

UNIT – VA

HUMAN

REPRODUCTIVE

SYSTEM

HUMAN REPRODUCTIVE SYSTEM

INTRODUCTION

HUMAN REPRODUCTIVE SYSTEM

HUMAN REPRODUCTIVE SYSTEM



HUMAN REPRODUCTIVE SYSTEM

SEXUAL REPRODUCTION - CHARACTERISTICS



Stronger ones survive and Variations lead weaker ones perish. Thus the to Evolution. species goes on improving.

Maternal and paternal gametes fuse, so there is genetic recombination and variations.

HUMAN REPRODUCTIVE SYSTEM

SEXUAL REPRODUCTION - CHARACTERISTICS



Gestation period – 22 months

Small number of
offsprings are
produced.
It takes place only
in favourable
conditions.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Variations lead to



1) Evolution

2) Reproduction

3) Locomotion

4) Respiration

HUMAN REPRODUCTIVE SYSTEM

REPRODUCTIVE SYSTEM

HUMAN REPRODUCTIVE SYSTEM

REPRODUCTIVE SYSTEM



Male Reproductive System

Female Reproductive System

Gametogenesis

HUMAN REPRODUCTIVE SYSTEM

REPRODUCTIVE SYSTEM



Menstrual Cycle

Fertilisation

Gastrulation

HUMAN REPRODUCTIVE SYSTEM

REPRODUCTIVE SYSTEM



Organogenesis

Placenta Formation

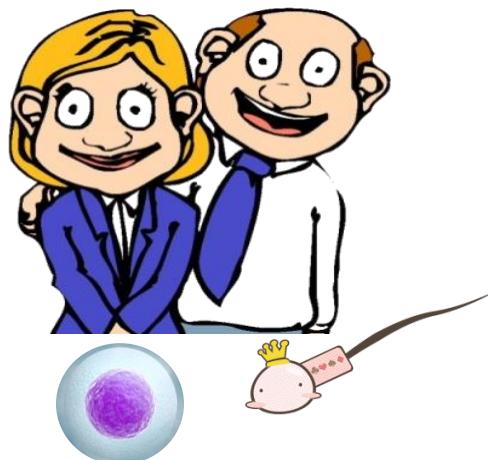
Parturition

Lactation

HUMAN REPRODUCTIVE SYSTEM

HUMAN REPRODUCTION

It is a form of sexual reproduction resulting in the conception of a child.



It typically involves sexual intercourse between a man and woman.



HUMAN REPRODUCTIVE SYSTEM

HUMAN REPRODUCTION - EVENTS

Gametogenesis (formation of gametes)

Insemination (Entry of Sperms into female genital tract)

Fertilization (Fusion of Gametes and formation of zygote)

Implantation (development of blastocyst & its attachment to the uterine wall)

Gestation (embryonic development)

Parturition (child birth)

