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UNIT I

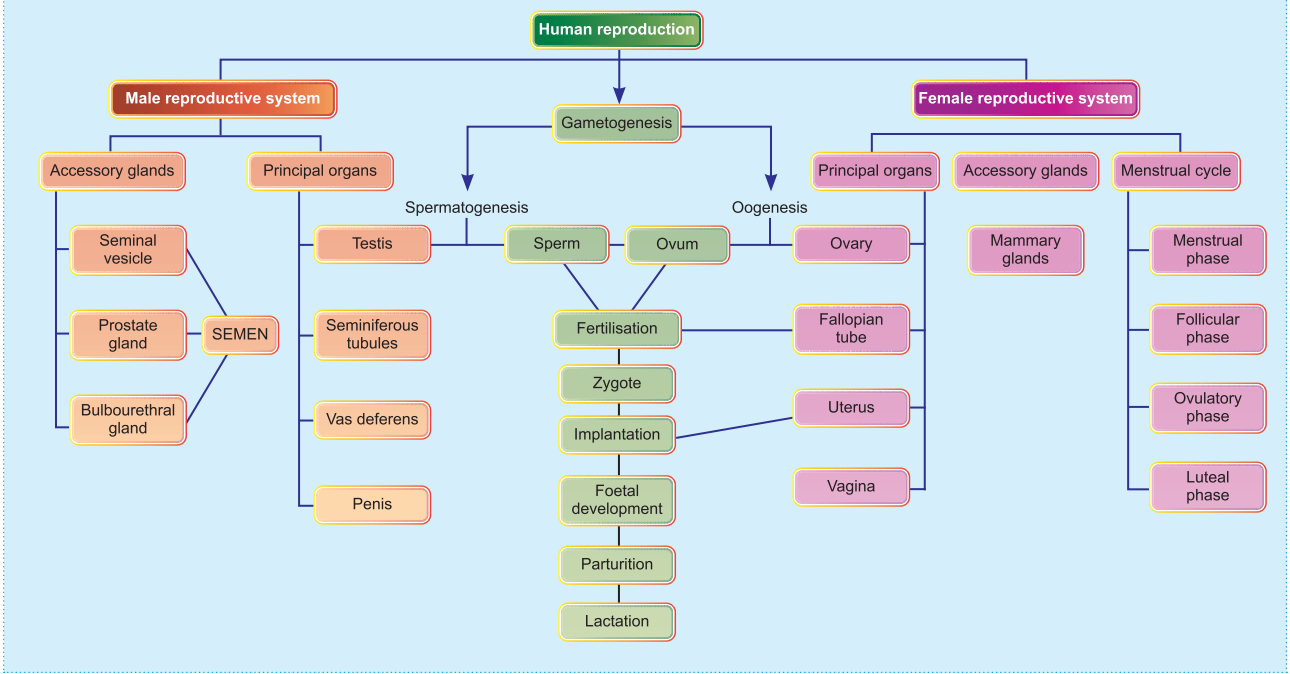
Chapter 2

HUMAN REPRODUCTION

CHAPTER SNAPSHOT

Publications

Concept Map



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Evaluation

1. **The mature sperms are stored in the**
(a) Seminiferous tubules (b) Vas deferens
(c) Epididymis (d) Seminal vesicle
[Ans. (c) Epididymis]

2. **The male sex hormone testosterone is secreted from**
(a) Sertoli cells (b) Leydig cell
(c) Epididymis (d) Prostate gland
[Ans. (b) Leydig cell]

3. **The glandular accessory organ which produces the largest proportion of semen is**
(a) Seminal vesicle
(b) Bulbourethral gland
(c) Prostate gland
(d) Mucous gland **[Ans. (a) Seminal vesicle]**

4. **The male homologue of the female clitoris is**
(a) Scrotum (b) Penis
(c) Urethra (d) Testis
[Ans. (b) Penis]

5. **The site of embryo implantation is the**
(a) Uterus (b) Peritoneal cavity
(c) Vagina (d) Fallopian tube
[Ans. (a) Uterus]

6. **The foetal membrane that forms the basis of the umbilical cord is**
(a) Allantois (b) Amnion
(c) Chorion (d) Yolk sac
[Ans. (a) Allantois]

7. **The most important hormone in intiating and maintaining lactation after birth is**
(a) Oestrogen (b) FSH
(c) Prolactin (d) Oxytocin
[Ans. (c) Prolactin]

