

## BYJU'S Study Planner for Board Term I (CBSE Grade 12)

Date: 11/11/2021

Subject: Biology

Topic : Human Reproduction

Class: Standard XII

1. Primary oocyte is formed by which type of cell division?

- ☒ A. Meiosis - I
- ☒ B. Meiosis - II
- ☒ C. Mitosis
- ☒ D. Amitosis

Oogonia

↓ Mitosis → Fetal life

Primary oocyte

↓ Meiosis I → Before ovulation

Secondary oocyte

↓ Meiosis II → After Fertilisation

Ovum

Hence, primary oocyte is formed by mitosis.

2. Menstrual flow occurs due to lack of:

- ☒ A. LH
- ☒ B. Estrogen
- ☒ C. Progesterone
- ☒ D. FSH

During the menstrual phase of the menstrual cycle, the production of LH reduces. This causes the degeneration of the corpus luteum and hence production of progesterone is reduced which leads to the breakdown of the endometrium of the uterus.

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3. Ejaculation of a human male contains 200 - 300 million sperms, of which for normal fertility \_\_\_\_\_ % sperms should have normal shape and \_\_\_\_\_ % must show vigorous motility.

☐ A. 40, 60

☐ B. 70, 30

☒ C. 60, 40

☐ D. 30, 70

60% of the sperms must have a functional normal shape and 40% of them must have vigorous motility to reach the ampulla of the fallopian tubes of a female reproductive tract.

4. Androgen binding protein (ABP) is secreted by which cells?

☒ A. Sertoli cells

☐ B. Leydig cells

☐ C. Sperm

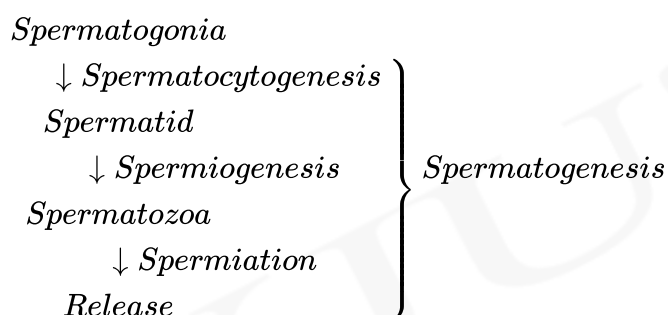
☐ D. Follicular cell

Androgen binding proteins (ABP) are glycoproteins produced by the sertoli cells in the seminiferous tubules. These proteins specifically bind to the testosterone and other androgens increasing its concentration inside the testes. This accumulation stimulates spermatogenesis.

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5. Spermatids are transformed into spermatozoa by which process?

- ☒ A. Spermiogenesis
- ☐ B. Spermiation
- ☐ C. Spermatocytosis
- ☐ D. Spermatogenesis



Hence, the spermatids are transformed into spermatozoa (sperms) by the process called spermiogenesis.

6. Which of the following does not exhibit internal fertilization?

- ☒ A. Frog
- ☐ B. Lizard
- ☐ C. Cow
- ☐ D. Crow

Fishes and amphibians exhibit external fertilization wherein fertilization occurs outside the body of the organism in the external medium. Frog being an amphibian, exhibits external fertilization.

Reptiles, birds and mammals exhibit internal fertilization wherein fertilization occurs inside the body of the organism. The lizard being a reptile, the cow being a mammal and the crow being a bird show internal fertilization.

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7. Extra embryonic membranes of embryo are derived from

- ☐ A. follicle cells
- ☐ B. inner cell mass
- ☐ C. formative cell
- ☒ D. trophoblast

Blastomeres in blastocyst are arranged into

1. an outer layer of cells called trophoblast
2. an inner group of cells attached to the trophoblast called the inner cell mass.

The trophoblast attaches to the endometrium and gives rise to the extra embryonic membranes of chorionic sac, amniotic sac, allantois and yolk sac.

The inner cell mass develops into an embryo.

8. The hormone that induces ovulation is produced by\_\_\_\_\_.

- ☐ A. hypothalamus
- ☒ B. adenohypophysis
- ☐ C. ovary
- ☐ D. neurohypophysis

The hormone that induces ovulation is LH. Rapid secretion of LH is observed on the 14th day of the 28-day menstrual cycle.

