A Textbook for GES 107

Reproductive Health, Sexually Transmitted Infections(STIs) & Human Immunodeficiency Virus(HIV)

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Overview of Reproductive System and Health

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Synopsis

The aim of the section is to learn about the essential physiology of the reproductive system. In addition it includes issues related to reproductive health. In addition, body dysfunctions associated with reproductive system considered necessary for this class will be dealt with.

Prior knowledge

Students must have gone through secondary school syllabus in biology or health sciences

Learning objectives

To understand, in a simplified manner, the structure and function of the female and male reproductive systems.
To understand basic health issues related to the reproductive system

Introduction

The reproductive system is unique in that it is the only organ system that is not vital for survival of the organism. Its major function is to ensure continuity of the species. This is achieved with the contribution of other systems in the body, such as the endocrine and urinary systems. An individual may live a long, healthy, and happy life without producing offspring, but if the species is to continue, at least some individuals must produce offspring.

Within the context of producing offspring, the reproductive system has four functions:

- Production of egg and sperm cells
- Transportation and sustenance of these cells
- Nurturing the developing offspring
- Production of hormones

These functions are divided between the primary and secondary organs of reproduction. The primary reproductive organs, or gonads, consist of the ovaries and testes. These organs are responsible for producing the egg and sperm cells, (gametes), and for producing hormones which function in the maturation of the reproductive system, the development of sexual characteristics, and have important roles in regulating the normal physiology of the reproductive system. All other organs, ducts, and glands in the reproductive system are considered secondary, or accessory, reproductive organs. These structures transport and sustain the gametes and nurture the developing offspring.

The male reproductive system

The functions of the male reproductive system include:

- Production of male gametes (sperm)
- Synthesis of androgens (male sex hormones) such as testosterone.
- Delivery of sperm into the female reproductive tract.

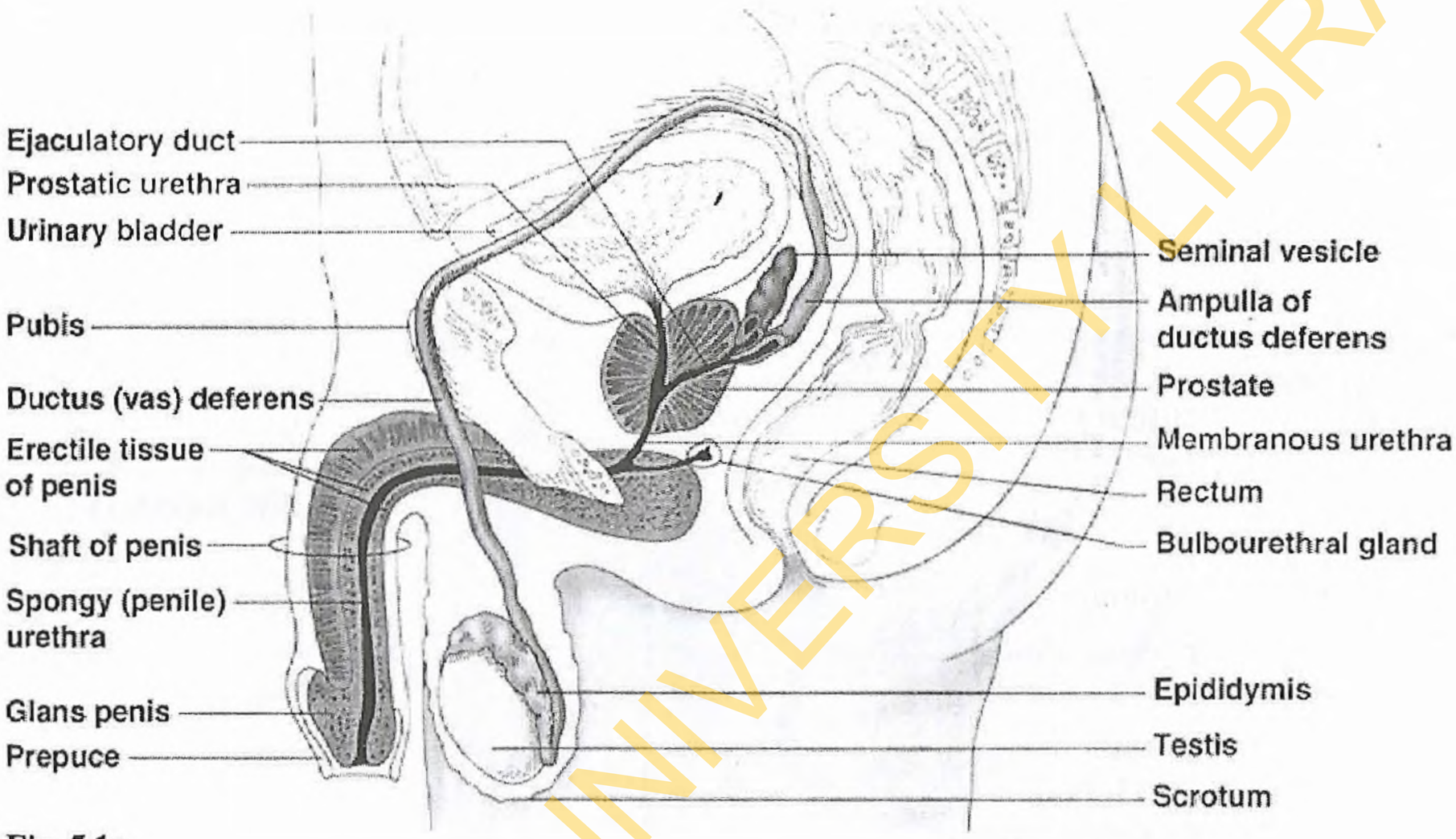


Fig. 5 1a

Structure of the Male Reproductive tract and accessory organs

Structurally, the male reproductive system may be divided into the following components: The Testes (Gonads), the Duct system, Accessory organs and External genitalia. The various structures of the male reproductive system are shown in Figure 5.1 a and b.

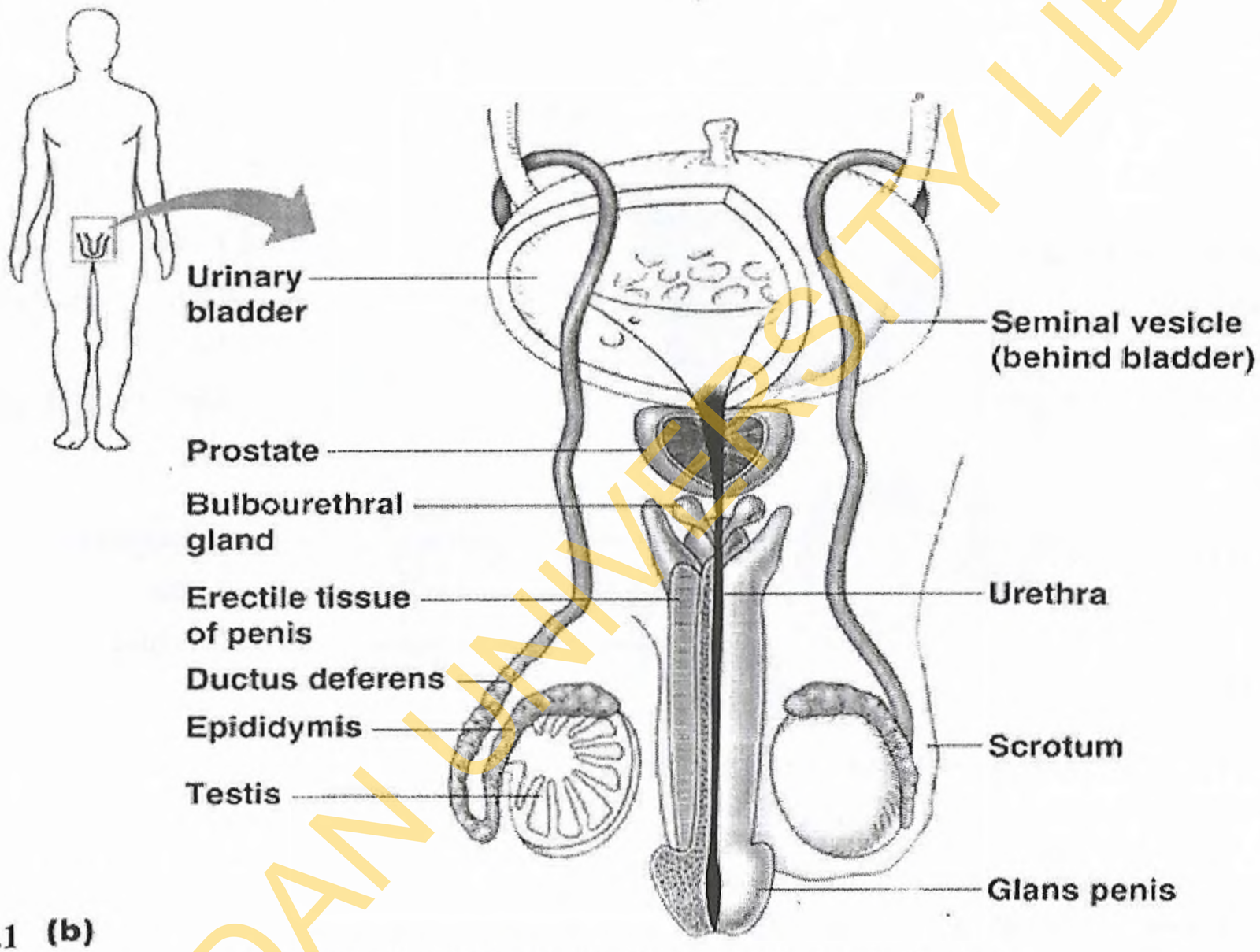


Fig 5.1 (b)

The Testes

The male gonads produce gametes (sperm) and hormones: testosterone and inhibin. The testes are formed at the time of development in the abdominal cavity from the same tissue and position as ovaries. Normally, the testes descend prior to birth through inguinal canal. However, failure of the testes to descend sometimes occur, a condition known as *Cryptorchidism*.

