ULTIMATE KCET

CRASH COURSE 2026

Biology (Zoology) | Lecture - 01

Human Reproduction

By – Raghunath Sir

Topics *to be covered*

1. Human Reproduction - Synopsis
2. Most Important MCQs

KCET Biology Strategy

Reading multiple books ❌

Ignoring NCERT diagrams ❌

Not revising regularly ❌

Skipping mock tests ❌

Days 1–10: Concept Building

Days 11–20: Practice + Revision

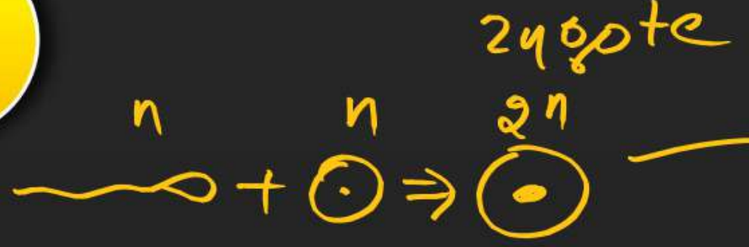
Days 21–30: Mock Tests + Final Revision

Solve MCQs daily (100–150 questions)

Previous Year Questions (VERY IMPORTANT)

Revise notes daily

Human Reproduction



Gametogenesis → Insemination → Fertilization → Implantation

Sperm
ovum

bastocyst

Implantation → Placentation

Chorionic villi

Placentation → Organogenesis

organs
organ system

Organogenesis → Parturition

Foetal ejection Reflex

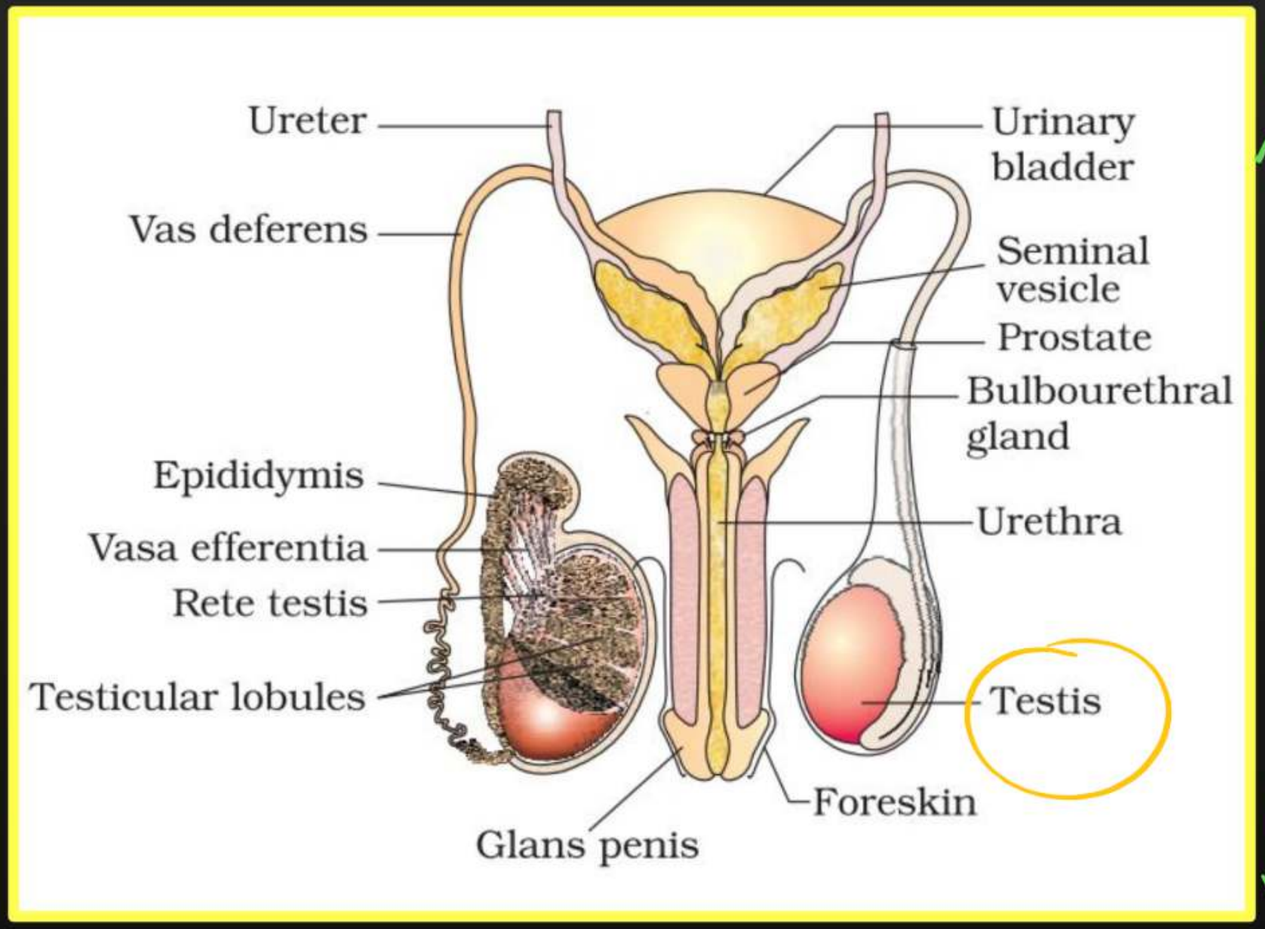
Parturition → Postnatal Development

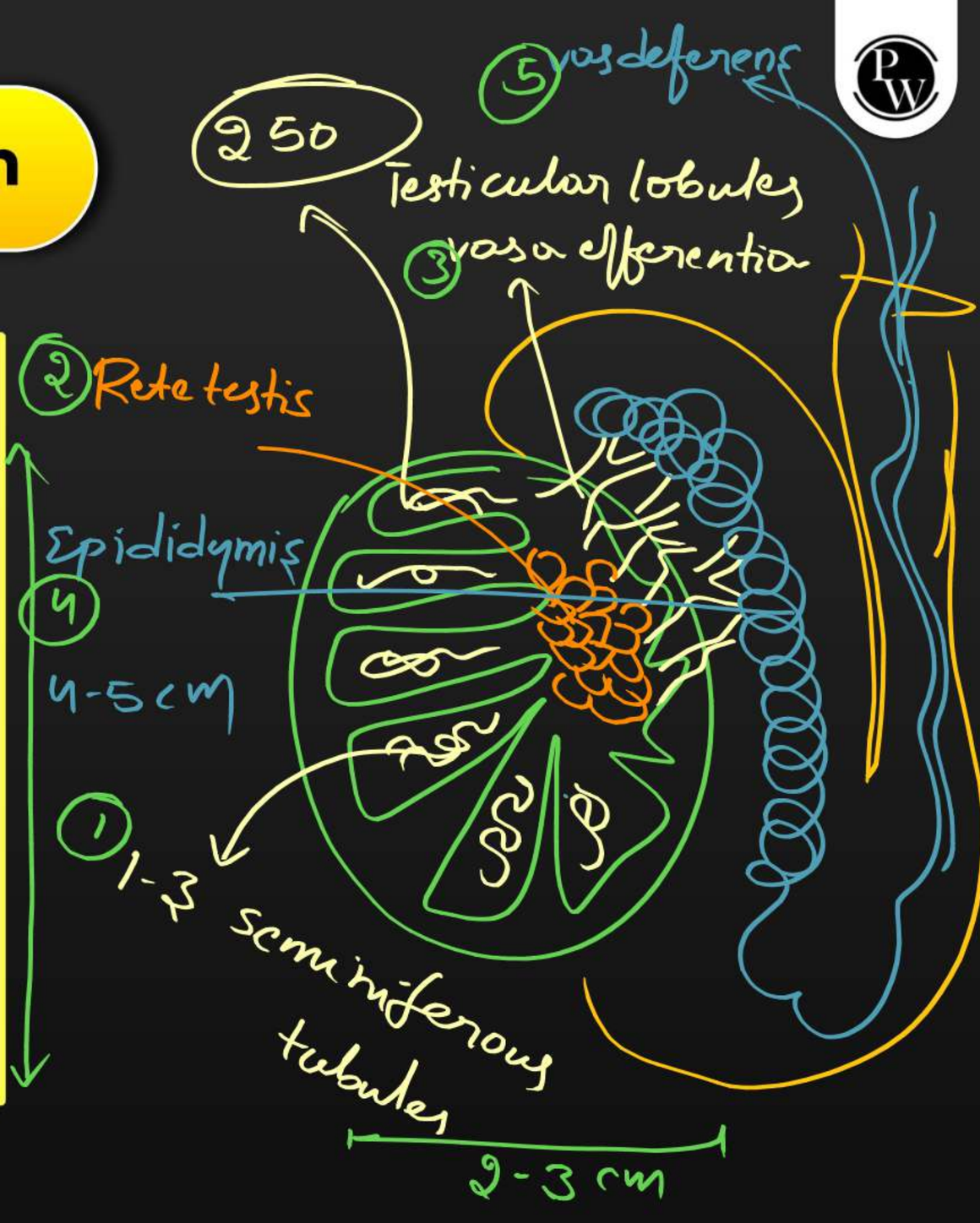
Oxytocin

Human Reproduction

Division	Male Reproductive System	Female Reproductive System
Primary Sex Organs	A pair of testes	A pair of ovaries
Secondary Sex Organs (Ducts)	Rete testis, Vasa efferentia, Epididymis, Vas deferens, urethra	Fallopian tubes, Uterus, Cervix, Vagina
Secondary Sex Organs (Glands)	Seminal vesicles, Prostate gland, Bulbourethral glands	Mammary glands
An External genitalia	Penis	Vulva

Male Reproductive System





Testes are extra-abdominal.

present with the scrotal sac (scrotum)

↓

Reduces the temp^{r} of testis 2-2.5°C

low temperature - favours spermatogenesis.

