Human Reproduction

2A Chapter

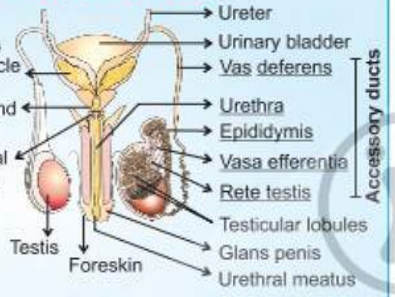
1 INTRODUCTION

- Humans are sexually reproducing viviparous organisms
- Reproductive system is composed of
  - **Primary sex organs** – Site for gamete formation
  - **External genitalia** – Involved in copulation
- Accessory ducts, Accessory glands } Facilitate transport of gametes

2 THE MALE REPRODUCTIVE SYSTEM

- **Location:** Pelvic region
- **Seminal plasma** from these contains fructose, calcium, enzymes
- Its secretions **lubricate the penis**
- Vas deferens receives a duct from seminal vesicle and opens into the urethra as the **Ejaculatory duct**

Accessory glands
- Seminal vesicle (*1 pair*)
- Prostate gland (*one*)
- Bulbourethral gland (*1 pair*)



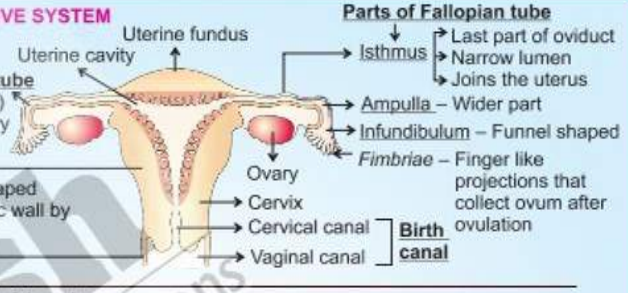
External genitalia of Male/Penis:

Parts	Features
Urethra	Originates from the urinary bladder and extends through the penis
Special tissues	Help in erection of penis to facilitate insemination
Glans penis	Enlarged end of penis covered by loose fold of skin called **foreskin**

3 FEMALE REPRODUCTIVE SYSTEM

- **Location :** Pelvic region
- **Oviduct/fallopian tube**
  - 10-12 cm (length)
  - Extend from ovary to uterus
- **Uterus/womb**
  - Inverted pear shaped
  - Attached to pelvic wall by ligaments
- Vagina

Accessory ducts



Parts of Fallopian tube
- Isthmus → Last part of oviduct; Narrow lumen; Joins the uterus
- Ampulla – Wider part
- Infundibulum – Funnel shaped
- *Fimbriae* – Finger like projections that collect ovum after ovulation

- **Uterine wall consists of three layers:**
  1. **Endometrium** – Lines lumen, glandular and undergoes cyclic changes during menstruation
  2. **Myometrium** – Thick layer of smooth muscles that show strong contractions during delivery
  3. **Perimetrium** – External thin membrane

External Genitalia of Female:

Parts	Features
Mons pubis	Cushion of fatty tissue covered by skin and pubic hair
Labia majora	Fleshy folds of tissue that extend down mons pubis and surround the vaginal opening
Labia minora	Paired folds of tissue under the labia majora
Clitoris	Tiny finger like structure which lies at the upper junction of labia minora above the urethral opening
Hymen	• Membrane that partially covers the opening of vagina • Can be torn while - sudden jolt/fall, horse riding, cycling, insertion of vaginal tampon. • May or may not be torn during the first coitus so its presence or absence is not reliable indicator of virginity or sexual experience.

4 PRIMARY SEX ORGANS

Parameters	Male	Female
Organ	Testis	Ovary
Number	2	2
Shape	Oval	Almond
Location	Outside abdominal cavity in a pouch called **scrotum**	Lower abdomen, one on each side
Dimensions	Length 4-5 cm, Width 2-3 cm	Length 2 to 4 cm
Covering	Dense connective tissue (outermost)	Thin epithelium (outermost)
Functions	Sperm formation, synthesise steroidal **testicular** hormones like androgens	Ova formation, synthesise steroidal **ovarian** hormones like estrogen and progesterone
Compartments	250 testicular lobules • 1-3 coiled seminiferous tubules/lobule	Peripheral **cortex** and inner **medulla** zones in ovarian stroma have follicles in various developing stages

• **Cells lining the seminiferous tubules**	**Functions**
1. Male germ cells/spermatogonia	Sperm formation
2. Sertoli cells	Provide nutrition to the germ cells

- Scrotum helps in maintaining the temperature 2 to 2.5°C lower than body temperature, necessary for **spermatogenesis**.
- Interstitial spaces outside seminiferous tubules contain **immunocompetent** cells and **Leydig cells**
- Ovary is connected to pelvic wall and uterus by **ligaments**.