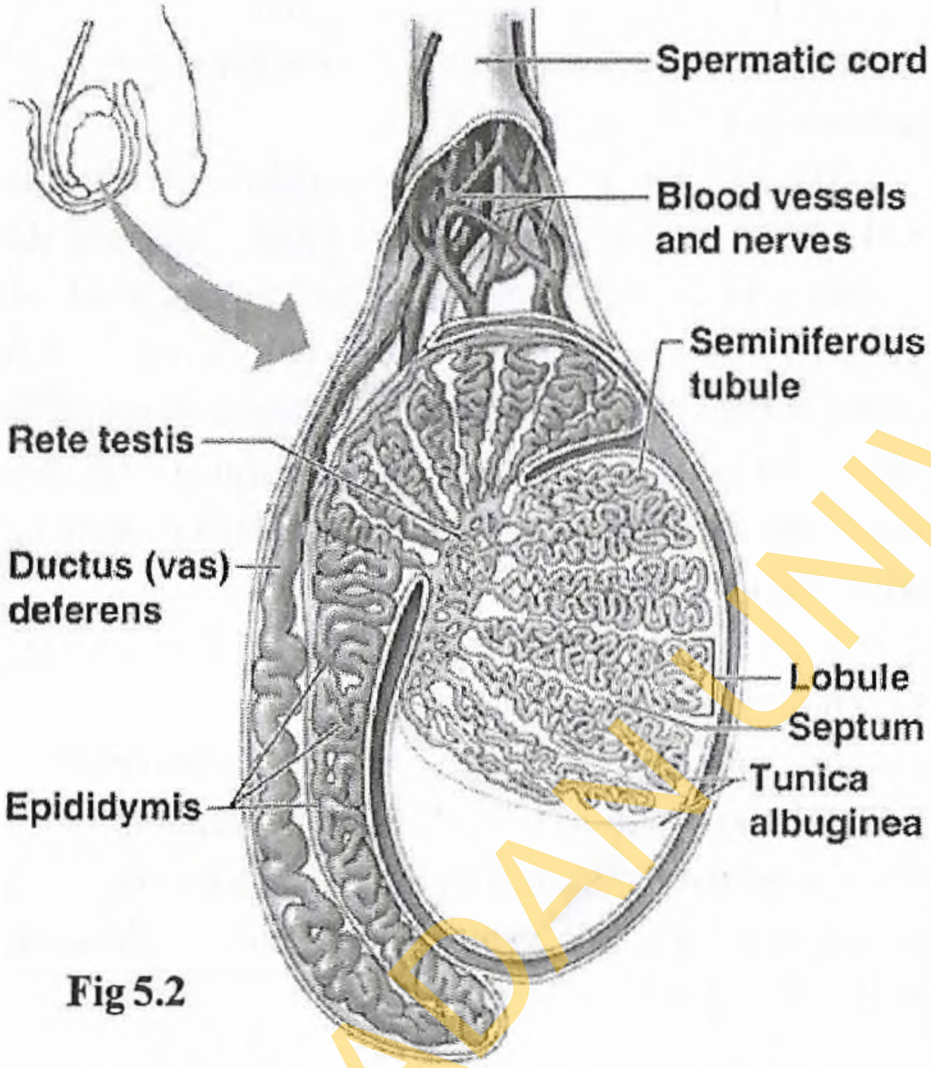


Fig 5.2

As shown in figure 5.2, each testis is divided into tiny lobules, each containing 1-4 coiled seminiferous tubules from which the male reproductive gametes are formed. It is the interstitial cells in the seminiferous tubules which produce androgens such as testosterone.

The Duct system

This consists of the Epididymis, ductus (vas) deferens and urethra. The epididymis is a comma-shaped, tightly coiled tube found in the superior part of the testis. The main function is to mature and store sperm cells at least for 20days. The epididymis is the first in a series of ducts through which sperm travel on their way towards the body exterior.

Sperm travel from the seminiferous tubules to the epididymis via the tubuli recti and the rete testis. Sperm remain within the epididymis for about 3wks. During this time, they mature and acquire the ability to swim.

The vas deferens, which carries sperm from the epididymis to the ejaculatory duct, runs upward from an epididymis as part of a spermatic cord and then enters the pelvic cavity via an inguinal canal.

The scrotum: This is a sac of cutaneous membrane that hangs outside the abdomino-pelvic cavity at the root of the penis. The paired testes (male gonads or primary sex organs) are suspended within the scrotum, separated by a connective tissue septum. This location provides a temperature 3°C lower than internal body temperature, which enhances sperm

production. The cremaster muscle elevates the testes in response to cold and lowers them when temperature rises. The dartos muscle adjusts the scrotal surface area in response to changes in temperature. On the other hand, the dartos muscle contracts in response to a drop in temperature. This decreases scrotal surface area and reduces heat loss. The dartos relaxes in response to a rise in temperature.

The Penis: The penis functions to deliver sperm into the female reproductive tract. It consists of an attached root and a free shaft, which ends in an enlarged tip (glans penis). The loose cuff of skin around the glans penis is known as the prepuce/foreskin, and is removed via circumcision. Internally, the penis contains a portion of the urethra (penile or spongy urethra) as well as 3 cylindrical erectile bodies. An erectile body is a network of connective tissue riddled with vascular sinuses and smooth muscle

Spermatogenesis

Spermatogenesis is the total process of sperm formation. Sperm production begins and puberty and continues throughout life, with several hundred million sperm being produced each day. Once sperm form they move into the epididymis, where they mature and are stored (Figure 5.3)

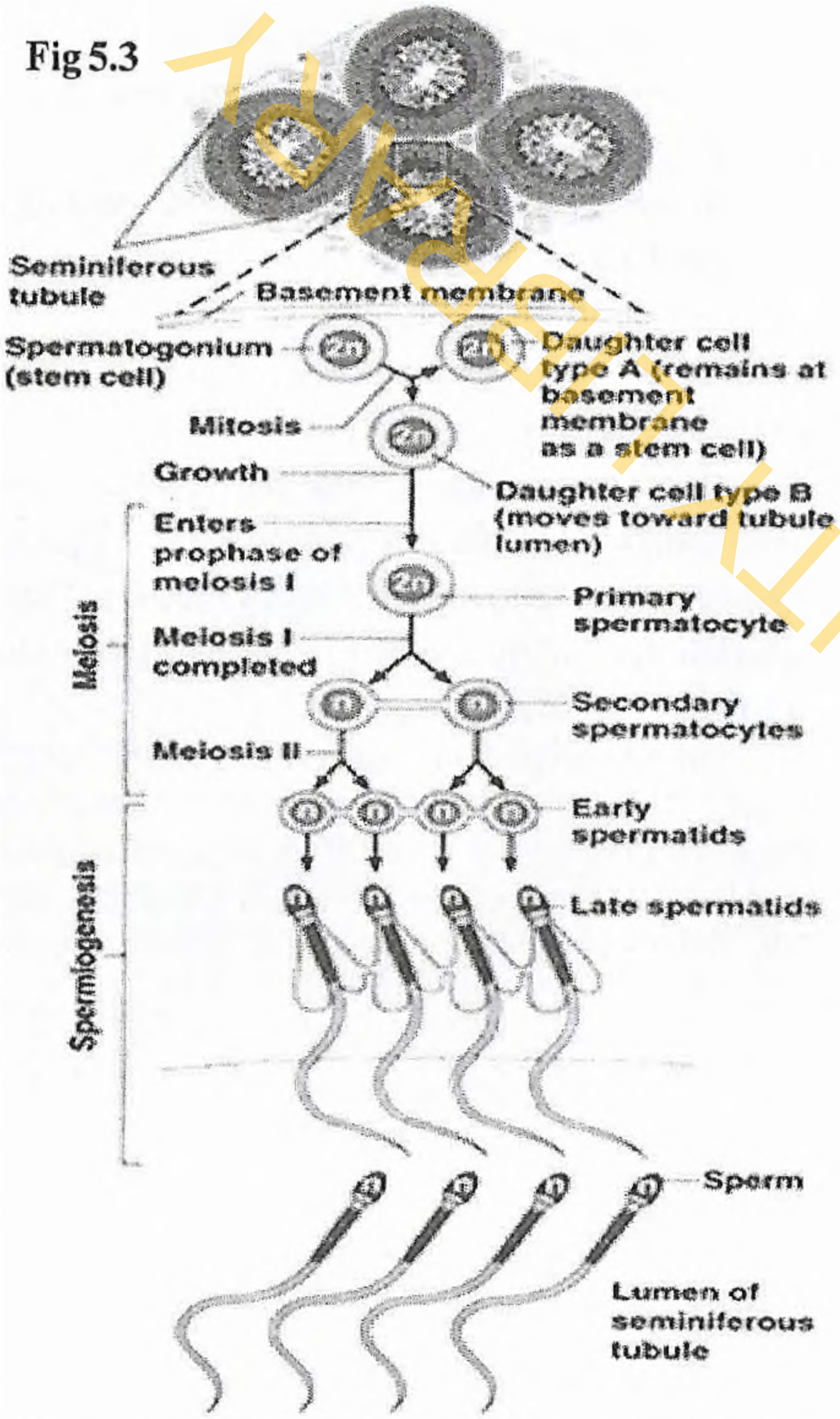
Spermatogenesis consists of 2 phases. The first phase is meiosis, during which the primary spermatocytes (stem cells) divide, each producing four spermatids (note that each spermatid contains 23 chromosomes). The second phase, known as spermiogenesis, occurs in the seminiferous tubules. Most of the cells that comprise the walls of the seminiferous tubules are in different stages of developing into sperm and are collectively known as spermatogenic cells. The cells found in the outermost layer of the tubule are diploid germ cells known as spermatogonia. The development of the spermatogonia through mitotic cell division to a matured sperm is known as spermatogenesis. The entire process of spermatogenesis takes 64 to 72 days.

