CHAPTER 20

REPRODUCTION

Key Concepts

20.1 Male reproductive system
20.2 Female reproductive system
20.3 Menstrual Cycle
20.4 Disorders of reproductive system
20.5 Sexually transmitted diseases

EXERCISE

SECTION I: Multiple Choice Questions

Select the correct answer from the following choices.

1. Sertoli cells are found in:
   (a) seminiferous tubules (b) seminal vesicle
   (c) between interstitial cells (d) epididymis
2. Fertilization of the ovum normally occurs:
   (a) in distal part of oviduct (b) in proximal part of oviduct
   (c) along the uterine wall (d) successfully in vagina
3. Embryo implants in the _____ of the uterus.
   (a) perimetrium (b) myometrium
   (c) endometrium (d) cervix
4. Spermatozoa are stored prior to emission and ejaculation in:
   (a) epididymis (b) seminal vesicle (c) urethra (d) prostate gland
5. The cervix is a portion of:
   (a) ovary (b) vagina (c) uterus (d) fallopian tube
6. If pregnancy is established, ovulation and menstruation _____ throughout gestation period

(c) cannot be affected (d) none of them

7. On which date is a woman most likely to ovulate if the first day of menstrual loss was first March?
(a) 5 March (b) 14 March (c) 20 March (d) 28 March

8. If ruptured graffian follicle is degenerated without forming corpus luteum, which of the following is expected?
(a) ovulation will not occur (b) menstruation will not occur
(c) pregnancy is established (d) none of them

9. How does a zygote differ from an ovum?
(a) A zygote has diploid number chromosomes
(b) A zygote is smaller
(c) A zygote consists of more than one cell
(d) A zygote is much larger

Answer

1	(a)	2	(b)	3	(c)	4	(a)	5	(c)
6	(b)	7	(b)	8	(d)	9	(a)		

SECTION II: Short Questions

Give short answers of the following questions.

Q1. List the structures of male reproductive system.

Answer

The male reproductive system includes:

i) Gonads (testes)
ii) Accessory duct (epididymis, ductus deferens, ejaculatory duct and urethra)
iii) Accessory gland (seminal vesicles, prostrate gland, bulbourethral glands)
iv) Cpulatory organ (penis)

Q2. List the structures of female reproductive system.

Answer

Female reproductive system consists of:

i) Gonads (a pair of ovaries)
ii) Oviduct
iii) Uterus
iv) Vagina

Q3. List the structure in order, through which a sperm passes on its way from seminiferrous tubules of the testis to the fallopian tubule of the female

i) In seminiferous tubule due to meiosis sperms (male gametes) are produced.
ii) From seminiferous tubules sperms travel towards vasa efferentia, which are produced by combination of seminiferous tubules.
iii) From vasa efferentia sperms are transferred towards highly coiled ducts called epididymis.
iv) Eididymis opens into the another duct called ductus deferens (sperm duct or vas deferens)
v) Vas deferens deep into the pelvic cavity and then joins with the duct of seminal vesicle. Here sperms store for time being.
vi) From seminal vesical sperms are transferred to short ejaculatory duct.
vii) Each ejaculatory duct then enters the prostrate gland, where it empties into the urethra.
viii) Urethra is the terminal portion of the male duct system and is also called urinogential duct as it carries urine as well as sperm fluid.
ix) It opens to outside at the external urethral orifice of the penis.
x) The penis transfers sperms into the female reproductive tract during copulation.

Q4. Define miscarriage, abortion and premature birth.

Answer

i) Miscarriage

A miscarriage is the spontaneous loss of a foetus before the 20th week of pregnancy. (Pregnancy losses after the 20th week are called preterm deliveries) A miscarriage may also be called a "spontaneous abortion." This refers to naturally occurring events, not medical abortions. Most miscarriages are caused by chromosome problems that make it impossible for the baby to develop. Usually, these problems are unrelated to the mother or father's genes.

Causes: Other possible causes for miscarriage include: Drug and alcohol abuse, exposure to environmental toxins, hormone problems, infections, obesity, physical problems with the mother's reproductive organs, problem with the body's immune response, serious body-wide diseases in the mother such as uncontrolled diabetes and smoking. It is estimated that up to half of all fertilized eggs die and are lost (aborted) spontaneously, usually before the women knows she is pregnant. Among those women who know they are pregnant, the miscarriage rate is about 15-20%. Most miscarriages occur during the first 7 weeks of pregnancy.

ii) Abortion

Abortion is defined as the termination of pregnancy by the removal or expulsion of a foetus or embryo from the uterus before it is viable. An abortion can occur spontaneously, in which case it is usually called a miscarriage, or it can be purposely induced. The term abortion most commonly refers to the induced abortion of a human pregnancy.

iii) Pre-mature Birth

The live birth which takes place before normal time (EDD or expected date of

Q5. What changes occur in ovulation and menstruation during gestation period?

Answer

i) Ovulation

Secretion and effect of LH: Decrease of FSH and increase of oestrogen, causes the pituitary gland to secrete Luteinizing hormone (LH) which induces ovulation – the release of ovum from the follicle.

Corpus luteum and progesterone: The follicle cells, after release of the egg, are modified to form a special structure called corpus luteum. This yellowish glandular structure starts secreting a hormone called progesterone. This hormone develops the endometrium and makes it receptive for the implantation of the zygote (placenta formation).

