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Write short notes on the following:

- Spermatogenesis

Spermatogenesis Is the Process of Formation of Spermatocytes from Spermatogonia.

Spermiogenesis Is the Process of Transformation of the Spermatids, Which Are Still Epithelioid, to Sperm Cells. The process of spermiogenesis takes place with the cells embedded in the Sertoli cells; it requires estrogen and FSH. Once the sperm cells are formed, they are extruded into the lumen of the tubule in a process stimulated by luteinizing hormone (LH). The first division of the type A spermatogonia to extrusion of the sperm cells requires a period of approximately 64 days.

Spermatogenesis is initiated at puberty, continues throughout the remainder of a man's life, and takes place in the walls of the seminiferous tubules. The walls of the tubules are composed of two compartments separated by tight junctions between the Sertoli cells:

- The basal layer, which consists of the Leydig cells and the spermatogonia
- The adluminal layer, which is made up of Sertoli cells and spermatocytes

The newly formed sperm cells are not functional and require a maturation process, which takes place in the epididymis over a period of 12 days.

Maturation

requires both testosterone and estrogen. The mature sperm are stored in the vas deferens.

- Male infertility

Male infertility refers to a male's inability to cause pregnancy in a fertile female. In humans it accounts for 40–50% of infertility. It affects approximately 7% of all men. Male infertility is commonly due to deficiencies in the semen, and semen quality is used as a surrogate measure of male fecundity.

- Combined androgen and sperm cell production defects resulting from developmental defects, such as Klinefelter's syndrome or abnormal testicular descent, acquired testicular defects, such as infections, autoimmune reactions, or systemic diseases such as chronic liver and kidney diseases.

Some important causes of male infertility include the following:

- Isolated dysfunction of sperm cell production with normal androgen levels, resulting from infection or trauma, congenital deformation of passages, or formation of nonmotile or otherwise abnormal sperm.

- Androgen dysfunction with normal sperm cell production, caused by hypothalamic-pituitary defects, Leydig cell defects, or androgen resistance