LH surge causes the rupture of Graafian follicle and release of secondary oocyte.

LH is produced by the adenohypophysis, the anterior pituitary gland.

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9. Select the correct option with respect to the hormone and its site of production.

- ☐ A. Progesterone - Graafian follicle
- ☐ B. Human placental lactogen - Corpus luteum
- ☐ C. Follicle stimulating hormone - Hypothalamus
- ☒ D. Human chorionic gonadotropin - Placenta

Human chorionic gonadotropin (hCG) is a hormone secreted by the placenta.

Presence of hCG in the urine confirms pregnancy.

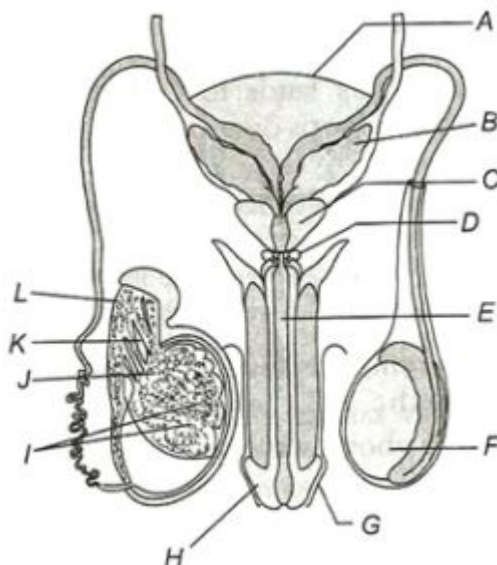
Progesterone is produced by the corpus luteum which is formed from the ruptured Graafian follicle after ovulation.

Human placental lactogen is secreted by the placenta.

Follicle stimulating hormone is secreted by the anterior pituitary.

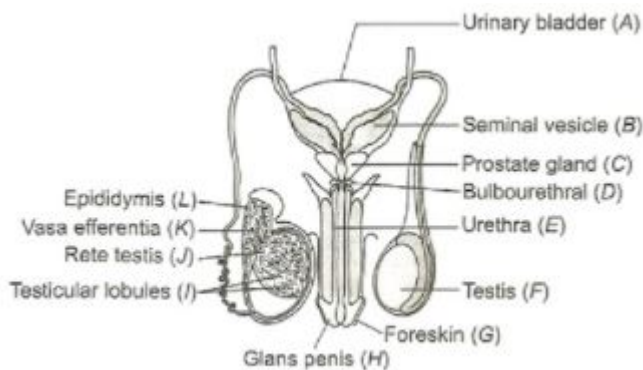
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10. Identify A, B, C and D in the given diagram.



- ☒ A. A-Urinary bladder, B-Bulbourethral gland, C-Prostate gland, D-Seminal vesicles
- ☒ B. A-Urinary bladder, B-Seminal vesicles, C-Prostate gland, D-Bulbourethral gland
- ☒ C. A- Prostate gland, B- Seminal vesicles, C- Urinary bladder, D- Bulbourethral gland
- ☒ D. A- Bulbourethral gland, B- Urinary bladder, C- Seminal vesicles, D- Prostate gland

Male reproductive system is made up of a pair of testis, scrotum, vasa efferentia, a pair of epididymis, a pair of vasa deferentia, a pair of seminal vesicles, a pair of ejaculatory ducts, urethra, prostate gland, a pair of Cowper's gland and penis. Diagrammatic view of male reproductive system is shown below. The correction option is: A-Urinary bladder, B-Seminal vesicles, C-Prostate gland, D- Bulbourethral gland.



Diagrammatic view of male reproductive system

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11. Hormones secreted by the corpus luteum are:

- ☒ A. hCG, hPL, Progesterone, Prolactin
- ☒ B. hCG, hPL, Estrogen, Relaxin, Inhibin
- ☒ C. Progesterone, Estrogen, Relaxin, Inhibin
- ☒ D. LH, Progesterone, Estrogen, Gluco-corticoids

After ovulation, the ruptured follicle is converted to a structure called corpus luteum. The primary hormone produced from the corpus luteum is progesterone, but it also produces inhibin A, estrogen and relaxin.

Progesterone supports the pregnancy. Progesterone also acts on the mammary glands and stimulates the formation of alveoli (sac-like structures which store milk) and milk secretion.

