reverse peristaltic movement of uterus and fallopian tubes. This in turn, increases the rate of transport of sperms in female genital tract during coitus (oxytocin is also responsible for this process).

Prostate gland

Human prostate gland weighs about 40 g. It consists of 20 to 30 separate glands, which open separately into the urethra. Prostate secretes prostatic fluid, which is emptied into prostatic urethra through prostatic sinuses. Prostate fluid is a thin, milky and alkaline fluid. It forms 30% of total semen.

Functions of prostatic fluid

Maintenance of sperm motility

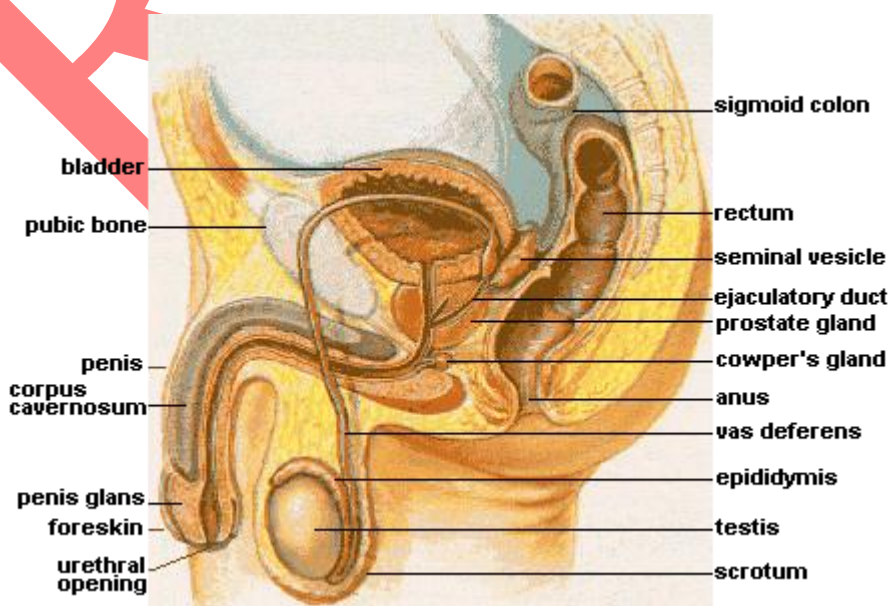
Prostatic fluid provides optimum pH for the motility of sperms. Generally, sperms are nonmotile at a pH of less than 6.0. There are some factors, which decrease the pH and motility of sperm both in vas deferens and female genital tract. In vas deferens End products of metabolic activities in the sperm make the fluid in vas deferens acidic, so that the sperms are nonmotile. In female genital tract Vaginal secretions in females are highly acidic with a pH of 3.5 to 4.0. So, when semen is ejaculated into female genital tract at coitus, sperms are nonmotile initially. However, the alkaline prostatic secretion, which is also present in semen neutralizes the acidity in vagina and maintains a pH of 6.0 to 6.5. At this pH, the sperms become motile and chances of fertilization are enhanced.

Clotting of semen

The clotting enzymes present in prostatic fluid convert fibrinogen (from seminal vesicles) into coagulum. It is essential for holding the sperms in uterine cervix.

Lysis of coagulum

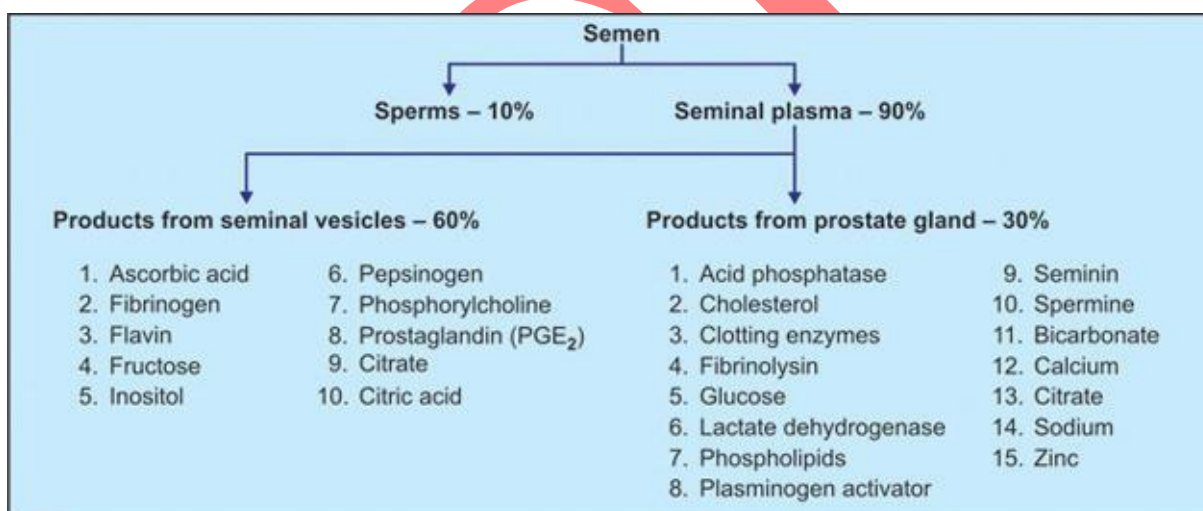
The coagulum is dissolved by fibrinolysin of prostatic fluid, so that the sperms become motile.