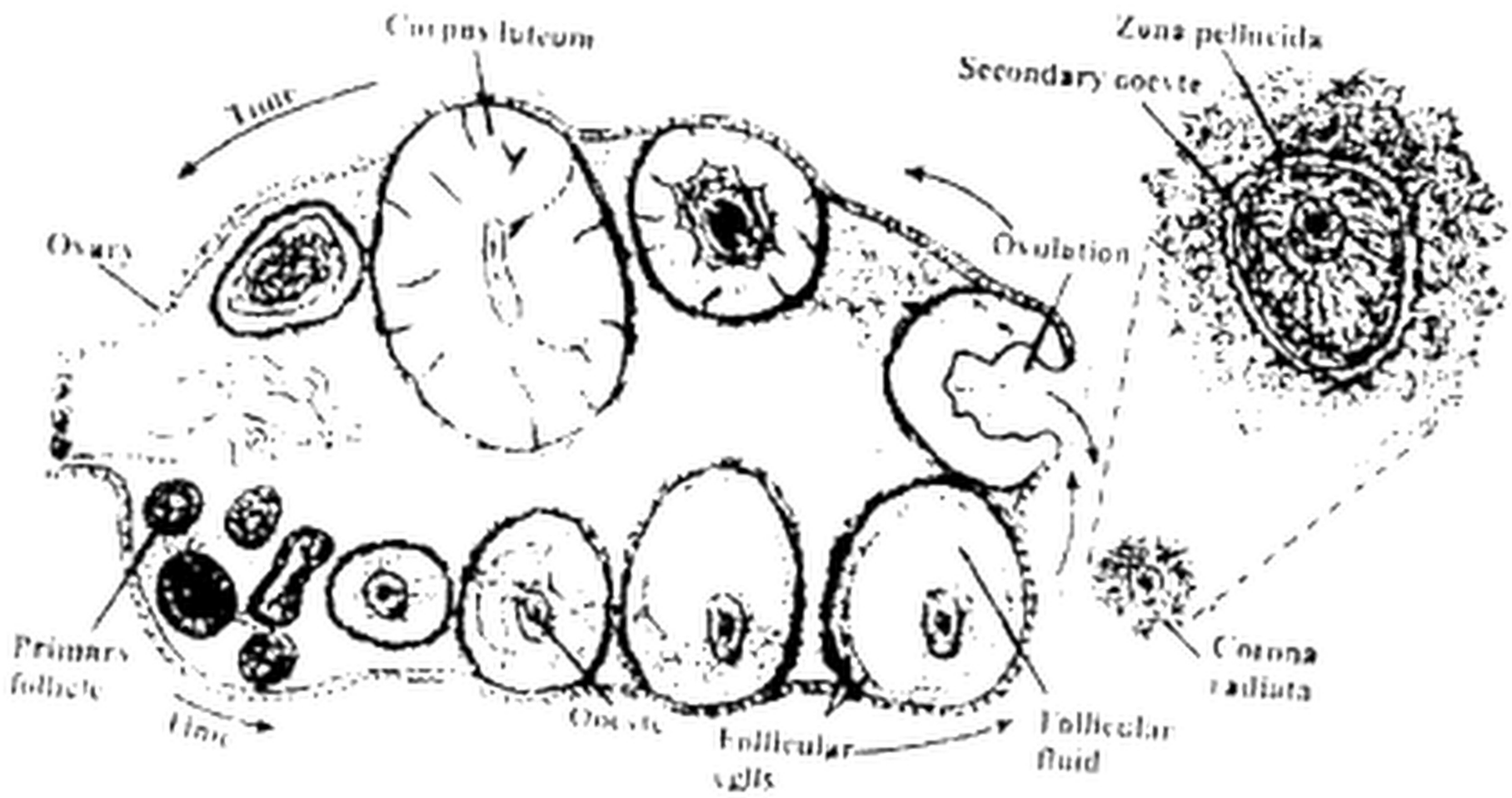


Fig. The ovarian and uterine cycles in human female

The release of secondary oocyte (ovulation) is timed to coincide with the thickening of the lining of the uterus. The uterine cycle in humans involves the preparation of the uterine wall to receive the embryo if fertilization occurs knowing how these two cycles compare, it is possible to determine when pregnancy is most likely to occur.

ii) Menstruation

If fertilization does not occur the corpus luteum starts degenerating. The progesterone secretion diminishes (reduces gradually) and its supporting effect on the spongy endometrium is reduced which suffers a breakdown. This causes the discharge of blood and cell debris known as menstruation. This stage usually last for 3-7 days.

Q6. Name the three phases of menstruation cycle and mention the characteristic days.

Answer

i) Menstruation phase from day 1 to 5.

iii) Secretory / post-ovulatory phase from day 15 to 28.

Q7. What is a role of corpus leteum in menstrual cycle?

Answer

After ovulation the follicle cells are modified into a special structure called corpus leteum, which is yellow glandular structure starts secreting a hormone called progesterone. This hormone develops the endometrium and makes it receptive for implantation of the zygote (placenta formation)

Q8. How will you differentiate miscarriage and abortion?

Answer

Miscarriage is a natural mishaps which is done spontaneously so called natural abortion or spontaneous abortion.

Abortion: is usually referred to the induced premature termination of pregnancy.

Q9. Name sexually transmitted diseases.

Answer

Sexually transmitted diseases (STDs) caused by viruses are AIDS, herpes genital warts and hepatitis B. The STDs gonorrhoea and syphilis are caused by bacteria.

Q10.What are the actions of FSH and LH in the human female?

Answer

i) **Follicle stimulating hormone** (FSH) stimulate the follicle for development of an egg in it during first days of the menstrual cycle. Only few ovarian follicles are stimulated. Out of few only one becomes mature called Graafian follicles in which oogenesis occurs.

ii) FSH also stimulate graafian follicle to secrete estrogen which is turn governs the vascularisation of endometrial lining of uterine wall. So endometrial wall becomes velvety, thick and well vascularized.

Release of LH. Estrogen has negative feedback upon FSH, so as the concentration of estrogen rises the level of FSH falls. This is a signal for anterior pituitary gland to release LH, which causes rupturing of graafian follicle and egg is released into oviduct, the event is known as ovulation, which takes less than five minutes. LH also converts the ruptured follicle to a yellowish glandular mass called corpus leteum.

Q11.Why are so many sperms produced in the male and so few ova produced in the female?

Answer

A man needs to constantly produce sperms in order to increase his change of reproduction. An individual sperms would be unlikely to get through to fertilize an egg so a man need to shoot lots of sperms into woman, in biological hope that one will get an fertilize egg. Most of sperms are killed by acidic environment in female reproductive system.

In female an egg needs to wait for sperm and is having high chances of being fertilized

HIV virus is transmitted by exchange of body fluids from infected persons to the uninfected. The measures that can help to prevent transmission of HIV are:

i) Refrain from sexual activity and follow Islamic principle of life.
ii) Routine testing for HIV can prevent transmission through blood transfusion.
iii) Ask the barbers to always use new blades and towels.
iv) Use of disposable syringes can avoid transmission of virus by needle.

Q13.Why it is necessary for large number of sperms to be produced when only one sperm is required to bring about fertilization?

Answer

It is estimated that about 525 billion sperms cells are produced over a life time and shed one billion of them per month. A healthy adult male can release between 40 million to 1.2 billion sperms cells in one ejaculation in female tract and most of them are killed due to acidic environment in female reproductive system.

Q14.Enlist the reasons of human male infertility.

Answer

The common reasons causes for male infertility are:

i) Azoo spermia
ii) Oligo spermia
iii) Auto immune disorder

Q15.Enlist the reasons of human female infertility.

Answer

The common causes of female infertility

i) Failure of ovulate
ii) Blocked fallopian tubule
iii) Uterus damage
iv) Cervical mucus defect
v) Endometrioses

Q16.What are anti-sperm antibodies?

Answer

An antisperm antibody test looks for special proteins (antibodies) that fight against a man's sperm in blood or semen. The test uses a sample of sperm and adds a substance only to affected sperm. Semen can cause an immune response in either man's or woman's body.

Q17.What are the ethical implications of abortion?

Answer

Abortion is one of the most controversial issues associated with reproduction. It raises ethical issues. The commonly raised ethical issues are:

2) Extra children may impose several financial stresses on an existing family.
3) Many abortions are carried out on foetuses with disabilities such as thallasaemia, Down syndrome etc..

SECTION III: Extensive Questions

Q1. Describe the structure of human male reproductive system and identify their function.

Answer

Reproductive System of Man

Human reproduction employs internal fertilization. The reproductive system is unique in two respects. Firstly, the fact that is does not become functional until it is 'turned on' at puberty by the action of sex hormones. In contrast, all other body systems are functional at birth or shortly thereafter. Secondly, the other organ systems of the body exhibit slight differences in male and female while the reproductive system is quite different in male and female.

Male Reproductive System

The main function of male reproductive system is to produce and maintain sperms.

Structure of Male Reproductive System

The male reproductive system includes: gonads (testes), accessory ducts (epididymis, ductus deferens, ejaculatory duct and urethra), accessory gland (seminal vesicles, prostate gland, bulbo urethral glands) and copulatory organ (penis).