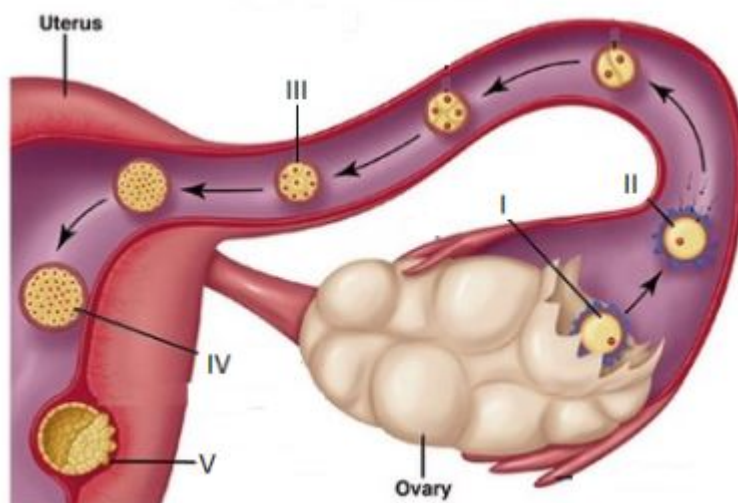
Inhibin A prevents the secretion of follicle-stimulating hormone.

Estrogen causes changes in the uterus to make it more suitable for implantation of the fertilized ovum and embryo nourishment.

Relaxin is known for cervical softening, loosening the pelvic girdle as preparation for pregnancy.

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12. The image given below depicts a diagrammatic sectional view of the female reproductive system of humans. Which set of I-V have been correctly identified?



- ☒ A. I - Zygote, II - Ovum, III - Morula, IV - Blastocyst, V - Implantation of blastocyst
- ☒ B. I - Ovum, II - Morula, III - Zygote, IV - Blastocyst, V - Implantation of blastocyst
- ☒ C. I - Ovum, II - Zygote, III - Morula, IV - Blastocyst, V- Implantation of blastocyst
- ☒ D. I - Ovum, II - Zygote, III - Blastocyst, IV - Morula, V - Implantation of blastocyst

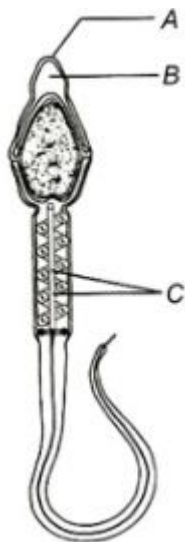
The secondary oocyte (ovum) (I) is released from the ovary and gets fertilised if simultaneously sperm also reaches the fallopian tube and forms zygote (II).

The zygote further divides by mitosis and forms 2, 4, 8, 16 daughter cells called blastomeres. The embryo with 8-16 blastomeres is called morula (III). Morula further divides and transforms into blastocyst (IV) and then the blastocyst gets implanted in the uterus (V).



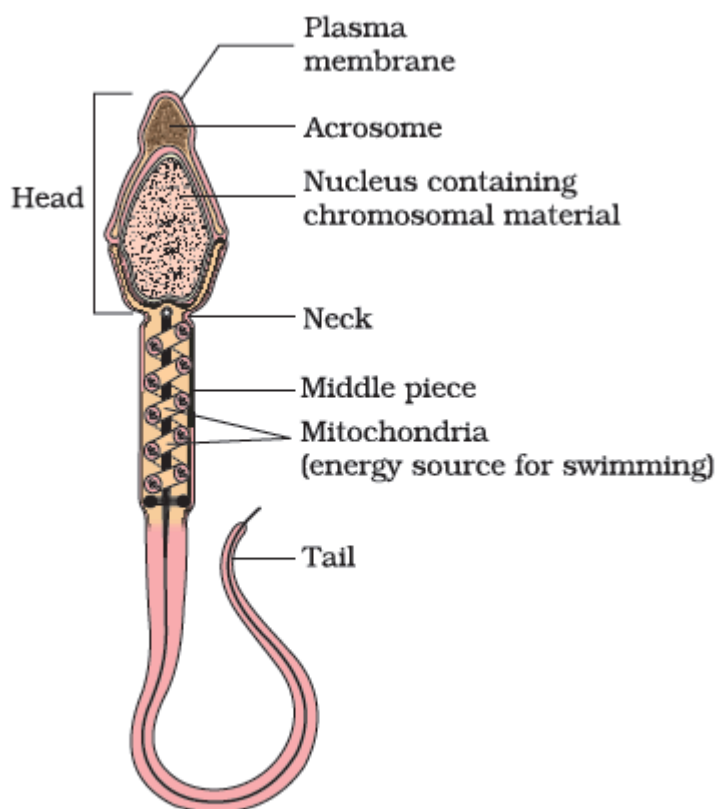
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13. Identify A, B and C in the given human sperm diagram.



