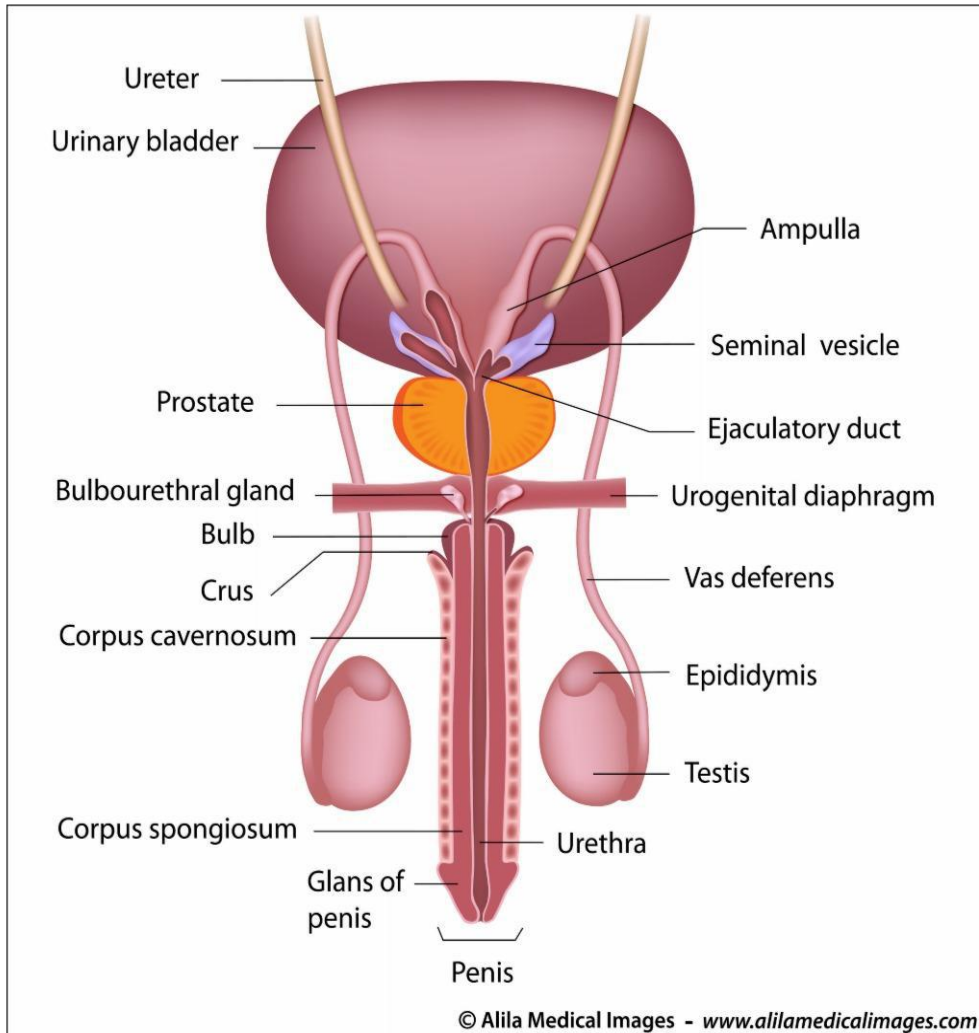


L No 18.
Human Reproduction

1. Describe male reproductive system in detail.



Male reproductive organs, dorsal view,... by Funzoo

Zazzle

Ans: Human male Reproductive System

2. Human male Reproductive system consists of :
- a) Pair of Testis located in scrotum
 - b) Pair of epididymis.
 - c) Pair of vasa differentia
 - d) Ejaculatory ducts.
 - e) Urethra
 - f) Penis
 - g) Accessory glands:
 - i) Pair of seminal vesicles
 - ii) Prostrate gland
 - iii) Cowper's gland

A) Pair of Testis located in scrotum

1. Each testis is an ovoid body located outside body cavity within a pouch called scrotum. Scrotum mainly protects testes and also helps in thermoregulation.
2. Testis are soft pinkish oval 4.5 cm long 2.5cm wide and 3cm thick. They are suspended in scrotum by spermatic cord.
3. Each testis is connected to wall of scrotum by “Gubernaculum”
4. Testis descends into scrotum in 7th month of foetal development. But if they fail to descend, it leads to sterility called as cryptorchidism.

Function: To produce sperms and male sex hormone testosterone.

B) Epididymis

1. These are a pair of “C” shaped structures, lying along posterior border of testis. Each is about 6cm long, highly coiled thin duct. It is differentiated into 3 parts.
2. Upper wide head or caput epididymis which receives vasa efferentia.
3. Middle narrower body or corpus epididymis.
4. Lower part is tail or cauda epididymis.
5. Function: Sperm storage till their maturity.