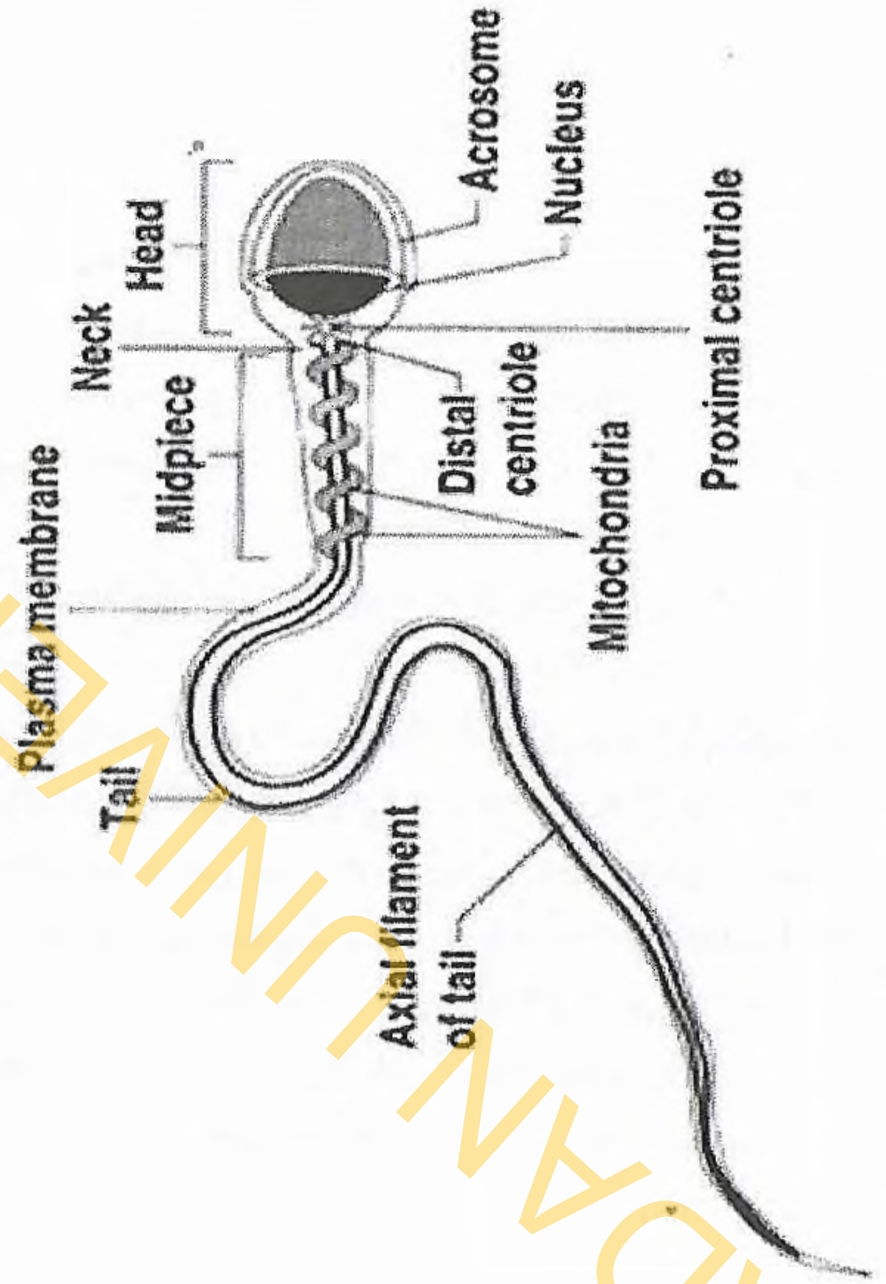
The adult sperm (shown on the right side of Figure 5.3) consists of 3 primary regions: Head – contains the nucleus (with 23 chromosomes) and the acrosome (contains digestive enzymes that help sperm penetrate the cells surrounding the egg); Midpiece – contains multiple mitochondria to provide the energy (in form of ATP) that powers the sperm's swimming; and the Flagellum – the long tail that is used to propel the sperm.

Erection and ejaculation

During sexual arousal, parasympathetic nerve activity leads to dilation of penile blood vessels and subsequently allowing blood to fill the erectile bodies. This compresses the veins draining the penis. The result is more blood into the penis and less blood out – yielding an erection.

Fig 5.3





Erection allows the penis to function as a copulatory organ. Erection is a spinal reflex but it can be modified by cerebral input. When sexually arousing impulses reach a certain threshold level, a massive increase of penile sympathetic nerve activity occurs. This sympathetic activity results in: (1) Contraction of reproductive ducts and glands and the emptying of their contents into the urethra; (2) Closing of the internal urethral sphincter to prevent urine expulsion or semen reflux; and (3) Expulsion of semen from the urethra. The entire ejaculatory event is associated with generalized muscle contraction, increased heart rate, and increased blood pressure.

Semen is the liquid transport medium for sperm. It protects, activates, and facilitates the movement of sperm. 10% is sperm and testicular fluid, 60% is seminal fluid, 30% is prostatic fluid. Semen is ejaculated within the vagina which coagulates rapidly into a gelatinous mass. The alkaline semen neutralizes the normally acid vagina which permits survival of sperm for several hours. Of the 60 million sperm per ejaculation, only a few 100,000 travel through the cervix. Progress to the uterus depends on the consistency of the cervical mucus.

THE FEMALE REPRODUCTIVE SYSTEM

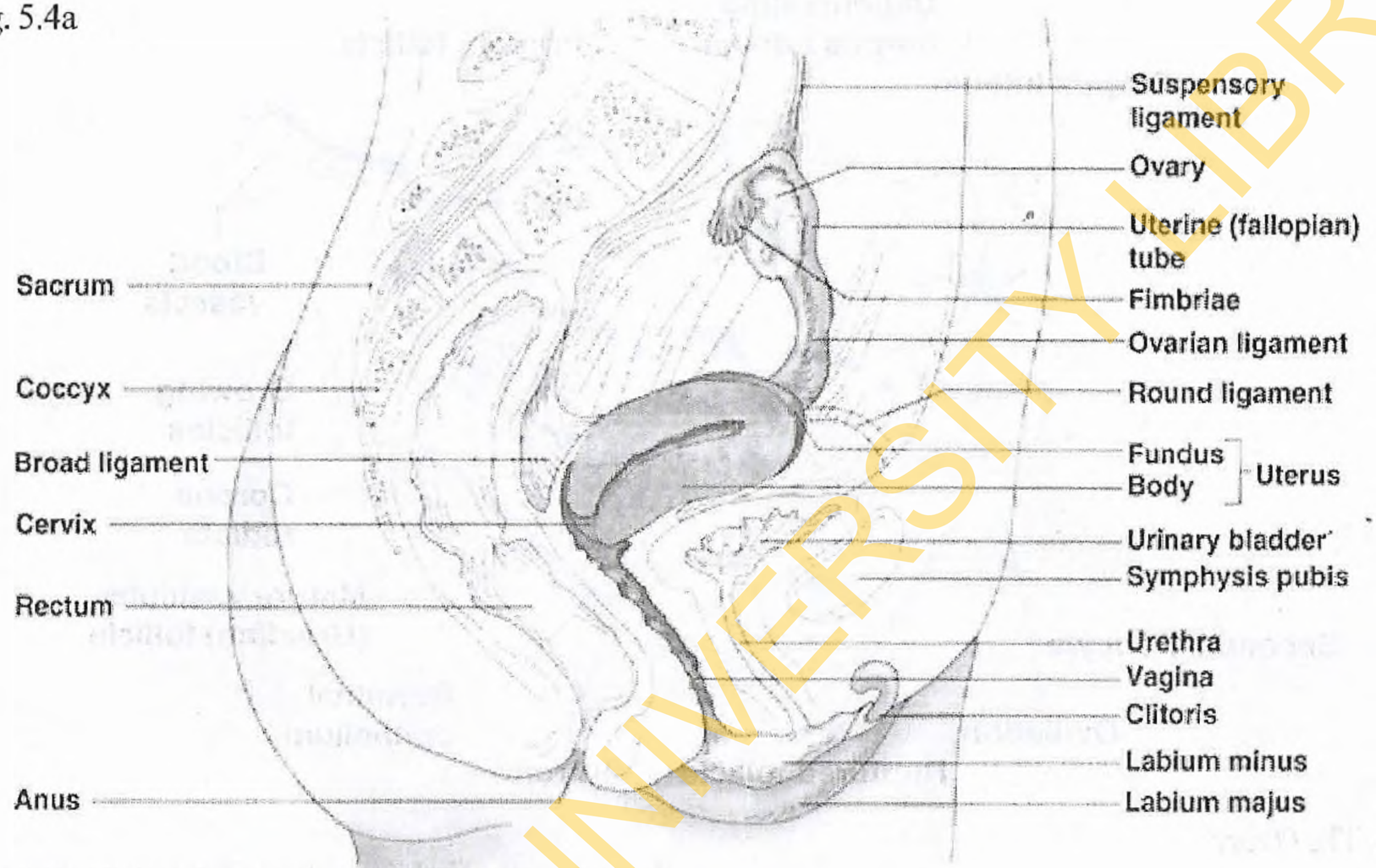
- The functions of the female reproductive system include:
  - Production of female gametes (ova).
  - Production of female sex hormones (estrogens and progesterone).
  - Reception and maintenance of a developing embryo and fetus.