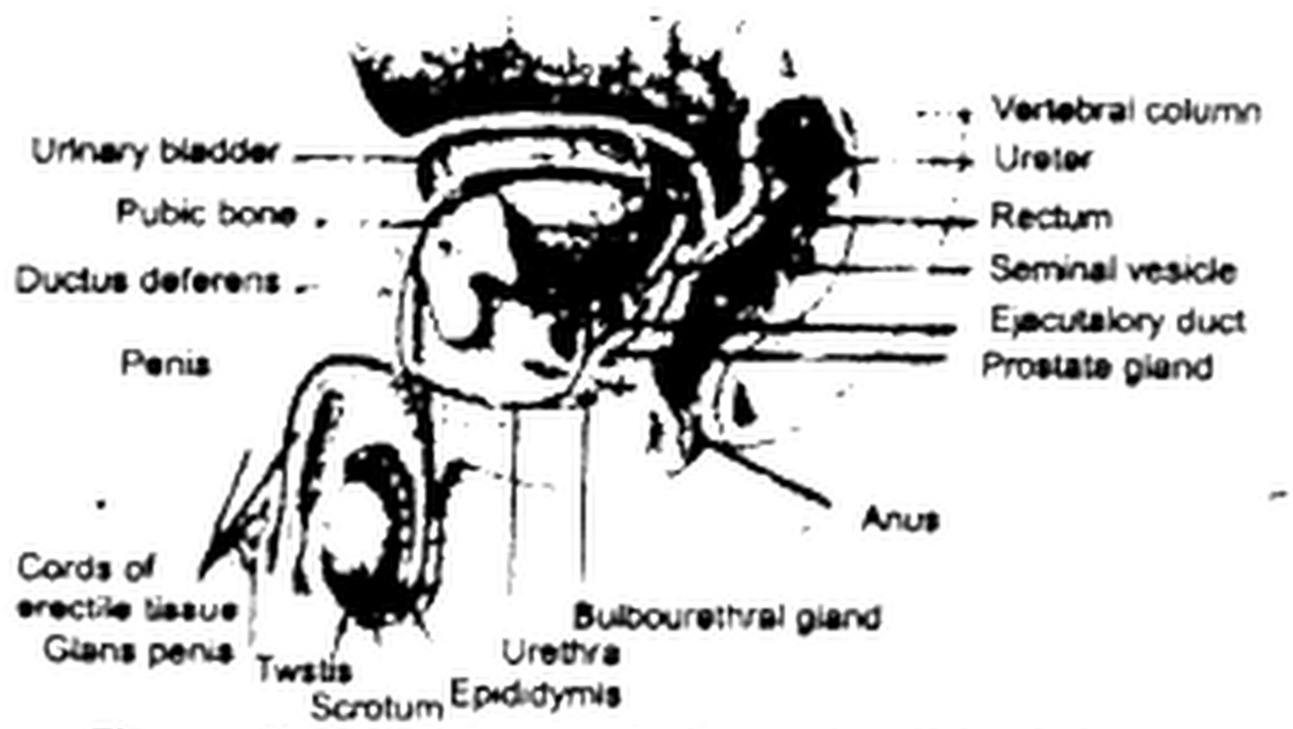


Fig. Human male reproductive system (lateral view)

Gonads (Tests)

The testes are male gonads which are situated outside the abdomen within a skin pouch called scrotum. Each testis is divided into 250 to 300 lobules. Each lobule contains one to four tightly coiled seminiferous tubules. The process of spermatogenesis takes place in inner epithelim (germinal epithelium) of the seminiferous tubules. Between, the

Accessory Ducts

At the distal end of testes, all the seminiferous tubules are combined together to form about 10 to 20 tubules called vasa efferentia that collect sperms from seminiferous tubules and transfer them to the epididymis. The epididymis is also a collection of few highly coiled ducts which rests on the backside of each testis. These ducts have an uncoiled length of about 6 m (20 feet). The epididymis functions in the transport and storage of the sperm. Here the sperm are stored temporarily, nourished and they gain the ability to swim.

Epididyms open into the another duct called ductus deferens (sperm duct or vas deferens) which moves deep into the pelvic cavity and then join with the duct of the seminal vesicle to form the short ejaculatory duct. Each ejaculatory duct enters the prostate gland; where it empties into the urethra.

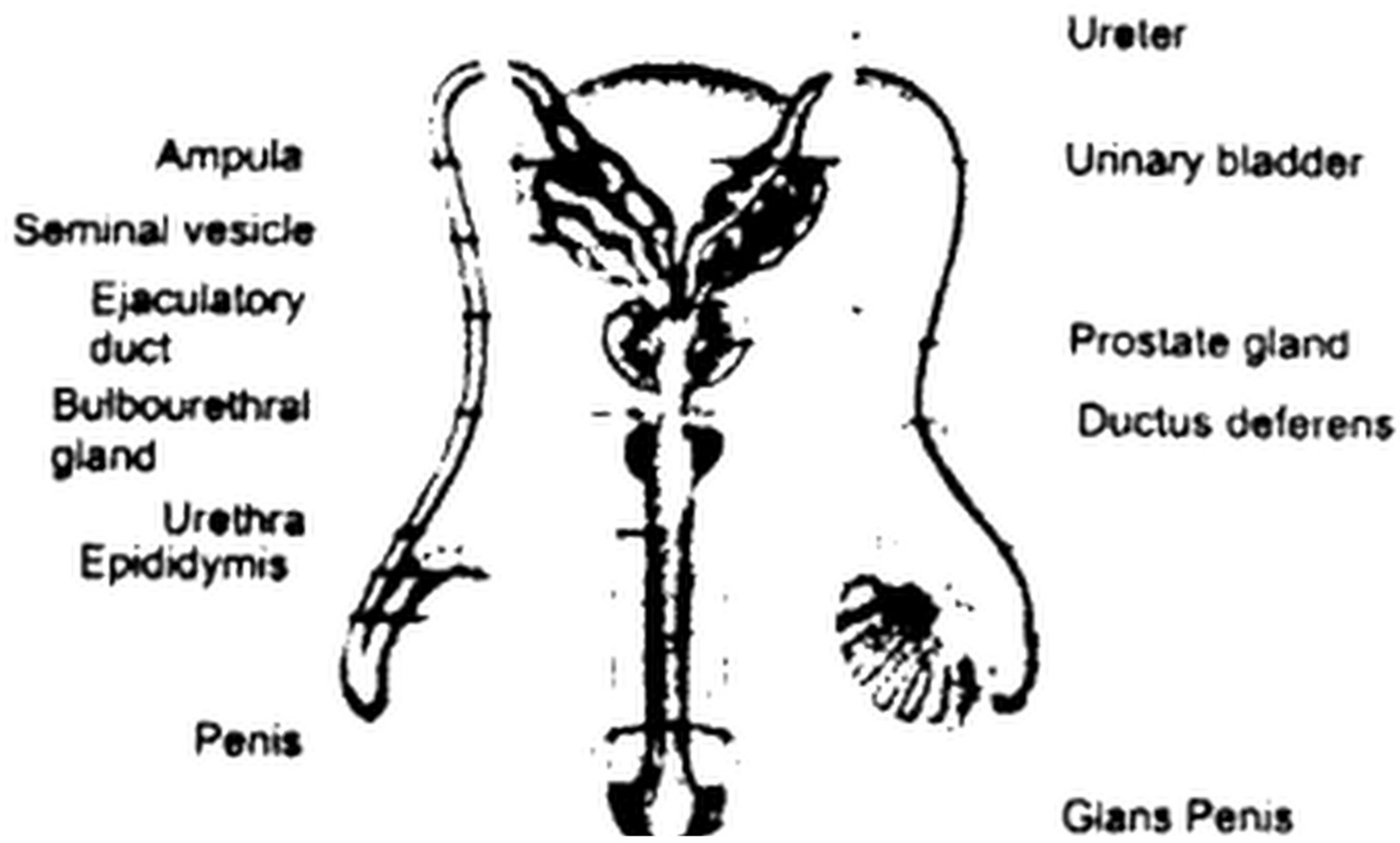
The urethra is the terminal portion of the male duct system and is also called urinogenital duct as it carries urine as well as sperm fluid. It opens to the outside at the external urethra orifice of the penis.

Copulatory Organ (Penis)

The human penis consists mainly of tissues that can fill with blood to cause an erection during sexual arousal. It is used to transfer sperm into the female reproductive tract during copulation.