8. **Mammalian egg is**
(a) Mesolecithal and non cleidoic
(b) Microlecithal and non cleidoic
(c) Alecithal and non cleidoic
(d) Alecithal and cleidoic
[Ans. (c) Alecithal and non cleidoic]

9. **The process which the sperm undergoes before penetrating the ovum is**
(a) Spermiation (b) Cortical reaction
(c) Spermiogenesis (d) Capacitation
[Ans. (d) Capacitation]

10. **The milk secreted by the mammary glands soon after child birth is called**
(a) Mucous (b) Colostrum
(c) Lactose (d) Sucrose
[Ans. (b) Colostrum]

11. **Colostrum is rich in**
(a) Ig E (b) Ig A
(c) Ig D (d) Ig M
[Ans. (b) Ig A]

12. **The Androgen Binding Protein (ABP) is produced by**
(a) Leydig cells (b) Hypothalamus
(c) Sertoli cells (d) Pituitary gland
[Ans. (c) Sertoli cells]

13. **Which one of the following menstrual irregularities is correctly matched?**
(a) Menorrhagia - excessive menstruation
(b) Amenorrhoea - absence of menstruation
(c) Dysmenorrhoea - irregularity of menstruation
(d) Oligomenorrhoea - painful menstruation
[Ans. (b) Amenorrhoea - absence of menstruation]

14. **Find the wrongly matched pair**
(a) Bleeding phase - fall in oestrogen and progesterone
(b) Follicular phase - rise in oestrogen
(c) Luteal phase - rise in FSH level
(d) Ovulatory phase - LH surge
[Ans. (c) Luteal phase - rise in FSH level]

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Answer the following type of questions
Assertion (A) and Reason (R)

(a) A and R are true, R is the correct explanation of A
(b) A and R are true, R is not the correct explanation of A
(c) A is true, R is false
(d) Both A and R are false

15. A – In human male, testes are extra abdominal and lie in scrotal sacs.
R – Scrotum acts as thermoregulator and keeps temperature lower by 2°C for normal sperm production .
[*Ans.* (a) A and R are true, R is the correct explanation of A]

16. A – Ovulation is the release of ovum from the Graafian follicle.
R – It occurs during the follicular phase of the menstrual cycle.
[*Ans.* (c) A is true, R is false]

17. A – Head of the sperm consists of acrosome and mitochondria.
R – Acrosome contains spiral rows of mitochondria.
[*Ans.* (d) Both A and R are false]

18. Mention the differences between spermiogenesis and spermatogenesis.

Ans.

Spermiogenesis	Spermatogenesis
Spermiogenesis is a part of spermatogenesis in which the haploid spermatids formed from secondary spermatocytes are transformed into mature spermatozoa.	Spermatogenesis is the sequence of all the events involved in the formation of male gametes or the sperms in the seminiferous tubule of the testis.
It is a stage in the maturation phase of spermatogenesis.	It includes multiplication, growth and maturation phase.

19. At what stage of development are the gametes formed in new born male and female?

Ans. *(i)* In a new born male, spematogenesis (formation of sperms) starts at the age of puberty. It is initiated due to the increase in the release of Gonadotrop in Releasing hormone.

(ii) Oogenesis is the process of development of the female gamete or egg in the ovaries. During foetal development, certain cells in the germinal epithelium of foetal ovary divide by mitosis and produce millions of oogonia or egg mother cells.

(iii) No more oogonia are added after birth. The oogonial cells enter into prophase I of meiosis to form primary oocytes which are temporarily arrested at this stage.

(iv) The primary oocytes then become primary follicles. From birth to puberty, a large number of follicles degenerate. At puberty the primary follicle undergoes further development and finally releases the ovum.

20. Expand the acronyms
a. FSH b. LH c. hCG d. hPL

Ans. (a) FSH – Follicular Stimulating Hormone
(b) LH – Leutinising Hormone
(c) hCG – Human Chorionic Gonadotropin
(d) hPL – Human Placental Lactogen.

21. How is polyspermy avoided in humans?

Ans. *(i)* During the process of fertilization in humans, the acrosome of the sperm enters through the corona radiata and zona pellucida layers of the ovum by releasing a enzyme called hyaluronidase. which is called acrosomal reaction.

(ii) Once fertilization is accomplished, cortical granules from the cytoplasm of the ovum form a barrier called the fertilization membrane around the ovum. This prevents further penetration of other sperms. Thus polyspermy (entry of more than one sperm into an egg) is prevented.

22. What is colostrum? Write its significance.

Ans. The mammary glands of a female secrete a yellowish fluid called colostrum during the initial days after parturition.

Significance :

(i) It has less lactose than milk and almost no fat, but it contains more proteins, vitamin A and minerals.

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(ii) It is rich in IgA antibodies. It helps to protect the infants digestive tract against bacterial infections.

(iii) It is the ideal food for infants since it contains all constituents in suitable concentration and is easily digestable.

(iv) It is loaded with immune, growth and tissue repair factors.

(v) It acts as a natural antimicrobial agent to actively stimulate the maturation of the infant's immune system.

(vi) It is fully sufficient till 6 months of age for all infants.

23. Placenta is an endocrine tissue. Justify.

Ans. *(i)* Human embryo is surrounded by 3 embryonic membranes. The chorionic villi and uterine tissues form the disc shaped placenta. It is a temporary endocrine organ formed during pregnancy and connects the foetus to the uterine wall through the umbilical cord.

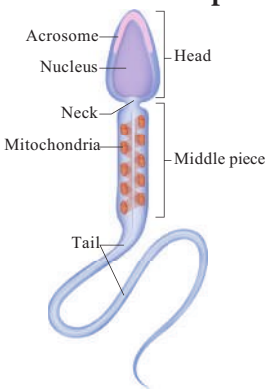
(ii) During pregnancy, the placenta acts as a temporary endocrine gland and produces large quantities of human Chorionic Gonadotropin (hCG), human Chorionic Somatomammotropin (hCS) or human Placental Lactogen (hPL), oestrogens and progesterone which are essential for a normal pregnancy.

(iii) A hormone called relaxin is also secreted during the later phase of pregnancy which helps in relaxation of the pelvic ligaments at the time of parturition. It should be noted that hCG, hPL and relaxin are produced only during pregnancy.

(iv) Thus placenta is a endocrine tissue.

24. Draw a labeled sketch of a spermatozoan.

Ans.



25. What is inhibin? State its functions.

Ans. *(i)* **Inhibin** is a hormone secreted by the sertoli cells in the stratified epithelium of the seminiferous tubule in the testis.

(ii) **Function:** It is involved in the negative feedback control of sperm production.

26. Mention the importance of the position of the testes in humans.

Ans. Testes are the primary male sex organs. They are a pair of ovoid bodies lying in the scrotum. The scrotum is a sac of skin that hangs outside the abdominal cavity. Since viable sperms cannot be produced at normal body temperature, the scrotum is placed outside the abdominal cavity to provide a temperature 2-3°C lower than the normal internal body temperature. Thus, the scrotum acts as a thermoregulator for spermatogenesis.

27. What is the composition of semen?

Ans. *(i)* Semen is a milky white fluid which contains sperms and the seminal plasma secreted from the **seminal vesicles**, **prostate gland** and **bulbourethral glands**.

(ii) The seminal plasma contains fructose sugar, ascorbic acid, prostaglandins and a coagulating enzyme called **vesiculase** which enhance sperm mobility. It also contains citrate, several enzymes and prostate specific antigens. It also provides nutrients and contains chemicals that protect and activate the sperms.

(iii) It acts as a transport medium for the sperms.

28. Name the hormones produced from the placenta during pregnancy.

Ans. Hormones produced by the placenta during pregnancy are:

(i) human Chorionic Gonadotropin (hCG)

(ii) human Chorionic Somatomammotropin (hCS)

(iii) human Placental Lactogen (hPL)

(iv) Oestrogens

(v) Progesterone

(vi) Relaxin

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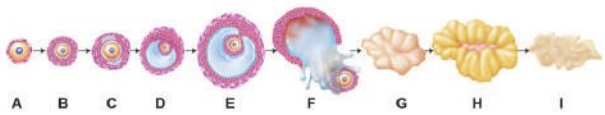
35. The following is the illustration of the sequence of ovarian events (a-i) in a human female.



a) Identify the figure that illustrates ovulation and mention the stage of oogenesis it represents.

b) Name the ovarian hormone and the pituitary hormone that have caused the above-mentioned events.

c) Explain the changes that occurs in the uterus simultaneously in anticipation.

d) Write the difference between C and H.

Ans. (a) The figure 'F' illustrates ovulation. It represents the maturation stage of oogenesis.

(b) The pituitary hormone leutinising hormone and the ovarian hormone oestrogen are responsible for the above mentioned events.

(c) ***(i)*** The endometrium of the uterus becomes thicker to receive the fertilized ovum in anticipation. (Implantation)

(ii) The uterine wall secretes nutritious fluid in the uterus for the foctus.

(d) 'C' indicates developmental stage of follicle in the Ovary when the ovum has not been released. 'H' indicates a stage where the ovum has been released and the remaining part of the ruptured graafian follicle has transformed into a temporary endocrine gland called corpus luteum to produce additional hormones for pregnancy.

ZOOLOGY LONG VERSION QUESTIONS (FOR PURE SCIENCE GROUP)

Q.No. 1 to 9 Refer Evaluation.

10. Painful menstruation is termed as

(a) Dysmenorrhoea (b) Menorrhagia
(c) Amenorrhoea
(d) Oligomenorrhoea

[*Ans.* (a) Dysmenorrhoea]

11. Refer Evaluation Q.No.10
12. Refer Evaluation Q.No.11
13. Refer Evaluation Q.No.12
14. Refer Evaluation Q.No.13
15. Refer Evaluation Q.No.14
16. Refer Evaluation Q.No.15
17. Refer Evaluation Q.No.16
18. Refer Evaluation Q.No.17
19. Refer Evaluation Q.No.18
20. Refer Evaluation Q.No.19
21. Refer Evaluation Q.No.20
22. Refer Evaluation Q.No.21
23. Refer Evaluation Q.No.22
24. Refer Evaluation Q.No.23
25. Refer Evaluation Q.No.24
26. Refer Evaluation Q.No.25
27. Refer Evaluation Q.No.26
28. Refer Evaluation Q.No.27
29. Refer Evaluation Q.No.28
30. Refer Evaluation Q.No.29
31. Refer Evaluation Q.No.30
32. Refer Evaluation Q.No.31
33. Refer Evaluation Q.No.32

34. List the various menstrual disorders.

Ans. (i) **Amenorrhoea :**

Absence of menstruation is called **amenorrhoea**. If menarche does not appear till the age of 18, it is called primary amenorrhoea. Absence of menstruation for over three consecutive months is secondary amenorrhoea.

(ii) **Polymenorrhoea :**

1. Polymenorrhoea is a term used to describe a menstrual cycle that is shorter than 21 days.
2. It may be due to hyperactivity of the anterior pituitary gland, psychological disturbances and malnutrition, Chronic pelvic inflammation by

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certain sexually transmitted diseases (STD) such as chlamydiasis or gonorrhoea can cause inflammation in the uterus causing polymenorrhoea.

(iii) **Dysmenorrhoea :** Pain associated with menstruation is called dysmenorrhoea. There are two types

1. Primary dysmenorrhoea is pain or cramps during menstrual period.
2. Secondary dysmenorrhoea is caused by a disorder in the reproductive system like endometriosis or uterine fibroids.

(iv) **Menorrhagia :**

1. Heavy and prolonged menstrual period that disrupts a woman's normal activities is referred to as menorrhagia.
2. Menorrhagia may be due to hormonal imbalance, ovarian dysfunction, uterine fibroids and may also be due to cancer of the ovary, uterus or cervix.

(v) **Oligomenorrhoea :** Oligomenorrhoea is a condition with infrequent menstrual periods. It occurs in women of childbearing age.

35. **Refer Evaluation Q.No.33**

36. **Refer Evaluation Q.No.34**

37. **Refer Evaluation Q.No.35**

Additional Questions

Choose the Correct Answer — 1 Mark

I. Choose the Correct options for the below Questions

1. _____ **are endocrine cells.**
(a) Inhibitin (b) Leydig cells
(c) Oogonia (d) Sertoli cells
[*Ans.* (b) Leydig cells]

2. **___ is not linked to male reproductive system.**
(a) Prostate gland
(b) Corpus albicans
(c) Cowper's gland
(d) bulbourethral glands
[*Ans.* (b) Corpus albicans]

3. **Testosterone is secreted by** _____
(a) spermatocytes (b) sperm
(c) polar bodies (d) leydig cells
[*Ans.* (d) leydig cells]

4. _____ **is not a part of female reproductive system in human.**
(a) Cervix (b) Infundibulum
(c) Isthmus (d) Prostate gland
[*Ans.* (d) Prostrate gland]