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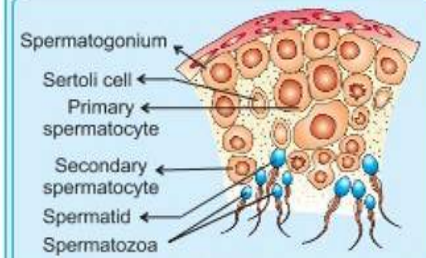


Fig. : Sectional view of seminiferous tubules

5 GAMETOGENESIS

Process of gamete formation

Parameters	Male	Female
Term	Spermatogenesis	Oogenesis
Process begins	At puberty	During embryonic development
Ploidy & chromosome number per cell	2n = 46	2n = 46

Male germ cells/ Spermatogonia → (Mitosis & differentiation) → Primary spermatocytes (2n = 46)

Female mother cells/ Oogonia → (Mitosis & differentiation) → Primary oocytes (In Fetus (arrested at prophase I))

Primary spermatocytes → (Periodic Meiosis I) → Secondary spermatocytes (n = 23) + 1st polar body

Primary oocytes → (Periodic Meiosis I: Birth / Puberty) → Secondary oocyte + 1st polar body

Secondary spermatocytes → (Meiosis II) → Spermatids (n = 23) → Spermiogenesis → Sperms (n = 23) → Spermiation → Released from seminiferous tubules

Secondary oocyte → (Meiosis II) → 2nd polar body + Ovum

*2n = diploid
*n = haploid

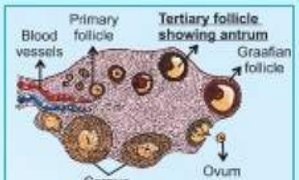


Fig. : Sectional view of ovary

Follicles → **Characteristics**

- Primary → Single layer of granulosa cells
- Secondary → More layers of granulosa cells and a **new theca layer**
- Tertiary → Completion of meiosis I (*Reduction division*); Fluid filled cavity **antrum** and theca layers are organised into external and internal layers
- Graafian/ mature → Secondary oocyte forms **acellular zona pellucida** around it
- Ovulation

- No more oogonia are formed and added after birth
- A large number of follicles degenerate from birth to puberty so only **60,000-80,000 primary follicles are left in each ovary at puberty**.
- **Meiosis** in oogenesis results in **unequal sized cells** and the secondary oocyte retains bulk of the nutrient rich cytoplasm of the primary oocyte
- Fate of polar body is not certain

- During the embryonic development, a couple of million gamete mother cells (oogonia) are formed within each fetal ovary

Spermiogenesis is transformation of **spermatids** to sperms and sperm head is embedded in **Sertoli cells**

6 Semen

- Secretions of epididymis and vas deferens are essential for maturation and motility of sperms
- **Male ejaculates** about 200-300 million sperms during a coitus.
- **For normal fertility :**
  - 60% sperms must have normal shape and size
  - **40% of 60% sperms must show vigorous motility**

7 HORMONAL REGULATION IN MALES

Hypothalamus ↓ secretes **GnRH** (significant amount) ↓ targets **Anterior pituitary** ↓ secretes **Gonadotropins**

- **FSH** (acts on Sertoli cells) → Synthesise & release → Some factors → **Spermiogenesis**
- **LH** (acts on Leydig/interstitial cells) → Synthesise & release → Androgens/Testicular hormones → **Spermatogenesis**

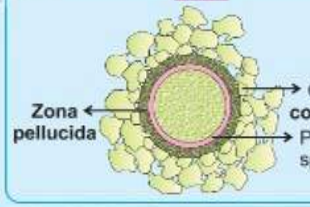
Inside / Outside: Seminiferous tubules

Stimulate

The function of male sex accessory ducts and glands are maintained by the testicular hormones (androgens)

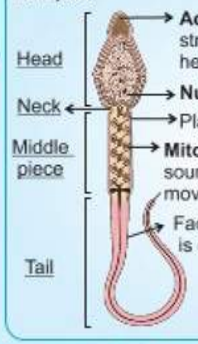
8 STRUCTURE OF GAMETES

Ovum



Sperm

Main parts



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9 HORMONAL REGULATION IN FEMALES AND MENSTRUAL CYCLE

- The cycle of events starting from one menstruation till the next one is termed **menstrual cycle**
- **Characteristic** of female primates → Monkeys, Apes, Humans
- **Begins** at puberty - **menarche**
- **Ceases** at 50 years - **menopause**