Structure of the Female Reproductive tract and accessory organs

Like the male, the female male reproductive system is structurally divided into three components: The ovaries (Gonads), the Duct system, Accessory organs and External genitalia. The various structures of the female reproductive system are shown in Figure 5.4.a

The external genitalia, or vulva, include the mons pubis, labia, clitoris, and structures associated with the vestibule as shown in figure 5.6. Apart from the external genitalia, the mammary glands, though found in both sexes, function only in females to produce milk for nourishing a newborn.

Fig. 5.4a



The ovaries

The ovaries contain sac-like structures called follicles (Fig 4b). The follicles contain the immature eggs known as oocytes. There are 4 basic stages of follicular development. A primordial follicle is of a single layer of squamous follicle cells surrounding an oocyte. A primary follicle has one or more layers of cuboidal follicle cells surrounding an oocyte. A secondary follicle is similar to a primary follicle except that fluid-filled spaces exist between the surrounding granulosa cells. A graafian follicle (vesicular follicle) contains a huge fluid-filled cavity called an antrum that dominates the whole structure. Each month, one graafian follicle (on average) will undergo ovulation and the oocyte will be ejected from the ovary into the peritoneal cavity. The remaining granulosa cells transform into a corpus hemorrhagicum and then into a short-lived endocrine structure known as the corpus luteum.

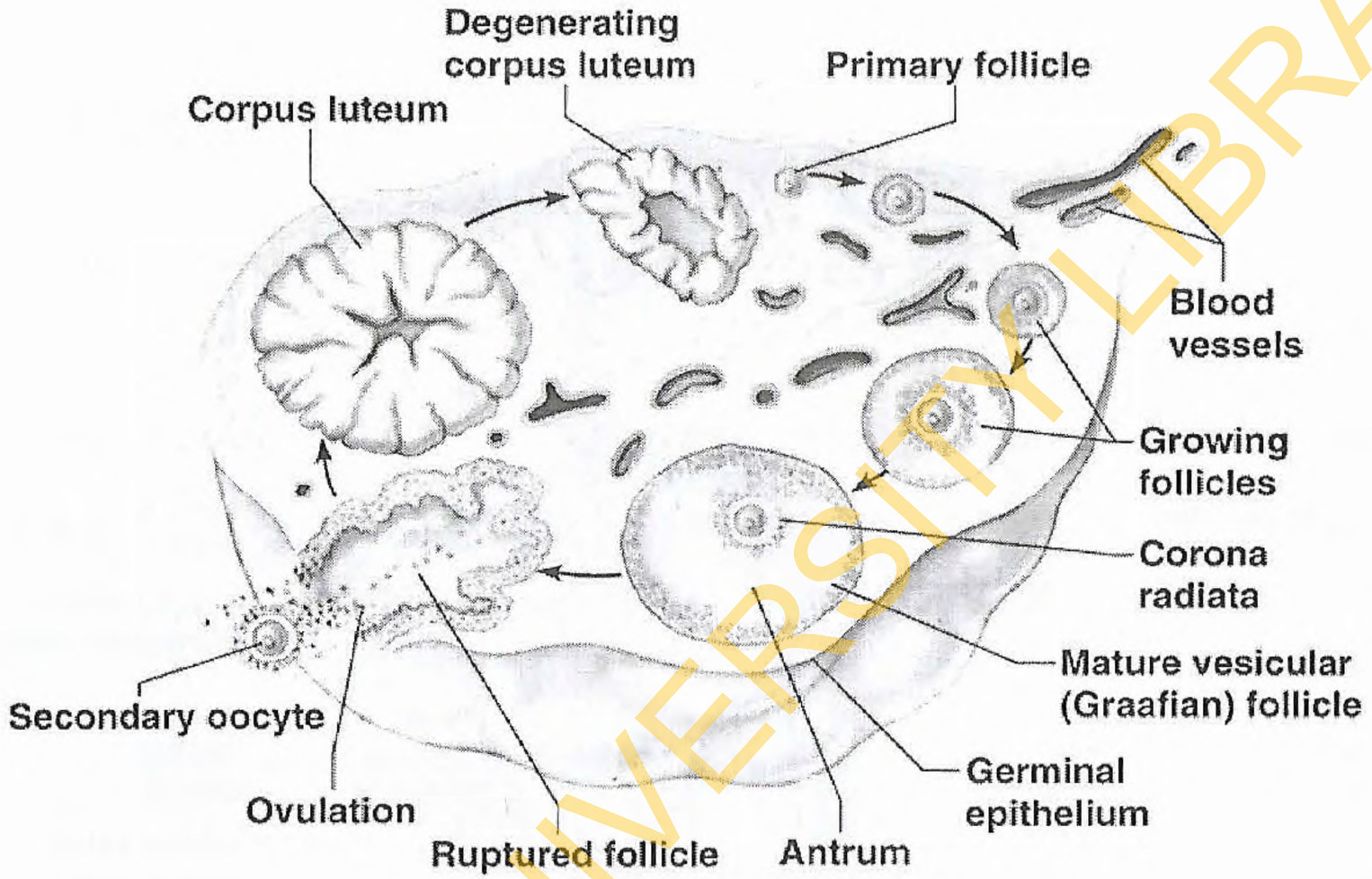


Fig. 5.4. The Ovary

The duct system

The duct system of the female reproductive system comprises the uterine tube, the uterus and vagina. Uterine or fallopian tubes are the initial part of the female duct system. The tube provides a site for fertilization by receiving the released egg at ovulation and transporting it to the uterus.

Each tube is 4 inches long and extends medially from the ovary to the uterus. The uterine tube has 4 regions. At the end are the fimbriae, ciliated fingerlike extensions that drape over the ovary. The infundibulum is an open funnel-shaped structure from which the fimbriae extend. The ampulla is the portion that curves around the ovary. The isthmus is the constricted region where the tube joins the uterus. When an ovulated oocyte is cast into the peritoneal cavity, the cilia on the fimbriae beat creating a current of fluid that draws the oocyte into the infundibulum. Fertilization usually occurs in the ampulla.

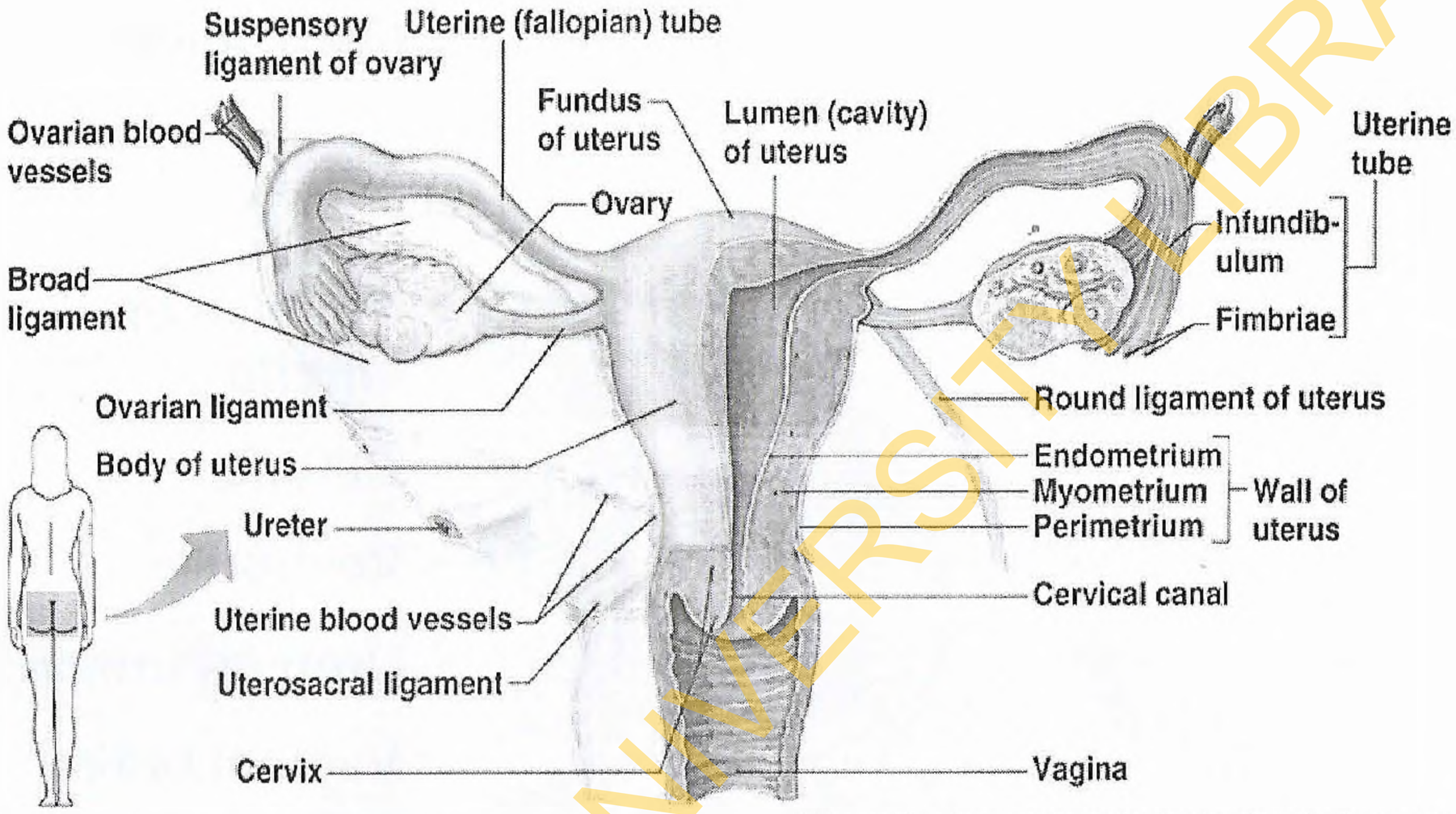


Fig. 5.5. The duct system of the female reproductive system

The uterus is a hollow, thick-walled organ located between the urinary bladder and rectum. The uterus (a)receives a fertilized egg (b) retains the fertilized egg and nourishes the fertilized egg. It is divided into three main regions – the body, which is the main portion; the fundus which is the superior rounded region lying where uterine tube enters. The Cervix is the narrow outlet that protrudes into the vagina

The vagina is the thin walled tube that sits between the bladder and rectum and extends from the cervix to the body exterior. It receives the penis and semen during sexual intercourse and provides a delivery route for an infant and for menstrual flow. The opening of the vagina is the external vaginal orifice. The opening between the vaginal canal and the cervical canal is the external os. In virgins, the vaginal mucosa partially covers the external vaginal orifice. This partition is called the hymen. The ovaries, uterine tubes, uterus, and vagina constitute the internal genitalia of the female reproductive system.