HUMAN REPRODUCTIVE SYSTEM



UNIT – VA

HUMAN

REPRODUCTIVE

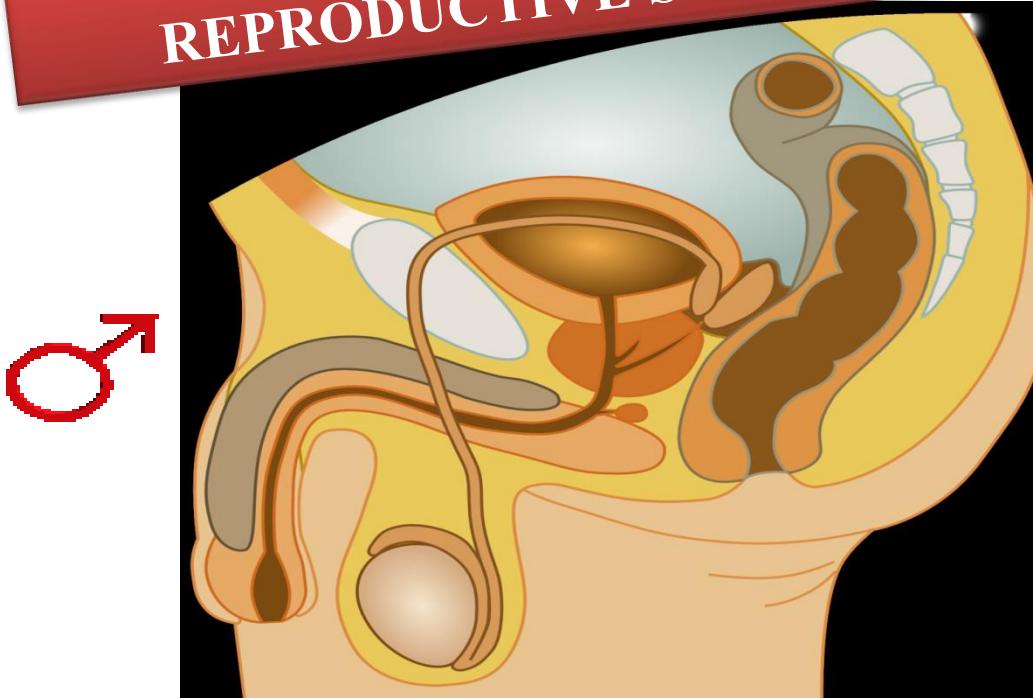
SYSTEM

HUMAN REPRODUCTIVE SYSTEM

MALE REPRODUCTIVE SYSTEM

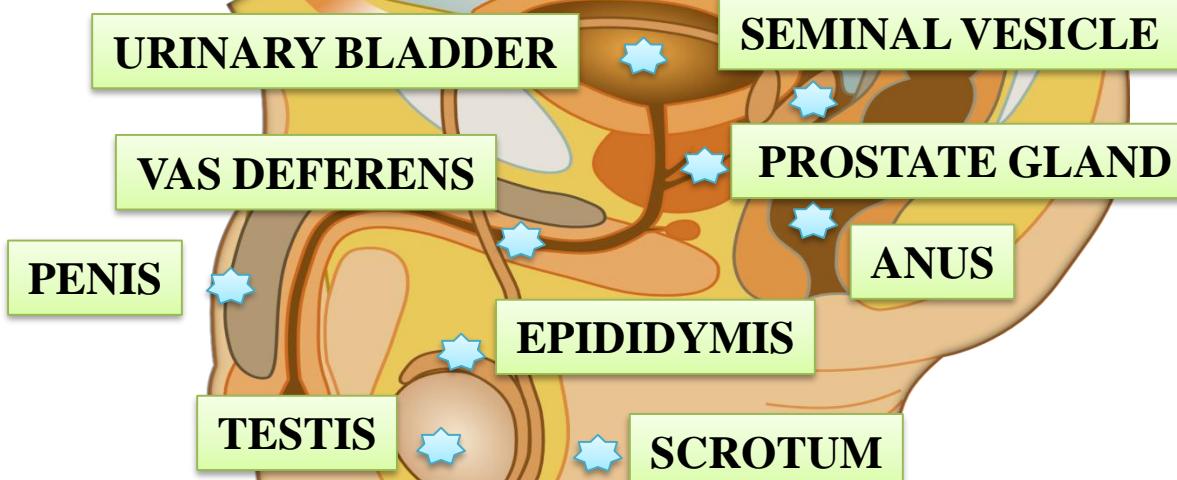
HUMAN REPRODUCTIVE SYSTEM

HUMAN MALE REPRODUCTIVE SYSTEM



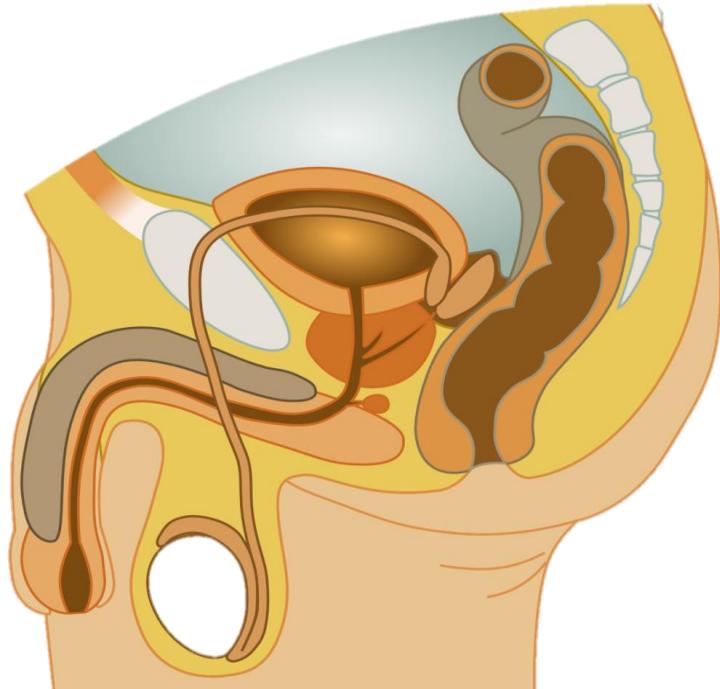
HUMAN REPRODUCTIVE SYSTEM

Names of the parts



HUMAN REPRODUCTIVE SYSTEM

MALE REPRODUCTIVE SYSTEM

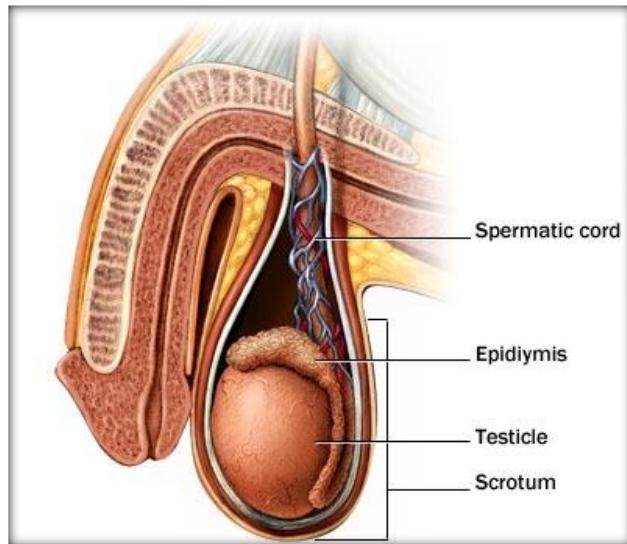


The sex organs, which are located in the pelvic region include a pair of testes along with accessory ducts, glands and external genitalia.

HUMAN REPRODUCTIVE SYSTEM

TESTES

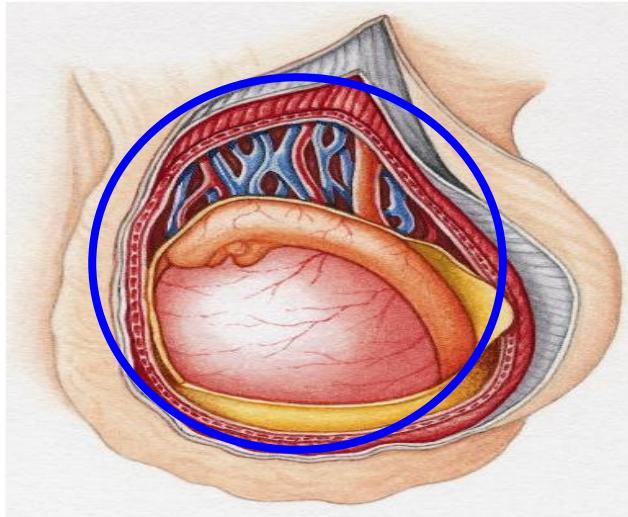
Testicles are a pair of soft, smooth, oval, pinkish male primary sex organs.



HUMAN REPRODUCTIVE SYSTEM

SCROTUM

- Testes are suspended outside the abdominal cavity within a pouch called scrotum.



HUMAN REPRODUCTIVE SYSTEM

Functions of Scrotum

Maintains the low temperature of the testes necessary for spermatogenesis.

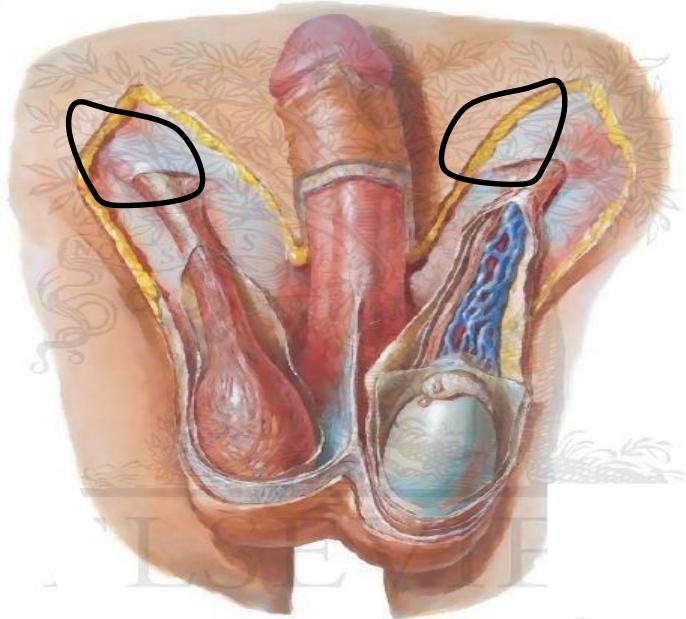
Protects the testes from mechanical injuries.

2-2.5⁰ C (34.5 –35⁰C)
lower than the normal internal body temperature.

HUMAN REPRODUCTIVE SYSTEM

SCROTUM

The cavity of the scrotal sac is connected to the abdominal cavity through the inguinal canal.



HUMAN REPRODUCTIVE SYSTEM

SPERMATIC CORD

Contents of Spermatic Cord

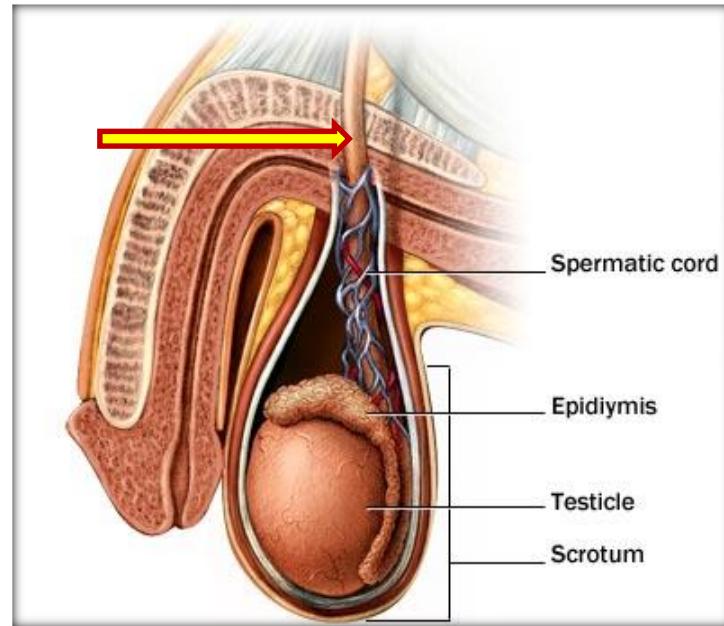
Arteries

Veins

Nerves

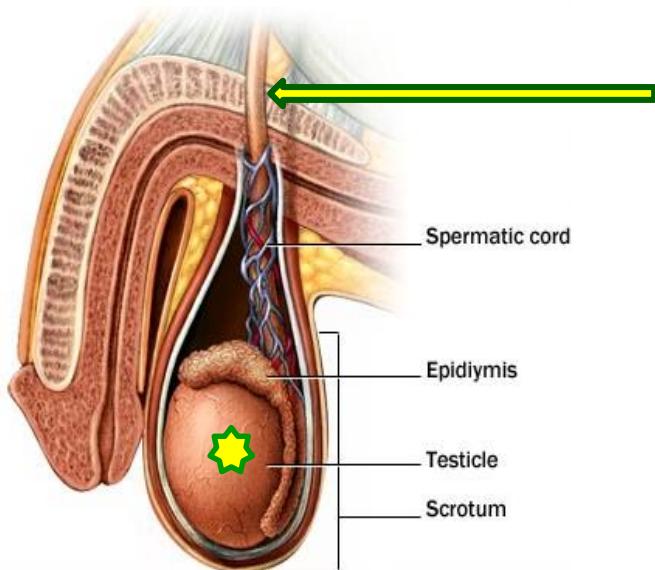
Vas deferens and other tissues

- It runs from the abdomen down to each testicles through inguinal canal.



HUMAN REPRODUCTIVE SYSTEM

TESTES



Testis is held in position in the Scrotum sac by gubernaculum and spermatic cord.

HUMAN REPRODUCTIVE SYSTEM

GUBERNACULUM



- A fibrous cord that connects the testis with the bottom of the scrotum.



GUBERNACULUM

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. A fibrous cord that connects the testis with the bottom of scrotum is

- 1) Vas deferens
- 2) Epididymis
- 3) Gubernaculum
- 4) Seminal duct

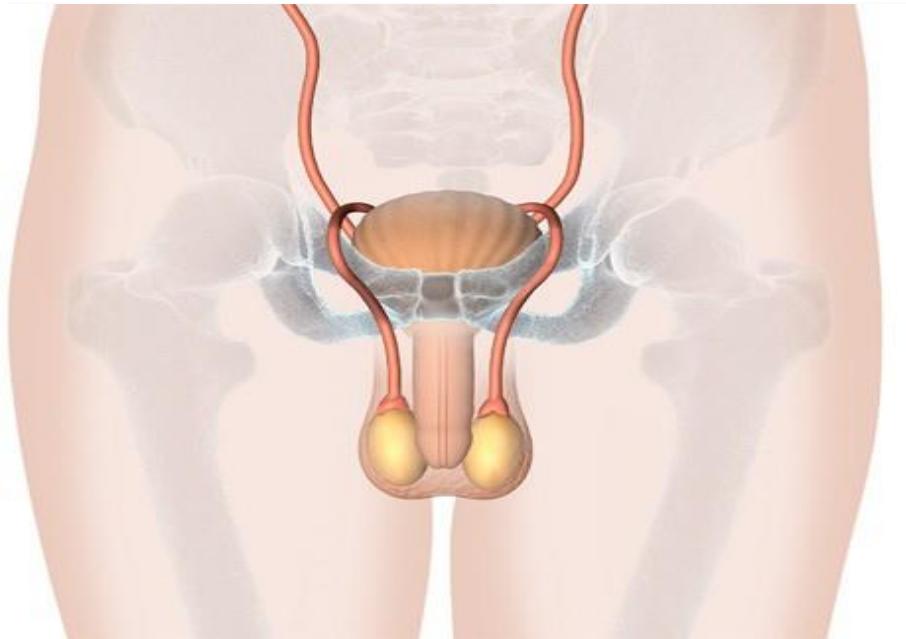


HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF TESTES

HUMAN REPRODUCTIVE SYSTEM

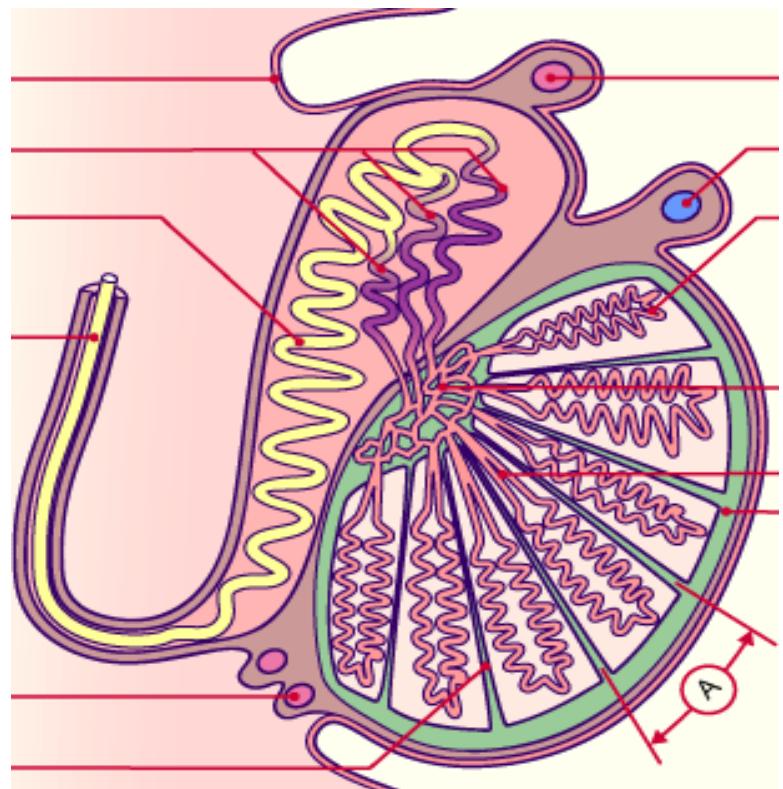
Internal structure and Functions of Testes