- ☐ A. A-Acrosome, B-Plasma membrane, C-Mitochondria
- ☒ B. A-Plasma membrane, B-Acrosome, C-Mitochondria
- ☐ C. A- Plasma membrane, B-Mitochondria, C-Acrosome
- ☐ D. A-Mitochondria, B-Plasma membrane, C-Acrosome

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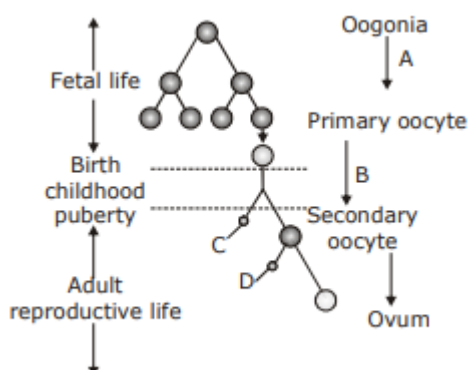
Structure of a sperm (spermatozoa): It consists of four parts i.e., Head, Neck, Middle piece and tail, enveloped by a plasma membrane.

- **Head-** It is the enlarged end of a sperm, containing the large haploid nucleus, i.e., condensed chromatin body and is capped by acrosome. The acrosome contains hydrolytic enzymes that help in dissolving membranes of the ovum for fertilization.
- **Neck-** It contains proximal centriole which is necessary for the first cleavage division of zygote and the distal centriole that is connected to the tail filament.
- **Middle piece-** It contains a number of mitochondria that provide energy for the movement of the tail that facilitate sperm motility essential or fertilization.
- **Tail-** It consists of axial filaments surrounded by the plasma membrane. It helps the sperms to swim in a fluid medium.

Hence, correct option is: A-Plasma membrane, B-Acrosome, C-Mitochondria.

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14. Identify A, B, C and D in the schematic representation of oogenesis.

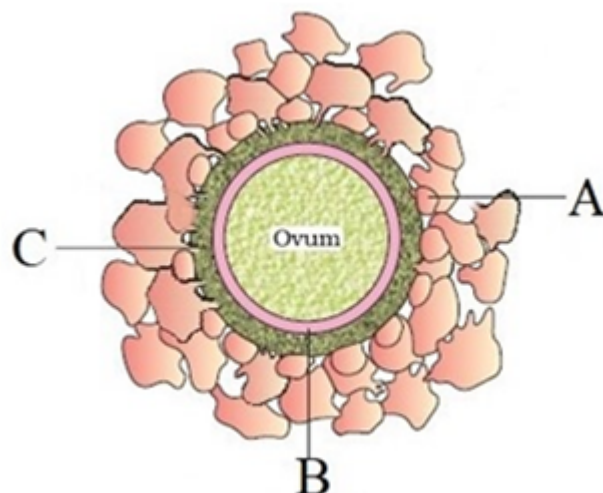


- ☒ A. A-Mitosis and differentiation, B-Meiosis I and II, C-Second polar body, D-First polar body
- ☒ B. A-Mitosis, B-Meiosis II, C-Ovum, D-First Polar Body
- ☒ C. A-Mitosis and differentiation, B-Meiosis I, C-First polar body, D-second polar body
- ☒ D. A-Meiosis I, B-Meiosis II, C- First polar body, D- Second polar body

Oogenesis (process of formation of mature female gamete) is initiated at embryonic stage to form oogonia. Oogonia undergoes mitosis and differentiation. These cells undergo prophase-I of meiosis-I and get arrested at this stage to form primary oocytes. The primary oocyte within the tertiary follicle grows in size and completes its first meiotic division. It is an unequal division resulting in the formation of a large haploid secondary oocyte and a tiny first polar body. Secondary oocyte completes meiosis to give ovum and secondary polar body.