Accessory Glands

A pair of seminal vesicles is located at the junction of sperm duct and ejaculatory duct. They provide an alkaline fluid containing fructose sugar; ascorbic acid and a coagulating enzyme called vesiculase, as well as other substances that enhance sperm motility thus improve their fertilizing power. The prostate gland encircles the urethra just below the bladder. Its secretion is a milky, slightly acidic fluid that contains citrate as a nutrient source and several enzymes. A pair of bulbourethral gland (Cowper's gland) is situated at the junction of ejaculatory duct and urethra. It secrets mucus and an alkaline fluid into the urethra. The alkaline fluid neutralizes the acidity of urine in the urethra.



Function of Male Reproductive System

The function of male reproductive system in human reproduction is production of sperms which is also called spermatogenesis.

Spermatogenesis

It is the process of sperm formation in males. During this process, spermatogonia divide by mitosis and give rise two distinct cell types i.e., types A and B. The type A daughter cell maintains the germ cell line while the type B cell gets pushed toward the lumen, where it becomes a primary spermatocyte. Each primary spermatocyte undergoes meiosis I, forming two smaller haploid cells called secondary spermatocytes.

Each secondary spermatocyte after meiosis II produces two daughter cells called spermatids. Each spermatid is a round, nonmotile haploid cell which after maturation changes into motile and active sperms. During this process a spermatid elongates, sheds its excess cytoplasm, and forms a tail.

The process begins around the age of 14 years in males (puberty), and continues throughout life. Every day, healthy adult male makes about 400 million sperms.

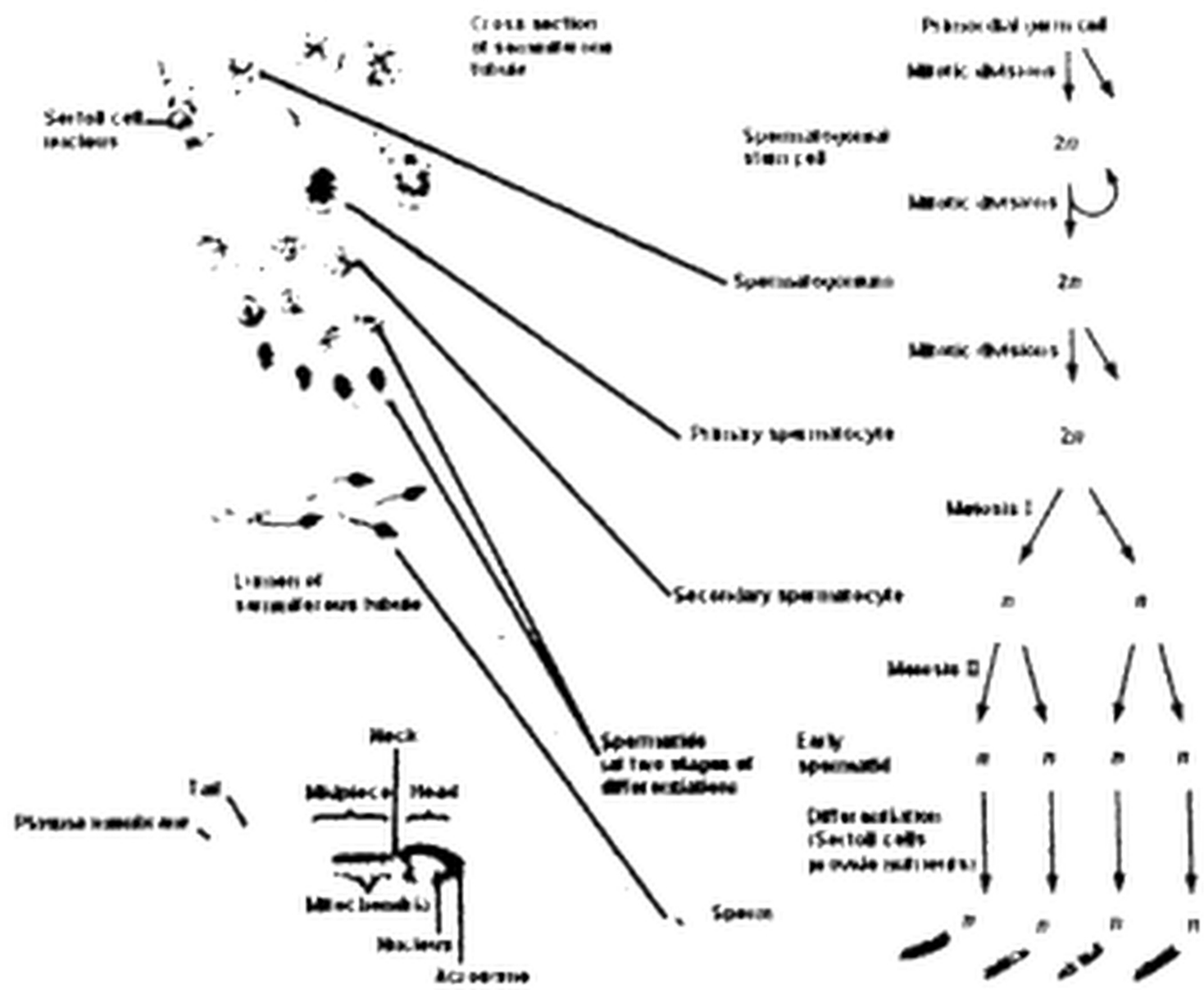


Fig. Spermatogenesis

Q2. Explain the principle reproductive hormones of human male and their role.

Answer

Process of spermatogenesis is controlled by hormonal secretions from hypothalamus and pituitary gland. The hypothalamus releases gonadotropin-releasing hormone

spermatogenesis by stimulating the sertoli cells to complete the development of sperms from spermatids. The sertoli cells are elongated cells found in the seminferous tubules of the testis and they nourish the spermatids. LH stimulates Leydig cells to release testosterone. Testosterone causes the growth and development of germinal epithelium to form sperms. Inhibin hormone is produced by the sertoli cells and serves to control the spermatogenesis at normal rate.