Male Accessory Glands

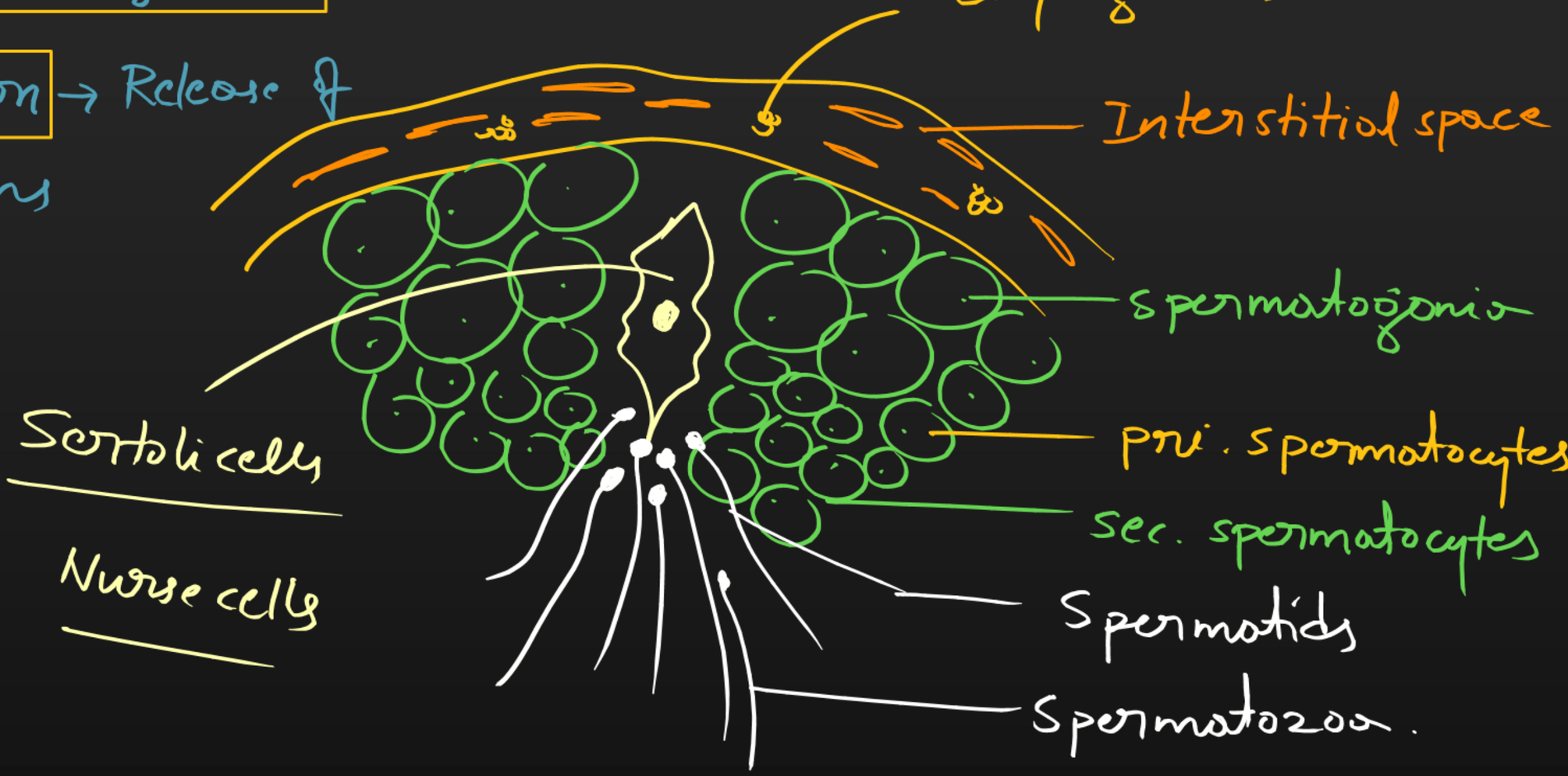
paired **Seminal vesicles**	It surrounds the urethra and produces a milky secretion which forms a considerable part of the semen. This secretion contains citric acid, lipids and enzymes. Secretion of the prostate gland nourishes and activates the spermatozoa to swim.
unpaired **Prostate gland**	These secrete mucus and a watery alkaline fluid that contains fructose which provides energy to the sperms.
Paired **Bulbourethral glands or Cowper's glands**	Attached to the urethra below the prostate gland. They secrete mucus fluid for the lubrication of the penis.

Section of Testis

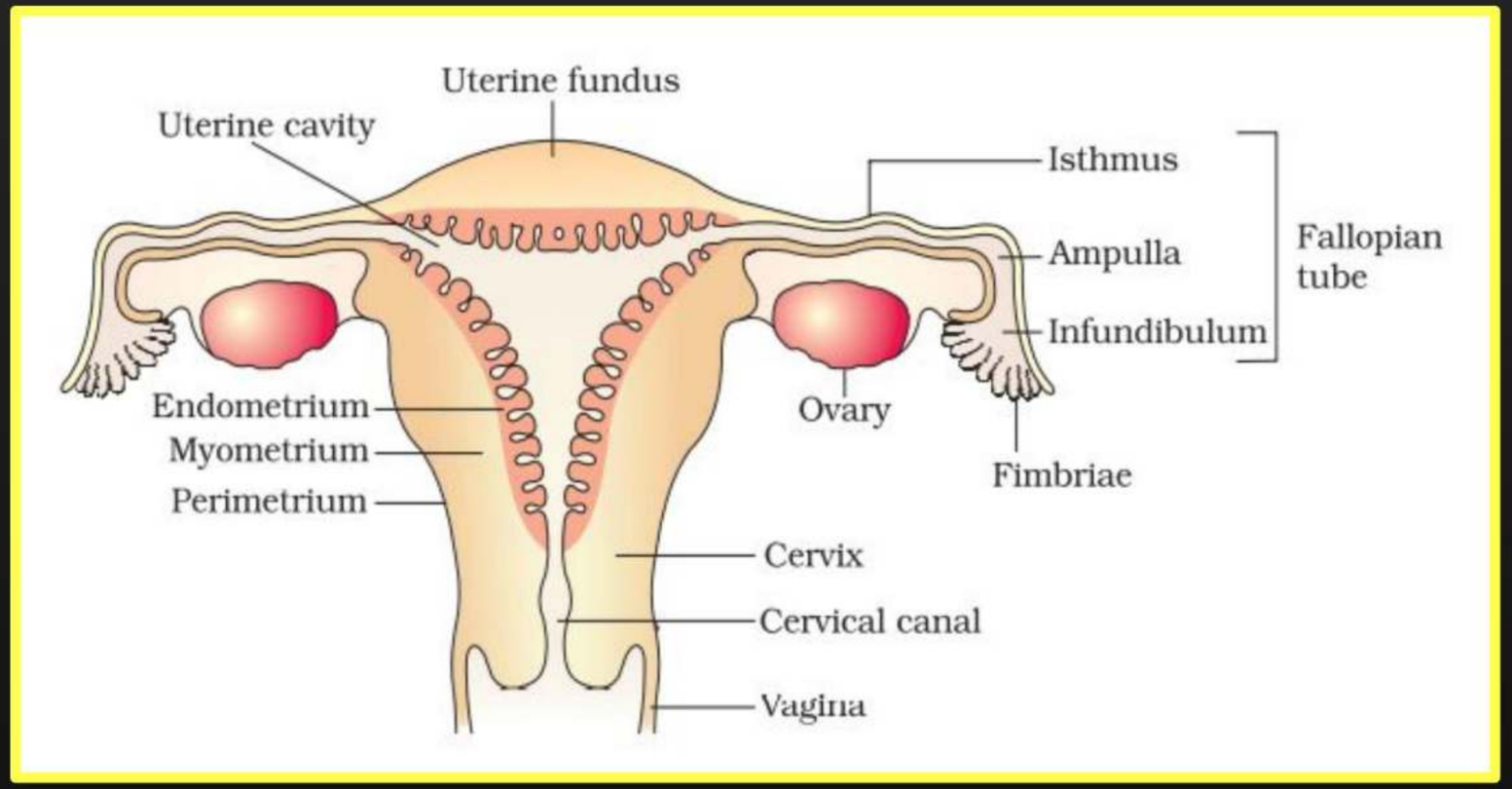
- Each testis is divided into 250 compartments called Testicular lobules
- Each lobule contains 1-3 highly coiled tubules known as seminiferous tubules in which sperms are produced.
- Each Seminiferous tubule is lined on its inside, by two highly specialized cells called male germ cells (spermatogonia) and Sertoli cells.
- Spermatogonia undergo meiotic cell division to produce Spermatozoa.
- Sertoli cells or nurse cells provide nutrition to the germ cells.
- The regions outside the seminiferous tubules contain masses of cells called interstitial cells or Leydig cells. They synthesize and secrete the male hormones called Androgens (testosterone) which maintain male sex characteristics.