C) Vasa Differentia

1. These are the pair of tubular structures arising from cauda epididymis. It is about 40 cm long and enters into abdominal cavity, through inguinal canal and arches behind urinary bladder.
2. Function: To carry sperms by peristaltic movement from epididymis to ejaculatory duct.

D) Ejaculatory ducts

1. These are formed by joining vasa deferens and duct of seminal vesicles they are about 2 cm long. Both ejaculatory ducts open into urethra in the region of prostate gland.

Function: It carries seminal fluid and spermatozoa to the urethra.

E) Urethra

1. It is common pathway for urine and semen. It is about 20 cm long and made up of 3 parts. -
 - i) Prostatic Urethra: First part which is surrounded by prostate gland. It carries urine only.
 - ii) Membranous Urethra: Middle part present between end of prostate gland. It carries urine and semen.
 - iii) Penile urethra: Last part situated in penis. It also carries urine and semen.

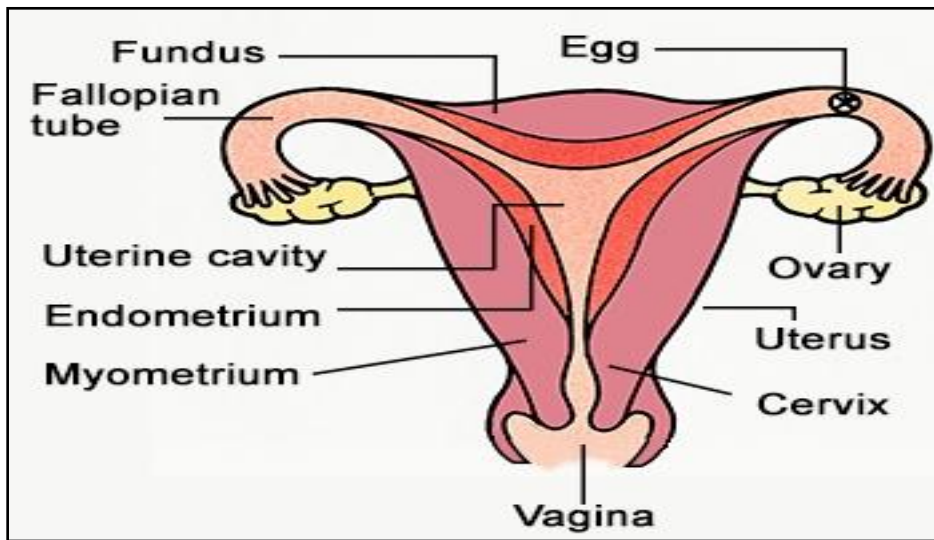
F) Penis:

1. It is cylindrical, erectile, pendulous organ suspended in pubic region in front of scrotum.
2. Function: It is copulatory organ.

G) Accessory Sex Glands:

1. **Seminal vesicles:** It contributes about 60% of total volume of semen. It secretes viscous fluid that contains fructose, fibrinogen and prostaglandins. Fructose provide energy to sperms for swimming. Fibrinogen helps in coagulation of semen after ejaculation. Prostaglandins stimulate contraction of female reproductive tracts to help process of fertilization.
2. **Prostate Gland:** It secretes whitish fluid forming around 30% of total volume of semen. Prostate fluid neutralizes acidity of vaginal secretion. It activates mobility of sperms and facilitate process of fertilization.
3. **Cowper's gland:** These glands secrete alkaline viscous fluid that neutralize acidity in penile urethra due to previous urination. It also lubricates vagina of female reproductive tract.

3. Describe female reproductive system in detail.



Ans: The reproductive organ of female reproductive system is categorized into external & internal reproductive system

I] External Genital/ Vulva

The external genitalia consist of 8 parts. i.e. labia majora, labia minora, , mons pubis, clitoris, vestibule, vestibular gland, Breasts.

- a) Labia majora: These are prominent & longitudinal folds on left and right side of vestibule.
- b) Labia minora: Smaller & thinner lip like folds located medially of labia majora.
- c) Mons Pubis: It is fleshy elevation above labia majora.
- d) Clitoris: Small erectile organ which is homologous to penis of male.
- e) Vestibule: It is median vertical depression of vulva.
- f) Hymen: It is thin layer of mucous membrane which partially occludes opening of vagina.
- g) Vestibular Glands: It is homologous to Cowper's gland in males.
- h) Breasts: It is pair of modified gland situated in pectoral region on cventral thoracic wall.