Reproductive phase

- **Cycle occurs if ovum remains unfertilized**
- **Lack of cycle** may be an indication of
  - Pregnancy, stress, poor health *etc.*
- Average duration in humans = 28/29 days

Menstrual Hygiene

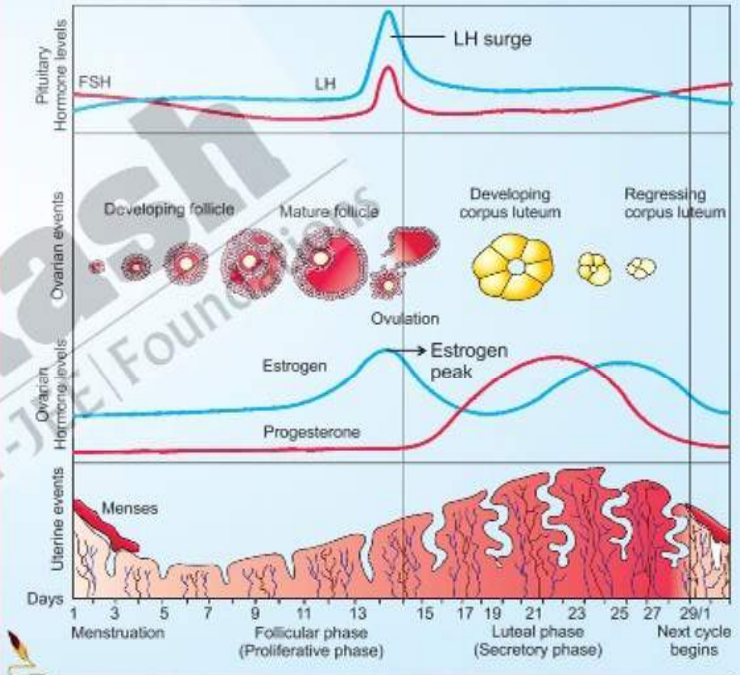
1. Maintenance of hygiene and sanitation during menstruation is very important
2. Take bath and clean yourself regularly use sanitary napkins/home made pads
3. Change sanitary pads after every 4-5 hrs.
4. Dispose of used sanitary napkins properly by wrapping it in used paper.
5. After handling the napkin wash hands with soap

Menstrual Cycle

- Changes in the ovary and the uterus are induced by changes in the levels of pituitary and ovarian hormones

Reproductive cycle

Phase	Duration	Hormones & their effects	Events in ovary	Events in uterus
Menstrual	3-5 days	Drastic decline in progesterone	Corpus luteum degenerates	• Breakdown of endometrial lining and its blood vessels which forms liquid that comes out through vagina constituting **menstrual flow**
Follicular or Proliferative phase	Variable	Gradual increase in FSH and LH that stimulate secretion of estrogen from follicles	Primary follicle gradually matures to Graafian follicle	• Endometrium regenerates through proliferation
Ovulation	14th day (Middle of cycle)	FSH and LH at peak, **(LH surge)**	Rupture of Graafian follicle and release of only one ovum/ cycle	• Proliferation of endometrium continues
Luteal or Secretory	**Fixed (14 days)**	Secretion of progesterone and estrogen	Remnants of the Graafian follicle transforms into corpus luteum	• Endometrium is maintained • If ovum remains unfertilized, endometrium is sloughed off, marking a new cycle



- **If ovum gets fertilized, endometrium is maintained by progesterone** necessary for implantation and other events of pregnancy.
- During pregnancy all events of menstrual cycle stop

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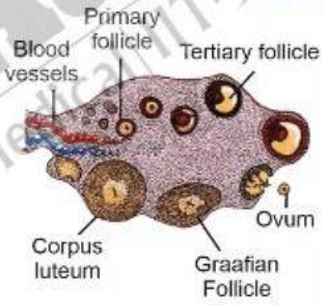
Sharpen Your Understanding