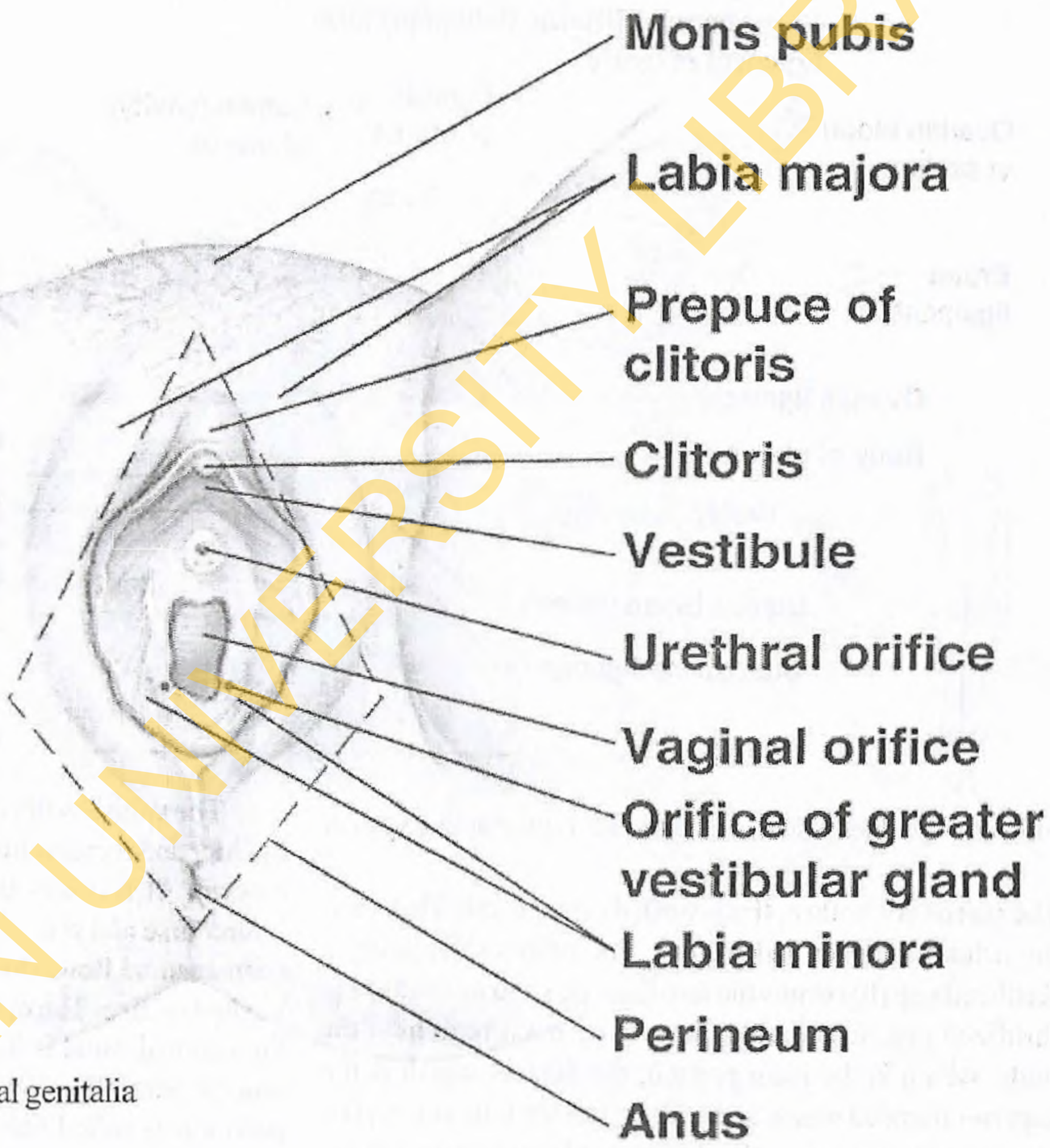


Fig. 5.6. The female external genitalia

The menstrual cycle

The series of cyclic changes which take place in the female reproductive system is referred to as menstrual cycle. Such changes take place in the ovary (ovarian cycle), the uterus (uterine cycle), cervix, breast, in addition to observable psychological changes. Perhaps the most conspicuous aspect of the cycle is the bleeding resulting from the sloughed surface of the endometrium (menstruation). The menstrual cycle is regulated by cyclic production of estrogens and progesterone. In addition, follicle stimulating hormone (FSH) and luteinizing hormone (LH) regulate the production of estrogens and progesterone. Each cycle is about 28days in length and ovulation typically occurs about midway through cycle on day 14.

The ovarian cycle (Figure 5.7) is the monthly series of events associated with the release of a secondary oocyte and the "just-in-case" preparation for its fertilization and implantation. It consists of 2 consecutive phases: the follicular phaseis the period during follicle growth is hormonally stimulated (typically days 1-14 of the cycle); the luteal phase is the period of corpus luteum activity, during which the uterus is prepared for pregnancy (typically days 15-28 of the cycle). At the beginning of the follicular phase, the hypothalamus begins to secrete increasing amounts of gonadotropin releasing hormone (GnRH). GnRH acts on the anterior pituitary, making it secrete follicle stimulating hormone (FSH) and luteinizing hormone (LH). The combination of FSH and LH stimulates follicle growth. As follicles mature and grow during the follicular phase, they secrete estrogen. Estrogen prepares the uterus for a possible pregnancy. Estrogen feeds back and prevents the release of FSH and LH from the anterior pituitary but at the same time causes the anterior pituitary to stockpile LH and FSH. As follicle growth continues and estrogen levels rise FSH and LH levels decline. Primary oocytes within late primary follicles secrete a thick sugar/protein matrix called the zona pellucida that surrounds the oocyte. Some primary follicles develop antrums and become secondary follicles. A single layer of follicle cells (the corona radiata) still surrounds the oocyte. Eventually only one follicle becomes a mature graafian follicle and is ready for ovulation. Remember – it took months for the graafian follicle to develop. On or around day 14, estrogen levels reach a threshold level and the anterior pituitary releases its stored FSH and more importantly its LH. A massive surge in plasma LH occurs, which leads to ovulation.

PUBERTY

Puberty refers to the stage of physical maturation in which an individual becomes physiologically capable of sexual reproduction. The biological changes that occur during puberty include several neurosecretory factors and/or hormones, all of which modulate somatic growth, the development of the sex glands, and their endocrine as well as exocrine secretions.

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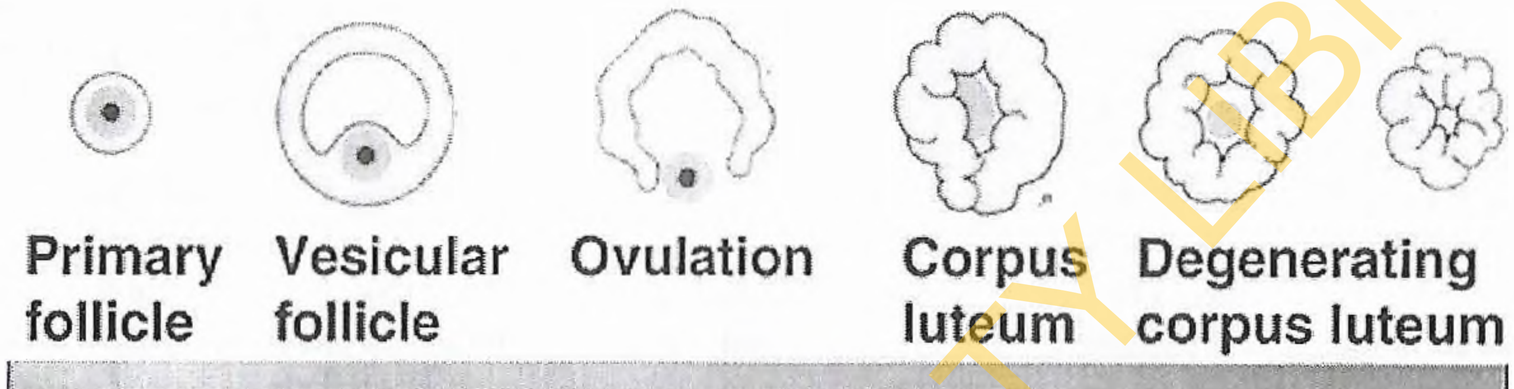

Fig. 5.7. The ovarian cycle

Following ovulation, the luteal phase commences. The corpus luteum begins to secrete progesterone as well as a small amount of estrogen. Progesterone maintains the uterus in a state ready to receive and nourish an embryo (if fertilization has occurred). Progesterone also inhibits any further pituitary release of FSH or LH. This prevents any further follicle growth or ovulation during the next 2 weeks– in case fertilization has occurred. If fertilization does not occur, then LH levels will become quite low due to the inhibitory effect of progesterone. LH is necessary for maintenance of the corpus luteum. As LH levels diminish past a threshold level, the corpus luteum begins to degenerate. It will gradually turn into a whitish mass of scar tissue known as a corpus albicans. As the corpus luteum degenerates, progesterone levels fall and the inhibition of pituitary FSH and LH is removed. LH and FSH levels begin to rise again and the cycle will begin anew. However if pregnancy does occur, then the soon-to-be placenta will produce a hormone known as human chorionic gonadotropin (HCG). It will maintain the corpus luteum and prevent its degeneration even as LH levels plummet.

The uterine cycle (Fig. 5.8) refers to the cyclical changes that occur in the uterus in response to ovarian hormones.

Days 1-5 are the menstrual phase, during which plasma progesterone will plummet and the stimulus for maintaining the thick endometrium will disappear. In response to this, the functional layer of the uterus will be shed and detached tissue and blood (menses) will slough out of the vagina. Days 6-14 are the proliferative phase, during which plasma estrogen is rising. This causes the functional layer to grow thicker and become more vascular and glandular. This is in preparation for the possibility of fertilization and pregnancy. Estrogen also causes cervical mucus to become less viscous. This will facilitate sperm entry. Days 14-28 are the secretory phase; during which plasma progesterone rises to its peak during this period of corpus luteum activity. Progesterone causes even more vascularization of the functional layer and causes the endometrial glands to twist, coil, and enlarge. Progesterone will cause cervical mucus to become more viscous (i.e., it creates a cervical plug). This helps prevent the embryo from being attacked by any pathogens that may migrate from the vagina.

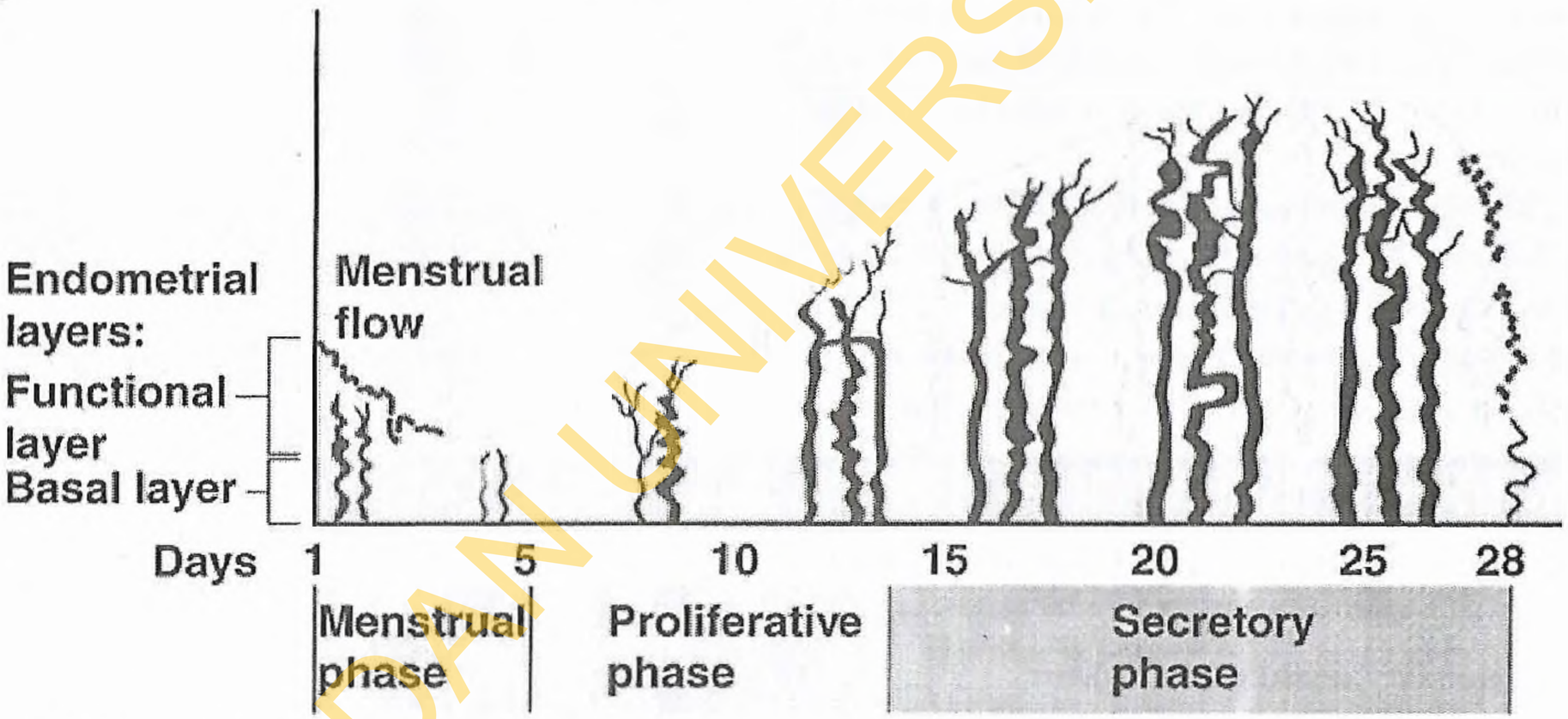

Fig. 5.8. The uterine cycle

Female secondary sexual characteristics

Secondary sexual development in girls (menache) involves the enlargement of the ovaries, uterus, vagina, labia, and breasts and growth of pubic hair. Between 11 and 14.5 years of age, the typical adolescent growth spurt takes place, and acne is frequent. Initially, a small breast subareolar nodule is observed, followed within approximately 6 months by the appearance of pubic hair and, shortly thereafter, axillary hair. A progressive increase in breast size, sexual hair, and genital development with the vaginal mucosa becoming more humid, of a darker pink colour, and taking on a secretory appearance will follow. The uterus increases in size up to stage P4 when the first menstruation occurs, and the maximal growth rate is reached.

Most girls reach menarche around 12.5 to 13 years of age; however, its occurrence may be as early as 10 or as late as 15 years of age in otherwise-normal girls.
First ovulatory cycles usually occur at a median age of 9 to 10 months after menarche. However, the time sequence in the appearance of sex characteristics may vary. Puberty is completed usually within 3 to 4 years of its onset, and the final height resulting from complete fusion of the epiphyses occurs within approximately 2 years after menarche.

Male secondary sexual characteristics

Progressively, the testis increases in size, mainly at the expense of the seminiferous tubules. A noticeable testicular growth and a slight progressive increase in scrotal folds and pigmentation constitute the first signs of puberty. Then the progression of pubertal development including penile size follows in close relation to the secretion of testosterone, followed by the growth of pubic hair several months later. Axillary hair appears around 13 years of age with characteristic body odour and lowering of the voice pitch, and acne is frequent. Finally, although prostatic development is initiated earlier, onset of sperm production (spermarche) occurs at a mean age of 14 years.

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9

Prevention, Control and Treatment of HIV/AIDS

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Introduction

HIV/AIDS is one of the world's most devastating epidemics with physical, social, psychological and economic effects on individuals, families and society. The young people are particularly at risk for HIV infection for a number of reasons which include incorrect and incomplete knowledge about the virus, the risk associated with its transmission, its prevention/ control measures and available treatment and support services in our society.

Prevention of HIV Infection

As at now, no vaccines exist for the prevention of HIV and AIDS. Hence, prevention of HIV infection is the most effective way to combat this multi-organ and mostly, sexually transmitted infection today. Although Scientists are making some progress in this area of developing effective tool against HIV, a vaccine against infection has not yet been invented. Therefore, prevention of HIV – is a reliable and secure way to protect against infection, and the results depend on the behaviour of each person.

Human Immunodeficiency Virus (HIV) can be transmitted in three main ways:

- Sexual transmission through vaginal, rectal or penile tissues Transmission through direct injection with HIV-contaminated drugs, needles, syringes, blood or blood products. From HIV-infected mother to the fetus in utero, through intrapartum innoculation from mother to infant or during breast-feeding
- For each route of transmission\,, there are things that individuals, communities and countries can do to reduce or eliminate risk of acquiring the infection.

When there is HIV, transmission can take place through all these three routes.. However, the number of infections resulting from each route will vary greatly between countries and population groups. Hence, HIV prevention should be comprehensive, making use of all approaches known to be effective rather than just implementing one or a few measures in isolation. Successful HIV prevention programmes not only give information, but also build skills and provide access to essential commodities such as condoms or sterile injecting equipment. It should be remembered that many people don't fit into only one "risk category". For example, injecting drug users need access to condoms and safer sex counselling as well as support to reduce the risk of transmission through blood.

HIV prevention needs to reach both people who are at risk of HIV infection and those who are already infected:

- People who do not have HIV need interventions that will enable them to protect themselves from becoming infected.

  People who are already living with HIV need knowledge and support to protect their own health and to ensure that they do not transmit HIV to others. This known as "positive prevention". Positive prevention has become increasingly important as improvements in treatment have led to a rise in the number of people living with HIV.

How HIV is NOT transmitted

There are a lot of misconceptions about HIV transmission that need to be corrected.