5. **The** _____ **glands in human female are homologous to the bulbouretural glands**
(a) Bartholin's glands (b) Skene's glands
(c) mammary glands (d) Cowper's gland
[*Ans.* (a) Bartholin's glands]

6. **The** _____ **glands in human female are homologous to the prostate gland in male**
(a) Bartholin's glands (b) Skene's glands
(c) mammary glands (d) Cowper's gland
[*Ans.* (b) Skene's glands]

7. _____ **is popularly known as sperm lysin.**
(a) Inhibitin (b) Hyaluronidase
(c) Androgen (d) Acrosome
[*Ans.* (b) Hyaluronidase]

8. **The whole process of spermatogenesis takes about** _____ **days**
(a) 25 (b) 42 (c) 64 (d) 72
[*Ans.* (c) 64]

9. **The** _____ **is the smallest human cell.**
(a) sperm (b) neuron
(c) nephron (d) alveoli
[*Ans.* (a) sperm]

10. **The corpus luteum secretes large amount of** _____
(a) testosterone (b) relaxin
(c) oestrogen (d) progesterone
[*Ans.* (d) progesterone]

11. _____ **is not linked to polymenorrhoea**
(a) Shorter cycle (b) Gland activity
(c) Malnutrition (d) Pain
[*Ans.* (d) Pain]

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18. Colostrum does not contain_____. [*Ans.* fat]

19. Failure of spermatogenesis is called _____. [*Ans.* azospermia]

20. Surgical removal of testis is called_____. [*Ans.* Orchidectomy]

21. The mitochandrial spiral in middle piece of sperm is called _____. [*Ans.* Nebenkern]

Very Short Answers 2 Marks

1. Define Gametogenesis.

Ans. Formation of gametes in males and females by spermatogenesis and oogenesis respectively.

2. Define Insemination.

Ans. Transfer of sperms by the male into the female genital tract is called Insemination.

3. Define fertilisation.

Ans. Fusion of male and female gametes to form zygote, is called fertilisation.

4. Define Cleavage.

Ans. Cleavage refers to the rapid mitotic divisions of the zygote which convert the single celled zygote into a multicellular structure called blastocyst.

5. Define Implantation.

Ans. Attachment of blastocyst to the uterine wall is called Implantation.

6. What is Placentation?

Ans. The process of formation of placenta which is the intimate connection between foetus and uterine wall of the mother for exchange of nutrients is called Placentation.

7. What is Gastrulation?

Ans. It is a process by which blastocyst is changed into a gastrula with three primary germ layers, namely ectoderm, endoderm and mesoderm.

8. What is Organogenesis?

Ans. Formation of specific tissues, organs and organ systems from three germ layers is called Organogenesis.

9. What is Parturition?

Ans. Expulsion of the baby from the mother's womb is called Parturition.

10. Name the types of cells found in seminiferous tubule.

Ans. *(i)* Sertoli cells or nurse cell
(ii) Spermatogonic cells.

11. What are leydig cells?

Ans. *(i)* Leydig cells or Interstitial cells are found in soft connective tissue surrounding the seminiferous tubules of tests and are endocrine in nature.
(ii) They secrete androgens namely testosterone. Hormone which initiates the process of spermatogenesis.

12. Name the accessory ducts associated with male reproductive system.

Ans. The accessory ducts associated with the male reproductive system include rete testis, vasa efferentia, epididymis and vas deferens

13. What is the significance of epididymis?

Ans. *(i)* The epididymis is a single highly coiled tube that temporarily stores the spermatozoa and they undergo physiological maturation and acquire increased motility and fertilizing capacity.
(ii) It is found in the testis.

14. Name the accessory glands of the male reproductive system.

Ans. The accessory glands of the male reproductive system include the paired seminal vesicles and bulbourethral glands also called Cowper's gland and a single prostate gland.

15. What is the function of seminal fluid?

Ans. The seminal fluid acts as a transport medium, provides nutrients, contains chemicals that protect and activate the sperms and also facilitate their movement.

16. Name the accessory organs of the female reproductive system.

Ans. The fallopian tubes (uterine tubes or oviducts), uterus and vagina constitute the female accessory organs.

17. Describe the location and shape of the uterus.

Ans. The uterus or womb is a hollow, thick-walled, muscular, highly vascular and inverted pear shaped structure lying in the pelvic cavity between the urinary bladder and rectum.

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