Spermiogenesis - Spermatids → Sperms

Spermiation → Release of Sperms



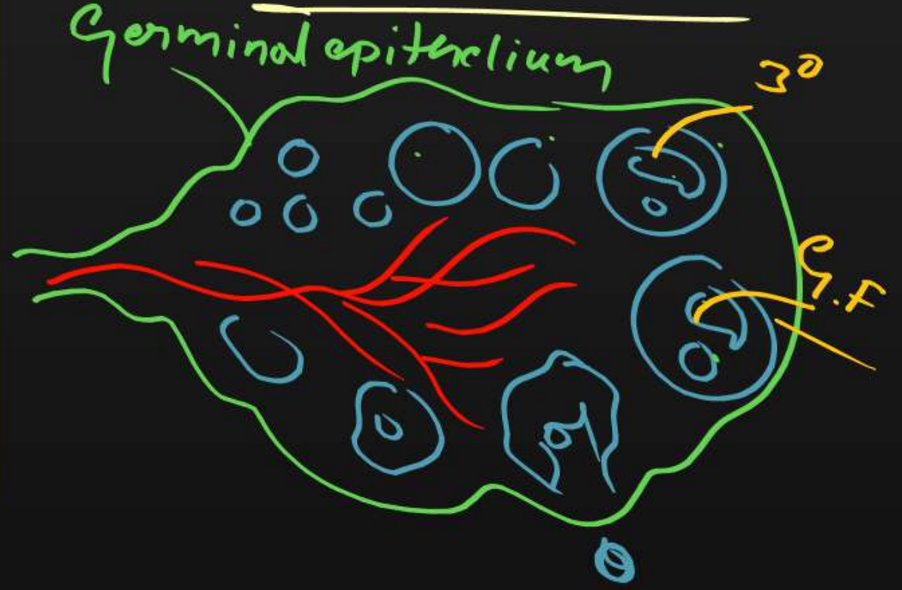
Female Reproductive System



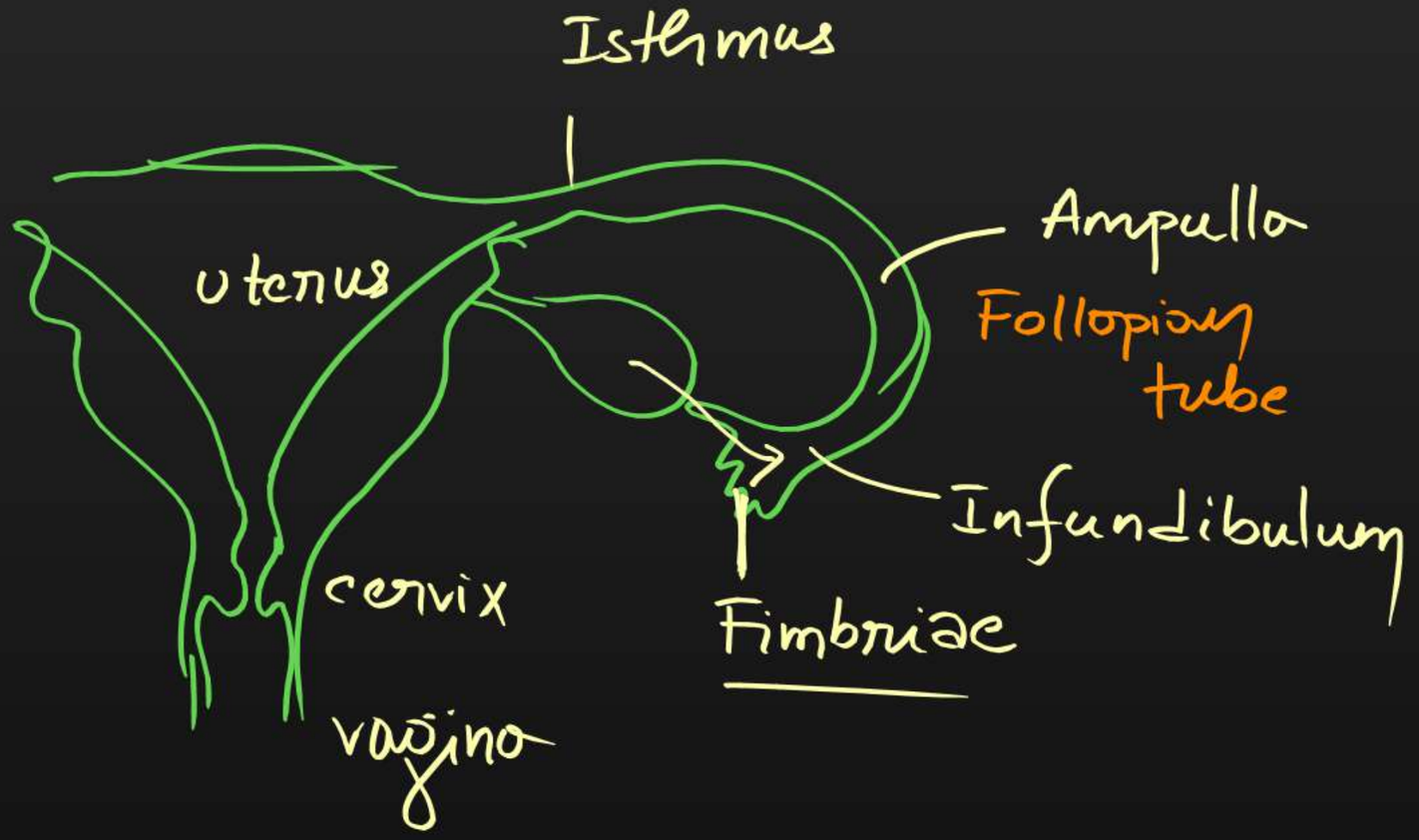
ovaries

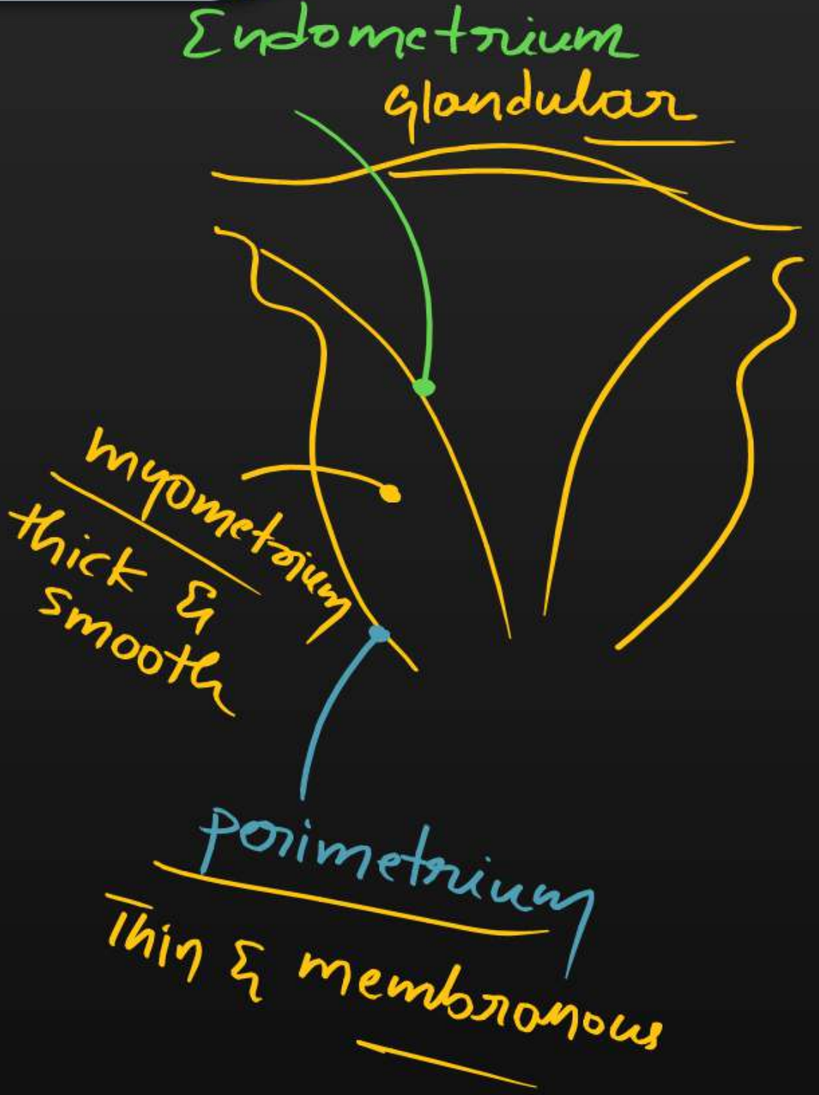
ova + ovarian hormones

Estrogen & progesterone



Female Accessory Ducts and Glands

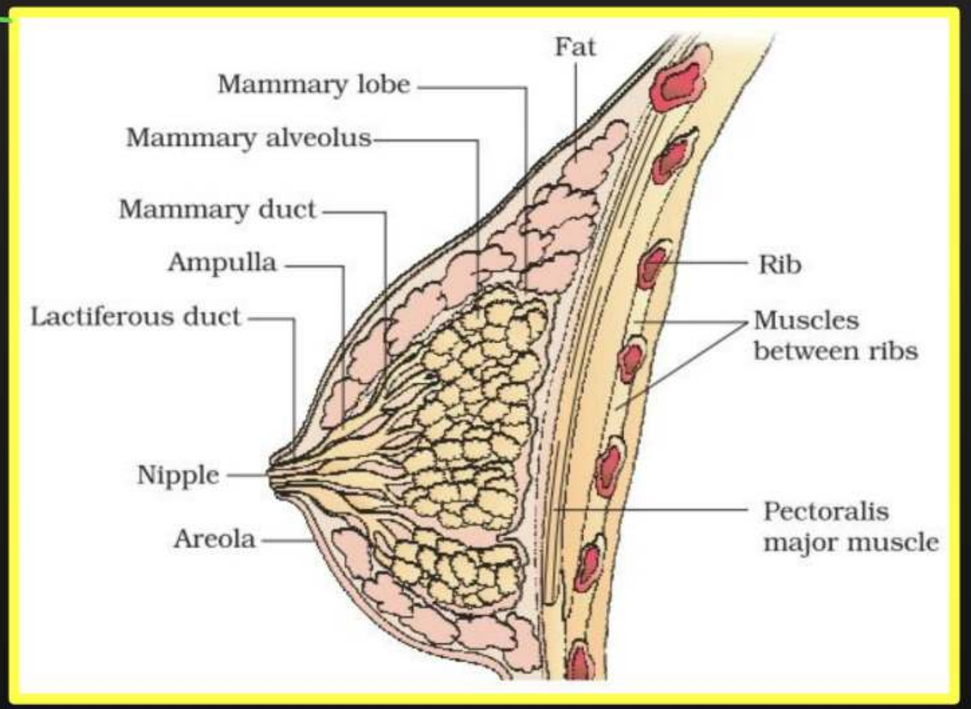




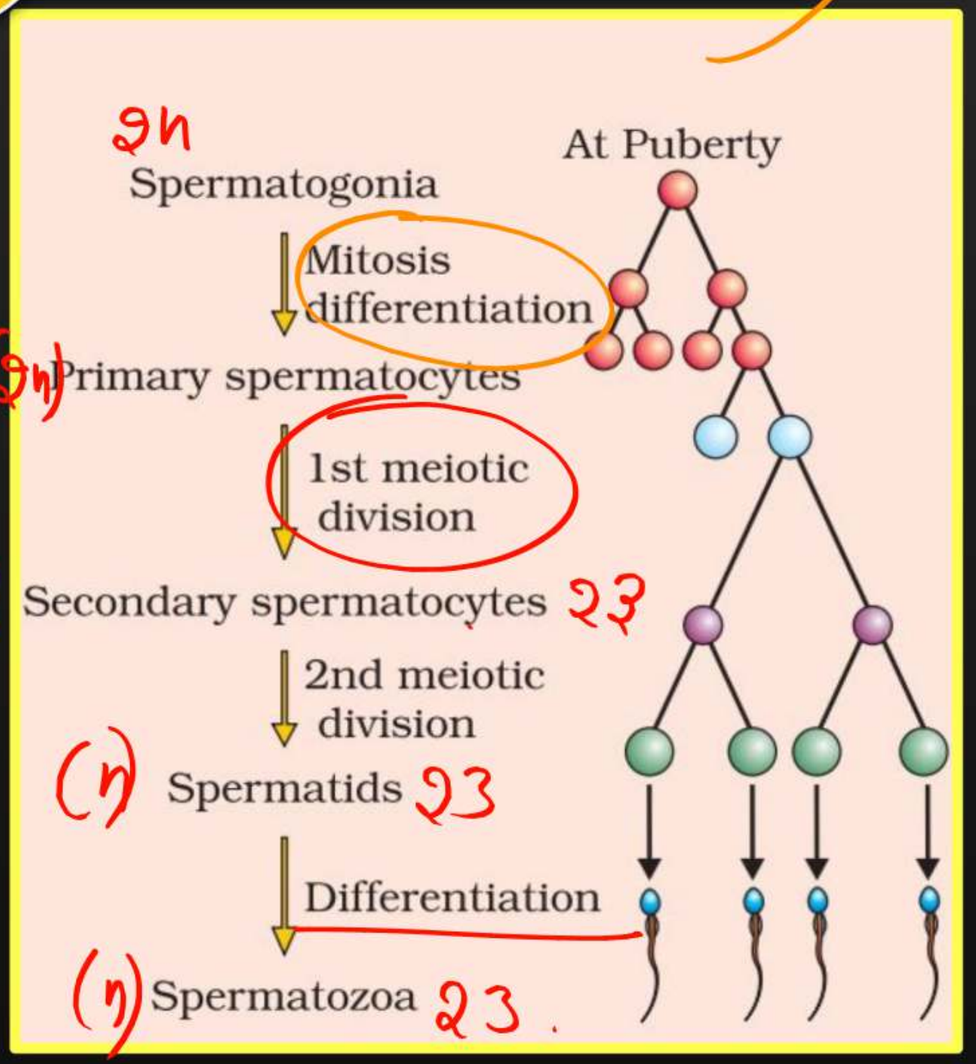
Mammary Gland

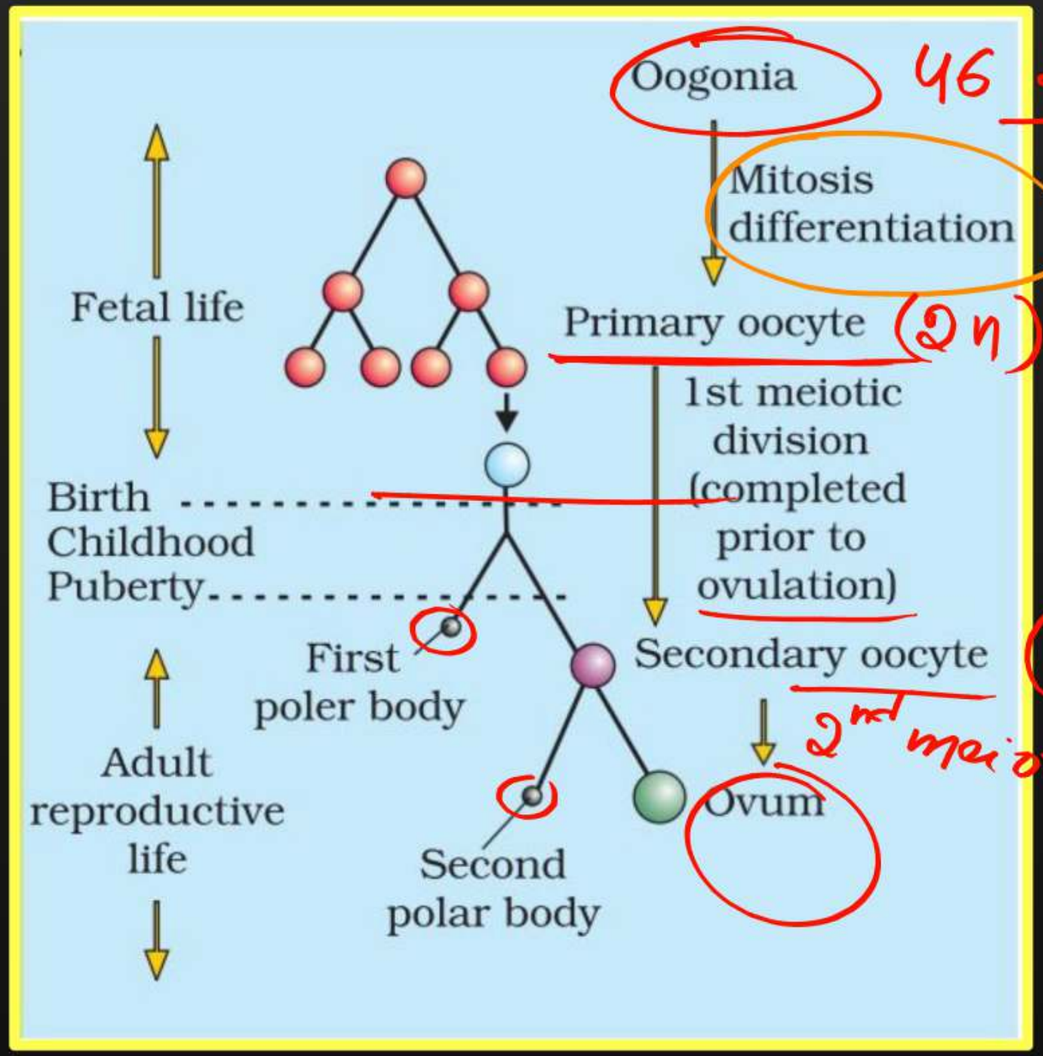
statement base question

- ✔ Human female has a pair of mammary glands (breasts) that contain glandular and fatty tissue.
- ✔ Each glandular tissue is divided into 15-20 mammary lobes and each lobe consists of a group of Alveoli.
- ✔ The alveoli open into Mammary tubule.
- ✔ The mammary tubules of each lobe open into small Mammary ducts.
