

CHAPTER II : THE MALE AND FEMALE REPRODUCTIVE SYSTEMS

THE MALE GENITAL TRACT

The male genital tract is the organ of reproduction, responsible for the production of male gametes or spermatozoa, their transport, nutrition and storage in the male genital tract, as well as their expulsion into the female genital tract during copulation.

The male genital tract includes :

- . The two testes produce sperm (exocrine function) and secrete androgens (endocrine function).
- . The genital tract, made up of intra-testicular spermatic tracts (straight tubes and rete testis) and extra-testicular spermatic tracts, a system of paired canals (efferent canals or cones, epididymis, deferent canal, ejaculatory canal) transporting spermatozoa.
- . Adjuvant glands, comprising the seminal vesicles, prostate and Cowper glands; these exocrine glands secrete the liquid that transports and nourishes the spermatozoa, which together form the semen.

I. The testis :

These are 2 main mixed (endocrine and exocrine) genital glands, responsible for sperm production and hormone secretion: testosterone, responsible for male secondary sexual characteristics. Located under the penis, outside the abdominal cavity, in a skin bag called the bursa.

Microscopic anatomy :

-Ovoid shape

-The testicle is enclosed by a fibrous membrane known as the testicular albuginea. This increases in size at the superior pole, forming the mediastinum testis (Highmore's body). From the mediastinum testis, partitions divide the testis into lobules.

There are 250 to 300 communicating testicular lobules, each containing several seminiferous tubules.

Between the seminiferous tubules is a highly vascularized, loose connective tissue (interstitium) containing islands of endocrine cells: **the Leydig cells** (interstitial gland of the testis).

The seminiferous tubule:

The seminiferous tubule is limited by a thin tubular membrane made up of the basal membrane, fibroblasts and collagen fibers; the tubular membrane is called the seminiferous tubule's own membrane; between the tubes, a loose connective tissue contains isolated endocrine cells or small islands located close to the capillaries: these endocrine cells or Leydig cells secrete mainly testosterone; they constitute the interstitial gland of the testis.

The wall of the seminiferous tubule is formed by a stratified epithelium comprising two types of cells: germline cells arranged in 4 to 8 sections, and Sertoli cells.

Sertoli cells :

Definition:

Sertoli cells are essential to the formation and function of the testis.

It is a large, simple cylindrical cell in the wall of the seminiferous tubules (in the testicles), whose branches surround the germ cells. These cells are linked together by tight junctions and form the blood-testicular barrier.

Functions :

*Germ cell support, protection and nutrition

*Spermiogenesis: liberation of spermatozoa into the seminiferous tubule lumen.

*Secretion of a liquid that circulates in the genital tract (used for sperm transport) and synthesis of proteins excreted in this liquid (dependent on pituitary FSH).

*Steroidogenesis: synthesis of testosterone

Interstitial cells: Leydig cells

Definition:

Between the seminiferous tubules: a loose, highly vascularized connective tissue within which endocrine cells are differentiated: the Leydig cells. Cells 15 to 20 micrometers in diameter, with rounded nuclei. Have the characteristics of cells producing steroid hormones.

Produce testicular androgens (testosterone).

Its activity is controlled by anteropituitary LH.

*Secretion of a liquid that circulates in the genital tract (used for sperm transport) and synthesis of proteins excreted in this liquid (dependent on pituitary FSH).

*Steroidogenesis: synthesis of testosterone,

II - The spermatic or genital tract :

The spermatic or male genital tract comprises the intra-testicular spermatic tract and the extra-testicular spermatic tract.

Intra-testicular spermatic tracts :

The seminiferous tubules open into short, narrow lumen segments

(25 microns in diameter) lined by cuboidal epithelium: the straight tubes; these open at the level of Highmore's body into a labyrinthine system of epithelium ducts, the rete testis.

Extra testicular spermatic tracts :

They begin with efferent ducts, continue with the epididymal duct, the vas deferens and end with the ejaculatory duct; these external genital channels then open into the prostatic urethra, the urogenital tract

1. The efferent cones : are 10 to 12 channels, 20 cm long by 0.2 mm in diameter, ensuring the transport of sperm from rete testis to the epididymis head.

2. The epididymal canal : is contained in the epididym.

• **The Epididymis:**

The epididymis is an organ attached to the posterior edge of the testicle. The epididymis, through its conduit, is the beginning of the sperm ducts that store and carry sperm. Its role is essentially the storage of newly formed sperm.

3. The deferential canal:

It follows the epididymal canal and ensures the transit of sperm to the urethra, via the ejaculatory canal; it is a straight tube, about 50 cm long.

The vas deferens plays a key role at the moment of ejaculation

4. The ejaculating canal:

It measures 2 cm and immediately enters the prostate tissue, losing its musculoskeletal; in the prostate, the even ejaculatory canals join the prostate urethra, odd and median urogenital tract, on both sides of the prostatic utricle.

III - The secondary glands

1. Prostate: Exocrine gland surrounding the initial part of the urethra.

Function :

- Develops prostatic fluid (acid) that is part of seminal plasma
- Presence of spermin which is responsible for the characteristic smell of sperm.

2. Seminal vesicles: They make seminal plasma (alkaline) which is a clear, viscous liquid. Seminal plasma is rich in fructose and protein and in prostaglandins and vesiculin (which causes sperm to clot in the female genital tract).

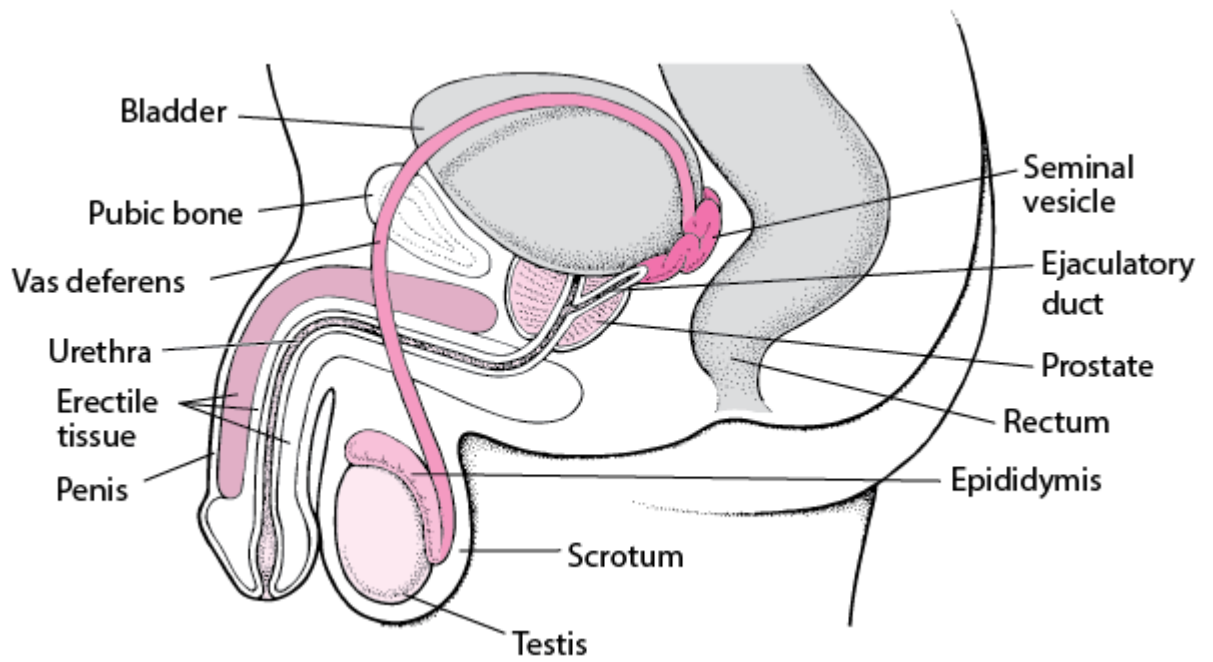
3. Cowper glands: These are two small masses with secretions similar to prostate fluid.