II] Internal Genitalia

Inside the female body following reproductive organs are present i.e. ovaries, fallopian tubes, uterus & vagina.

- a) Ovaries
 - 1. Ovaries are primary sex gland present in lower half of the abdomen.
 - 2. Each ovary is suspended from dorsal body wall by a fold of peritoneum called the mesoovarium. This suspension is also called broad ligament.
 - 3. Ovaries produce female gametes or ova and also female sex hormones estrogen & progesterone.
 - 4. These 2 hormones are responsible for secondary sexual characters. They also control menstrual cycle, pregnancy and parturition.

b) Fallopian Tubes/ Oviducts

1. A pair of tubes lying horizontally over peritoneal cavity close to the ovary are called fallopian tubes. It is 10 cm long, narrow, muscular structure lined by epithelium.
2. They transport the ovum from ovary to uterus.
3. Fallopian tube is divided into 3 parts i.e. infundibulum, ampulla, isthmus/ cornua

c) Uterus

1. Uterus or womb is pear shaped, highly muscular, thick walled hollow organ measuring above 8 cm in length, 5 cm in width and 2 cm in thickness.
2. Uterus consist of following 3 parts:
 - i. Fundus
 - ii. Body or corpus
 - iii. Cervix
3. Uterine wall consist of following 3 layers:
 - i. Peritoneum
 - ii. Myometrium
 - iii. Endometrium
4. Uterus receives the ovum from fallopian tube. It develops placenta during pregnancy for the nourishment of foetus. At the time of parturition it expels the young one at the birth.

d) Vagina

1. Vagina is also called birth canal.
2. It is about 7.5 cm to 10cm in length and opens into vestibule of vulva. Inner lining cells of vagina store glycogen.
3. Vagina also acts as a copulatory passage as it receives semen during intercourse.
4. It allows passage of menstrual flow.

4. **Describe menstrual cycle in human beings.**

Ans: 1. Menstrual cycle starts at the time of puberty. It lasts for about 28 days and it is repeated throughout child bearing years for about next 32 years. It stops with menopause.

2. Hormones FSH, LH, Estrogen and progesterone are responsible for these cyclic changes in mature females.

3. Menstrual phase is divided into 3 phases: a) **Menstrual Phase**

b) **Follicular/ Proliferative Phase**

c) **Luteal / Secretary phase**

a) Menstrual Phase

1. Menstrual phase extends from 1st to 4th day of the menstrual cycle.
2. Menstruation occurs in absence of fertilization.
3. During this bleeding occurs as the endometrium of uterus is sloughed off.
4. The menstrual flow consists of secretion of endometrial glands, secretion of endometrial glands, cell debris, and unfertilized ovum along with 35 to 45 ml of blood.
5. After about 4th day of bleeding, once again the FSH secretion from the pituitary is resumed and the new follicles start developing.

b) Follicular/ Proliferative Phase

In this phase changes occur in ovary as well as uterus.

i) Ovarian Changes:

1. When ovary is in follicular phase uterus enters in proliferative phase.
2. This takes place from 5th to 13th day of the cycle.
3. New primordial follicle in the ovary due to action of FSH from pituitary.
4. Primordial follicle gradually changes into Graffian.
5. The theca interna of the follicle start producing hormone estrogen.

ii) Uterine changes:

1. Corresponding to the changes in the ovary, the uterus undergoes proliferation.
2. Endometrial glands of uterus are stimulated by the estrogen secreted by the ovary.
3. These glands do the repair process of uterus.

c) Ovulatory Phase

1. During this phase, ovulation takes place.
2. It is the shortest phase. It usually occurs on 14th day of the cycle.
3. It occurs due to increased level of LH in blood.
4. Ovum enters into fallopian tube through ostium. The ovum must be fertilized within 24-48 hours after fertilization.
5. If fertilization takes place the fertilized egg passes through fallopian tube and reaches the uterus on 3rd day after ovulation. Implantation of embryo in uterus occurs in 6th or 7th day.
6. If fertilization does not occur the ovum degenerates.

d) Secretory Phase

1. It is longest phase starts from 15th day upto 28th day of menstrual cycle.

CHANGES IN OVARY:

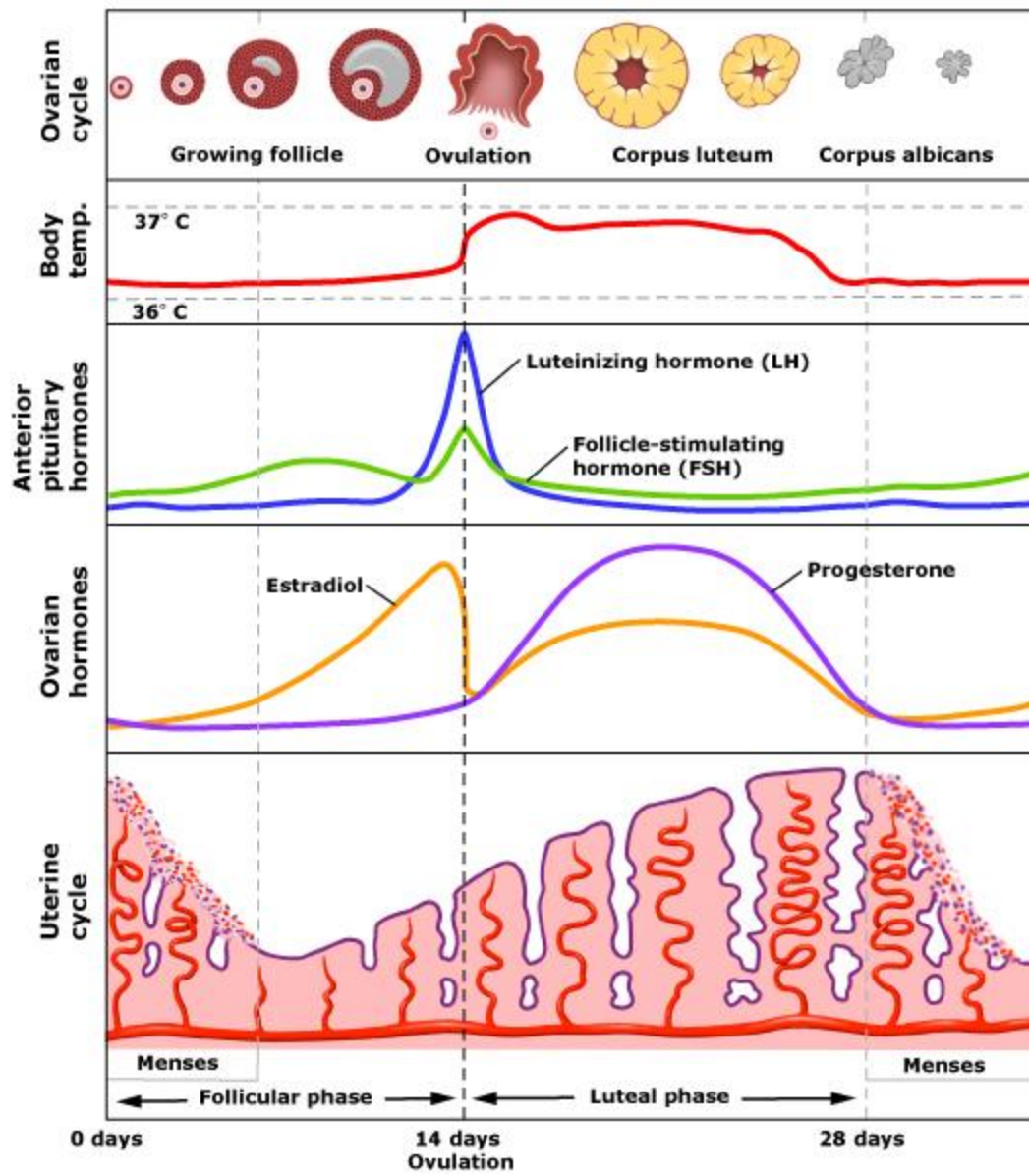
1. After ovulation empty follicle develops into corpus luteum which act as endocrine gland and secretes progesterone.
2. Progesterone helps in maintaining thickness of endometrium. So it is called as pregnancy hormone.
3. Corpus luteum is active till the placenta takes up the function of HCG.
4. HCG is similar to LH. Abortion occurs if corpus luteum becomes inactive before the formation of placenta.

FATE OF CORPUS LUTEUM

1. If the ovum is not fertilized, the corpus luteum degenerates and transform into whitish scar called corpus albicans.
2. If ovum is fertilized pregnancy occurs and corpus luteum increases in size. It attains the diameter of 20-30 mm and persists for 3-4 months.
3. During this time it secretes progesterone and maintains the thickness of endometrium.
4. After 3-4 months placenta starts secreting progesterone and corpus luteum degenerates.
5. No shedding of blood takes place during this time.
6. Therefore missing of menstrual period is the first indication of pregnancy.