- ✔ Several mammary ducts join to form a wider Mammary ampulla that is connected to lactiferous duct just before the nipple through which milk is released.

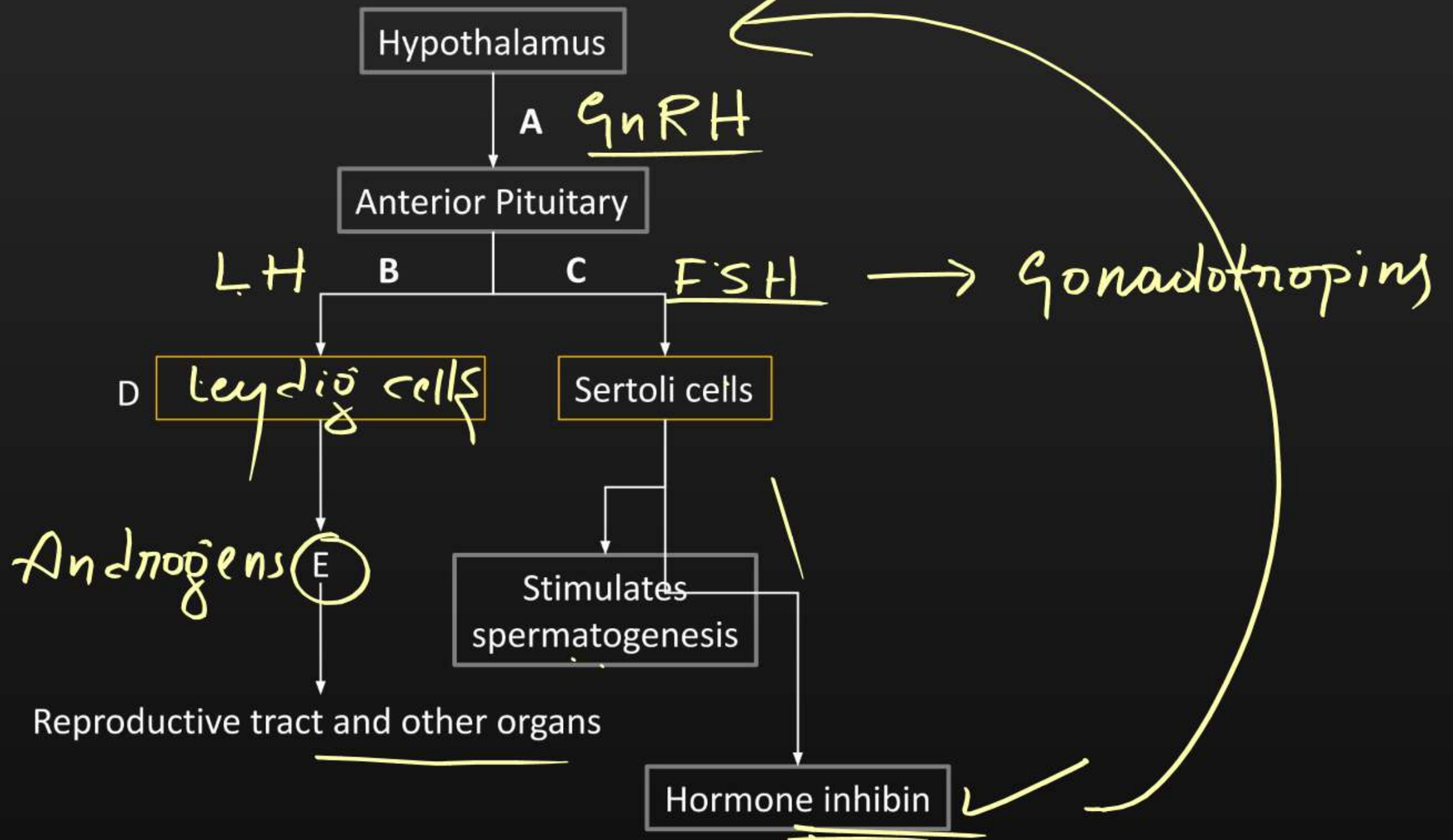


Gametogenesis



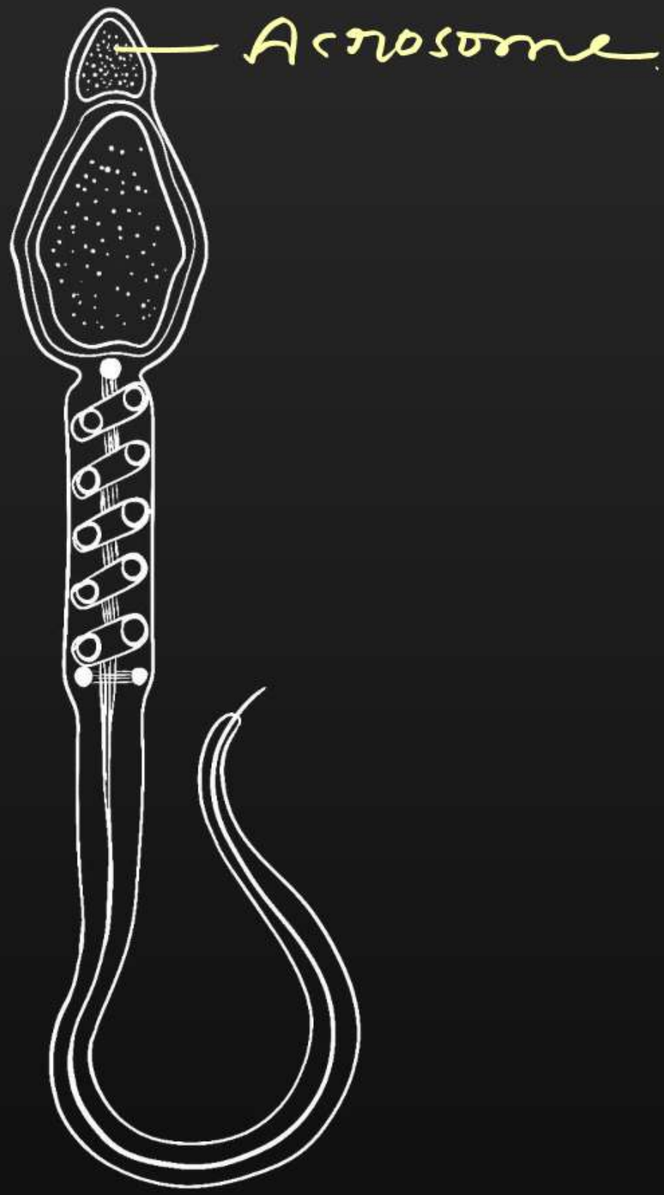


Hormonal Regulation of Spermatogenesis



Structure of Human Sperm

- A sperm consists of four parts—head, neck, middle piece and tail.
- Head is the enlarged end of a sperm, contains an elongated haploid nucleus, anterior portion of nucleus capped by Acrosome. The acrosome contains Hyaluronidase enzymes that help in dissolving membranes of the ovum during fertilization.
- Neck contains proximal and Distal centriole.
- Middle piece contains a number of Mitochondria that provide energy for the movement of the tail.
- Tail helps the sperms to swim in a fluid medium.