Spermatogenesis

Production of Testosterone

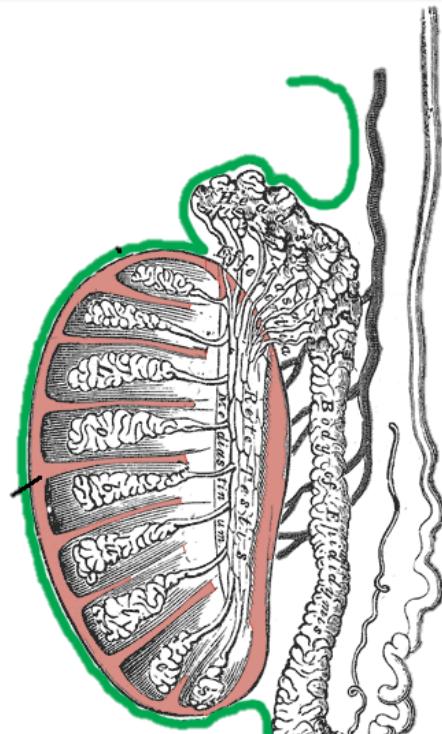
HUMAN REPRODUCTIVE SYSTEM



INTERNAL STRUCTURE
(HISTOLOGY) OF TESTIS

HUMAN REPRODUCTIVE SYSTEM

HISTOLOGY OF TESTIS



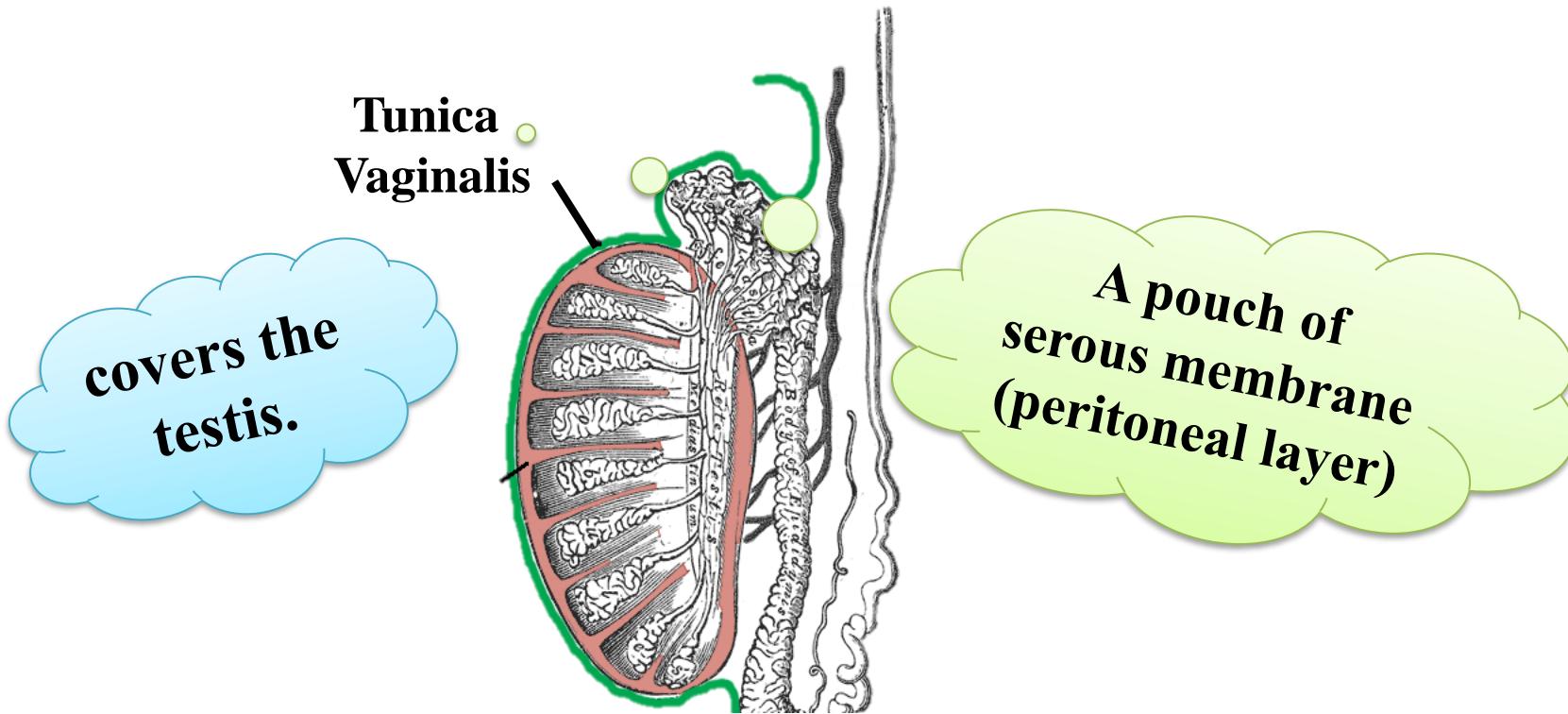
Testis enclosed in two protective layers.

1. Outer layer – Tunica Vaginalis (epithelium + connective tissue)

2. Inner layer – Tunica Albuginea (fibrous connective tissue)

HUMAN REPRODUCTIVE SYSTEM

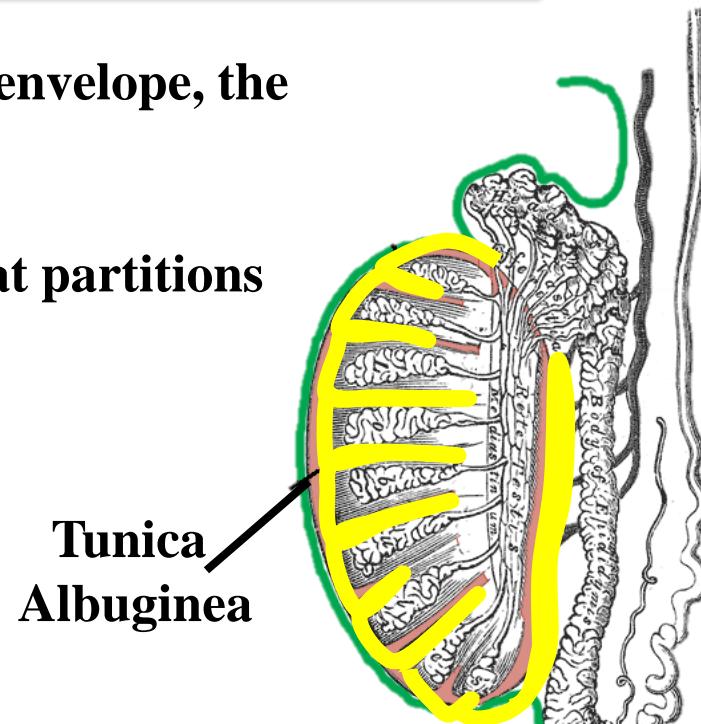
Tunica Vaginalis (epithelium + connective tissue)



HUMAN REPRODUCTIVE SYSTEM

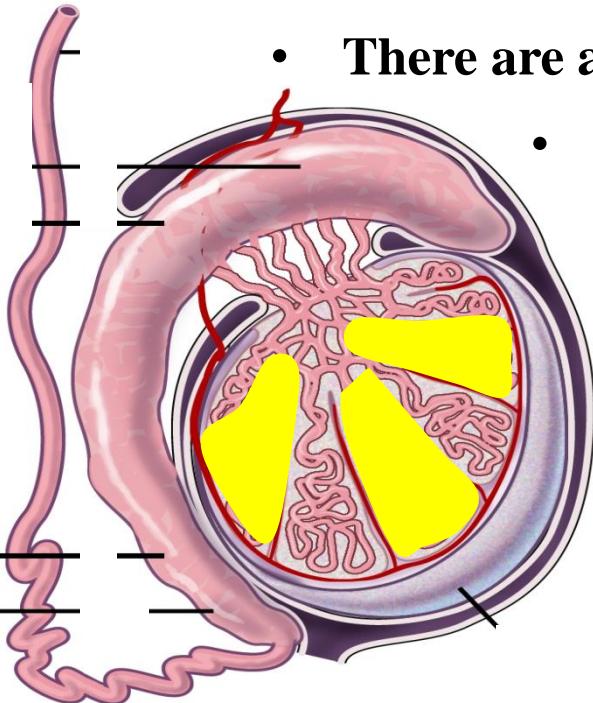
Tunica Albuginea (fibrous connective tissue)

- Each testis is enclosed in a fibrous envelope, the tunica albuginea.
- It extends inward to form septa that partitions the testis into lobules



HUMAN REPRODUCTIVE SYSTEM

HISTOLOGY OF TESTIS

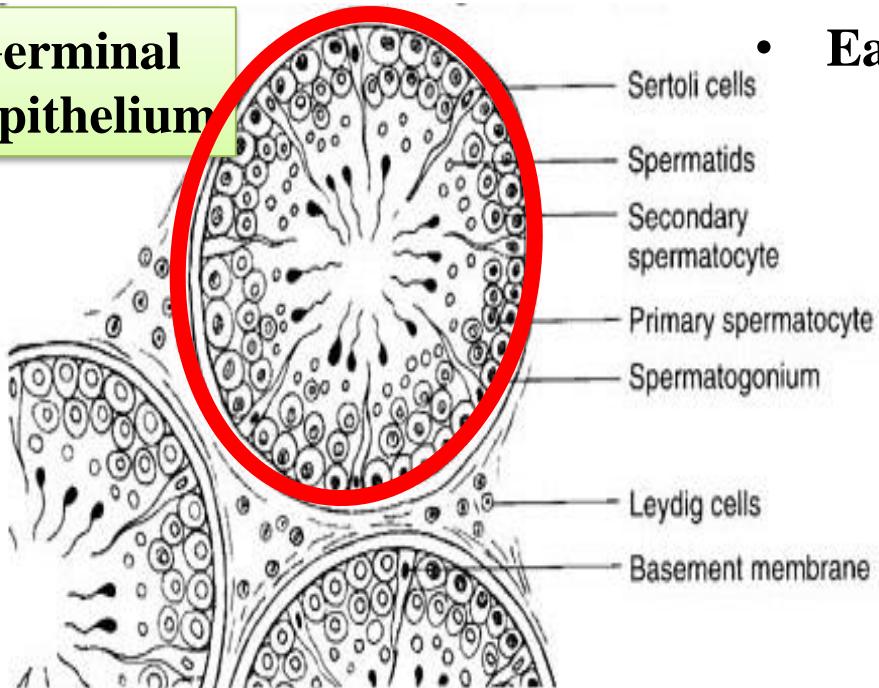


- There are about 250 testicular lobules in each testis.
- Each lobule contains 1 to 3 highly coiled seminiferous tubules.

HUMAN REPRODUCTIVE SYSTEM

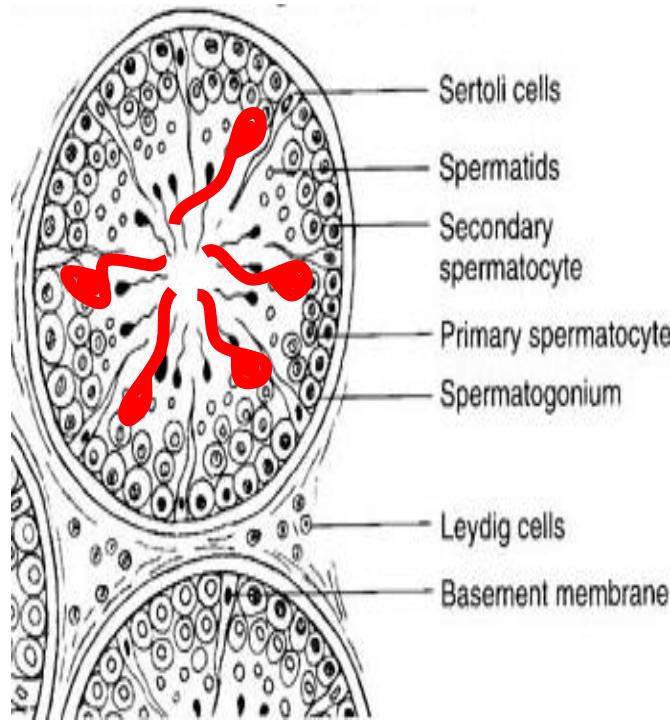
SEMINIFEROUS TUBULE

Germinal
Epithelium



- Each seminiferous tubule is lined by the germinal epithelium.

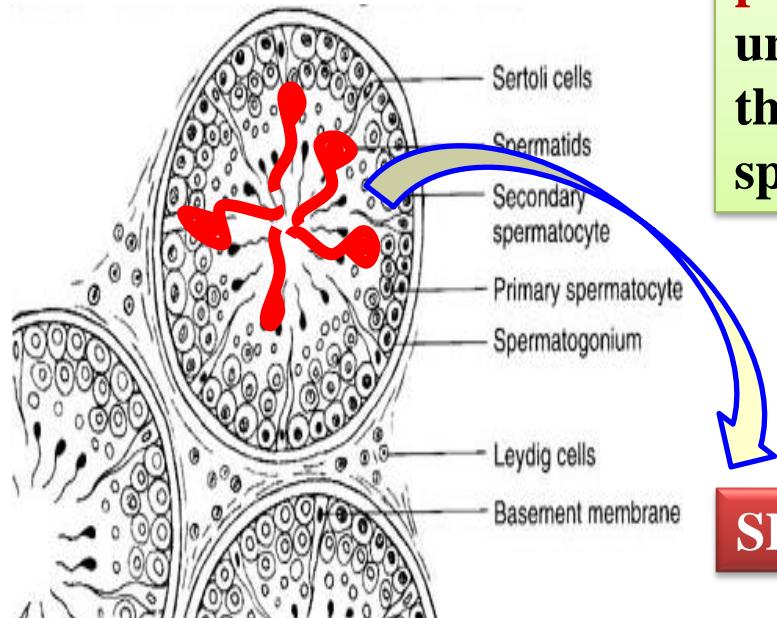
HUMAN REPRODUCTIVE SYSTEM



- Germinal epithelium consists of undifferentiated male germ cells called **Spermatogonial mother cells**.
- It also bears ‘nourishing cells’ called **Sertoli cells**.

HUMAN REPRODUCTIVE SYSTEM

Spermatogonia

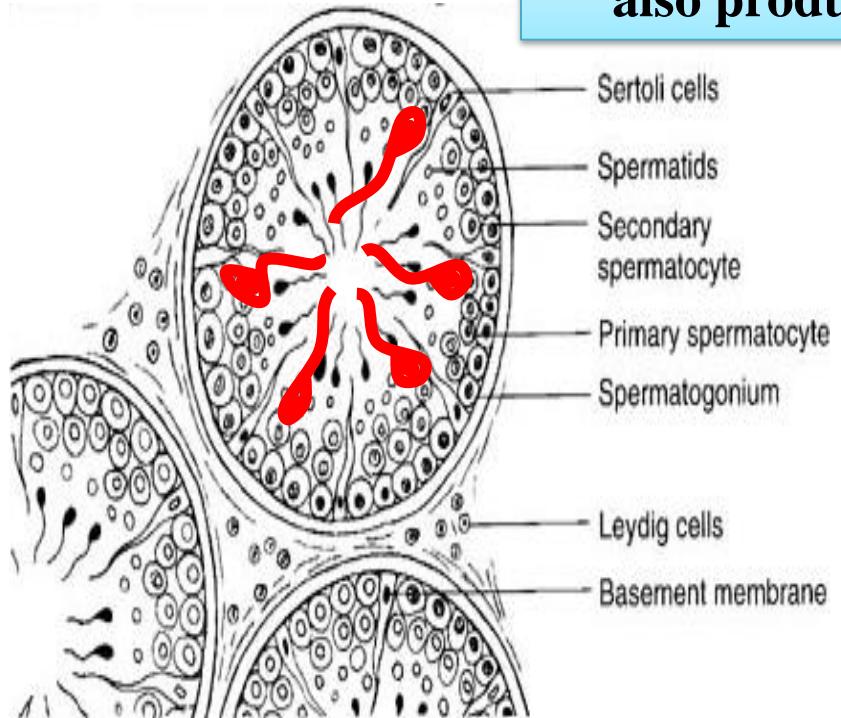


The spermatogonia produce the **primary spermatocytes** that undergo **meiosis**, finally leading to the formation of **spermatozoa** or sperms (spermatogenesis).

SPERMS

HUMAN REPRODUCTIVE SYSTEM

Sertoli cells

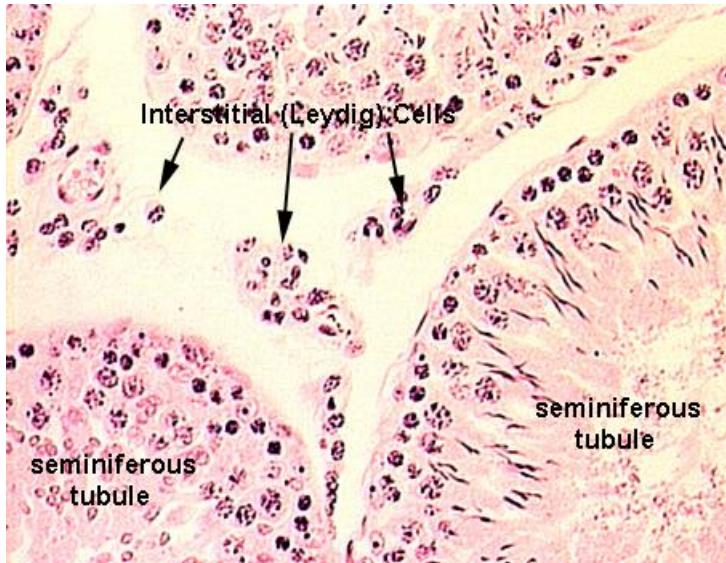


- Provide **nutrition** to the spermatozoa and also produce a hormone called **inhibin**.

Inhibin inhibits
the secretion of
FSH.

HUMAN REPRODUCTIVE SYSTEM

INTERSTITIAL SPACES

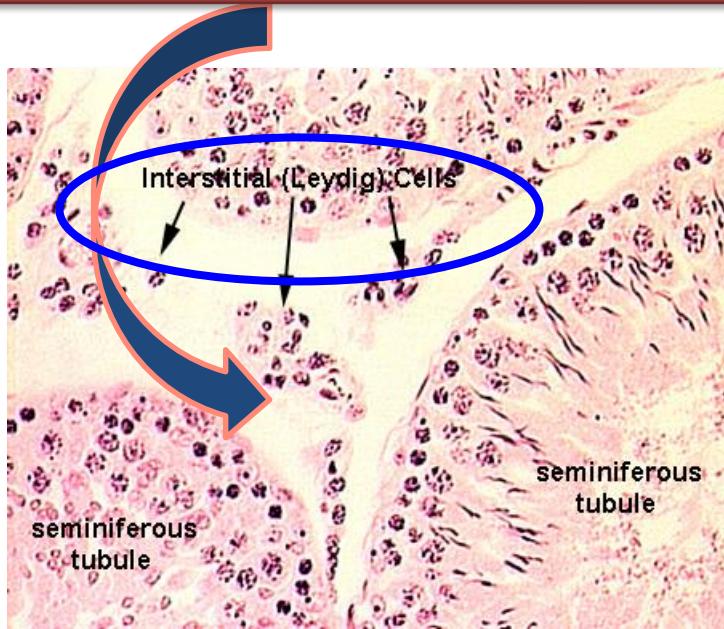


- The regions outside the seminiferous tubules are called **Interstitial spaces**.

Interstitial spaces

HUMAN REPRODUCTIVE SYSTEM

INTERSTITIAL SPACES

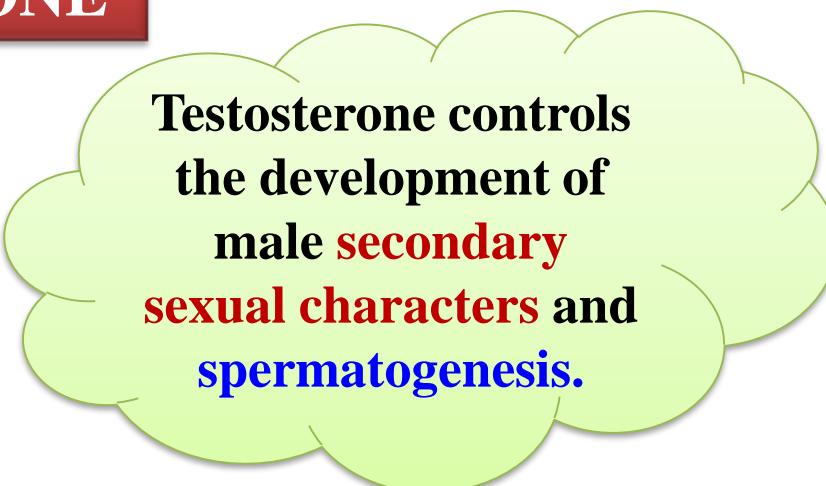


- Contain interstitial cells of Leydig or Leydig cells.
- Leydig cells produce androgens, the most important of which is testosterone.