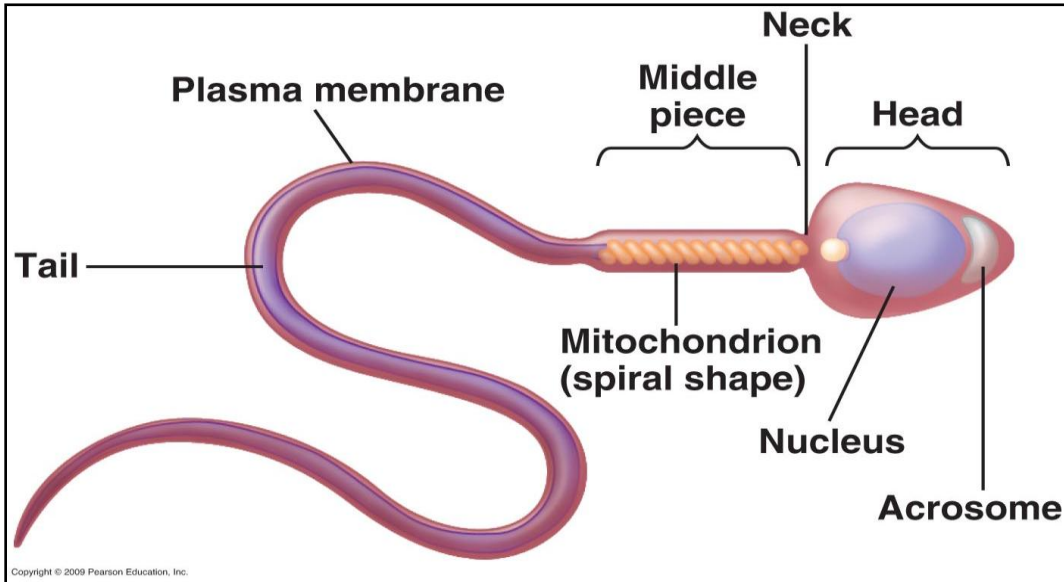
CHANGES IN OVARY:

1. Corpus luteum secretes progesterone.
2. It causes growth of endometrial gland.
3. This gland secretes fluid which is rich in glycogen for nourishing the embryo. Therefore it is called as uterine milk.
4. Thus further increase in thickness of endometrium takes place.
5. If fertilization occurs, embryo is implanted in thickened endometrium.
6. During pregnancy test, the presence of HCG is detected in urine.

