

Seminal Plasma: Key Role in Reproduction and Fertility

Arnold Podder*

Department of Embryology, Adama Science and Technology University, Adama, Ethiopia

DESCRIPTION

Seminal plasma is a fluid that forms a vital part of semen, produced by male reproductive glands. This fluid is primarily responsible for the transport and protection of sperm, helping them survive and function effectively in the female reproductive tract. While sperm cells are essential for fertilization, the role of seminal plasma in assisting sperm to reach and fertilize the egg cannot be understated. This article explains the composition, function, and significance of seminal plasma in reproduction.

Seminal plasma is the fluid portion of semen that surrounds spermatozoa when ejaculated. It is secreted by the accessory sex glands, which include the seminal vesicles, prostate gland, and bulbourethral glands. Seminal plasma provides an environment that supports sperm survival and motility, ensuring they can successfully reach and fertilize an egg during natural reproduction or assisted reproduction methods. Seminal plasma is a mixture of various components, with each playing a specific role in the reproductive process. The majority of seminal plasma comes from the seminal vesicles, which contribute roughly 60%-70% of the total volume. The prostate gland contributes about 20%-30%, and the bulbourethral glands provide a smaller portion.

Seminal plasma plays a multifaceted role in reproduction. The primary role of seminal plasma is to provide a suitable environment for sperm. The fluid acts as a buffer to neutralize the acidic environment of the female reproductive tract, specifically the vagina, which is hostile to sperm. By maintaining a slightly alkaline pH, seminal plasma helps protect sperm cells and promotes their survival. Sperm need to move efficiently toward the egg for fertilization to occur. Fructose, a sugar present in seminal plasma, provides the necessary energy for sperm motility. Seminal plasma also prevents sperm from clumping together, ensuring individual sperm cells can swim freely. This function is vital for sperm to navigate through the cervix and uterus to reach the egg. Seminal plasma contains enzymes that help sperm navigate through the female reproductive system. These enzymes break down the cervical mucus, allowing sperm to swim through the cervix and into the uterus. Additionally, seminal plasma contains prostaglandins that stimulate uterine contractions, which help propel sperm toward the fallopian tubes where fertilization may occur.

Seminal plasma plays an indirect yet essential role in capacitation, the process by which sperm gain the ability to fertilize an egg. During capacitation, sperm undergo physiological changes that enhance their ability to penetrate the egg. Seminal plasma components, such as proteins and ions, facilitate capacitation, which is necessary for sperm to undergo the acrosome reaction and fertilize the egg. The female immune system may recognize sperm as foreign entities and potentially mount an immune response against them. Seminal plasma contains immunosuppressive factors that reduce the female immune system's ability to reject sperm. This immune modulation helps sperm survive long enough to reach the egg and ensures the success of fertilization. The composition and quality of seminal plasma are important indicators of male fertility. Abnormalities in seminal plasma, such as low fructose levels or a lack of protective proteins, can reduce sperm motility and impair fertility. Semen analysis, which examines both sperm characteristics and seminal plasma, is commonly used in fertility clinics to diagnose male infertility.

By analyzing seminal plasma, clinicians can identify specific issues with sperm function, such as poor motility or low sperm count, and recommend appropriate treatments. Assisted reproductive technologies like *In Vitro* Fertilization (IVF) may be used to help overcome some of the challenges related to seminal plasma composition.

CONCLUSION

Seminal plasma is essential for successful reproduction. It supports sperm motility, protects sperm cells, and plays a role in fertilization by facilitating capacitation and the acrosome reaction. By understanding the composition and functions of seminal plasma, we gain valuable insights into male fertility and the challenges associated with reproduction. Advancements in reproductive medicine, including semen analysis and assisted reproductive technologies, allow healthcare providers to address issues related to seminal plasma composition and improve fertility outcomes. Ongoing research into the properties and functions of seminal plasma continues to expand our understanding of male reproductive health and enhance fertility treatments worldwide.

Correspondence to: Arnold Podder, Department of Embryology, Adama Science and Technology University, Adama, Ethiopia, E-mail: podderarnold18@gmail.com

Received: 28-Feb-2025, Manuscript No. JFIV-25-36991; **Editor assigned:** 03-Mar-2025, PreQC No. JFIV-25-36991 (PQ); **Reviewed:** 17-Mar-2025, QC No. JFIV-25-36991; **Revised:** 24-Mar-2025, Manuscript No. JFIV-25-36991 (R); **Published:** 31-Mar-2025, DOI: 10.35841/2329-9495.25.13.402

Citation: Podder A (2025). Seminal Plasma: Key Role in Reproduction and Fertility. *J Fertil In Vitro IVF Worldw Reprod Med Gent Stem Cell Biol.* 13:402.

Copyright: © 2025 Podder A. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.