IV - The urethra or urogenital canal :

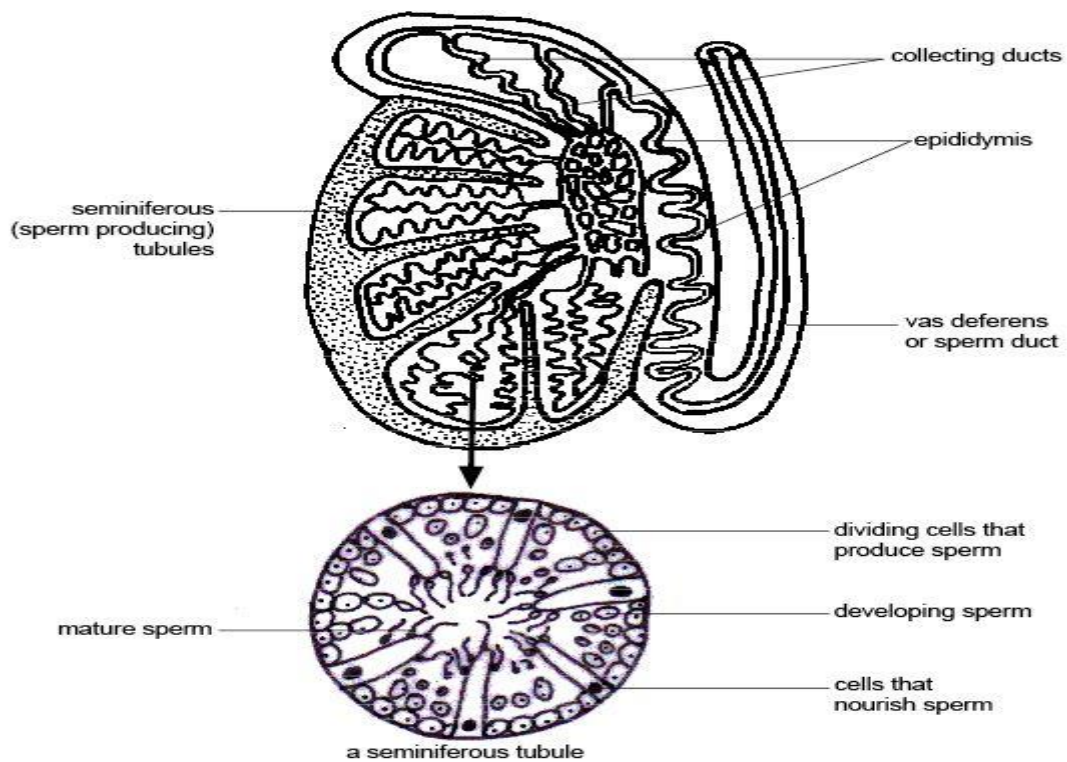
1. The urethra : starts at the lower part of the bladder and opens at the end of the penis; it measures between 20 and 25 cm. The urethra ensures the evacuation of urine during urination and conveys sperm during ejaculation.

2. • The penis: The penis belongs to the male reproductive and urinary systems. It is an external organ. It has two major functions:

- Allow urine from the bladder to drain away;
- Expel sperm into the vagina when ejaculating during sex.



Male reproductive system



The female genital system

The female genital system includes internal (two ovaries, two fallopian tubes, uterus and vagina) and external (vulva = labia majora, labia minora and clitoris).

The internal genitalia

1. The vagina : is a tube-shaped organ, 10 to 15 cm long, very extensible, in which sperm are deposited during sexual intercourse. It is also the natural way of passage of the fetus during childbirth.