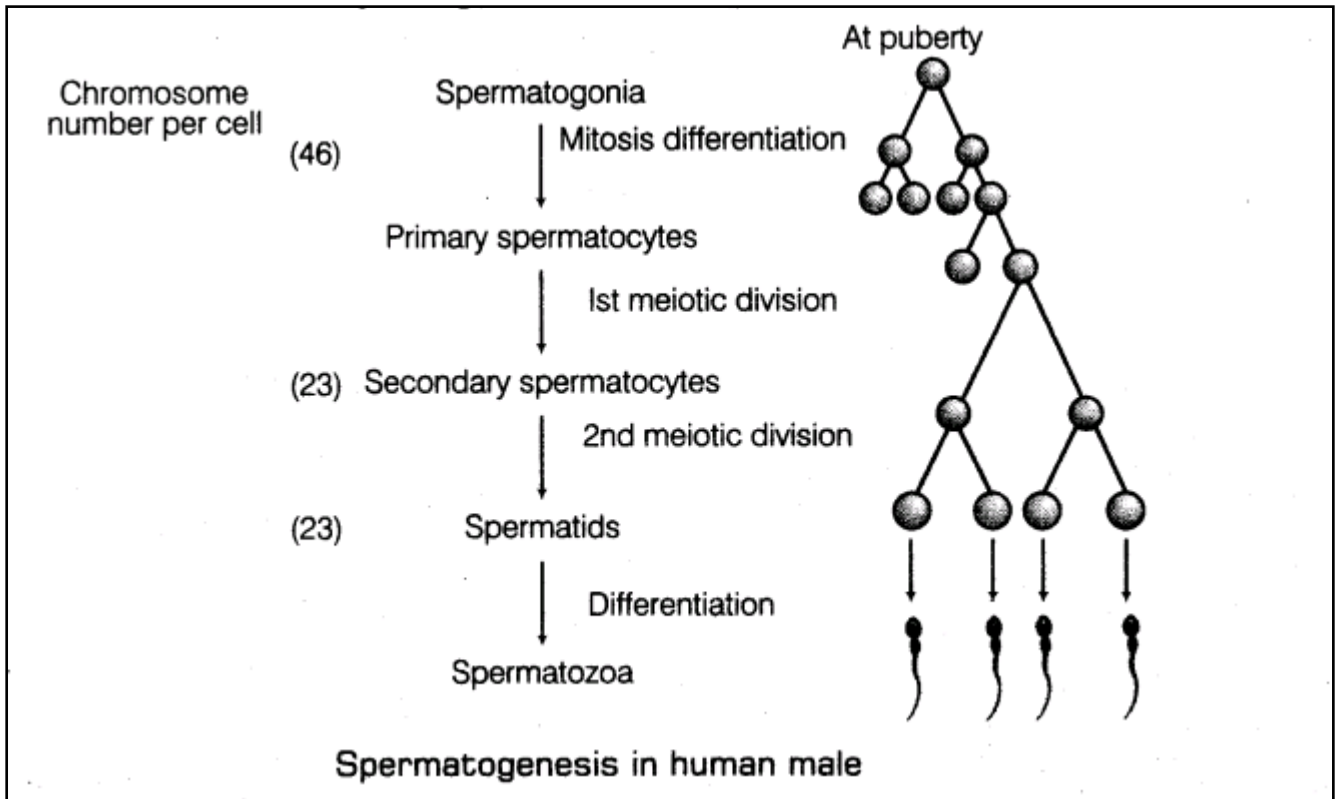


[Diagram = 2m, 4 phases=4m, meaning of menstrual cycle=1m]

5. Draw a neat well labeled diagram of sperm.

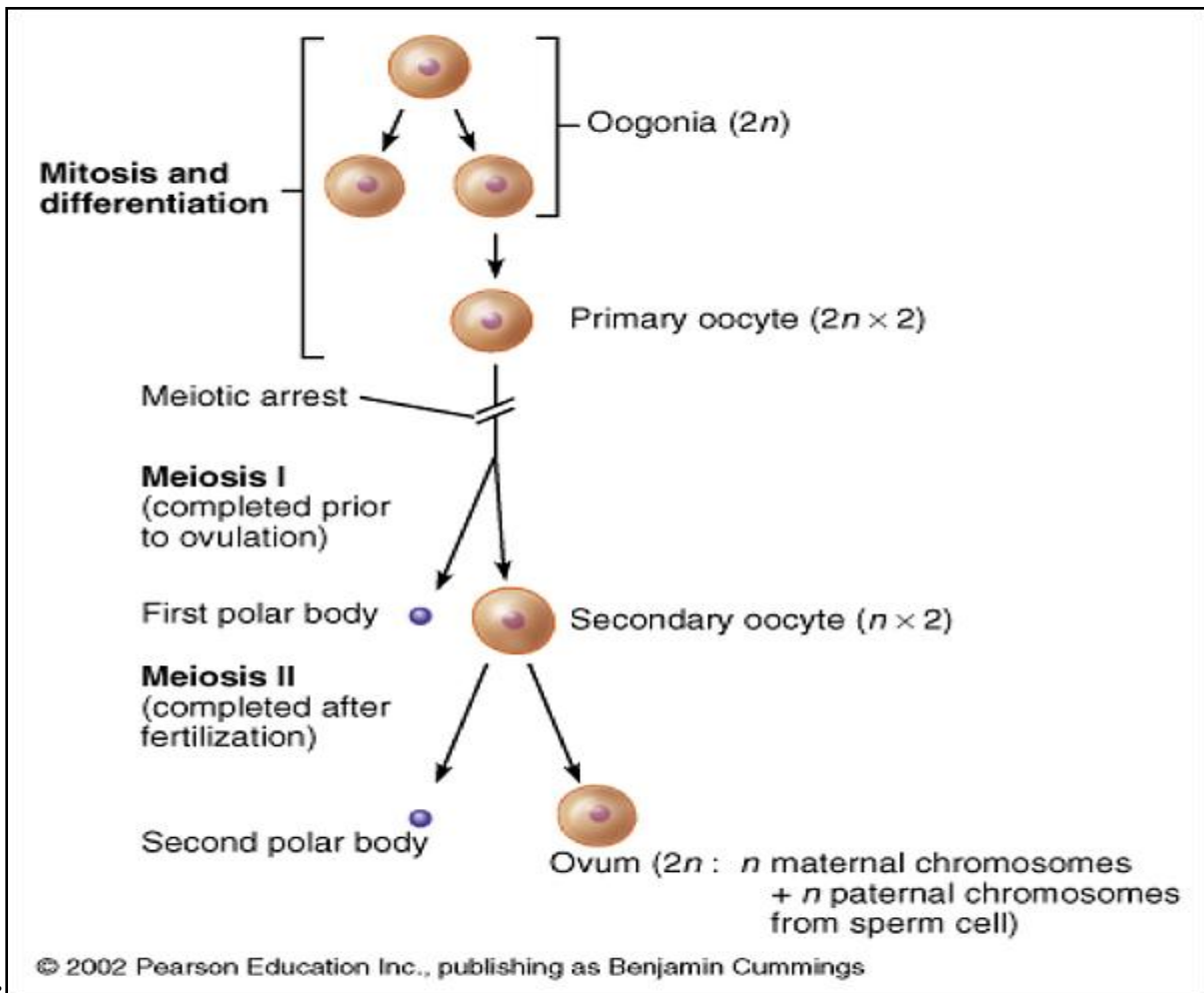


6. Sketch and label stages of spermatogenesis.



Ans:

7. What is oogenesis? Explain the process of oogenesis along with structure of mature ovum. Sketch and label stages of oogenesis.