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15. Label the following layers around ovum properly.



- ☒ A. A - Zona Pellucida; B - Corona Radiata; C - Perivitelline Space
- ☒ B. A - Corona Radiata; B - Zona Pellucida; C - Perivitelline Space
- ☒ C. A - Corona Radiata; B - Perivitelline Space; C - Zona Pellucida
- ☒ D. A - Perivitelline Space; B - Zona Pellucida; C - Corona Radiata

The corona radiata surrounds an egg and consists of two or three layers of cells from the follicle. They are attached to the zona pellucida – the outer protective layer of the egg.

The perivitelline space is the space between the zona pellucida and the cell membrane of an oocyte or fertilized ovum.

16. Which of the following cells synthesize androgens?

- ☒ A. Leydig cells
- ☒ B. Sertoli cells
- ☒ C. Zona glomerulosa
- ☒ D. Myometrium

Leydig cells / Interstitial cells found in the interstitial spaces outside the seminiferous tubules secrete androgens. Leutinsing hormones (LH) secreted by pituitary acts on the Leydig cells and stimulates the production of androgens which in turn stimulate spermatogenesis.

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17. Choose the correct option with respect to the assertion and reason given.

Assertion (A): Not all copulations lead to fertilisation and pregnancy in human beings.

Reason (R): Fertilisation can only occur if the ovum and sperms are transported simultaneously to the ampullary region of the fallopian tube.

- ☒ A. [A] is true and [R] is false.
- ☒ B. [A] is false and [R] is true .
- ☒ C. Both [A] and [R] are true and [R] is a correct explanation to [A].
- ☒ D. Both [A] and [R] are true but [R] is not a correct explanation to [A].

The site of fertilisation in human beings is the ampullary region of the fallopian tube. Therefore for fertilisation to take place sperm and ovum have to be transported simultaneously to the ampullary region.

During copulation sperms are transferred into the vagina. From vagina, they reach the ampulla of the fallopian tube passing through the cervix and uterus.

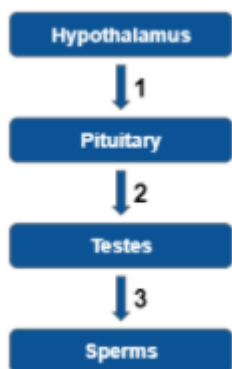
But only one secondary oocyte (ovum) is released during each menstrual cycle (reproductive cycle) which is usually a 28-day cycle.

The secondary oocyte (ovum) is released from the ovary due to the rupture of the Graafian follicle. The secondary oocyte is collected by the fimbriae of the fallopian tube and transported into the ampullary region. Fertilisation and pregnancy is possible if sperm comes in contact with the secondary oocyte during that period.

Hence not all copulations lead to fertilisation and pregnancy.

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18. Study the image related to spermatogenesis and name the hormones involved at each stage of the following flow chart.



- ☐ A. 1 - GnRH, 2 - LH, 3 - FSH
- ☒ B. 1 - GnRH, 2 - LH, 3 - Testosterone
- ☐ C. 1 - LH, 2 - FSH, 3 - GnRH
- ☐ D. 1 - FSH, 2 - LH, 3 - GnRH

Spermatogenesis is the process of production of sperms and it is under the control of hormones.