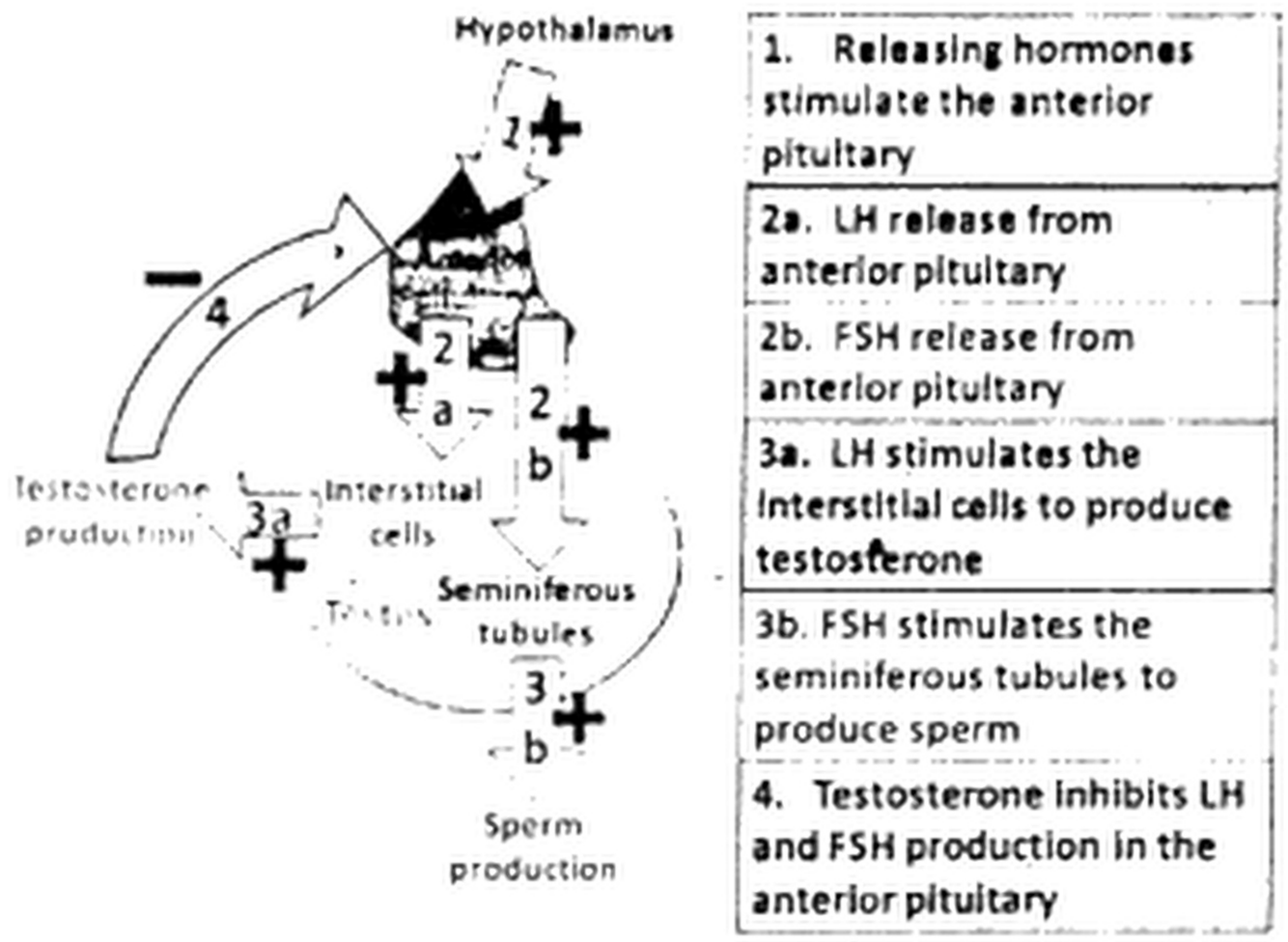


Fig. Hormonal control of male reproductive system

Q3. Explain the structure of human female reproductive system and describe their function.

Answer

Female Reproductive System

The reproductive role of the female is far more complex than that of a male. She not only has to produce gametes, but her body must be prepared to nurture a developing embryo for a period of approximately nine months.

Structure of Female Reproductive System

Female reproductive system consists of gonads (a pair of ovaries), oviducts, uterus and vagina.

Gonads (Ovaries)

Ovaries are female gonads which produce ova and release hormones. The paired ovaries flank the uterus on each side and each ovary is held in place within the peritoneal cavity by several ligaments. The ovaries are solid, ovoid structures, measure about 3-5 cm long and 2.3 cm wide. Within the ovary are many tiny saclike structures called ovarian follicles each of which consists of an immature egg, called an oocyte. In adult women, one of the ripening follicles ejects its oocyte from the ovary each month. This event is called ovulation. After ovulation, the ruptured follicle is transformed into

Oviduct (Fallopian Tubes or Uterine Tube)

The oviduct form the initial part of the female duct system. They receive the ovulated oocyte and are the site where fertilization generally occurs. Each oviduct is about 10 cm long and transfer developing ovum from ovary towards the uterus. The oviduct contains sheets of smooth muscular peristalsis and the beating of the cilia. Non-ciliated cells produce a secretion that keeps the oocyte (and sperm, if present) moist and nourished.

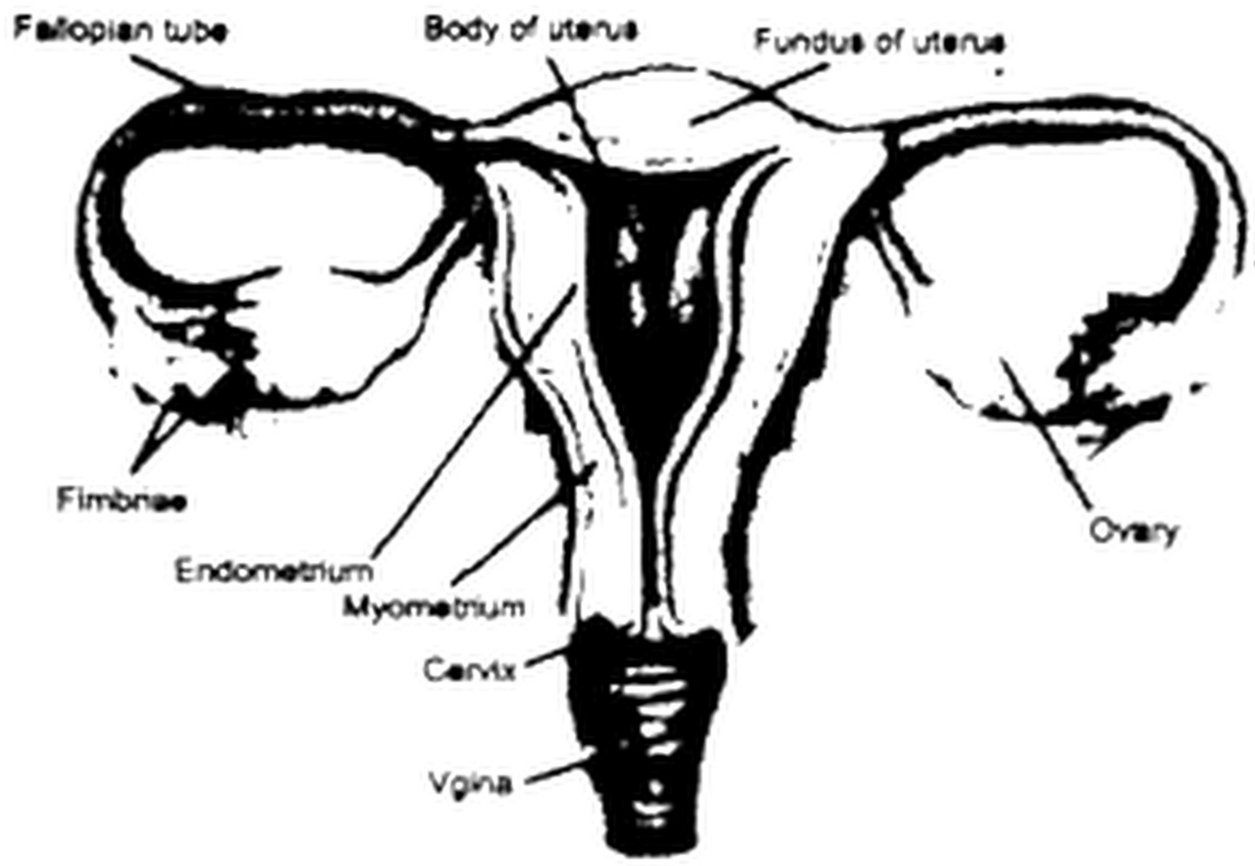


Fig Human female reproductive system

Uterus

The uterus or womb is a hollow, muscular organ shaped somewhat like an inverted pear. The uterus has three portions: the fundus, the body and the cervix. The oviducts join the uterus just below the fundus and the opening of the cervix leads to the vaginal canal. The wall of the uterus is composed of three layers. The perimetrium is the outermost thin covering layer of the uterus. The myometrium is the middle thick muscular layer composed of bundles of smooth muscle, which contracts rhythmically during childbirth to expel the baby from the mother's body. The endometrium is the inner spongy lining of the uterine cavity. If fertilization occurs, the young embryo is implanted into the endometrium and resides there for the rest of its development. The main functions of uterus are to receive, retain, and nourish a fertilized ovum. Cervix is a narrow entrance to the uterus from the vagina. It is normally blocked by a plug of mucus.