Ans:

Ans: OOGENESIS: The process of formation of haploid ovum from diploid germ cell is called oogenesis. Oogenesis occurs in female gonad called ovary.

It is completed in 3 phases

I] Multiplication Phase: Germinal cells undergo mitotic divisions to form large number of oogonia. Oogonia in human beings are formed in female ovary even before birth.

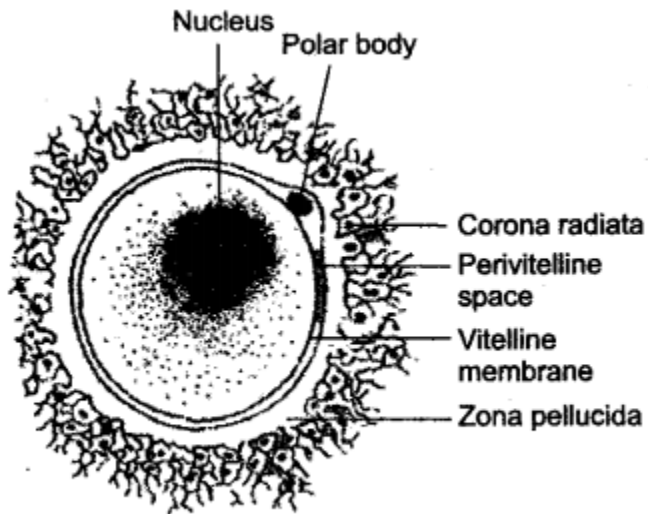
II] Phase of Growth: Before puberty under the influence of FSH of the oogonia grows in size much larger than spermatozoa. The grown up cell is called primary oocyte.

III] Maturation Phase: Primary oocyte undergoes maturation of meiotic division. Meiotic I division of primary oocyte shows equal nuclear division but unequal cytoplasmic division. So at the end of meiosis I division, large sized haploid secondary oocyte and haploid small sized polar body are formed.

Secondary oocyte and polar bodies undergo 2 meiotic divisions. Meiosis II is arrested at metaphase stage & secondary oocyte is released from ovary. Remaining part of division is completed at the time of fertilization. This division is also unequal by which functional female gamete ovum is formed. This ovum is ready for fertilization.

STRUCTURE of OVUM

1. The ovum discharged by the ovary during ovulation is actually a secondary oocyte.
2. The ovum is rounded haploid non motile female gamete.
3. It is the largest cell of the body. It measures about 0.1 mm or 100 μ in diameter.
4. It is almost free of yolk and is said to be microlecithal.
5. It has abundant cytoplasm called ooplasm and plasma membrane now called vitelline membrane.
6. There is no centrioles but it has 2 poles
7. Its side which shows polar body and nucleus is called animal pole while the opposite pole is termed as vegetal pole.
8. Ovum has 2 coatings, inner zona pellucid and outer corona radiate.



Structure of ovum(unfertilized)

(*Definition of oogenesis=1m, process of oogenesis=2m, diagram= 1m, ovum structure= 2m, diagram=1m*)

8. **Explain the mechanical methods of birth control**

Ans: Using Condom, Diaphragm, cervical cap and intrauterine devices are mechanical methods of birth control

- a) **Condoms:** It is a device used by males. They are rubber sheaths used to cover erect penis. It prevents semen from flowing out in vagina and thus checks the pregnancy.
- b) **Diaphragm & cervical cap:** These are devices used by females. They are fitted on the cervix of vagina so that sperm do not gain entry into uterus & fallopian tubes.
- c) **Intrauterine devices / IUD:** IUD are plastic or metal devices placed inside the uterus by medical doctor. Loop, copper-T, Spiral, ring, bowl, shield etc are different types of IUD. They prevent implantation of ovum inside the uterus, so that the women does not get pregnant.

9. **Write short note on physiological devices of birth control.**

Ans: 1) Physiological devices are in form of oral contraceptive pills or birth control pills. They are hormonal preparation and check ovulation by inhibiting the secretion of FSH and LH.