2. The uterus : is a smooth muscular organ of about 7 cm, triangular in shape, in which the embryo then the fetus develops. It is hollowed out of a thin cavity: the uterine cavity.

3. The cervix : provides communication between the uterine cavity and the vagina, it consists of two parts:

The exocervix: lower part of the cervix in contact with the vagina.

The endocervix: upper part of the cervix in contact with the uterus.

***Cervical mucus :** the vaginal mucosa, itself devoid of glands. It is slightly alkaline (unlike the vaginal environment which is acidic) and forms a viscous plug closing the cervix (except at the time of ovulation when it becomes liquid, «filante», and loses its filling function in order to let pass the sperm).

4. Ovaries : The female ovaries or gonads are 2 even, symmetrical glands attached to the uterus by a ligament

The ovary has two areas:

Medullary zone: richly vascularized. This is the feeding zone of the ovary.

The cortical area: which occupies more than 2/3 of the ovary, there are 200,000 to 400,000 reproductive cells.

function:

Endocrine: production of sex hormones

Exocrine: production of eggs.

5. The uterine tubes (or fallopian tubes) : are located on either side of the uterus. They look like two ram horns ending in a pavilion.

The fallopian tubes measure about 12 to 15 centimeters, for a diameter of 1 centimeter at the narrowest areas, up to 3 centimeters at the level of the pavilions. On the outside are muscles that allow to direct the pavilions towards the ovary during fertilization (to recover the egg).

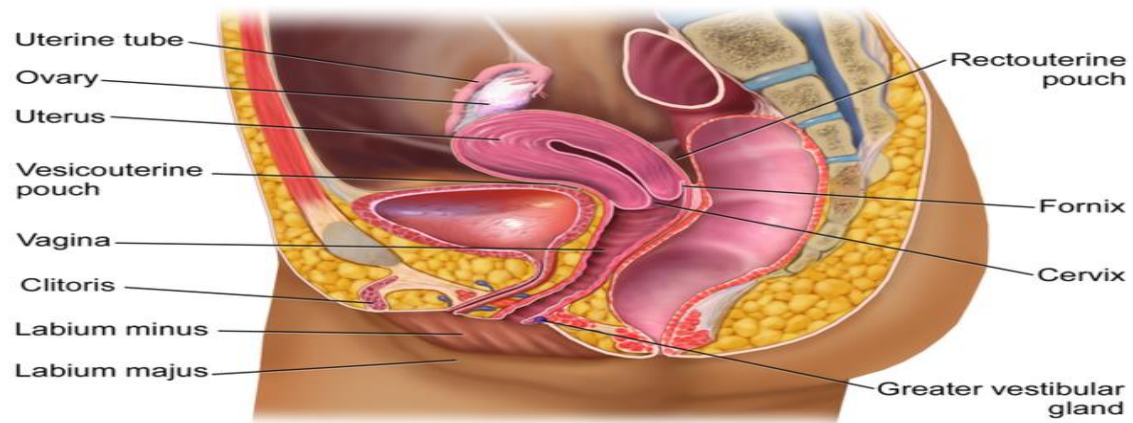
Located between the ovaries and the uterus, the role of the fallopian tubes is to carry to the uterus the eggs made each month by the ovaries.

The external genitalia

The vulva:

It's all the external bodies. There are:

- 1. The clitoris:** The clitoris is part of the female sex organs located at the top of the labia minora. It is a small organ richly innervated made of erectile tissues that plays a determining role in the sexual pleasure of the woman.
- 2. Labia majora:** are folds of relatively large tissues, which enclose and protect the other external genitals. They contain sweat and sebaceous glands, which produce lubricating secretions. After puberty, they are covered with hair.
- 3. Labia minora:** are very variable in size, from very small to a maximum width of 5 centimetres. They are inside the labia majora and surround the opening of the vagina.



The Female Reproductive System