While HIVcan be transmitted through the routes described above, the following are the ways by which HIV cannot be transmitted:

- Hugging and shaking hands
- Coughing and sneezing
- Eating together
- Using toilet
- Sharing cups, dishes and cutlery
- Mosquito bites

HIV infection prevention measures

There are a number of measures to prevent and control HIV in the society. These prevention and control strategies can be primary, secondary or tertiary.

- Primary prevention strategies include HIV counselling, HIV information and education, sensitization and promotion of positive (healthy) behaviours. Behavior Change Communication (BCC), which is targeted, mainly, at the youths and other high risk groups.
- Secondary HIV prevention involves early diagnosis through screening and reduction of amount of virus in the body of the person infected by the use of drugs targeted at the virus call anti-retroviral drugs (RVs) and preventing HIV infected mother from transmitting the virus to their babies.
- Tertiary HIV control helps to minimize complications and disabilities that may arise from the epidemic like deaths, irreversible kidney or liver damage and to eliminate new cases by measures including intensifying clinical trials to discover vaccines for preventing HIV or providing cure.

HIV Counselling and Testing (HCT)

During HIV counselling and testing, basic information regarding mode of transmission,, assessment of risk of having or contracting HIV preventive methods, available care and support are provided to the counsellee. In addition, the counsellee is given the opportunity to ask questions and clear any gray areas or doubts. Those who discover they are not infected can also benefit, by receiving counselling on how to remain uninfected.Also, people living with HIV are less likely to transmit the virus to others if they know they are infected and if they have received counselling about safer behaviour. For example, a pregnant woman who has HIV will not be

able to benefit from interventions to protect her child unless her infection is diagnosed and information about prevention of mother to child transmission provided to her. Hence, HIV counselling and testing are fundamental for HIV prevention. In general a comprehensive HCT service has the following benefits:

1. Ability to increase awareness of HIV and AIDS
2. Increases clients' understanding of their vulnerability through risk assessment
3. Reduces anxiety for test results outcome
4. Easey acceptance of HIV positive status
5. Encourages both HIV negative and positive individuals to adopt safer behaviours
6. Provide additional information to HIV positive individuals that will enable them to seek proper care and treatment
7. Reduce the transmission of HIV from mother to child by providing appropriate options
8. Assist client to disclosure of HIV status to someone who will be there for them

Prevention of sexual transmission of HIV

The AIDS pandemic has resulted largely from sexual spread of HIV. Sexual transmission accounts for about 80% of transmission in our environment. The difficulty in discussing sex openly due to complex social and religious factors makes this mode of transmission difficult to control. However, its prevention will depend greatly on education aimed at changing high risk behaviours that will lead to reduction in the risk of exposure.

Reduction or elimination of the spread of HIV infection through sexual contact can be achieved through the 'ABC" approach of prevention of sexually transmitted infections

A - Abstain from sex or delay first sex especially for our young, unmarried boys and girls

B - Being faithful to one's partner in a relationship

C - Condom use consistently and correctly

Other primary prevention measures include:

D - Desist from sharing needles, syringes and other contaminated instruments, blood and blood products

E. - Encourage voluntary counselling and testing

F - Facilitate a society free of stigma and discrimination

Abstinence

The most effective way to avoid acquiring HIV infection through sex is by abstaining from sexual intercourse. This approach encourages young adults to abstain from sex until marriage. There are programmes and ways to develop skills for practising abstinence and which encourage participants to adopt social norms that support abstinence. Between hormones and peer pressure, saying no to sex can be difficult for young people. For those wanting to say "no" to sex but are having problems doing so, here are some ways you can say "no" to sex. Say no and keep saying no as many times as it takes to get the point across.

- Before the occasion arises, practise what you would say if someone pressured you to have sex.

- Get out of a troublesome situation by walking away and staying away.
- Use body language that helps makes your point. Stand tall, speak clearly and confidently, and look the person straight in the eye when saying no.
- Beware of "pressure lines" and respond accordingly. For instance if someone says"Everybody's doing it." Your response could be something to the effect "I'm not everybody. I don't have to do it because anyone else is."

Be faithful to one partner

This approach encourages participants to eliminate casual sex partners and to practice fidelity within their marriages and other sexual relationships. Studies in some countries have shown that faithfulness to one's spouse reduces exposure to HIV. However, the faithfulness must be mutual, i.e., Both spouses must be faithful to each other. In Uganda between 1989–1995, a 20% decline in casual sex partners led to 11% decline in reported cases of HIV.

Condom use

Condoms must be used correctly and consistently for it to be effective in preventing the transmission of HIV or any other sexually transmitted disease. Numerous studies have shown that condoms, if used consistently and correctly, are highly effective at preventing HIV infection.Also, there is no evidence that promoting condoms leads to increased sexual activity among young people.

On the other hand, there is now very strong evidence that male circumcision reduces the risk of HIV transmission from women to men by around 50%, which is enough to justify its promotion as an HIV prevention measure in some high-prevalence areas.Other factors that may contribute in reducing the sexual spread of HIV include: discouraging and avoiding female circumcision, treatment of other sexually transmitted infections, especially those that cause ulcers such as herpes, chlamydia, syphilis, etc. There is evidence to suggest that treating genital herpes in HIV positive people may reduce the risk of them transmitting HIV to their partners.

Prevention of infection through blood/blood product transfusion.

Less than 2% of cases of AIDS detected in Western Europe and North America have been associated with blood transmission. In Africa, however, transfusion of blood and blood product have been of relatively high importance in the spread of HIV and, therefore, reduction of spread through this means in Africa must be taken very seriously.

Transmission by blood transfusion can be greatly reduced by screening for HIV and all other blood-borne organisms in all blood and blood-products for human use.. However, .because screening is not quite 100% accurate, it is sensible to place some restrictions on who is eligible to donate, provided that these are justified by epidemiological evidence, e.g. individuals with known risky behaviours should be discouraged from donating blood or tissue and reducing the number of unnecessary transfusions also helps to minimise risk.

Prevention of occupational exposure to HIV infection
The safety of medical procedures and other activities that involve contact with blood, such as tattooing and circumcision, can be improved by routinely sterilising equipment. An even better option is to dispose of equipment after each use, and this is highly recommended if at all possible.

Health care workers themselves run a risk of HIV infection through contact with infected blood. The most effective way for staff to limit this risk is to practise universal precautions, which means acting as though every patient is potentially infected and protect yourself and others from exposure to blood and other body fluids. The practice of universal precautions includes washing hands and using protective barriers for direct contact with blood and other body fluids.Many resource-constrained countries like ours lack facilities for rigorously screening blood supplies in many of our laboratories and health facilities. In addition, a lot of countries have difficulty recruiting enough blood donors, and so have to resort to importing blood or paying their citizens to donate, which is not the best way to ensure safety.
In much of the world, the safety of medical procedures in general is compromised by lack of resources, and this may put both patients and staff at greater risk of HIV infection.

Prevention of Mother-to-child transmission (PMTCT)
Recent gains in child survival rates are threatened by the AIDS epidemic. Each year, approximately 600 000 infants, most of them in Sub-Saharan Africa, are born with or become HIVpositive as a result of mother-to-child HIV transmission. This way of HIV transmission accounts for about 10% of cases in our setting. The rising number of HIV-positive children places an enormous burden on families and health care systems. Thus, one of the most important areas of HIV prevention is the prevention of vertical transmission of HIV infection.

The steps towards reducing the number of babies infected in this way is to prevent HIV infection in women, prevent unwanted pregnancies including among people living with HIV, assist HIV positive women to ensure good health during pregnancy and ensure safe delivery and provide care, treatment and support for every member of family affected by HIV. A number of things that can be done to help a pregnant woman with HIV to avoid passing her infection to her child include:

1. Counselling and support during pregnancy to prevent complications like encouraging her to rest, eat good food, prevent malaria, reporting any concern early, etc
2. A course of antiretroviral drugs given to her during pregnancy and labour as well as to her newborn baby can greatly reduce the chances of the child becoming infected. Although the most effective treatment involves a combination of drugs taken over a long period, even a single dose of treatment can cut the transmission rate by half.. A caesarean section is an operation to deliver a baby through its mother's abdominal wall, which reduces the baby's exposure to its mother's body fluids. This procedure lowers the risk of HIV transmission, but is likely to be

recommended only if the mother has a high level of HIV in her blood, and if the benefit to her baby outweighs the risk of the intervention.

3. Practice of safe feeding for the baby.- Breastfeeding is the best food for the baby. But the HIV can be transmitted through breast milk. To reduce the risk of HIV infection to the baby from breastfeeding, HIV positive mothers are advised to give the baby ONLY breast milk for the first six months of life. Such mothers and/or babies will be on HIV drugs during this period of breast milk exposure. Alternatively, the baby can be fed with replacements feeds like infant formula, especially, when breast milk feeding is not achievable. However, use of such replacement feeds should be acceptable, feasible, affordable, sustainable and safe. However, if safe water is not available then the risk of life-threatening conditions from replacement feeding may be greater than the risk from breastfeeding. An HIV positive mother should be counselled on the risks and benefits of different infant feeding options. She should be helped to select the most suitable option for her situation.In much of the world lack of drugs and medical facilities limits what can be done to prevent mother-to-child transmission of HIV. Antiretroviral drugs are not widely available in many resource-poor countries; caesarean section is often impractical, and many women lack the resources needed to avoid breastfeeding their babies.

HIV-related stigma is another obstacle to preventing mother-to-child transmission. Some women are afraid to attend clinics that distribute antiretroviral drugs, or to feed their babies with formula, because of the fear that their HIV status will be revealed.

Post-exposure Prophylaxis (PEP)

Post-exposure prophylaxis (PEP) is any prophylactic treatment started immediately after exposure to a pathogen (such as a disease-causing virus), in order to prevent infection by the pathogen and the development of disease. In relation to HIV, some of these exposures will include: needle stick injury, rape, accidental splashes with blood or any of the body fluid.