Spermatogenesis and Oogenesis

Spermatogenesis	Oogenesis
Occurs in Testes	Occurs in Ovaries
It begins at puberty	It begins at the foetal stage
Four gametes are formed	One gamete is formed
Polar bodies are not formed	Polar bodies are formed
It is continuous and occurs throughout the life	It terminates with menopause
Sperms produced by this process are much smaller	Ovum is larger in size

Question

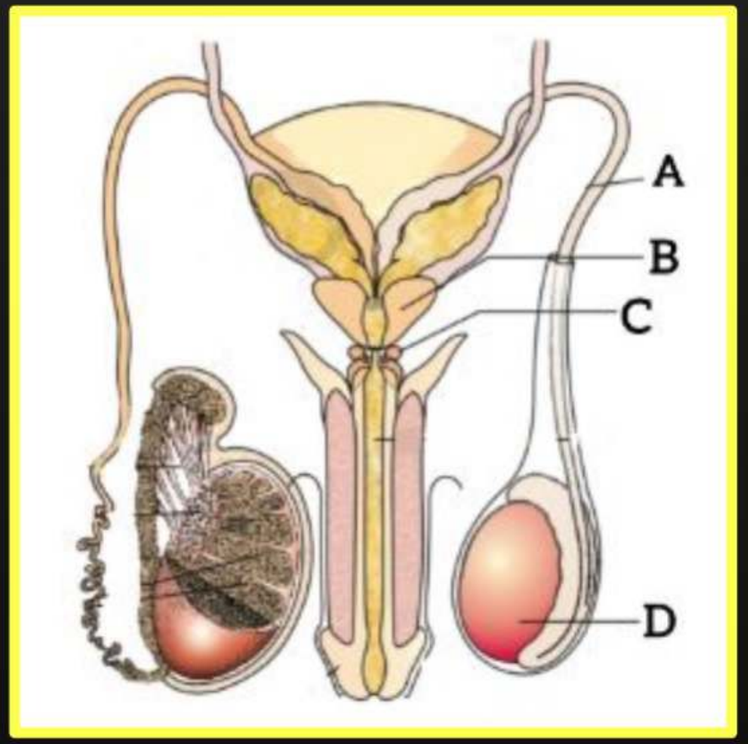
Read the following statements about the given diagram carefully and choose the correct option.

(I) 'A' carries urine and 'C' stores sperms.

(II) 'C' secretes a fluid that helps in the lubrication of the penis.

(III) 'D' produces testosterone but not sperms.

(IV) 'B' represents the prostate gland.



A (I) and (II) only

B (II) and (III) only

C (II) and (IV) only

D (I) and (IV) only

Question

Secretions from which one of the following are rich in fructose, calcium, and some enzymes?

Seminal vesicle & prostate.

A. Male accessory glands ✓

B. Liver ✗

C. Pancreas ✗

D. Salivary glands ✗

Question

Which of the following is an unpaired gland of male reproductive system?

A. Bulbourethral gland

B. Seminal vesicle

C. Prostate gland

D. All of these

Unpaired.

Question

Sertoli cells are also called

Nurse cells, supportive

A. Sustentacular cells

B. Sperm cells

C. Interstitial cells

D. Leydig cells

Question

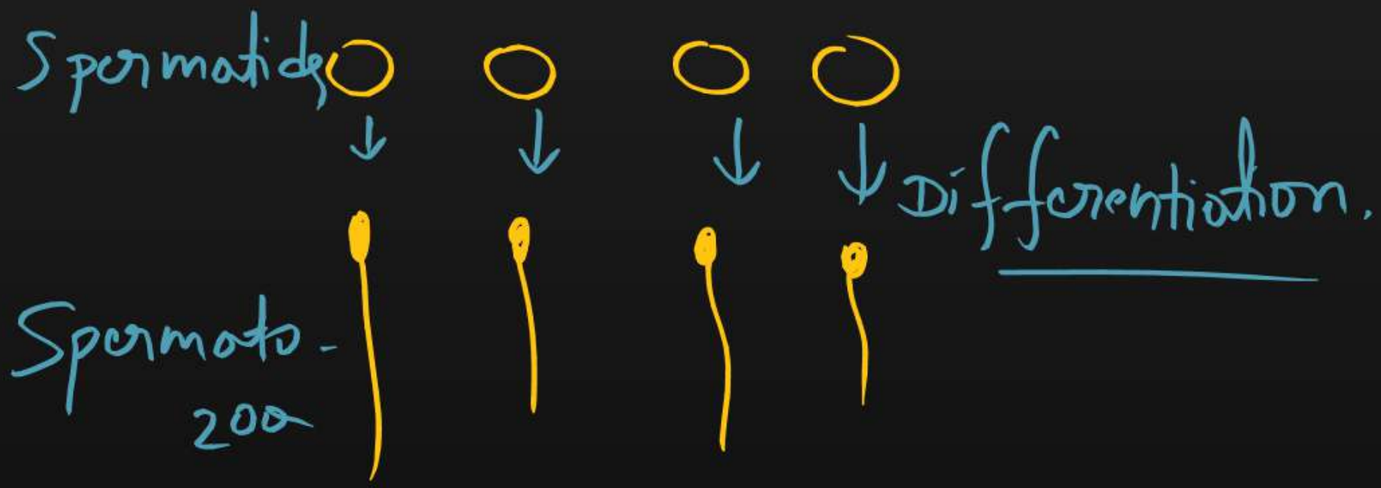
The spermatids are transformed into spermatozoa by the process called:

A. Spermiogenesis

B. Spermiation

C. capacitation

D. both (A) and (B)



Question

Select the incorrect statement.

60% → normal shape & size

40% → vigorous motility.

A. Seminal plasma, along with sperms form semen.

B. 80% of ejaculated sperms must have normal shape and size.

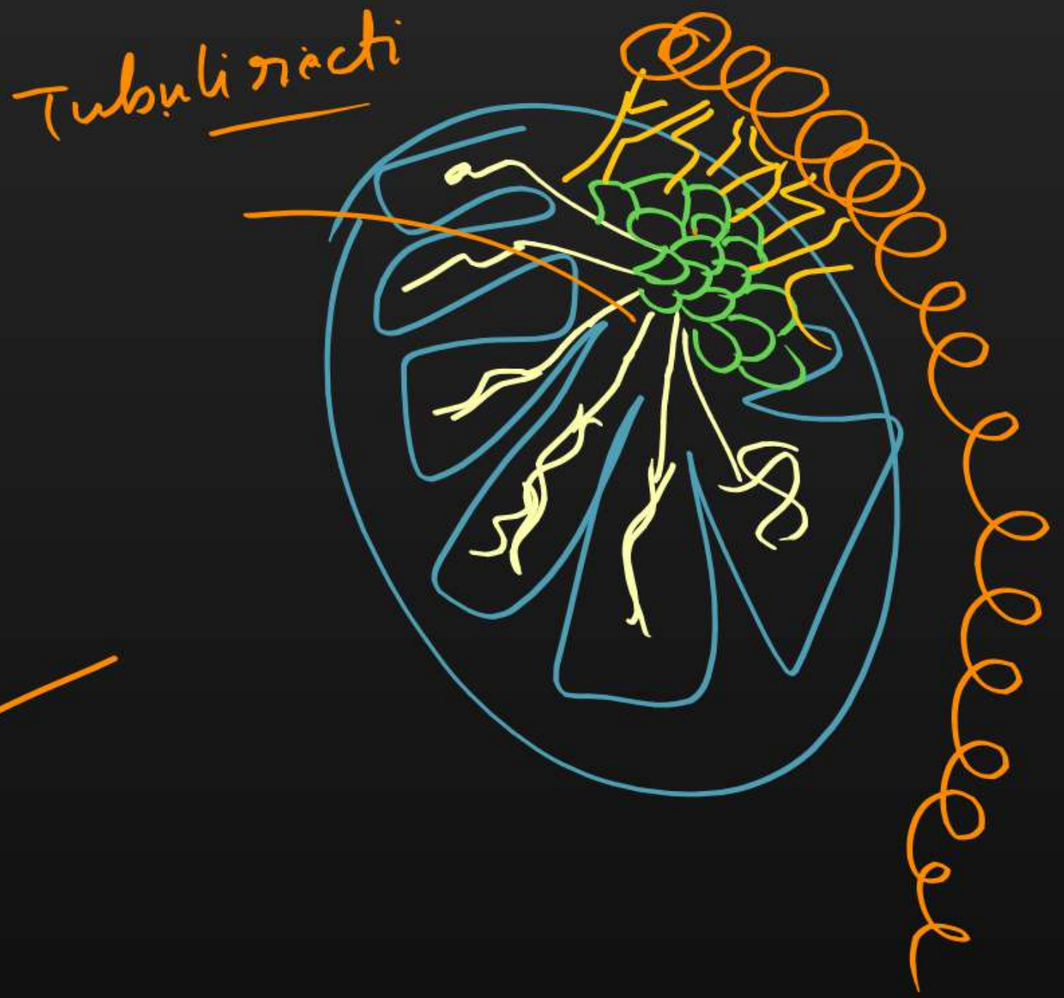
60%.

C. 40% of the ejaculated sperms, which have normal shape and size must show vigorous motility.

D. The tail of sperms helps in motility.

Question

Tubuli recti of seminiferous tubules open into



A. Epididymis

B. Vasa efferentia

C. Vasa deferentia

D. Rete testis

Question

Which of the following depicts the correct pathway of transport of sperms?

A. Rete testis → Vasa efferentia →Epididymis → Vas deferens

B. Rete testis → Epididymis → Vasa efferentia → Vas deferens

C. Rete testis → Vas deferens → Vasa efferentia → Epididymis

D. Vasa efferentia → Rete testis → Vas deferens → Epididymis

Question

For normal fertility, how much percentage of total sperms must have normal shape and size?