2) Woman who is using pills does not release ovum at the time of ovulation and therefore conception does not occur.

3) Birth control pills have side effects such as nausea, breast tenderness, weight gain, slight bleeding during menstrual periods.

4) Though it is commonly used birth control in India, it can cause lots of health hazards for women due to synthetic hormones.

5) The birth control pills contain progesterone and estrogen. Mala-D to be taken daily and Saheli to be taken weekly are 2 common birth control pills in India.

10. **Write short note on Amniocentesis**

Ans:1) Amniocentesis is a technique of withdrawing amniotic fluid from pregnant mother's uterus. For this purpose sterile hypodermic needle is used.

2) This amniotic fluid may contain foetal cells. These cells are used for prenatal test. Chromosomal defects can be checked by this technique.

3) However in India, this technique is illegal because it is used to determine sex of the child before birth. Due to social stigma female fetuses are aborted and hence now amniocentesis is legally banned.

Q. Differentiate between Embryo and Foetus

Zygote	Embryo	Fetus
Forms when a male sperm cell fertilizes a female egg cell.	First stage of the zygote's development where its cells multiply to form their designated functions (differentiation).	Refers to a point in the embryo's development where it takes on a more human form, and some bodily functions begin to work.

EMBRYO	FOETUS
1. An embryo is formed by the repeated cell division of a zygote.	1. A foetus is formed by the growth and development of an embryo.
2. An embryo is an unborn baby in the uterus in the early stages of development (upto 8 weeks)	2. A foetus is an unborn baby in the uterus in the later stages of development (after 8 weeks till birth).
3. An embryo is multicellular.	3. A foetus is multicellular.

11. **What is function of corpus luteum.**

Ans: Corpus luteum produces progesterone and hence is called secondary endocrine source. It helps in maintaining pregnancy.

12. **Name the cell organelle which forms the acrosome in the sperm.**

Ans: Golgi complex

13. **What is beginning of menstrual cycle called?**

Ans: Menarche

14. **What is ending of menstrual cycle called?**

Ans: Menopause

15. **What is pregnancy?**

Ans: Pregnancy is the condition of carrying developing embryo in the uterus .

16. **What is gemmule?/ How is gemmule formed?**

Ans: Gemmule is the internal bud formed by aggregation of arcaeocytes in sponges to overcome unfavourable season.

17. **What are the functions of scrotum?**

Ans: Scrotum protects the testis and also act as thermoregulator.

18. **Which gland is modified to form breast.**

Ans: Sweat gland

19. **Name the hormone secreted by corpus luteum?**

Ans: Progesterone and relaxin.

20. **Name the surgical procedure performed on mother when foetus fails to come out?**

Ans: Caesarean section

21. **What is ZIFT?**

Ans: Zygote Intra Fallopian Transfer by which early embryo is transferred into the fallopian tube.

22. **Whatis MTP?**

Ans: Medical Termination of pregnancy which is an intentional or voluntary termination of pregnancy before the full term.

23. **What is colostrums?**

Ans: Colostrum is milk, produced during initial few days after the parturition. It is rich in antibodies.

24. **How is pregnancy detected by testing urine?**

Ans: Hormone HCG (Human Chorionic Gonadotropin) is present in the urine of pregnant women. Its presence by chemical testing confirms pregnancy.

25. **Which gland provide fluids to the semen?**

Ans: Prostate gland provide fluids to the semen.

26. **Name the hormone which maintains sexual charracteristis of males.**

Ans: Three **hormones** are the principle regulators of the **male** reproductive system: follicle-stimulating **hormone** (FSH) stimulates spermatogenesis; luteinizing **hormone** (LH) stimulates the production of testosterone; and testosterone stimulates the development of **male** secondary sex characteristics and spermatogenesis.

27. **Where does fertilization and implantation occur?**

Ans: **Fertilization** occurs in the fallopian tubes. Once **fertilization takes place**, this newly **fertilized cell** is called a zygote. From here, the zygote **will** move down the fallopian tube and into the uterus. The zygote then burrows into the uterus lining. This is called **implantation**.

28. **Enlist external genital organs in females.**

Ans: The **external genital organs** include the mons pubis, **labia** majora, **labia** minora, Bartholin glands, and clitoris.

29. **Difference between blastula and gastrula.**

Blastula	Gastrula
1. Blastula has a blastocoel. 2. Blastula is produced by the process of blastulation. 3. Blastula undergoes implantation followed by gastrulation.	1. Gastrula has a gastrocoel or archenteron. 2. Gastrula is produced by the process of gastrulation. 3. Gastrula undergoes morphogenesis and then forms germ layers.

Ans:

