NCERT Solutions for Class 12 Biology Chapter 3 Human Reproduction

Q1. Fill in the blanks:

(a) Humans reproduce _____ (asexually/sexually)

(b) Humans are _____ (oviparous, viviparous, ovoviviparous)

(c) Fertilisation is _____ in humans (external/internal)

(d) Male and female gametes are _____ (diploid/haploid)

(e) Zygote is _____ (diploid/haploid)

(f) The process of release of ovum from a mature follicle is called _____

(g) Ovulation is induced by a hormone called _____

(h) The fusion of male and female gametes is called _____

(i) Fertilisation takes place in _____

(j) Zygote divides to form _____ which is implanted in uterus.

(k) The structure which provides vascular connection between foetus and uterus is called _____

Answer:

(a) Humans reproduce sexually

(b) Humans are viviparous

(c) Fertilisation is internal in humans

(d) Male and female gametes are haploid

(e) Zygote is diploid

(f) The process of release of ovum from a mature follicle is called ovulation

(g) Ovulation is induced by a hormone called luteinizing hormone

(h) The fusion of male and female gametes is called fertilisation

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(i) Fertilisation takes place in a fallopian tube

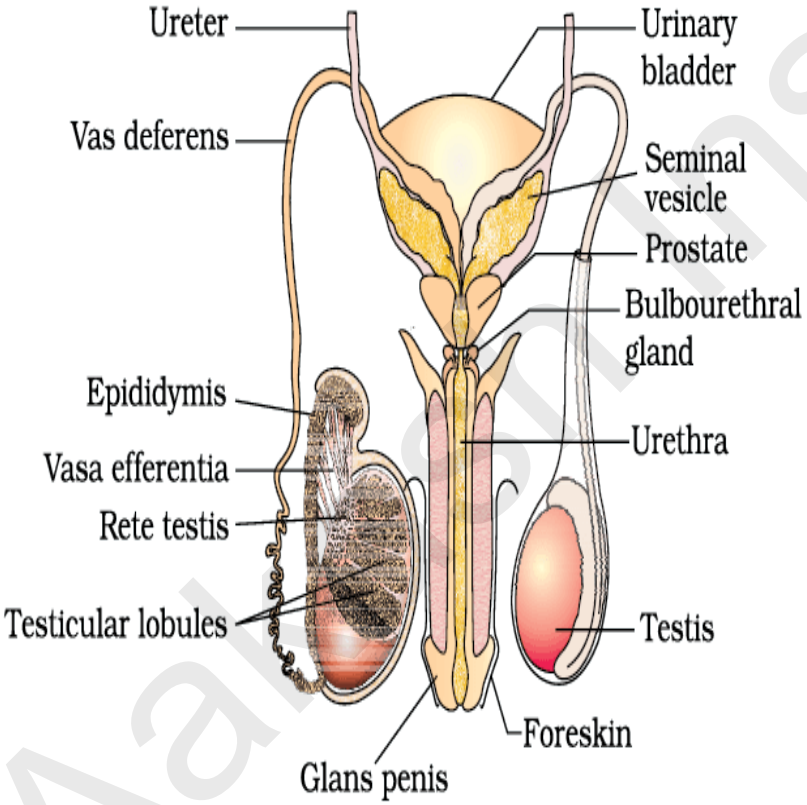
(j) Zygote divides to form a blastocyst which is implanted in the uterus.

(k) The structure which provides vascular connection between foetus and uterus is called placenta

Q2. Draw a labelled diagram of male reproductive system.

Answer:

Labelled diagram of the male reproductive system is as follows:



Q3. Draw a labelled diagram of female reproductive system.

Answer:

Female reproductive system

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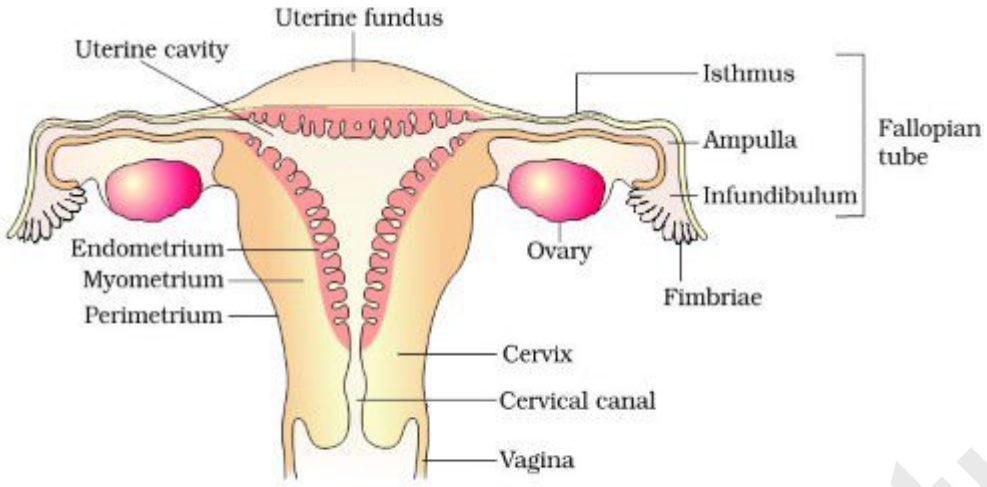


Figure 3.3 (b) Diagrammatic sectional view of the female reproductive system

Q4. Write two major functions each of testis and ovary.

Answer:

Functions of testis

1. Testis produces spermatozoa which are male gametes.
2. In testis, the male sex hormone testosterone is developed.

Functions of ovary

1. The ovary produces ovum by the process oogenesis.
2. Graffian follicles in ovary produce female sex hormone called estrogen.

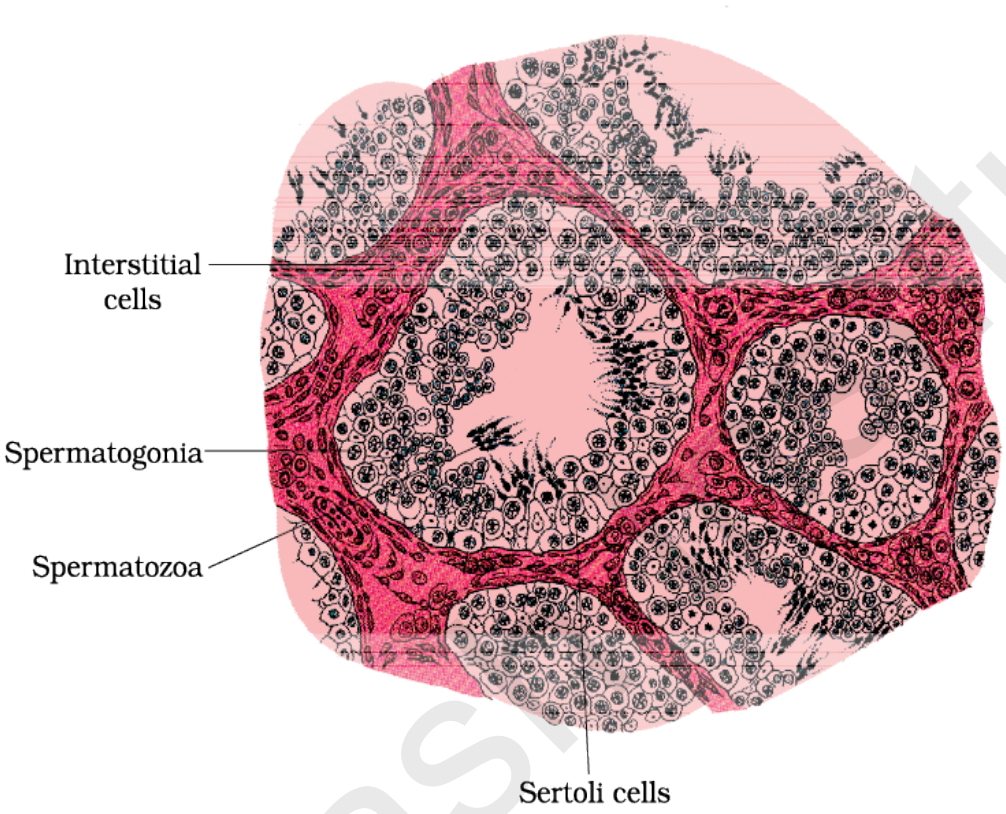
Q5. Describe the structure of a seminiferous tubule.

Answer:

Seminiferous tubules are highly coiled structures present in testicular lobules. The seminiferous tubules are lined by two types of cells i.e. spermatogonia and sertoli cells

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from inside. Spermatogonia are the male germ cells that form sperms through meiotic divisions followed by mitotic division, while Sertoli cells provide nutrition to the germ cells. The regions outside the seminiferous tubules called is called the interstitial space and it contains small blood vessels and Leydig cells. TheLeydig's cells secrete androgens.

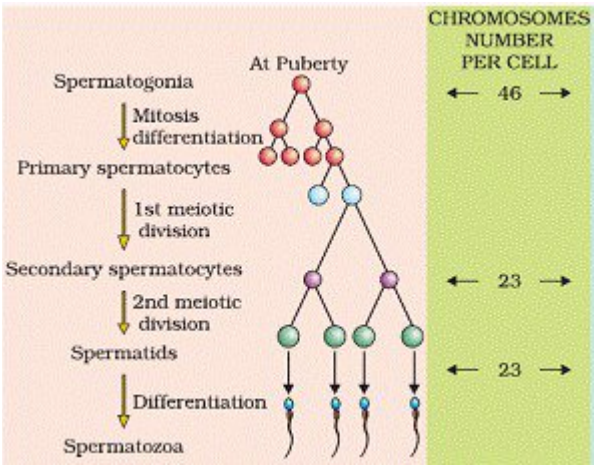


Q6 What is spermatogenesis? Briefly describe the process of spermatogenesis.

Answer:

Spermatogenesis- It is the process of formation of spermatozoa from spermatogonia in testes at the time of puberty is called spermatogenesis. In this process, the spermatogonia present at the inner side of seminiferous tubules multiply by mitotic division and increase in number. Each spermatogonium contains 46 chromosomes. Spermatogonia forms spermatocyte that undergoes meiotic division to produce secondary spermatocytes having 23 chromosomes. The secondary spermatocytes

undergo 2nd meiotic division to form spermatids. The spermatids are transformed into spermatozoa by the process called **spermiogenesis** . The sperm heads remain embedded in the Sertoli cells and are released from seminiferous tubules by the process of **spermiation**



Q7. Name the hormones involved in regulation of spermatogenesis.

Answer:

Spermatogenesis initiated due to an increase in the secretion of gonadotropin-releasing hormone by the hypothalamus. Increase in GnRH act on anterior pituitary and stimulate secretion of two gonadotropins, LH (luteinizing hormone) and FSH (follicular stimulating hormone). Among these, LH acts on Leydig cells and stimulates them to secrete androgens whereas FSH acts on Sertoli cells and stimulates the secretion of some factors which help in spermiogenesis.

Q8. Define spermiogenesis and spermiation.

Answer:

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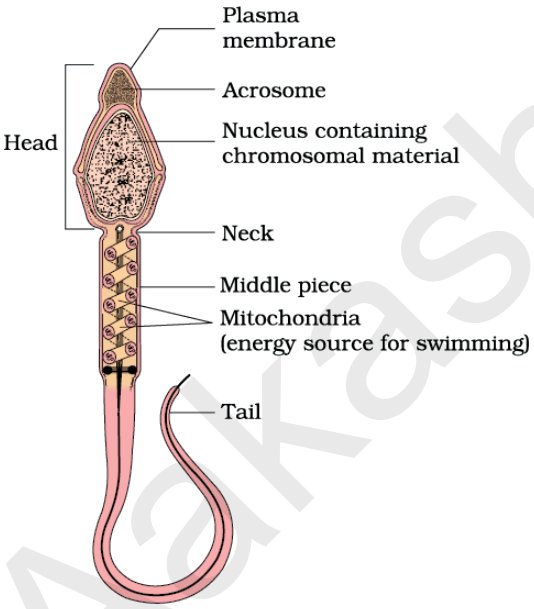
Spermiogenesis- The spermatids are transformed into spermatozoa by the process called**spermiogenesis** .

Spermiation- The release of sperms from the seminiferous tubules occurs through a process called spermiation.

Q9. Draw a labelled diagram of sperm.

Answer:

Labelled diagram of human sperm is as follows:



Q10. What are the major components of seminal plasma?

Answer:

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The major components of seminal plasma are mucous, fructose, calcium, ascorbic acid, certain enzymes and some secretions of accessory glands.

Q11. What are the major functions of male accessory ducts and glands?