In the case of HIV infection, post-exposure prophylaxis is a course of antiretroviral drugs which reduces the risk of seroconversion after events with high risk of exposure to HIV (e.g., unprotected anal or vaginal sex, needlestick injuries, or sharing needles).The CDC recommends PEP for any HIV negative person who has recently been exposed to HIV for any reason.To be most effective, post-exposure prophylaxis should begin within an hour of exposure.After 72 hours post-exposure PEP is much less effective, and may not be effective at all.[4] This prophylactic treatment for HIV typically lasts four weeks.

Although there is compelling evidence based on available data that PEP after HIV exposure is effective, there have been cases where it has failed. Usually failure is attributed to the delay in receiving treatment, the level of exposure (i.e., the viral load received), or both. PEP can also slow down the development of antibodies, potentially causing false negatives on a later HIV test. Doctors will advise patients who received PEP to get a test at 6 months post-exposure as well as the standard 3- month test.

The antiretroviral regimen used in PEP is the same as the standard highly active antiretroviral therapy used to treat AIDS. It requires close compliance and can have unpleasant side effects including malaise, fatigue, diarrhea, headache, nausea and vomiting.

Steps to take after an accidental exposure

The step one will take after an exposure will depend on the type of exposure.

Needle stick injury

After an accidental needle stick injury the first thing to do is wash the point of injury under running water with soap. Avoid squeezing since this may increase inflammation reaction , which may actually encourage establishment of the infection . Report immediately to the closest HIV treatment centre where some baseline laboratory test will be done and treatment administered.

Sexual exposure

In case of sexual exposure such as rape, report immediately to the closest HIV treatment centre where some baseline laboratory test will be done and treatment administered. List of centres where HIV treatment is available in Oyo state and other parts of the country is shown in the table below

Table 1: List of some HIV/AIDS treatment Centres in Nigeria.

State	Location	Name of Centre
Oyo State	Ibadan	University College Hospital
	Ibadan	Adeoyo Maternity
	Ibadan	St. Mary Catholic Hospital
	Ibadan	Oluyoro Catholic Hospital
	Ogbomosho	Oyo State Specialist Hospital
	Ogbomosho	Baptist Medical Centre
	Saki	General Hospital
	Saki	Baptist Medical centre
	Oyo town	State Hospital
Nation wide	State Capitals	Federal Teaching Hospitals and Federal Medical Centres

Treatment of HIV/AIDS

In the early years of the HIV/AIDS epidemic, people with HIV/AIDS were not likely to live longer than a few years mainly because their suppressed immune system could not fight opportunistic infection.Although, there is currently no cure for HIV or AIDS, medications are available to effectively fight HIV and its complications. Treatments are designed to reduce the quantity of HIV in the body, keep the immune system as healthy as possible and decrease the occurrence of opportunistic infections.

As at today, there are over 30 antiretroviral drugs (ARVs) approved by the Food and Drug Administration of the United States of America to treat HIV infection. These treatments do not cure people of HIV or AIDS. Rather, they suppress the virus, by preventing its rapid multiplication, even to undetectable levels, but the drugs do not completely eliminate HIV from the body. By suppressing the amount of virus in the body, people infected with HIV can now lead longer and healthier lives. However, they can still transmit the virus and must continuously take antiretroviral drugs and practice other secondary preventive measures in order to maintain their health quality.

Antiretroviral drugs are medications for the treatment of infection by retroviruses, primarily HIV. When several of such drugs, typically three or four, are taken in combination, the approach is known as Highly Active Antiretroviral Therapy, or HAART. The advantage of HAART over mono/single drug treatment is the ability to maximally suppress the virus because each of the drugs in the combination interferes with different points of the virus replication (multiplication) thereby increasing response to treatment.

Who qualifies for antiretroviral therapy?

It is not everyone who is HIV positive that requires anti-retroviral drugs. There are criteria that a person with HIV must meet before initiating (starting) ARVs. However, it is not advisable to stop antiretroviral therapy once they are initiated, i.e. anyone who commences ART is expected to continue with it for the rest of his/her life (until a cure is discovered). The following are very important considerations for ART initiation:

1. Willingness and readiness of the patient to begin therapy
   - Because of the severity of side effects in some cases and the importance of compliance/adherence to ART, it is necessary to involve patients in therapy decision making
   - If a patient on ART does not comply or adhere to treatment schedule, the virus will develop resistance to the ART regimen and even future regimen
2. The stage of the infection
   - The stage of infection is determined by the CD4 level,Viral load (quantity of virus in blood) and the presence of one or more of some other clinical diseases
   - The National treatment guideline recommends that treatment is initiated when the CD4 level is less than 350cells/μl and viral load greater than 50,000 copies/ml
   - The guideline also recommends treatment of Patients with clinical AIDS
   - HIV individuals whose CD4 is greater than 350cells/

µl and viral load less than 50,000 copies/ml and without clinical AIDS do not necessarily need drugs, but require close monitoring and HIV support and care

3. Other health problems

- Presence or absence of co-infection with other pathogens like Hepatitis B, Hepatitis C and Tuberculosis will determine which drug regimen and when to commence
- Knowledge of the state of the liver, bone marrow and kidney will contribute whether to start the ARVs, or not the type of regimen to use as well as when to reduce or withhold the ARVs

Treatment as a prevention measure

The principle of antiretroviral therapy is to interfere with the replication (multiplication) cycle of HIV, reducing the number of new virus produced and thus reducing the quantity of virus circulating in the blood. The drugs are capable of decreasing the virus load to an undetectable level. Studies have shown that when the virus level is so low, the chance of transmitting the virus is also low. Hence HIV therapy in addition to its benefit to PLWA is of great public health importance in preventing HIV transmission in the public. However, this does not mean people should disregard the "ABC" of primary HIV prevention as discussed earlier bearing in mind that treatment as a prevention measure is not 100% proven to be protective.

Care and Support for PLWAs

Care and support for PLWAs have broader scope and covers many elements including the following: policy to prevent, protect, treat and care for PLWAs and their families, medical care (treatment of and prophylaxis against opportunistic infections, and use antiretrovirals), nursing, laboratory services, pharmacological services, counselling, social support, self-help group activities, home and community-based care, alternative care and health promotion

The role of Youths in HIV Prevention, Treatment, Care and Support

The youths and the youngs ones are disproportionately affected by HIV. They have the disadvantage of having to cope with this epidemic in the society for a longer period. As such they need to play important roles in preventing, control ling and carring for the people living with HIV in the society. The following are some of the ways by which the youths can contribute to the preventive measures of HIV/AIDS:

Be informed and act responsibly

Know as much as you can about HIV & AIDS. Know how the virus can be contracted, how you can keep yourself safe. Also be aware that HIV-positive people can look and feel healthy for a long time. By participating fully in classroom discussions about HIV & AIDS, and by being well-informed and acting responsibly, young people can help prevent the spread of HIV & AIDS for their own and future generations.

- Respect others

Others should be treated with support and respect.

Discriminating against friends, relations, classmates etc with HIV & AIDS or relations of people with HIV violates human rights. People who are discriminated against are often lonely and depressed. Fear of discrimination can even prevent them from seeking help.

- Show care and support

There are many simple ways to show support to HIV-positive people. Treat them with kindness and understanding. It is safe to work, play and learn alongside someone who is infected by HIV. Those who have a family member with HIV & AIDS, or who have lost a loved one to AIDS, also need support. We should know that it can happen to any one.

Conclusion

To be successful, a comprehensive HIV prevention programme needs strong political leadership. This means politicians and leaders in all sectors must speak out openly about AIDS and not shy away from difficult issues like sex, sexuality and drug use. In addition, HIV epidemics thrive on stigma and discrimination related to people living with the virus and to marginalized groups such as sex workers. Their spread is also fueled by gender inequality, which restricts what women can do to protect themselves and their babies from infection. Protecting and promoting human rights should be an essential part of any comprehensive HIV prevention strategy. Mother-to-child HIV transmission can be greatly reduced by expanding high quality antenatal and obstetric care, voluntary HIV counselling and testing, access to antiretroviral therapy, and exclusive breastfeeding or the use of breast milk substitutes -. In addition, medications are now available for the management of HIV infection and HIV positive individuals can lead a longer and healthy life. However one can only partake of the benefit of ART if he/she knows her HIV status. Scientists are working hard to identify a cure for HIV/AIDS, but while we wait for that to become a reality, let us do that which we have control over – *KNOW YOUR HIV STATUS AND PROTECT YOURSELF FROM HIV INFECTION.*

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ABOUT THE BOOK

"Reproductive Health represents a major challenge in the developing and resource- constraint countries of Africa, Asia and Latin America. The indicators portend grave crisis deserving of urgent and sustained intervention. They clearly mirror the state of development in these countries. African countries have the worst maternal and child mortality ratios/rates. They also harbour about 70% of the global burden of HIV and AIDS.

It is against this backdrop that this introductory course becomes apt. The course represents our determined efforts to correct the imbalance in knowledge and efforts. The introductory section sets the tone for the course. In all, it comprises twelve chapters covering such diverse fields as Healthy Living, Human Nutrition and Health, Microbes and Human Health, the reproductive system, Sexually Transmitted Infections, Prevention, Control and treatment of HIV/AIDS, Youth and Life Skill, Genetic Disorder and Non Communicable Diseases in Africa, and then ending with a novel chapter on Drugs and Mankind. The chapters have been carefully selected and packaged by seasoned academics and leaders in the field."

- Prof. I. F. Adewole, Vice-Chancellor, University of Ibadan.

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