Interstitial / leydig cells

HUMAN REPRODUCTIVE SYSTEM

TESTOSTERONE

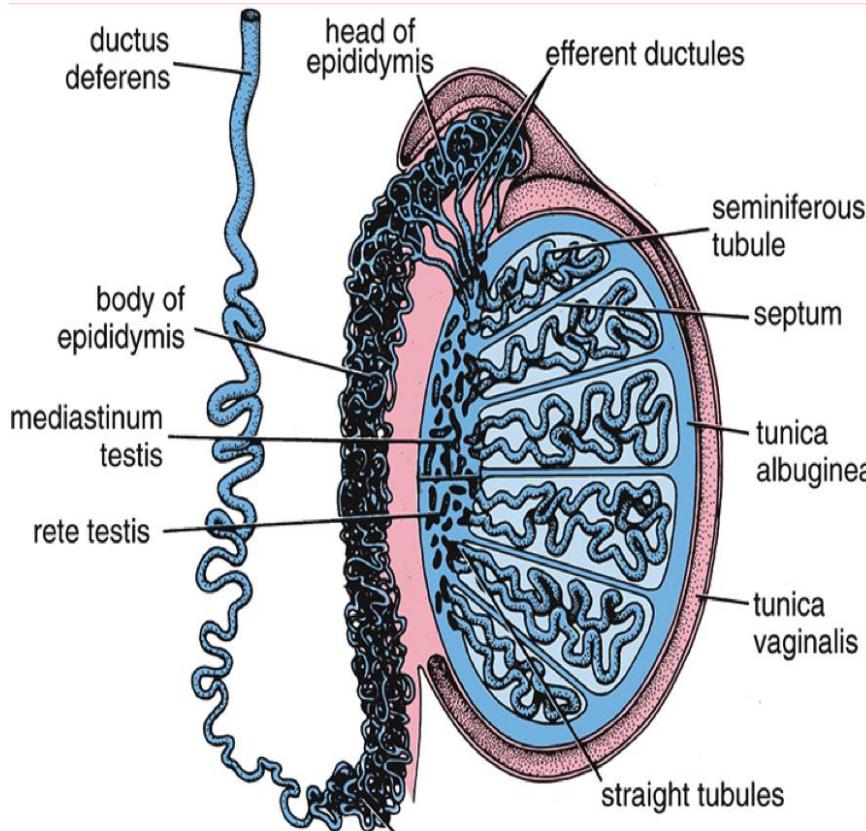


Testosterone controls
the development of
male **secondary**
sexual characters and
spermatogenesis.



Other immunologically
competent cells are also present.

HUMAN REPRODUCTIVE SYSTEM



The seminiferous tubules open into the vasa efferentia through the **rete testis**.

Rete testis is present in mediastinum testis which is a mass of connective tissue at the back of the testis.

HUMAN REPRODUCTIVE SYSTEM

Note

CRYPTORCHIDISM (Undescended Testis)

- **Testis does not descend from abdomen into scrotum.**
- **Testis does not produce sperms. So, male becomes sterile.**

HUMAN REPRODUCTIVE SYSTEM

1. In each testis the number of testicular lobules is

MCQs

1) 350

2) 420



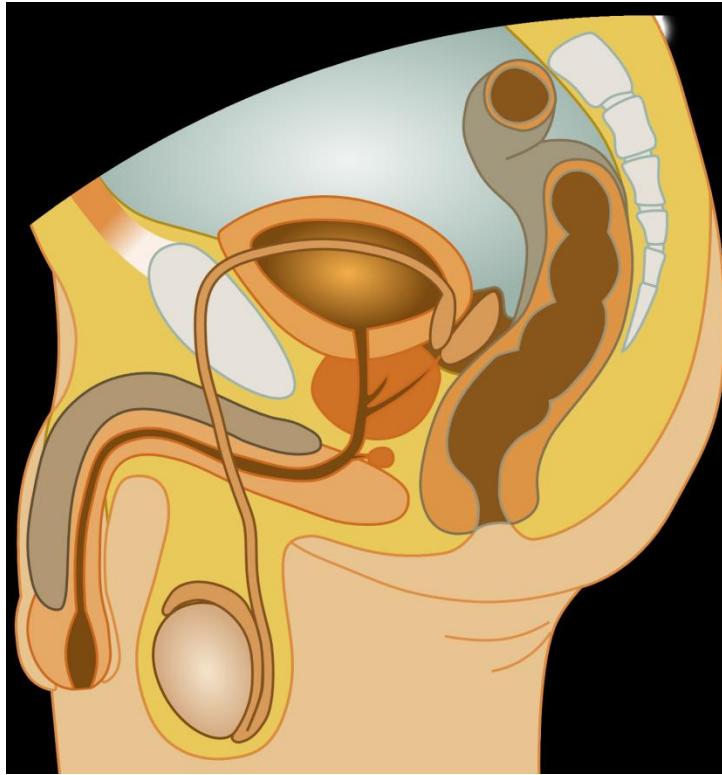
3) 250

4) 500

HUMAN REPRODUCTIVE SYSTEM

VASA EFFERENTIA

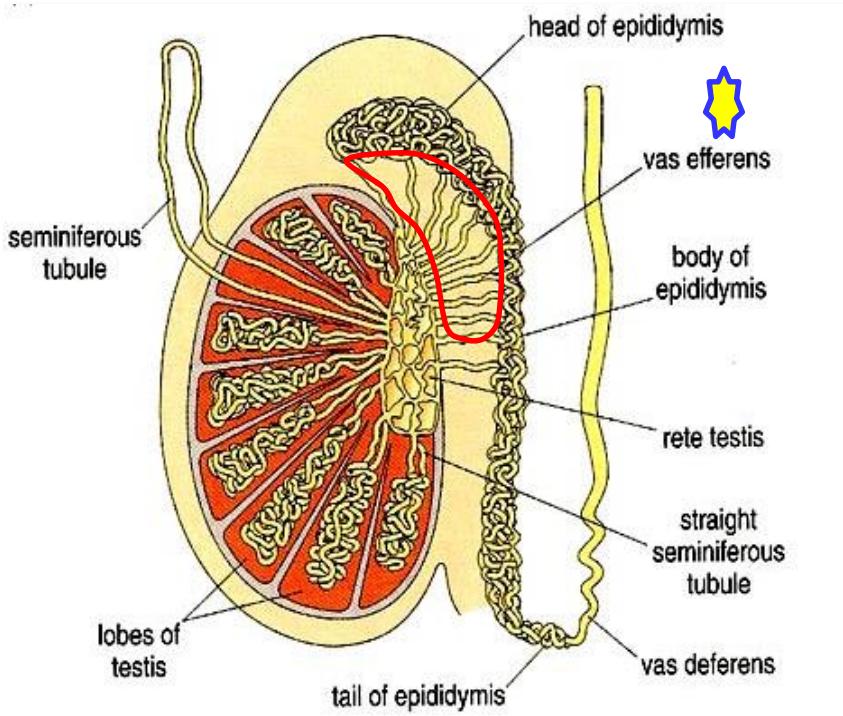
HUMAN REPRODUCTIVE SYSTEM



**HUMAN MALE
REPRODUCTIVE SYSTEM**

HUMAN REPRODUCTIVE SYSTEM

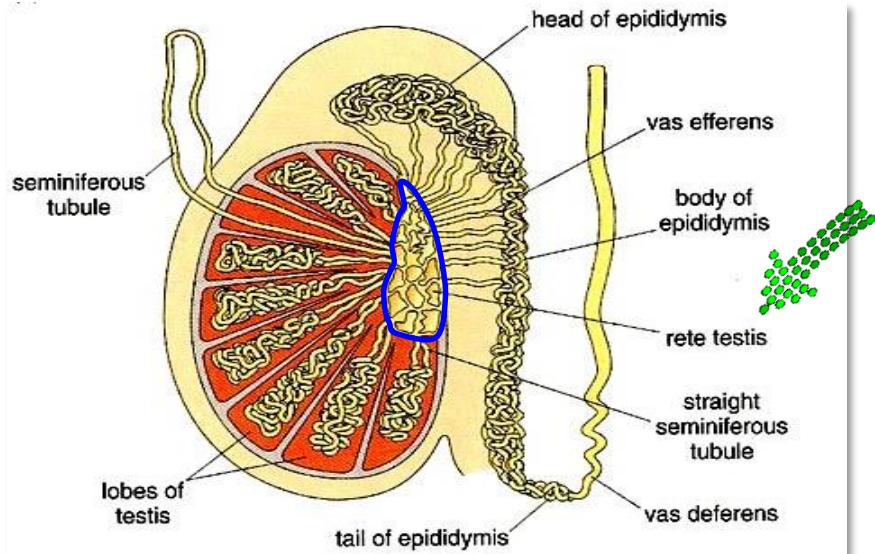
VASA EFFERENTIA



The seminiferous tubule opens into the vasa efferentia through the **rete testis**.