1. Choose the **incorrect** statement w.r.t. primary sex organ in males [NCERT Pg. 43]
   (1) They have immunocompetent cells in their interstitium.
   (2) They bear connection with abdomen
   (3) They are lined by meiotically dividing sertoli cells and germ cells
   (4) They have Leydig cells that secrete androgens
2. Ejaculatory duct is formed by uniting with a duct from which gland? [NCERT Pg. 43]
   (1) Seminal vesicle
   (2) Prostate
   (3) Vas deferens and seminal vesicle
   (4) Bulbourethral
3. Maximum number of sperms formed by 16 primary spermatocytes are [NCERT Pg. 49]
   (1) 16 (2) 32
   (3) 64 (4) 8
4. Which of the following statement is **incorrect** w.r.t. vasa deferentia? [NCERT Pg. 43]
   (1) Arises from the base of epididymis
   (2) They are two in number
   (3) They store sperms temporarily
   (4) They carry sperms from rete testis to epididymis
5. Read the following statements and select the **incorrect** option [NCERT Pg. 45]
   (1) Ovary is connected to the pelvic wall and uterus by ligaments
   (2) Fundus is thickest part of uterine tube that follows directly into of oviduct ampulla
   (3) Edges of the infundibulum possess fimbriae
   (4) Ampulla is the widest part of oviduct
6. Select the **correct** sequence of layers around ovum from outer to inner side
   (a) Zona pellucida (b) Corona radiata
   (c) Plasma membrane [NCERT Pg. 51]
   (1) a → b → c (2) b → a → c
   (3) a → c → b (4) c → a → b
7. Following is a diagrammatic sectional view of ovary. Select the **incorrectly** labelled part [NCERT Pg. 49]



   (1) Primary follicle (2) Tertiary follicle
   (3) Graafian follicle (4) Corpus luteum

NCERT Based MCQs

8. Which of the following hormone attains the highest peak in the middle of menstrual cycle with a duration of 28/29 days? [NCERT Pg. 51]
   (1) Estrogen
   (2) Progesterone
   (3) FSH
   (4) LH
9. Degeneration of which structure in ovary causes disintegration of the endometrium leading to menstruation? [NCERT Pg. 51]
   (1) Primary follicle
   (2) Secondary follicle
   (3) Graafian follicle
   (4) Corpus luteum
10. Which layer in the wall of uterus undergoes cyclical changes during menstrual cycle? [NCERT Pg. 46]
    (1) Perimetrium (2) Myometrium
    (3) Endometrium (4) Mesometrium
11. Significantly large amounts of progesterone is produced by which of the following in ovary? [NCERT Pg. 51]
    (1) Primary follicle
    (2) Mature follicle
    (3) Corpus luteum
    (4) Graafian follicle

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12. Secretions of which structures are essential for maturation and motility of sperms? [NCERT Pg. 48]

a. Epididymis
b. Vas deferens
c. Seminal vesicle
d. Bulbourethral gland

(1) a, b only
(2) b, c only
(3) a, d only
(4) a, b, c

13. How many follicles are present in each ovary at the time of puberty? [NCERT Pg. 48]

(1) 1.5-2 lakh
(2) 60,000-80,000
(3) 30,000-40,000
(4) 1,20,000-1,60,000

14. Which of the following statements are **correct** w.r.t. hymen? [NCERT Pg. 46]

(a) Is often torn during first intercourse
(b) Partially covers vaginal opening
(c) It forms a part of external genitalia

(1) a, b only
(2) b, c only
(3) a, c only
(4) a, b, c

15. How many of the following features are common for both male and female gametes in humans? [NCERT Pg. 48]

a. Presence of Locomotory structure
b. Number of chromosome
c. Arrangement of mitochondria
d. Similar size and shape

(1) a, c
(2) b, c
(3) c, d
(4) b

16. Termination of oogenesis is indicated by the formation of [NCERT Pg. 52]

(1) First polar body
(2) Secondary polar body
(3) Secondary oocyte
(4) Theca layer

17. Select the **incorrect** option with legends to oogenesis in human female? [NCERT Pg. 49]

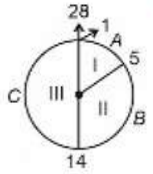
(1) Meiosis I in oogonia starts in the fetal life
(2) Tertiary follicle is characterized by presence of a distinct antrum
(3) In meiosis II, first polar body divides to form two polar bodies of equal size
(4) First meiotic division completes prior to ovulation

18. How many of the given developing stages during gametogenesis are haploid? [NCERT Pg. 49]

Spermatozoa, Secondary oocyte, Spermatid, Oogonia, Primary spermatocyte

(1) 2 (2) 3
(3) 1 (4) 4

19. Study the given diagram w.r.t menstrual cycle and select the **correct** statement regarding it [NCERT Pg. 50]



(1) A – Endometrium regenerates through proliferation
(2) B – Broken endometrium comes out through vagina.
(3) C – Graafian follicle enlarges by the end of this phase
(4) D – Secretions of endometrial glands is very high

20. Complete the analogy w.r.t. menstrual cycle

LH surge : Ovulation

Progesterone peak : _____ [NCERT Pg. 50]

(1) After ovulation (2) Before ovulation
(3) During ovulation (4) Bleeding phase

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Thinking in Context

1. In humans each testis has about _____ compartments called _____. [NCERT Pg. 43]
2. For normal fertility in humans at least _____ % of sperms must have normal shape and size. [NCERT Pg. 48]
3. Loose fold of skin around glans penis is called _____. [NCERT Pg. 44]
4. Semen contains seminal plasma secreted by male _____ glands and cells called _____. [NCERT Pg. 48]
5. Functions of male accessory ducts and glands are maintained by _____. [NCERT Pg. 48]
6. _____ number of sperms are formed from four spermatids by process known as spermiogenesis. [NCERT Pg. 49]
7. Leydig cells present in the interstitial spaces outside seminiferous tubules are also called _____. [NCERT Pg. 43]
8. Male urethra is a common passage for _____ and _____ in humans. [NCERT Pg. 43]
9. When primary follicle gets surrounded by more layers of granulosa cells and a new theca, it is called _____. [NCERT Pg. 48]
10. Zona pellucida is formed by secretions of _____. [NCERT Pg. 49]
11. _____ follicle is characterized by a fluid filled cavity, antrum. [NCERT Pg. 48]
12. About _____ million sperms are ejaculated during a coitus by a human male. [NCERT Pg. 48]
13. Two zones of ovarian stroma are outer _____ and inner _____. [NCERT Pg. 44]
14. Each ovary is approximately _____ cm in length and the oviduct is about _____ cm long. [NCERT Pg. 44,45]
15. _____ and _____ together form the birth canal. [NCERT Pg. 46]
16. Optimum temperature necessary for spermatogenesis is _____. [NCERT Pg. 43]
17. Corpus luteum exist in _____ phase of menstrual cycle. [NCERT Pg. 51]
18. Cessation of menstrual cycle is termed as _____. [NCERT Pg. 51]
19. The first menstruation begins at _____ and is called _____. [NCERT Pg. 49]
20. _____ are fleshy folds of tissue that extend from mons pubis and surrounds the vaginal opening in female external genitalia. [NCERT Pg. 46]

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Human Reproduction

2B Chapter

1 INTRODUCTION

- **Sequence of reproductive events occuring in humans include:**

Gametogenesis
↓
Insemination
↓
Fertilization
↓
Implantation
↓
Gestation
↓
Parturition/Birth

2 PATH FOLLOWED BY GAMETES IN FEMALE REPRODUCTIVE TRACT

- During coitus, semen is released from male reproductive tract by the penis into the female reproductive tract *i.e.*, the vagina by process termed **Insemination**

Sperms	**Oocyte**
Released in vagina	Released in body cavity
swim through ↓	captured by ↓
Cervix	Fimbriae
enters ↓	↓
Uterus	Infundibulum

Reach

Ampulla (site of fertilisation)

↓

Fusion of gametes/**syngamy**/**Fertilization** (vital event of sexual reproduction)

- Fertilization can only occur if the **ovum** and **sperms** are **transported simultaneously** to the ampullary region. This is the reason why not all copulations leads to fertilization and pregnancy

3 CHANGES IN GAMETES DURING FERTILIZATION

Secretions of **Acrosome part of sperm**
↓ allow
Entry of sperm into cytoplasm of oocyte through zona pellucida and plasma membrane

- Changes in zona pellucida prevent entry of additional sperms and **ensures that only one sperm can fertilise an ovum**

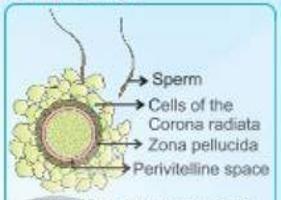


Fig. : Ovum surrounded by few sperms

Inducing completion of Meiosis II of secondary oocyte

Form • *Cytoplasmically unequal 2nd meiotic division*

2nd Polar body (n) (1) — (*Released in Perivitelline space*)

Ovum/ootid (n) (1) + Sperm (n) → Nuclei fuse → **Zygote** (2n)

- **Characteristics :**
  - Vital link that ensures continuity of species between organism of one generation and the next.
  - Sex of a child is decided at this stage

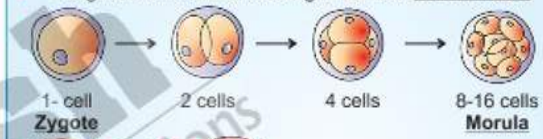
4 SEX OF A BABY IS DETERMINED BY THE FATHER

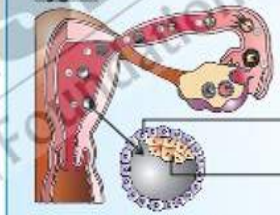
Parameters	**Female**	**Male**
Chromosome pattern	XX	XY
Gametes formed	X X	X Y
Fusion of gametes	XX XX	XY XY
	Female	**Male**

- 50% male gametes carry X chromosome and 50% carry Y chromosome
- Zygote would carry either XX or XY depending on whether the sperm carrying X or Y fertilizes the ovum

5 DEVELOPMENT OF THE ZYGOTE

- Every sexually reproducing organism, including human beings begin life as a single cell *i.e.*, the **zygote**.
- The process of development of embryo from zygote is called **embryogenesis**.
- During embryogenesis, zygote undergo **cell divisions** and **cell differentiation**
- Cleavage starts as zygote moves through isthmus to the uterus
- Daughters formed after cleavage are called **Blastomeres**





→ **Trophoblast** – Outer layer of blastomeres attaches to endometrium

→ **Inner cell mass** – Inner group of cells attached to trophoblast → Differentiates into embryo with three germ layers

Blastocyst
Implants in uterus

The inner cell mass contains certain cells called **stem cells** which have the potency to give rise to all the tissues and organs.

↓

After attachment, uterine cells divide rapidly and cover the blastocyst.
Embedding of blastocyst in endometrium is called **Implantation**
Leads to ↓
Pregnancy

- **Germ layers**
  - Outer – Ectoderm
  - Middle – Mesoderm
  - Inner – Endoderm

} These together give rise to all tissues/organ in adults.

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6 CHANGES AFTER IMPLANTATION

Embryo/Foetus — Finger like projections appear on the trophoblast called **chorionic villi**

Mother — Uterine tissue

Interdigitate to form ↓

(Structural and functional unit between embryo/foetus and mother)

Placenta

Functions:

- Supply of O_2 and nutrients to the embryo
- Removal of CO_2 and excretory/waste materials produced by the embryo
- **Acts as endocrine tissue :**
  - hCG/human chorionic gonadotropin
  - hPL/human placental lactogen
  - Relaxin (Also secreted by ovary in later phase of pregnancy)

  } Produced only during pregnancy

  - Estrogens
  - Progestogens
  - Cortisol
  - Prolactin
  - Thyroxine

  } **Increase several folds during pregnancy, essential for supporting:**
    - Foetal growth
    - Metabolic changes in mother
    - Maintenance of pregnancy

Placenta is connected to the embryo through an **umbilical cord** which helps in the transport of substances to and from the embryo

7 GESTATION PERIOD

- Average duration of pregnancy in
  - Dog ~ 63 days
  - Cat ~ 63 days
  - Elephant ~ 18-22 months
  - Human ~ 9 months

Major events during gestation period in humans:

Trimester	Month	Week	Event
1st	I	4	Heart is formed, sign of growing foetus noticed by listening to the heart sounds through stethoscope
	II	8	Foetus develops limbs and digits
	III (end)	12	Most of major organ systems are formed including external genital organs
2nd	V	20	First movement of foetus, Appearance of hair on head
	VI (end)	24	Body is covered with fine hair, Eyelids separate, Eyelashes are formed
3rd	IX (end)	36	Foetus is fully developed and is ready for delivery

8 PARTURITION

- **Defined as delivery of the foetus (Child birth)**
- **Signals for parturition originate from** → **Fully developed foetus** and **Placenta**

Lead to ↓

Mild uterine contractions called ↓

Foetal ejection reflex triggers ↓ release of

Oxytocin from posterior pituitary of mother

Causes ↓

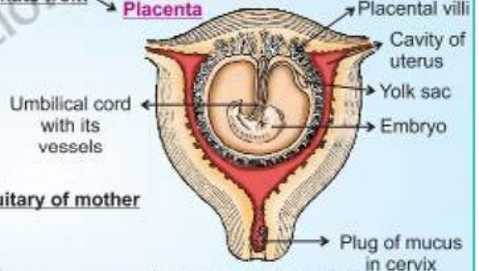
Strong uterine contractions leading to ↓

Expulsion of baby through birth canal **(Parturition)** followed by ↓

Expulsion of placenta

This is positive feedback loop

*Oxytocin is synthesized by its **source gland hypothalamus** but released from posterior pituitary.