Vagina

The vagina is a thin-walled 8-10 cm long tube and extends from the cervix to the body exterior. In virgin females, generally the vaginal orifice is partially closed by a thin membrane called the hymen. Vagina is often called the birth canal as it provides a passageway for delivery of an infant and for delivery of an infant and for menstrual flow. The urethra is embedded in its anterior wall.

Function of Female Reproductive System

(oogenesis), fertilization, development of embryo and production of female sex hormones.

Oogenesis

The process of egg formation in females is called oogenesis. This process starts when the individual is at the stage of foetus. In the period the oogonia (diploid stem cells of the ovaries) multiply rapidly by mitosis and then enter a growth phase. Gradually the oogonia are transformed into primary oocytes and become surrounded by a single layer of follicle cells. The primary oocytes begin the first meiotic division, but become "stalled" late in prophase I and do not complete it. They remain in this state all through childhood; the wait is a long one, at least 10 to 14 years.

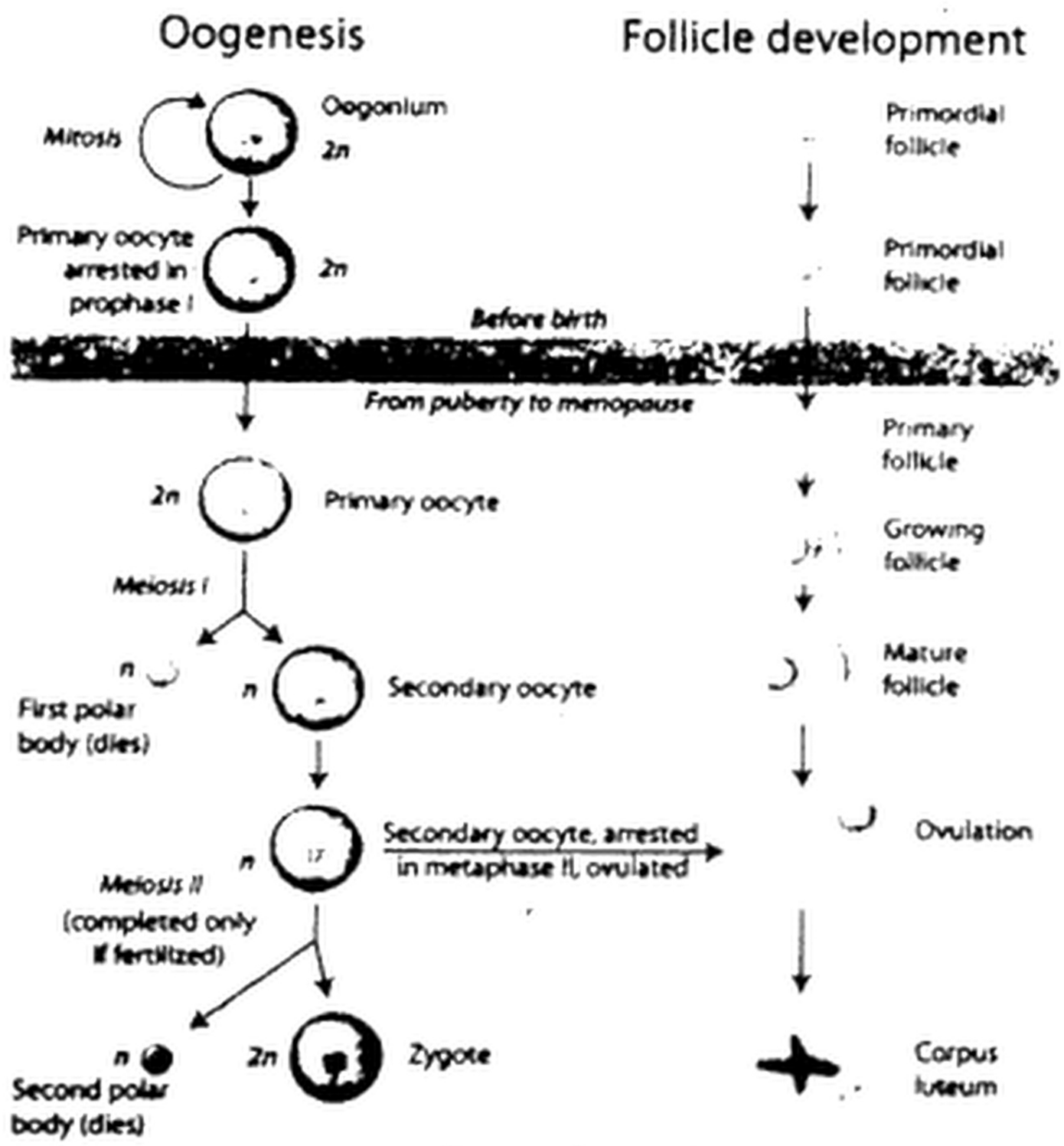


Fig. Oogenesis

At puberty, a small number of primary oocytes are recruited each month, however, only one is selected each time to continue meiosis I, ultimately producing two haploid cells (that are quite dissimilar in size). The larger cell, which contains nearly all the cytoplasm of the primary oocyte, is the secondary oocyte. The smaller cell is called the first polar body. In humans, the secondary oocyte arrests in metaphase II and it is this cell that is ovulated. If an ovulated secondary oocyte is not penetrated by a sperm, it simply deteriorates. But, if sperm penetration does occur, it quickly completes meiosis II (in oviduct), yielding one large ovum and a tiny second polar body. The unequal cytoplasmic divisions that occur during oogenesis ensure that a fertilized egg has

Q4. Describe the events of a menstrual cycle and explain its hormonal regulation.

Answer

Female Reproductive Cycle and Its Hormonal Regulation

The female reproductive system undergoes cyclic events. Therefore the sequence of all reproductive events in female reproductive system is called female reproductive cycle or menstrual cycle.The female reproductive cycle is primarly divided into two phases i.e., ovarian cycle (includes those events that occur in ovaries) and uterine cycle (includes those events that occur in uterus). The events of ovarian cycle are very well coordinated with events of uterine cycle by pituitary hormones called gonadotrophins. Based upon changes and hormonal regulation the cycle can be divided into three phases i.e., menstrual phase, proliferative phase and secretory phase.

Menstrual Phase (Days 1-5)

In this menstruation phase, the uterus sheds all but the deepest part of its endometrium. The thick, hormone-dependent functional layer of the endometrium detaches from the uterine wall, a process that is accompanied by bleeding for 3 – 5 days. The detached tissue and blood pass out through the vagina as the menstrual flow. At the beginning of this stage, ovarian hormones are at their lowest normal levels and gonadotrophins are beginning to rise. Then FSH levels begin to rise.

Proliferative / Pre-ovulatory Phase (Days 6-14)

Through the influence of a rise in follicle stimulating hormone (FSH) during the first days of the cycle, a few ovarian follicles are stimulated. These follicles compete with each other for dominance. As a result all but on one of these follicles stop to grow and finally disintegrate (follicle atresia), while one dominant follicle in the ovary continue to mature and becomes Graffian follicle or mature follicle, in which oogenesis occurs.

FSH also stimulates the graffian follicle to secrete estrogen which in turn governs the vascularisation of endometrial lining of uterine wall. Consequently, the endometrium once again becomes velvety, thick and well vascularised. Normally, cervical mucus is thick and sticky, but rising estrogen levels cause it to thin and become crystalline, forming channels that facilitate the passage of sperm into the uterus.