Answer:

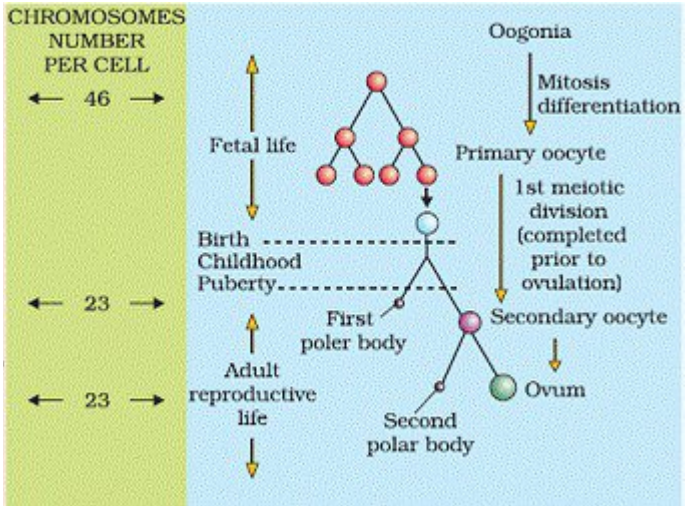
Male accessory ducts include vasa efferentia, epididymis. vas deferens and rete testis. THey transport and temporarily store spermatozoa. Male accessory glands include seminal vesicle, bulbourethral gland and prostate gland. These glands secrete fluids that lubricate the female reproductive system and sperms.

Q12 . What is oogenesis? Give a brief account of oogenesis.

Answer:

The process of formation of mature female gametes is called oogenesis. It starts during embryonic development stage when millions of oogonia (gamete mother cells) are formed in each fetal ovary. The gamete mother cells start division and enter into prophase-I of meiotic division and get temporally arrested. At this stage, they are called **primary oocytes** . Each primary oocyte gets surrounded by a layer of granulosa cell than it is called the **primary follicle** . The primary follicle gets surrounded by more layers of granulosa cells called secondary follicle that transform into tertiary follicle that contains a fluid filled cavity called **antrum.** The tertiary follicles further change into the mature follicle called **Graafian follicle** , which rapture to release secondary oocytes (ovum) from the ovary by the process of ovulation.

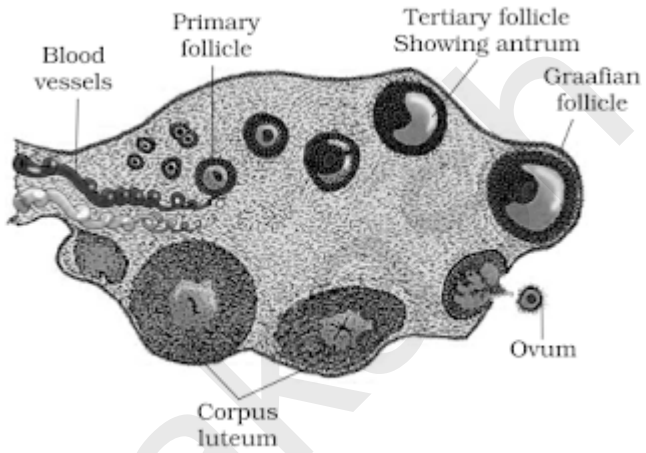
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Q13 . Draw a labelled diagram of a section through ovary.

Answer:

A labelled diagram of a section through the ovary is as follows:

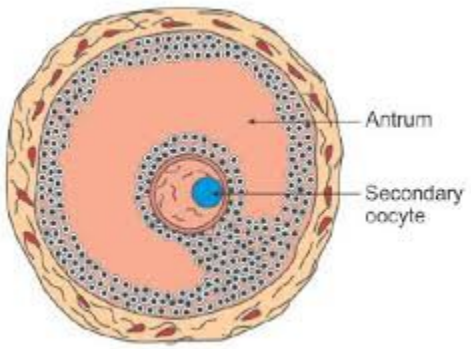


Q14 . Draw a labelled diagram of a Graafian follicle?

Answer:

Diagram of Graffian follicle

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Q15. Name the functions of the following:

(a) Corpus luteum

Answer:

Corpus luteum-

It secretes progesterone. Progesterone is essential for the maintenance of endometrium.

(b) Endometrium

Answer:

Endometrium- Implantation of the fertilized ovum and many events of pregnancy takes place in the endometrium.

(c) Acrosome

Answer:

Acrosome- It is filled with enzymes that hydrolyse egg membrane thus, helping the sperm in penetration of ovum during fertilisation of the ovum.

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(d) Sperm tail

Answer:

Sperm tail- It provides motility to sperms.

(e) Fimbriae

Answer:

Fimbriae- After ovulation, it helps in the collection of the ovum.