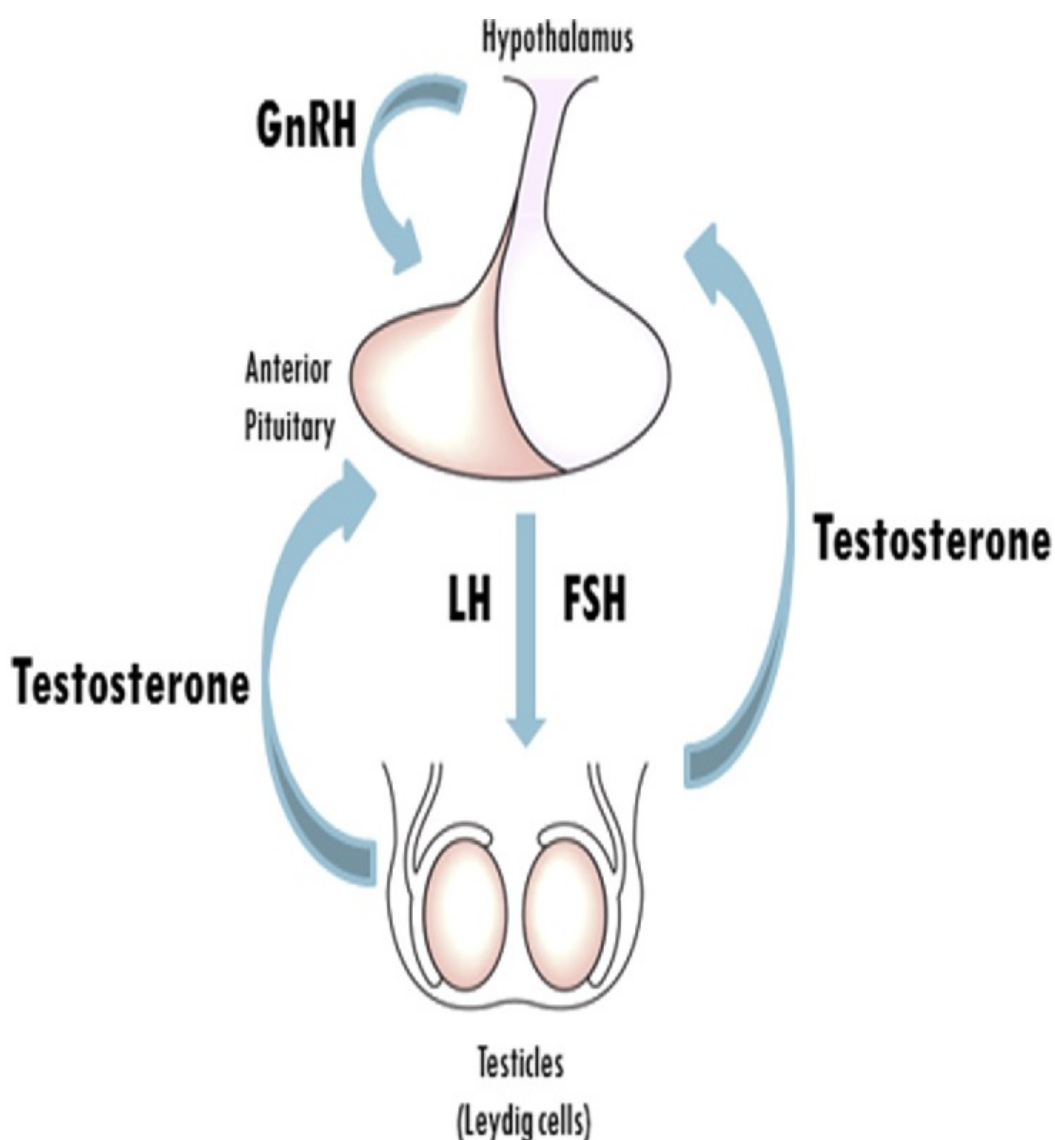
Hypothalamus secretes gonadotropin releasing hormone or GnRH at the time of puberty in males.

GnRH stimulates the anterior pituitary to produce two gonadotropins, luteinising hormone (LH) and follicle stimulating hormone (FSH).

LH or luteinising hormone is also called interstitial cell-stimulating hormone (ICSH). It stimulates Leydig cells of testes to produce testosterone and other androgens.

Testosterone supports the process of spermatogenesis. Hence option b is correct.

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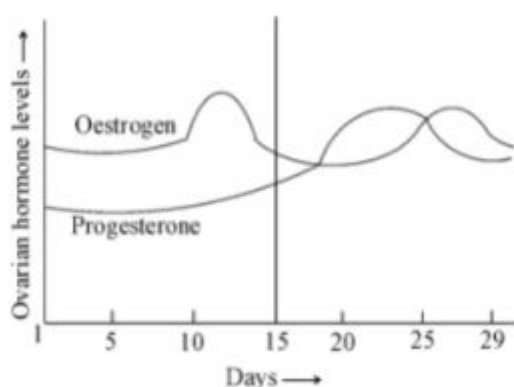


FSH or follicle stimulating hormone acts on Sertoli cells. Sertoli cells produce ABP and inhibin. ABP is an androgen binding protein which binds to testosterone and maintains high levels of androgens essential for spermatogenesis. Inhibin suppresses FSH synthesis.