A 30%

B 85%

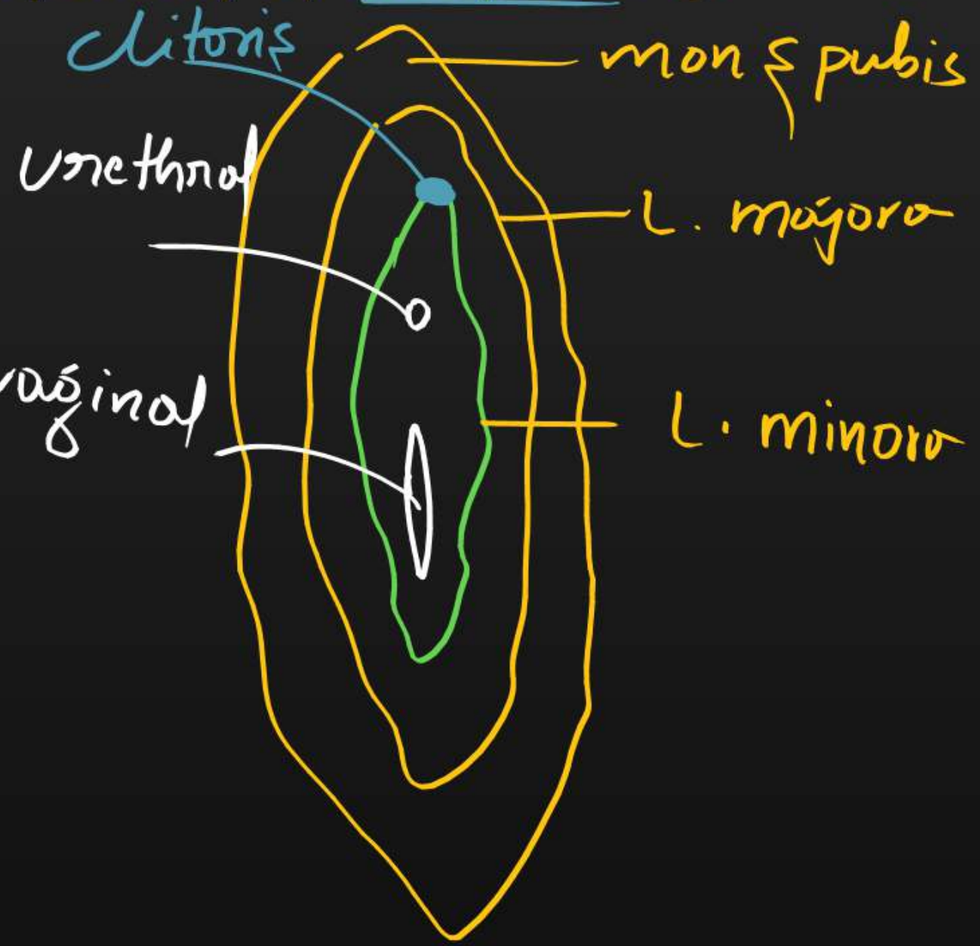
C 50%

D 60%

Question

Statement-I: The labia minora extend down from the mons pubis.

Statement-II: The opening of the vagina is often covered partially by the hymen.



A. Statement I and Statement II both are correct.

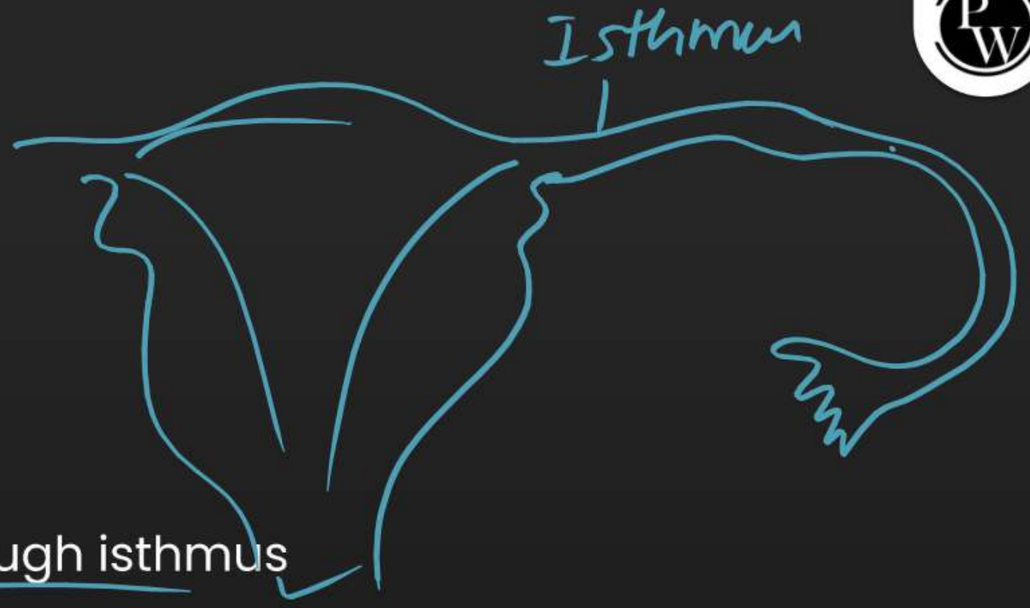
B. Statement I is correct, but Statement II is incorrect.

C. Statement I incorrect, but Statement II is correct

D. Statement I and Statement II both are incorrect.

Question

Select the incorrect statement.



A. The oviduct communicates with uterine cavity through isthmus

B. Endometrium lining of the uterus is the site of implantation

C. Both the ovaries alternatively get activated every month and one secondary oocyte is released in each menstrual cycle

D. Mesometrium is the middle thick smooth muscle layer of uterus

Myometrium

Question

Given below are two statements.

Statement I: The shape of the uterus is like an inverted pear.

Statement II: Each ovary is covered by a thin epithelium which encloses the ovarian stroma.

In the light of the above statements, choose the most appropriate answer from the options given below.

Single, hollow, muscular, Inverted-pear-shaped.

A Statement I is correct but Statement II is incorrect.

B Statement I is incorrect but Statement II is correct.

C Both Statement I and Statement II are correct.

D Both Statement I and Statement II are incorrect.

Question

The edges of the infundibulum posses finger-like projections called fimbriae which helps in

A. Collection of sperms

B. Collection of ovum after ovulation

C. To facilitate implantation

D. To pass nutrition towards ovum

Question

Which of the following are the diploid stages in gametogenesis?

(2n)

46

2n spermatogonia

2n pri. spermatocyte

(n) sec. spermato

(n) spermatids

(n) Spermato zoa

A. Spermatogonia and spermatid

B. Spermatogonia and primary spermatocytes

C. Spermatogonia and sperm

D. Primary spermatocytes and secondary spermatocytes.

Question

Which of the following is the correct sequence for the formation of spermatozoa?

A. Spermatogonia → spermatid → spermatocytes → spermatozoa

B. Spermatids → spermatogonia → secondary spermatocyte → spermatozoa

C. Spermatids → spermatogonia → primary spermatocytes → secondary spermatocytes

D. Spermatogonia → primary spermatocytes → secondary spermatocytes → spermatids → spermatozoa

Question

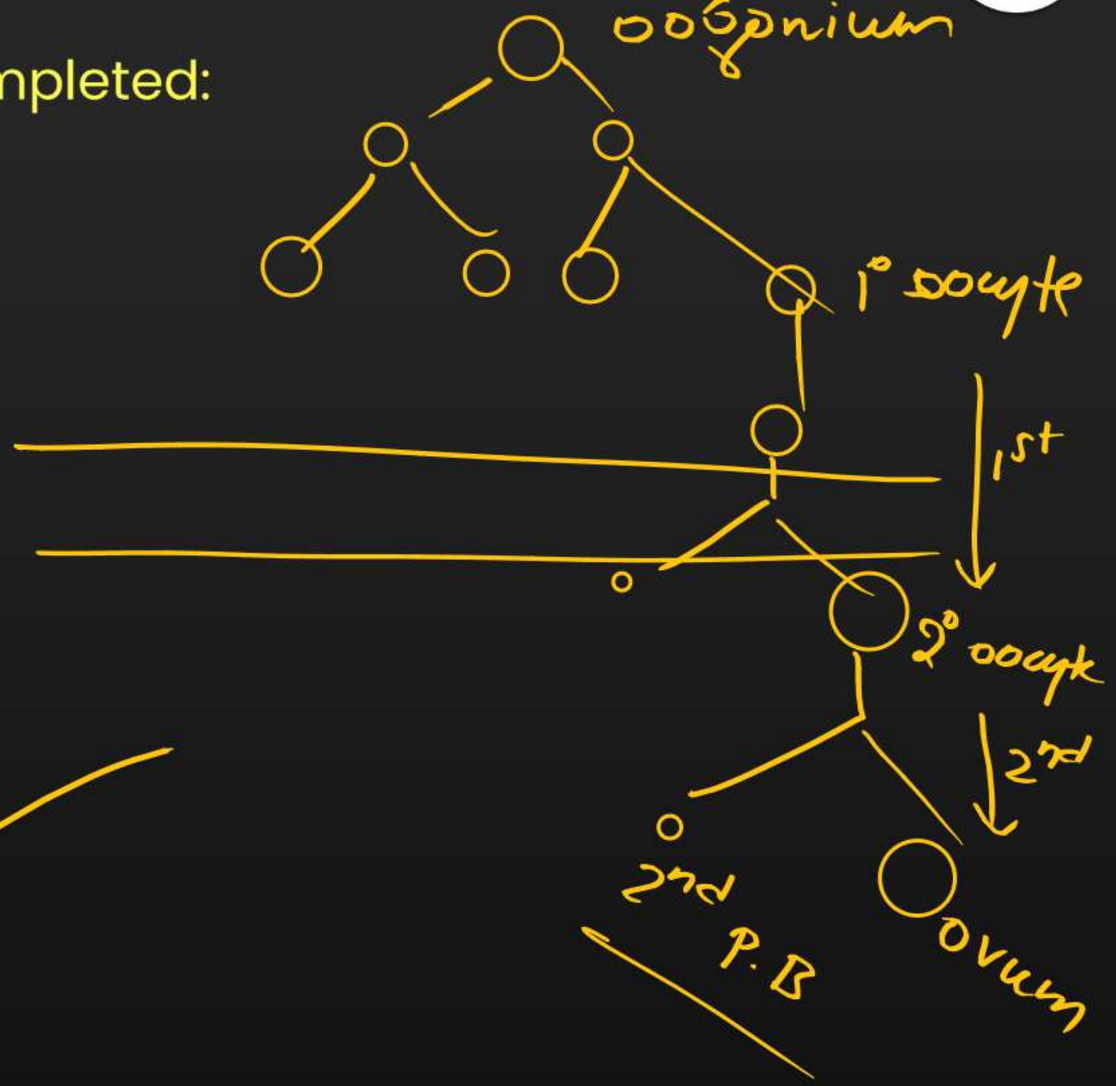
The meiotic division of the secondary oocyte is completed:

A. At the time of copulation.

B. After zygote formation.

C. At the time of fusion of a sperm with an ovum.

D. Prior to ovulation.



Question

Given below are two statements.

