Semen is a fluid produced by the seminal vesicles.

**LEARNING OBJECTIVE**

Describe semen

**Key Takeaways**

**Key Points**

- Seminal fluid mixes with fluids produced by the prostate and bulbourethral glands.
- The seminal fluid provides nutrition and protection for sperm during its journey through the female reproductive tract.
- Semen initially coagulates in the vagina, then liquefies to allow the sperm to move.

**Key Terms**

- **seminal vesicle**: One of two simple tubular glands located behind the male urinary bladder, responsible for the production of about sixty percent of the fluid that ultimately becomes semen.
- **seminal fluid**: Semen is a fluid that helps in promoting the survival of spermatozoa and provides a medium through which they can move.
**semen**: The fluid produced in male reproductive organs of an animal that contains the reproductive cells.

Semen is an organic fluid, also known as seminal fluid, that may contain spermatozoa. It is secreted by the gonads (sexual glands) and can fertilize female ova. In humans, seminal fluid contains several components besides spermatozoa, including enzymes (proteolytic and others) and fructose. These elements promote the survival of spermatozoa and provide a medium for motility. Semen is produced and originates from the seminal vesicles, located in the pelvis. The process that results in the discharge of semen is called ejaculation.

### Semen Production and Secretion

During the process of ejaculation, sperm pass through the ejaculatory ducts and mix with fluids from the seminal vesicle, the prostate, and the bulbourethral glands to form semen. The seminal vesicles produce a yellowish viscous fluid rich in fructose, amino acids, and other substances that make 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 fluid to lubricate the lumen of the urethra.

### Sperm Protection and Transport

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 semen 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 seminal plasma provides a nutritive and protective medium for the spermatozoa during their journey through the female reproductive tract. The normal environment of the vagina is a hostile one for sperm cells, as it is acidic (from the native microflora producing lactic acid), viscous, and patrolled by immune cells. The components in the seminal plasma attempt to compensate for this hostile environment. Basic amines such as putrescine, spermine, spermidine, and cadaverine are responsible for the smell and flavor of semen. These alkaline bases counteract the acidic environment of the vaginal canal and protect DNA inside the sperm from acidic denaturation.

### Characteristics of Ejaculate

According to the World Health Organization, normal human semen has a volume of 2 ml or greater, pH of 7.2 to 8.0, sperm concentration of 20×10^6 spermatozoa/ml or more, sperm count of 40×10^6 spermatozoa per ejaculate or more, and motility of 50% or more within 60 minutes of ejaculation. After ejaculation, the latter part of the semen coagulates immediately, forming globules. After about 15–30 minutes, a prostate-specific antigen present in the semen causes the decoagulation of the seminal coagulum. It is postulated that the initial clotting helps keep the semen in the vagina, while liquefaction frees the sperm to make their journey to the ova.

Semen quality is a measure of the ability of semen to accomplish fertilization and thus a measure of a man’s fertility. Semen can be preserved for long-term storage by cryopreservation. For human sperm, the longest reported successful storage with this method is 21 years.