The human foetus within the uterus

Child birth is induced by a complex **neuroendocrine mechanism** involving **cortisol, estrogens and oxytocin**.

Doctors inject oxytocin to induce delivery.

9 MAMMARY GLANDS AND LACTATION

- Functional mammary gland is characteristic of all female mammals
- Paired structures (Breasts) that contain variable amount of fat and **Glandular tissue**

divided into ↓

(15-20) **Mammary lobes** contain ↓

Mammary alveolus/ cluster of cells (*secrete and store milk*) in their lumen opens into ↓

Mammary tubules join to form ↓

Mammary duct Many join to form ↓

Mammary ampulla connected to ↓

Lactiferous duct (Through which milk is sucked out)

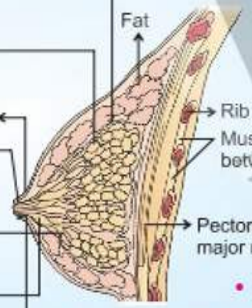


Fig.: Sectional view of Mammary gland

- **Mammary glands** → Undergo differentiation during pregnancy; Secrete milk after child birth that helps mother in feeding new born by process called **lactation**.
- Milk produced during initial few days of lactation is called **colostrum** which contains several antibodies, absolutely essential to develop resistance for the new born babies.
- Breast feeding during the initial period of infant growth is recommended by doctors for bringing up a healthy baby

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Sharpen Your Understanding

1. Read the following statements and select the **correct** option

Statement A : All copulations do not lead to fertilization and pregnancy.

Statement B : Fertilization is possible only if ovum and sperms are transported simultaneously to the ampullary region. [NCERT Pg. 51]

(1) A is true and B is incorrect statement
(2) Both A and B statements are correct
(3) Only B statement is correct
(4) Both A and B are incorrect

2. Which of the following event triggers the formation of ootid? [NCERT Pg. 52]

(1) Entry of sperm in fallopian tube
(2) Binding of sperm to zona pellucida
(3) Changes in the plasma membrane of sperm
(4) Entry of sperm into cytoplasm of secondary oocyte

3. Which region of blastocyst contains stem cells that have potency to give rise to all the tissues and organs? [NCERT Pg. 54]

(1) Trophoblast
(2) Blastocoel
(3) Inner cell mass
(4) Zona pellucida

4. In mammals, embryo proper is formed from [NCERT Pg. 53]

(1) Trophoblast
(2) Inner cell mass
(3) Chorionic villi
(4) Polar body

5. Implantation usually occurs at [NCERT Pg. 53]

(1) Morula stage
(2) Zygote stage
(3) Blastocyst stage
(4) First cleavage stage

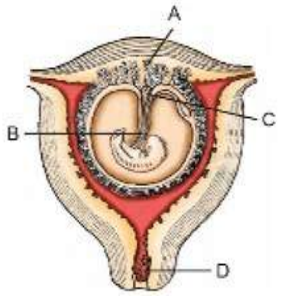
6. During pregnancy hormones like thyroxine, estrogen, progesterone *etc.*, increase several folds in the maternal blood. Which of the following features justify this increase? [NCERT Pg. 53]

a. Support fetal growth
b. Support metabolic changes in the mother
c. Essential for maintenance of pregnancy
d. To promote menstrual cycle on regular basis during pregnancy

(1) a, b only
(2) b, c only
(3) a, d only
(4) a, b, c

NCERT Based MCQs

7. In the figure shown below, which labelled structure has **not** been correctly identified? [NCERT Pg. 53]



(1) A-Placental villi (2) B-umbilical cord
(3) C-Yolk sac (4) D-Cervical plug

8. Foetal ejection reflex in human female is induced by [NCERT Pg. 54]

(1) Release of oxytocin from fetal pituitary
(2) Signals from fully developed foetus and placenta
(3) Release of oxytocin from adenohypophysis
(4) Pressure exerted by water bag on uterine wall

9. Which of the following hormone, do the doctors inject to induce delivery? [NCERT Pg. 54]

(1) Estrogen (2) Progesterone
(3) Prolactin (4) Oxytocin

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10. Breast feeding during initial period of infant growth is recommended by doctors for bringing up a healthy baby because it contains [NCERT Pg. 54]