Q16. Identify True/False statements. Correct each false statement to make it true.

(a) Androgens are produced by Sertoli cells. (True/False)

Answer:

Androgens are produced by Sertoli cells. (False).

Androgens are produced by Leydig's cells

(b) Spermatozoa get nutrition from Sertoli cells. (True/False)

Answer:

Spermatozoa get nutrition from Sertoli cells. (True)

(c) Leydig cells are found in ovary. (True/False)

Answer:

Leydig cells are found in ovary. (False)

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Leydig cells are found in seminiferous tubules of testis

(d) Leydig cells synthesise androgens. (True/False)

Answer:

Leydig cells synthesise androgens. (True)

(e) Oogenesis takes place in corpus luteum. (True/False)

Answer:

Oogenesis takes place in corpus luteum. (False)

Oogenesis takes place in ovary

(f) Menstrual cycle ceases during pregnancy

Answer:

Menstrual cycle ceases during pregnancy. (True)

(g) Presence or absence of hymen is not a reliable indicator of virginity or sexual experience. (True/False)

Answer:

Presence or absence of hymen is not a reliable indicator of virginity or sexual experience. (True)

Q17 . What is menstrual cycle? Which hormones regulate menstrual cycle?

Answer:

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Menstrual cycle : The reproductive cycles in female primates is called the menstrual cycle. In a 28 days menstrual cycle, the menses takes place on cycle days 3-5. The menstrual cycle consists of phases like menstrual phase, follicular phase, ovulatory phase and luteal phase.

Menstrual phase

1. The production of LH from the anterior lobe of the pituitary gland is reduced.

2. The withdrawal of this hormone causes degeneration of the corpus luteum and, therefore progesterone production is reduced.

3. Production of oestrogen is also reduced in this phase.

4. The endometrium of the uterus breaks down & menstruation begins.

5. The cells of endometrium secretions, blood & unfertilised ovum constitute the menstrual flow.

Follicular phase-

1. This phase usually includes cycle days 6-13 or 14 in a 28 days cycle.

2. The follicle stimulating hormone (FSH) secreted by the anterior lobe of the pituitary gland stimulates the ovarian follicle to secrete oestrogens.

3. Oestrogen stimulates the proliferation of the endometrium of the uterine wall.

4. The endometrium becomes thicker by rapid cell multiplication and this is accompanied by an increase in uterine glands & blood vessels.

Ovulatory phase

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1. Both LH & FSH attain a peak level in the middle of the cycle (about 14 th day).

2. Oestrogen concentration in blood increases.

3. Rapid secretion of LH induces rupturing of the graffian follicle and thereby the release of the ovum. In fact, LH causes ovulation.

Luteal Phase:

1. Includes cycle days 15 to 28.

2. Corpus luteum secretes progesterone.

3. Endometrium thickens.

4. Uterine glands become secretory.

Hormonal control of the menstrual cycle.

1. FSH stimulates the ovarian follicles to produce oestrogens.

2. LH stimulates corpus luteum to secrete progesterone.

3. Menstrual phase is caused by the increased production of oestrogens.

4. LH causes ovulation

5. The proliferative phase is caused by the increased production of oestrogens.

6. The secretory phase is caused by increased production of progesterone.

Q18. <u>What is parturition? Which hormones are involved in induction of parturition?</u>

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Answer:

The process of delivery of the foetus is called parturition. Oxytocin hormone causes a strong contraction of uterine. Contraction of uterine becomes stronger and stronger by the stimulatory reflex between uterine contraction and oxytocin secretion. This leads to the expulsion of the baby out of the uterus through the birth canal.

Q19. In our society the women are often blamed for giving birth to daughters. Can you explain why this is not correct?

Answer:

The sex chromosome in human female is XX while in a male it is XY. Thus, female produces haploid gametes having all X chromosomes but male produces two types of gametes with either X or Y. The sex of the child will be dependent on which sperm whether the one with X chromosomes or the one with Y chromosome fertilises the ovum with X chromosome. Therefore, the sex of the baby is determined by the father's chromosomes not mother's.

Q20. How many eggs are released by a human ovary in a month? How many eggs do you think would have been released if the mother gave birth to identical twins? Would your answer change if the twins born werefraternal?

Answer:

One ovum is released by a human ovary in a month. Identical twins are developed from a single egg. Hence, only one egg would have been released when the mother gave birth to identical twins. If the twins are fraternal twins then they must have been developed from two eggs.

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