Statement I: Primary oocyte surrounded by a layer of granulosa cells is called the primary follicle.

Statement II: Large number of primary follicles degenerate during the phase from birth to puberty.

At puberty - 60,000 - 80,000 pri. follicles

In the light of the above statements, choose the most appropriate answer from the options given below.

(A) Statement I is correct but Statement II is incorrect.

(B) Statement I is incorrect but Statement II is correct.

(C) Both Statement I and Statement II are correct.

(D) Both Statement I and Statement II are incorrect

Question

Which of the following statement is not correct for oogonia?

A. They are million gamete mother cells

B. They are formed within each foetal ovary → A couple million of oogonia

C. They are formed throughout the life of female

D. They start division and get arrested at prophase-I of meiotic division

Menstrual Cycle

- The rhythmic series of changes that occur in the reproductive organs of female primates (monkeys, apes and human beings) is called menstrual cycle.
- It is repeated at an average interval of about 28/29 days.
- The first appearance of menstruation at puberty is called Menarche.
- During pregnancy all events of the menstrual cycle stop and there is no menstruation.
- A natural decline or cease of menstrual cycle at the age of 45-50 years is called Menopause.

Menstrual Phase

bleeding, menses

- The soft tissue of endometrial lining of the uterus disintegrates causing bleeding.
- The unfertilised egg and soft tissues are discharged.
- It lasts for 3-5 days.

Follicular Phase

proliferative

- The primary follicles in the ovary grow and become a fully mature Graafian follicle.
- The endometrium of the uterus is regenerated due to the secretion of LH and FSH from anterior pituitary and ovarian hormone, estrogen.
- It lasts for about 8 to 10 days.

Ovulatory Phase

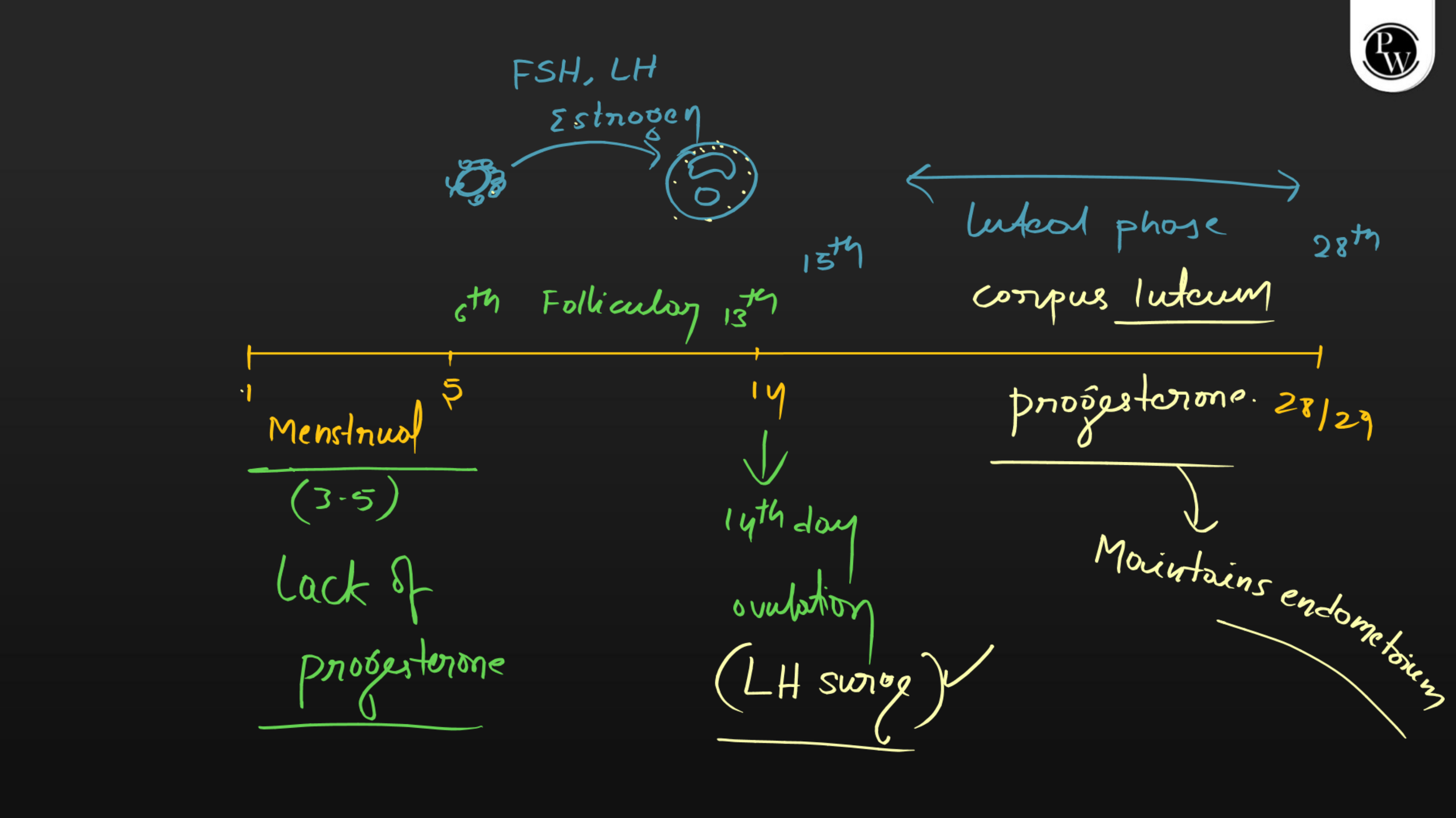
- Rapid secretion of LH (LH surge) induces rupture of Graafian follicle, thereby leading to ovulation (release of ovum).
- It lasts for only about 48 hours.

2° oocyte

Luteal Phase

Secretory phase

- In this phase the ruptured follicle changes into corpus luteum in the ovary and it begins to secrete the hormone progesterone.
- The endometrium thickens further, and their glands secrete a fluid into the uterus.
- It lasts for only 12-14 days.


FSH, LH
Estrogen
15th
Luteal phase
28th
6th
Follicular
13th
corpus luteum
1
5
14
28/29
Menstrual
(3-5)
Lack of
progesterone
14th day
ovulation
(LH surge)
progesterone.
Maintains endometrium

Menstrual Cycle

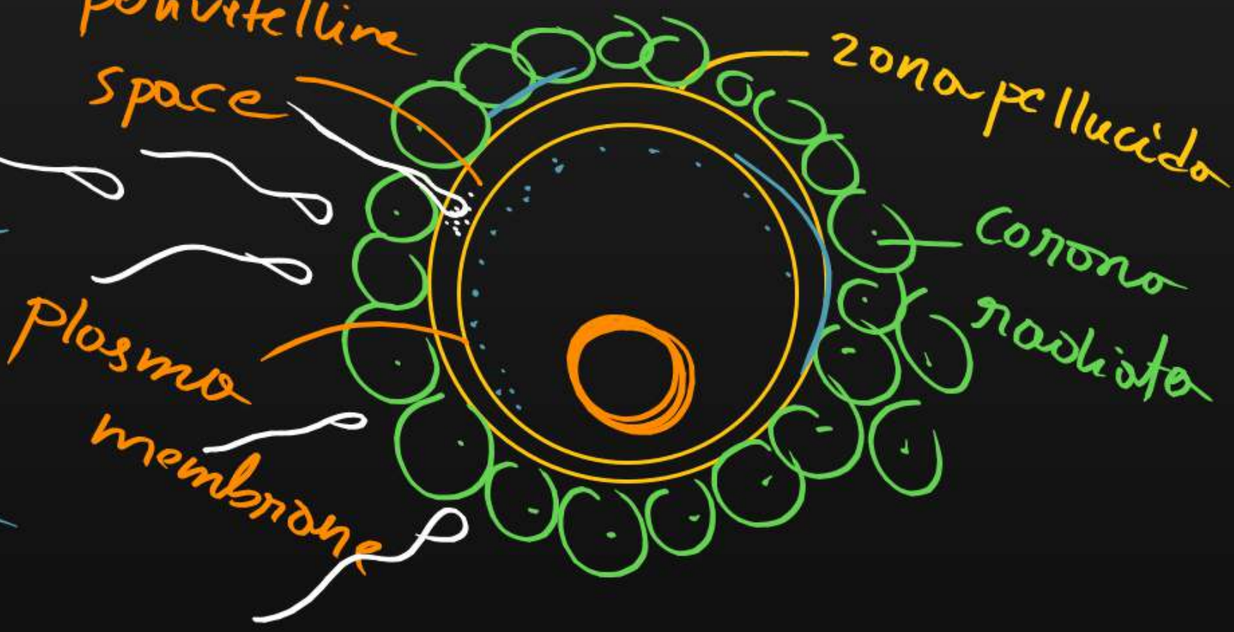
Fertilization and Implantation

The process of fusion of a sperm (male gamete) with an ovum (female gamete) is called fertilisation.

During coitus, semen is released by the penis into the vagina (insemination). The motile sperms swim rapidly through the cervix, enter into the uterus and reach the ampullary-isthmic junction of the oviduct.