(1) High amount of iron

(2) Low amount of cholesterol

(3) Almost all vitamins

(4) Several antibodies

11. Milk is secreted by the alveoli present in the mammary lobes and it reach upto nipple through following regions. Arrange these regions in a **correct** order [NCERT Pg. 46]

a. Lactiferous duct b. Mammary duct

c. Ampulla d. Mammary tubule

(1) b → c → d → a (2) d → b → c → a

(3) b → d → c → a (4) a → b → d → c

12. Which regions of glandular tissue in mammary glands store milk? [NCERT Pg. 47]

(1) Mammary tubule (2) Mammary alveoli

(3) Lactiferous duct (4) Mammary duct

13. Parturition is the process of giving birth to a baby. It is controlled by [NCERT Pg. 54]

(1) Neural mechanism only

(2) Endocrine mechanism only

(3) Physical mechanism only

(4) Neuro-endocrine mechanism

14. Foetal movement starts usually from [NCERT Pg. 54]

(1) II month of pregnancy

(2) III month of pregnancy

(3) IV month of pregnancy

(4) V month of pregnancy

15. Which of the following event takes place earliest by the end of first month of embryonic development? [NCERT Pg. 54]

(1) Major organs are formed

(2) Foetus develops limbs and digits

(3) Embryo's heart is formed

(4) Movement of foetus is observed

16. Select the **correct** option w.r.t. given statements [NCERT Pg. 53]

Statement A: After implantation, blastocyst gets embedded in the endometrium of uterus

Statement B: Uterine cells divide rapidly and cover the blastocyst once it gets attached to the uterine wall

(1) Both A and B statements are correct

(2) Only B is the correct statement

(3) Both A and B statements are incorrect

(4) A is correct and B is an incorrect statement

17. Which of the following hormone is secreted by placenta only? [NCERT Pg. 53]

(1) Oxytocin

(2) Estrogen

(3) Progesterone

(4) hCG

18. In humans, the placental villi are derived from [NCERT Pg. 53]

(1) Yolk sac (2) Chorion

(3) Endometrium (4) Water bag

19. Foetal ejection reflex triggers the release of [NCERT Pg. 54]

(1) Oxytocin from foetal pituitary

(2) Oxytocin from placenta

(3) Oxytocin from maternal pituitary

(4) hPL from placenta

20. Which of the following event is the last one to be observed during gestation period in a normal pregnancy? [NCERT Pg. 54]

(1) Eyelids separate and eyelashes are formed

(2) Listening to the heart sound of foetus through stethoscope

(3) Secretion of oxytocin from mammary glands

(4) Vigorous contractions of uterus

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Thinking in Context

1. The process of fusion of a sperm with an ovum is called _____. [NCERT Pg. 51]
2. After implantation, finger like projections appear on the trophoblast called _____. [NCERT Pg. 53]
3. First cell of a new generation is termed _____. [NCERT Pg. 52]
4. Secretions of _____ help the sperm entry into the cytoplasm of ovum through zona pellucida. [NCERT Pg. 51]
5. Morula is _____ blastomere stage in humans. [NCERT Pg. 53]
6. Early repeated mitotic divisions in the zygote are called _____. [NCERT Pg. 52]
7. All the three germ layers of embryo are formed from _____. [NCERT Pg. 54]
8. In humans during coitus, male ejaculates about _____ sperms in the vagina of females. [NCERT Pg. 48]
9. In foetus, most of the major organ systems are formed by the end of _____. [NCERT Pg. 54]
10. Gestation period in humans averages around _____. [NCERT Pg. 54]
11. _____ and _____ hormones have lactogenic properties. [NCERT Pg. 53]
12. _____ and _____ hormones are produced by both placenta as well as ovary. [NCERT Pg. 53]
13. Sex of a baby is decided at the time of _____ formation. [NCERT Pg. 52]
14. Oxytocin acts on uterine muscles and causes stronger contractions, which in turn stimulates further secretion of _____ hormone. [NCERT Pg. 54]
15. The process of child birth is called _____. [NCERT Pg. 54]
16. The milk produced in early few days after delivery is called _____. [NCERT Pg. 54]
17. Placenta is connected to the embryo through _____. [NCERT Pg. 53]
18. Structural and functional unit formed between developing foetus and maternal body is called _____. [NCERT Pg. 53]
19. Number of lobes found in each mammary gland of human female are _____. [NCERT Pg. 47]
20. Out of the three germ layers, X is formed after formation of Y and Z layers. [NCERT Pg. 54]

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