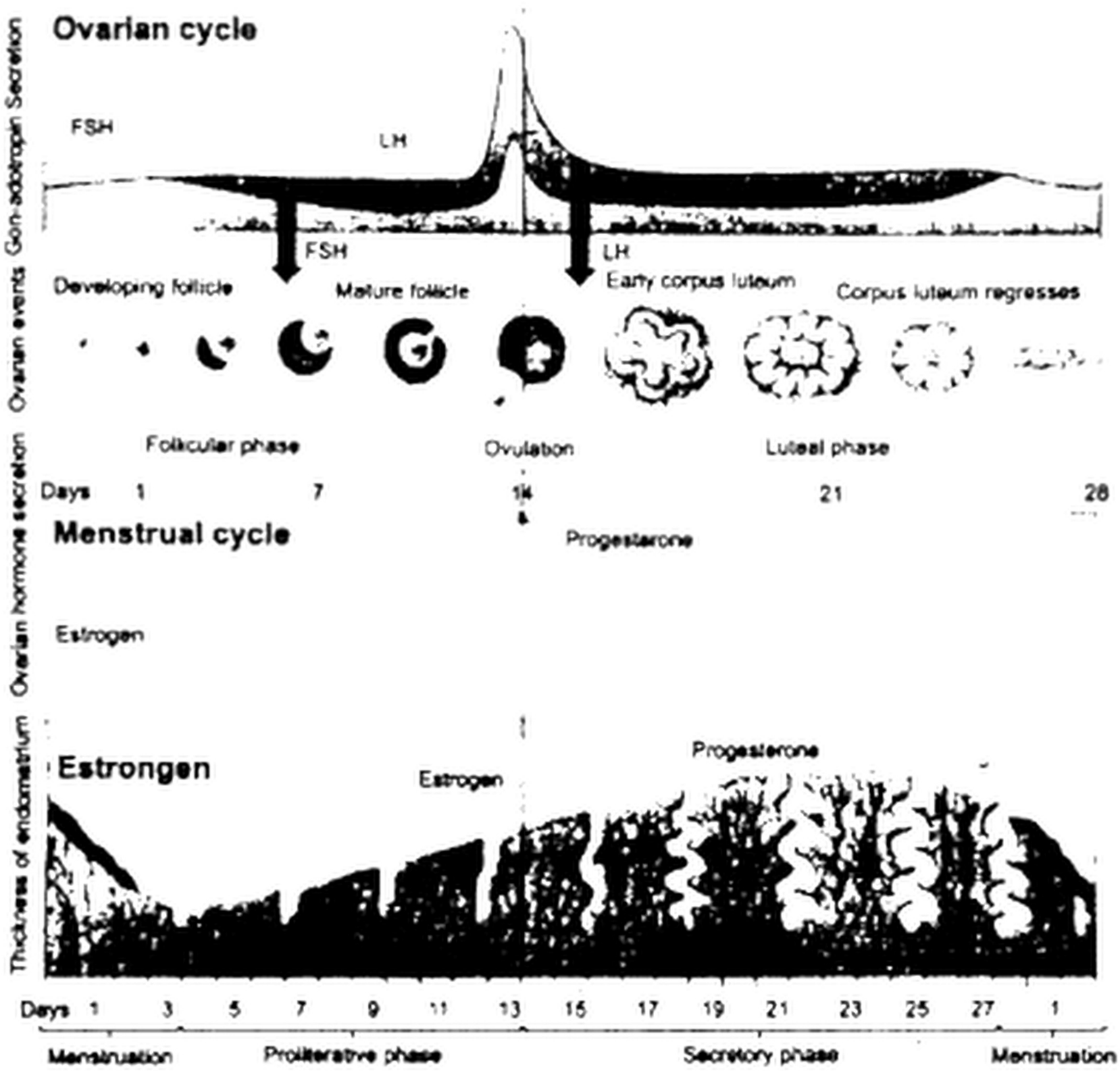


Fig. The Human female reproductive cycle

Estrogen has negative feedback upon FSH, therefore, as the concentration of estrogen rises the level of FSH falls. This is a signal for anterior pituitary to release LH, at the end of the proliferative stage (day 14) in response to the sudden release of LH from the anterior pituitary causes the release of developing egg from the graffian follicle into the oviduct, the event is known as ovulation, which takes less than five minutes. LH also converts the ruptured follicle to a yellowish glandular mass called corpus luteum.

Fig. 20.10 Menstrual cycle

Secretory / Post-ovulatory Phase (Days 15-28)

During the secretory phase, the endometrium prepares for implantation of an embryo Rising levels of progesterone from corpus leteum act on the estrogen-primed endometrium, causing the arteries

layer to a glandular secretory layer (uterine glands). The uterine glands enlarge, coil and begin secreting nutritious glycogen into the uterine cavity. These nutrients sustain the embryo until it has implanted in the blood-rich endometrial lining.

If fertilization has not occurred, the corpus luteum begins to degenerate toward the end of the secretory phase as LH blood level declines. Progesterone levels Fall, depriving the endometrium of hormonal support and endometrial cells die, setting the stage for menstruation to begin on day 28.

In human beings, menstrual cycle ceases around 50 year of age and it is termed as menopause. Cyclic menstruation is an indicator of normal reproductive life of females and extends between menarche (first menstruation) and menopause.

Q5. What is infertility? What are the causes of human male and female infertility?

Answer

Infertility cannot be defined precisely because there are varying degrees of infertility. A useful working definition is the failure to achieve pregnancy.

Causes of Male Infertility

The common causes of male infertility are azoospermia, oligosepermia, sperm deformities and autoimmune disorder.

i) Azoospermia

Azoospermia is the state of having no sperms. It is the cause of about 5% of male infertility. It may be caused if sperm ducts are blocked due to infection, injury, gonoreehoea and T.B. The blockage may be congenital (dating from birth).

ii) Oligospermia

Sperm count below 20 million/ml called oligospermia. More than 90% of male infertility is due to low sperm count.

iii) Sperm Deformities

The changes in shape of sperms are called sperm deformities. It is usual for a small proportion of sperm to be abnormal, for example having two tails, no head or abnormal shape.

iv) Autoimmune Disorder

In some individuals, the infertility is probably due to an immune response by the male to its own sperms. Antibodies are made which attack the sperm and reduce sperm count.

Causes of Female Infertility

The common causes of female infertility are: Failure to ovulate, blocked fallopian tubule, uterus damage, cervical mucus defect and endometriosis.

i) Failure to Ovulate

Sometimes the hypothalamus or pituitary gland fail to produce hormones normally,

normally. In other case there may be physical damage to ovaries.

ii) Blocked Oviduct

In some females the infertility is due to the diseases causing blockage of fallopian tube. It may be due to infections.

iii) Uterus Damage

In some females, the infertility is caused by problems with the uterus. Here the problem is not one of getting pregnant but of maintaining the pregnancy and preventing miscarriage. Fibroids are benign (non-cancerous) tumours that grow from the walls of the uterus, can cause infertility.

iv) Cervieal Mucus Defect

During ovulation, mucus in the cervix becomes thinner so that sperm can swim through it more easily. If there is a problem with the mucus, it can make it harder to conceive.

v) Endometriosis

It is a condition where small pieces of the endometrium, start growing in other places, such as the ovaries. This can cause infertility because the new growths form adhesions (sticky areas of tissue) or cysts (fluid-filled sacs) that can block or distort the pelvis. These make it difficult for an egg to be released and become implanted into the womb.