Semen

Semen is a white or grey fluid that contains sperms. It is the collection of fluids from testes, seminal vesicles, prostate gland and bulbourethral glands. Semen is discharged during sexual act and the process of discharge of semen is called ejaculation.

At the time of ejaculation, human semen is liquid in nature. Immediately, it coagulates and after some time it becomes liquid once again (secondary liquefaction). Fibrinogen secreted from the seminal vesicle is converted into a weak coagulum by the clotting enzymes secreted from prostate gland. Coagulum is liquefied after about 30 minutes, as it is lysed by fibrinolysin produced in prostate gland. When semen is ejaculated, the sperms are non-motile due to the viscosity of coagulum. When the coagulum dissolves, the sperms become motile.



SPERM

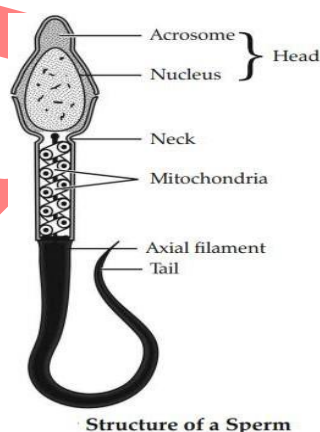
Sperm is the male gamete (reproductive cell), developed in the testis. It is also called spermatozoon (plural = spermatozoa). Matured sperm is 60 μ long. Total count of sperm is about 20 to 100 million/mL of semen. Sterility occurs when the sperm count falls below 20 million/mL. Though the sperms can be stored in male genital tract for longer periods, after ejaculation the survival time is only about 24 to 48 hours at a temperature equivalent to body temperature. Rate of motility of sperm in female genital tract is about 3 mm/minute. Sperms reach the fallopian tube in about 30 to 60 minutes after sexual intercourse. Uterine contractions during sexual act facilitate the movement of sperms.

Structure of Sperm

Sperm consists of four parts: 1. Head 2. Neck 3. Body 4. Tail.

1. Head

Head of sperm is oval in shape (in front view), with a length of 3 to 5 μ and width of up to 3 μ . Anterior portion of head is thin. Head is covered by a thin cell membrane and it is formed by a condensed nucleus with a thin cytoplasm. Anterior two thirds of the head is called acrosome or galea capitis. Acrosome is the thick cap like anterior part of sperm head. It develops from Golgi apparatus and it is made up of mucopolysaccharide and acid phosphatase. Acrosome also contains hyaluronidase and proteolytic enzymes, which are essential for the sperm to fertilize the ovum.



2. Neck

Head is connected to the body by a short neck. Its anterior end is formed by thick disk-shaped anterior end-knob, which is also called proximal centriole. Posterior end is formed by another similar structure known as posterior end knob. It gives rise to the axial filament of body. Often, the neck and body of sperm are together called midpiece.

3. Body

Body is cylindrical with a length of 5 to 9 μ and the thickness of 1 μ . The body of the sperm consists of a central core called axial filament, covered by thin cytoplasmic capsule. Axial filament starts from posterior end knob of the neck. It passes through the body and a perforated disc called end disk or end ring centriole. Finally, the axial filament reaches the tail as axial thread. In the body, the axial filament is surrounded by a closely wound spiral filament consisting of mitochondria.

4. Tail

Tail of the sperm consists of two segments: i. Chief or main piece: It is enclosed by cytoplasmic capsule and has an axial thread. It is 40 to 50 μ long ii. Terminal or end piece: It has only the axial filament.

Urethra

Urethra in male has both reproductive and urinary functions. Urethra contains mucus glands throughout its length, which are called glands of Littre. The bilateral bulbourethral glands or Cowper glands also open into the urethra.

Penis

Penis is the male genital organ. Urethra passes through penis and opens to the exterior. Penis is formed by three erectile tissue masses, i.e. a paired corpora cavernosa and an unpaired corpus spongiosum. Corpus spongiosum surrounds the urethra and terminates distally to form glans penis.