1. Approach of sperm to ovum
2. Penetration of sperm
3. Cortical reaction
4. Fusion of gametic nuclei

Acrosome → Hyaluronidase → penetrates the zona pellucida



Fertilization and Implantation

Zygote —Cleavage→ Morula

8-16 cells

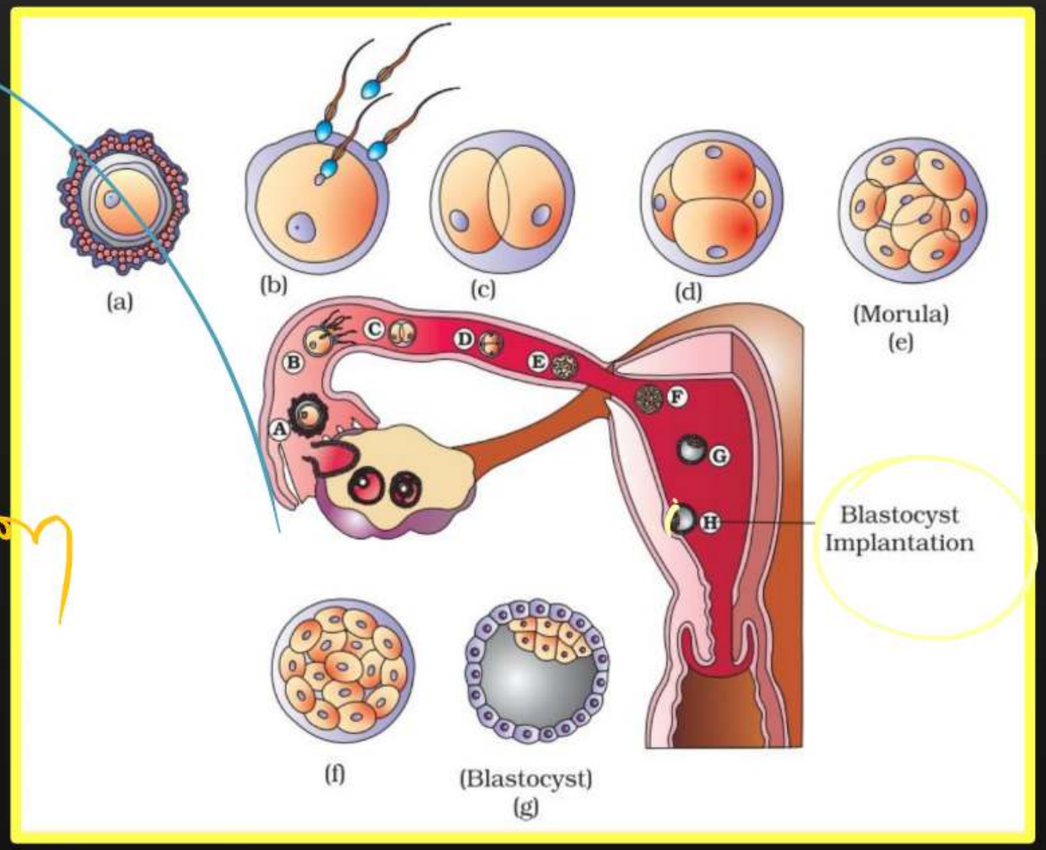
Blastomeres arranged in two layers

Blastula

Implantation

Trophoblast

Inner cell mass → Embryo



Major Features of Embryonic Development

- After one month of pregnancy, the embryo's Heart is formed.
- By the end of second month of pregnancy, the foetus develops limbs and digits.
- By the end of third month, most of the organ systems are formed.
- Appearance of Hair on Head and First foetal movement is observed during 5th fifth month.
- After six months, the body is covered with fine hair, eye-lids separate and eyelashes are also formed.
- By the end of nine months of pregnancy, the foetus is completely developed and ready for its delivery.

Parturition

The act of expelling the full term foetus from the mother's uterus at the end of gestation period is called parturition.

Parturition signals originate from the fully developed foetus and the placenta which induce mild uterine contractions called foetal ejection reflex.

Triggers the posterior pituitary → oxytocin

oxytocin → uterine contraction → Expulsion of the baby

Lactation

Mammary glands of female undergo differentiation and start producing milk at the end of pregnancy. This is called lactation.

The milk produced during the initial few days of lactation is called colostrum which contains several antibodies absolutely essential to develop resistance for the new-born babies. Breastfeeding during the initial period of infant growth is recommended by doctors for bringing up a healthy baby.

IgA

passive immunity.

Thick, yellowish

nutrient-rich.

Question

Assertion: Zona pellucida is a cellular layer of ovum in human female.

Reason: Corona radiata is a non-cellular layer of ovum.

non-cellular

cellular

A. Assertion (A) and reason (R) both are correct statements and R is correct explanation for A.

B. Assertion and reason both are correct statements but R is not correct explanation for A.

C. Assertion is correct statement but reason is wrong statement.

D. Assertion and reason both are wrong

Question

Which of the following events is not associated with ovulation in human female?

A. Release of secondary oocyte

B. LH surge

C. Decrease in estradiol

D. Full development of Graafian follicle

Question

Identify the correct statement on inhibin.

A. Inhibits the secretion of LH, FSH and prolactin

B. Is produced by granulosa cells in ovary and inhibits the secretion of FSH

C. Is produced by granulosa cells in ovary and inhibits the secretion of LH.

D. Is produced by nurse cells in testes and inhibits the secretion of LH.

Question

GnRH, a hypothalamic hormone, is needed in reproduction because it acts on;

A. Anterior pituitary and stimulates secretion of LH and FSH.

B. Posterior pituitary and stimulates secretion of oxytocin and FSH.

C. Posterior pituitary and stimulates secretion of LH and relaxin.

D. Anterior pituitary and stimulates secretion of LH and oxytocin.

Question

Select the correct match.

A. Perimetrium - Exhibits strong contractions under the action of oxytocin. (Myometrium)

B. Endometrium - Inner glandular lining of uterus. ✓

C. Insemination - Release of sperms outside the body of a male. (Ejaculation)

D. Secretory phase - An ovarian event in menstrual cycle that ceases after ovulation. (start)

Question

LH surge occurs during which phase of menstrual cycle?

A. Menstrual phase

B. Beginning of proliferative phase

C. Secretory phase

D. At the middle of the cycle

Question

Which of the following correctly describes the hormonal changes during the menstrual cycle?

A. FSH and LH levels peak during menstruation, leading to endometrial shedding.

B. Estrogen and progesterone levels are highest during the menstrual phase.

C. LH surge occurs around the 14th day of the cycle, leading to ovulation.

D. Progesterone is secreted in large amounts by the Graafian follicle before ovulation.

Question

In absence of fertilization, corpus luteum degenerates into

A. Tunica albuginea

B. Membrana granulosa

C. Zona pellucida

D. Corpus albicans

Question

Ovulation in the human female normally takes place during the menstrual cycle:

A. Just before the end of the secretory phase

B. At the beginning of the proliferative phase

C. At the end of the proliferative phase

D. At the mid secretory phase

Question

H.W

Below is given the unorganised list of some important events in the human female reproductive cycle. Identify the correct sequence of these events and select the correct option.

(i) Secretion of FSH

(ii) Growth of corpus luteum

(iii) Growth of the follicle

(iv) Ovulation

(v) Sudden increase in the levels of LH

A (i) → (iv) → (iii) → (v) → (ii)

B (ii) → (i) → (iii) → (iv) → (v)

C (iii) → (i) → (iv) → (ii) → (v)

D (i) → (iii) → (v) → (iv) → (ii)

Question

Which of the following statement is incorrect?

A. The process of fusion of a sperm with an ovum is called fertilisation.

B. During fertilisation, a sperm comes in contact with the zona pellucida layer of the ovum.

C. Not all copulations lead to fertilisation and pregnancy.

D. Fertilisation takes place in isthmus part of oviduct.

Ampulla

Question

After a sperm has penetrated an ovum, in the process of fertilisation, entry of further sperms is prevented by:

polyspermy

A. Development of the vitelline membrane.

B. Development of the pigment coat.

C. Condensation of yolk.

D. Formation of fertilisation membrane. ✓

Question

What triggers the acrosome reaction in sperm?

A. Progesterone from follicular cells

B. Enzymes from Sertoli cells

C. Sperm binding to zona pellucida

D. Capacitation in the epididymis

Question

Which of the following forms the outer layer of blastocyst?

A. Zona pellucida

B. Trophoblast

C. Inner cell mass

D. Corona radiata

Question

Ectopic pregnancies are referred to as

A. Implantation of defective embryo in the uterus

B. Pregnancies terminated due to hormonal imbalance

C. Pregnancies with genetic abnormality

D. Implantation of embryo at site other than uterus

Question

During implantation, level of which hormone is highest?

A Oestrogen

B Progesterone

C LH

D FSH

Question

Choose the incorrect match

A. Morula – 8 to 16 blastomeres

B. Blastocyst – Implantation in Endometrium

C. Second polar body – Completion of 1st meiotic division

D. Foetal ejection reflex – Cortisol, estrogen,oxytocin

Question

Which of the following is incorrect match?

A. Primary follicles at puberty in each ovary - 60,000 - 80,000

B. Antrum - Fluid filled cavity

C. Child birth - Colostrum

D. Daughter cells - Blastomeres

Question

Eyelids and eyelashes are formed during

A 1st month

B 2nd month

C 5th month

D 7th month

Question

What is the function of stem cells in the inner cell mass?

A. They provide nutrients to the embryo.

B. They develop into the placenta.

C. They have the potential to form all tissues and organs.

D. They form the amniotic sac.

Question

Correct sequence in development is;

A. Fertilisation → Zygote → Cleavage → Morula → Blastula → Gastrula

B. Fertilisation → Zygote → Blastula → Morula → Cleavage → Gastrula

C. Fertilisation → Cleavage → Morula → Zygote → Blastula → Gastrula

D. Cleavage → Zygote → Fertilisation → Morula → Blastula → Gastrula

Question

Parturition is induced by

A. A complex neuroendocrine mechanism

B. A simple neuroendocrine mechanism

C. A neuroexocrine mechanism

D. A physio-chemical mechanism

Question

Foetal ejection reflex in human female is induced by

A. Release of oxytocin from pituitary

B. Fully developed foetus and placenta

C. Differentiation of mammary glands

D. Pressure exerted by amniotic fluid.

Question

Read the following statements carefully and select the correct statements.

(i) hPL plays a major role in parturition.

(ii) Foetus shows movements first time in the 7th month of pregnancy.

(iii) Signal for parturition comes from fully developed foetus and placenta.

(iv) Embryo's heart is formed by the 2nd month of pregnancy.

A (ii) and (iii)

B (iii) only

C (ii) and (iv)

D (i) and (iv)

Question

Which of the following is the correct order of reproductive events in humans, starting from gametogenesis?

A. Gametogenesis → Fertilisation → Insemination → Gestation → Parturition

B. Gametogenesis → Insemination → Fertilisation → Implantation → Gestation → Parturition

C. Fertilisation → Insemination → Implantation → Parturition → Gestation

D. Insemination → Fertilisation → Gametogenesis → Gestation → Parturition

Question

What is colostrum rich in?

A. Blood

B. Antigens

C. Antibodies

D. Life fluid

Question

Arrange the parts of mammary gland w.r.t milk secretion.

I. Mammary duct

II. Lactiferous duct

III. Alveoli

IV. Mammary ampulla

V. Mammary tubules

Choose the correct option.

A III → I → IV → V → II

B II → III → V → IV → I

C III → V → I → IV → II

D V → III → IV → II → I

Question

Milk secretion is regulated by:

A. Increased secretion of progesterone.

B. Increased secretion of estrogen.

C. Increased secretion of prolactin.

D. Increased secretion of relaxin.

Thank You