Treatment of Infertility

Where environmental factors such as smoking, obesity and stress are involved, treatment is aimed at removing or reducing the factor responsible. A number of treatment are available e.g., surgical, hormone treatments, in vitro fertilization etc..

Q6. Explain "in vitro" fertilization.

Answer

In vitro fertilization (IVF), means fertilization outside of the female body. IVF is the most effective types of assisted reproductive technology. It is often used when a woman's fallopian tubes are blocked or when a man produces too few sperm. This is commonly known as test-tube baby technique. The technique involves fertilizing one or more eggs outside the body and then transferring the fertilized eggs, known as 'pre-embryos, back into the uterus i.e., embryo transfer.

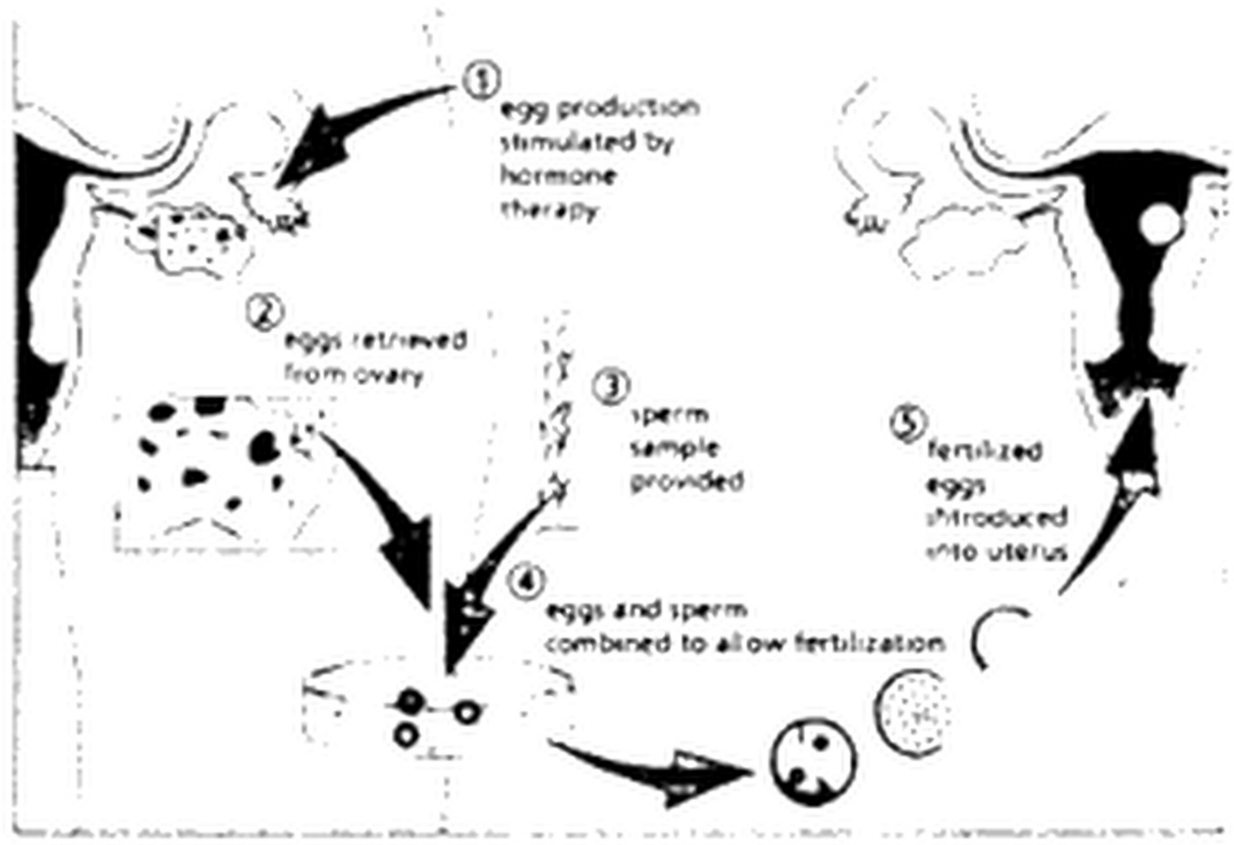


Fig. In vitro fertilization

In this procedure, the ovary is stimulated with a drug, (having fertility FSH) to produce several eggs. Eggs can be collected from the follicle by sucking out the fluid contents of mature follicles with a fine hollow needle which is inserted through the abdominal wall under general anaesthetic.

Sperms are collected from the male partner and washed in a culture fluid to remove seminal fluid. About 100,000 healthy sperms are added to each egg about six hours after egg collection. This is done in a glass dish or tube. The fertilized eggs are grown for about two days, after which they are usually at 2 to 8 cell stage. After examination under the microscope, the embryo are transferred through the cervix into the uterus using a fine plastic tube. She is subsequently treated with progesterone to promote favourable uterine environment for implantation of the embryos.

Q7. Describe causes, symptoms and treatment of gonorrhoea and syphilis.

Answer

SEXUALLY TRANSMITTED DISEASES (STDs)

Sexually transmitted diseases are contagious diseases caused by pathogens that are passed from one human to another by sexual contact. The STDs caused by viruses are AIDS, herpes genital warts and hepatitis B. The STDs gonorrhoea and syphilis are caused by bacteria. We will discuss here cause (aetiology), symptoms and treatment of these two bacterial diseases.

1) Gonorrhoea

Gonorrhoea is caused by bacteria *Neisseria gonorrhoeae*. The symptoms in male include pain of, urination and have a milky urethral discharge three to five days after contact. Unfortunately, majority of women are asymptomatic until they develop severe pain in the abdominal region due to pelvic inflammatory disease. For the treatment of gonorrhoea the antibiotics penicillin or tetracycline is used.

2) Syphilis

Syphilis is caused by bacteria called treponema pallidum

(ulceration sore with hard edges) indicates the site of infection. The chancre (shang'ker) can go unnoticed, especially since it usually heals spontaneously leaving little scarring. During the secondary stage, the individual breaks out in a rash. The rash is seen even on palms of the hands and soles of the feet. During the tertiary stage, gummas (small rubbery granuloma) appear on skin or internal organs. Foetus infected with syphilis is usually stillborn or die shortly after birth. For treatment of syphil is antibiotics e.g., penicillin, is used.

3) AIDS – A Worldwide Sexually Transmitted Disease

AIDS is one of the most serious, deadly diseases in human history. In the early 1980s doctors in the United States identified the first cases of AIDS in San Francisco and New York. Now there are an estimated 42 million people living with HIV or AIDS worldwide and more than 3 million die every year from AIDS-related illnesses.

AIDS is caused by the human immunodeficiency virus (HIV). HIV destroys helper T-lymphocyte which is major components of immune system therefore the people with the HIV begin to get serious infections.

KEY POINTS

- Reproduction guarantees the transmission of one generation's genetic material into the next generation.
- Male reproductive system consists of a pair of testes, ducts, glands, and external genitalia.
- Each testis is divided into 250 to 300 lobules. Each lobule contains one to four tightly coiled seminiferous tubules. The process of spermatogenesis takes place here in the seminiferous tubules.
- The Prostate gland produce a secretion which is a milky, slightly acidic fluid that contains citrate as a nutrient source and several enzymes.
- Cowpers' gland secretes mucus and an alkaline fluid into the urethra. The alkaline fluid neutralizes the acidity of urine in the urethra.
- The Bulbourethral glands produce thick and clear mucus. Some of the mucus drains into the urethra when a man becomes sexually excited and neutralizes traces of acidic urine in the urethra.
- Semen is a white, sticky mixture of sperm and secretions of accessory glands.