FSH acts directly on spermatogonia to stimulate sperm production.

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19. Read the graph and correlate the uterine events that takes place according to the hormonal levels on:
- A. 6-15 days
  - B. 16-25 days
  - C. 26-28 days (if the ovum is not fertilized)



- ☒ A. A-Degeneration of endometrium, B-Myometrium thickens, becomes vascularized ready to receive and implant embryo, C-Regeneration of endometrium
- ☒ B. A-Degeneration of endometrium, B-Endometrium thickens, becomes vascularized, ready to receive and implant embryo, C-Regeneration of endometrium
- ☒ C. A-Degeneration of endometrium, B- Endometrium thickness, becomes vascularized, ready to receive and implant embryo, C-Regeneration of endometrium
- ☒ D. A-Regeneration of endometrium, B- Endometrium thickens, becomes vascularized ready to receive and implant embryo, C-Degeneration of endometrium

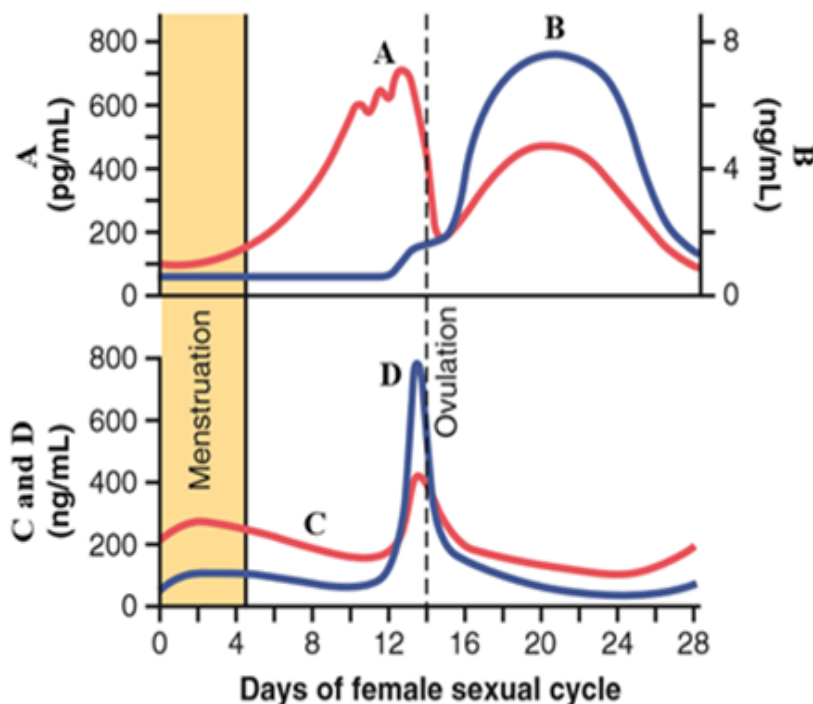
**Menstrual cycle (ovarian cycle):** It is a series of cyclic changes that occur in the reproductive tract of human females and other primates with a periodicity of 28 days, right from menarche to menopause. It is characterized by menses or loss of blood for a few days. The given chart depicts menstrual cycle. Here,

- A (6-15 days) - Regeneration of endometrium occurs.
- B (16-25 days) - Endometrium thickens, becomes vascularized ready to receive and implant embryo.
- C (26-28 days if the ovum is not fertilized) - Endometrium will degenerate.



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20. Refer to hormonal levels in menstrual cycle and select the incorrect option accordingly.



- ☒ A. B - Hormone responsible for uterine changes
- ☒ B. D - Hormone responsible for ovulation
- ☒ C. A - Cessation of secretion can lead to Osteoporosis
- ☒ D. C - Secreted by Corpus luteum

The various hormones which regulate the menstrual cycle :

A - Oestrogen - There is a direct relationship between the lack of estrogen after menopause and the development of osteoporosis.

B - Progesterone - helps thicken the lining of the uterus to prepare for a fertilized egg. If there is no fertilized egg, progesterone levels drop and menstruation begins.

C - FSH - Secreted by anterior pituitary gland not by Corpus luteum. Corpus luteum secretes Progesterone.

D - LH - an acute rise of LH triggers ovulation and development of the corpus luteum.