HUMAN REPRODUCTIVE SYSTEM

RETE TESTIS

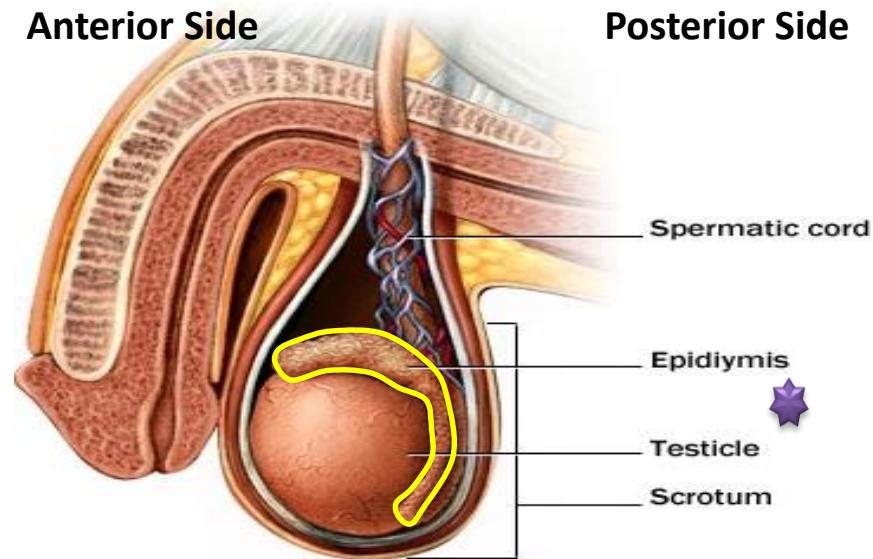


A Network Of tubules in the testis, carrying spermatozoa from the seminiferous tubules to the vasa efferentia

HUMAN REPRODUCTIVE SYSTEM

EPIDIDYMIS

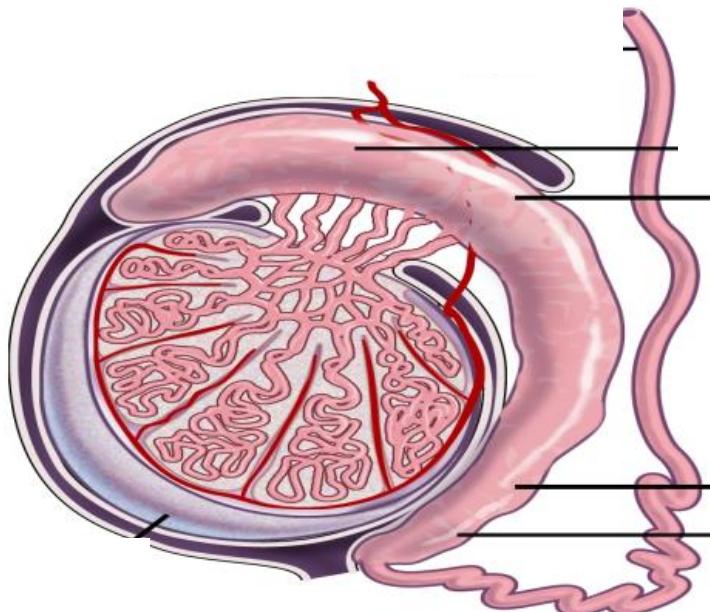
The vasa efferentia leave the testis and open into a narrow, tightly coiled tube.



Epididymis is located along the posterior surface of each testis.

HUMAN REPRODUCTIVE SYSTEM

EPIDIDYMIS

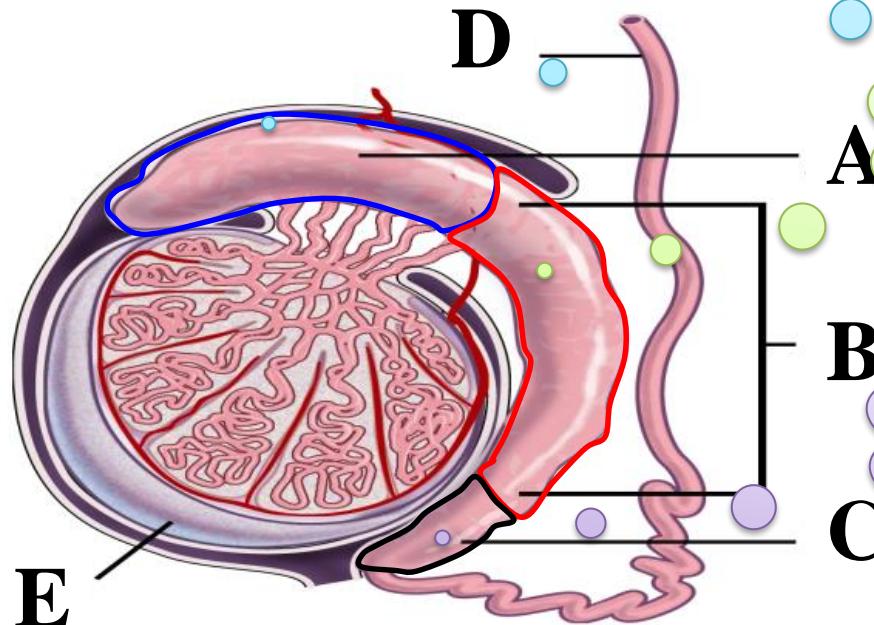


It provides storage space for the sperms and gives the sperms time to mature.

HUMAN REPRODUCTIVE SYSTEM

EPIDIDYMIS

It is differentiated into three regions



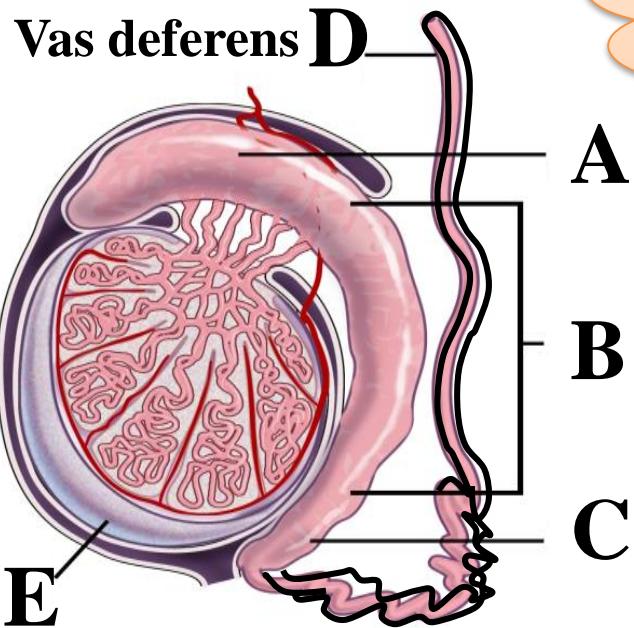
(A)
Head or caput
Epididymis

(B)
Body or corpus
Epididymis

(C)
Tail or cauda
Epididymis

HUMAN REPRODUCTIVE SYSTEM

EPIDIDYMIS



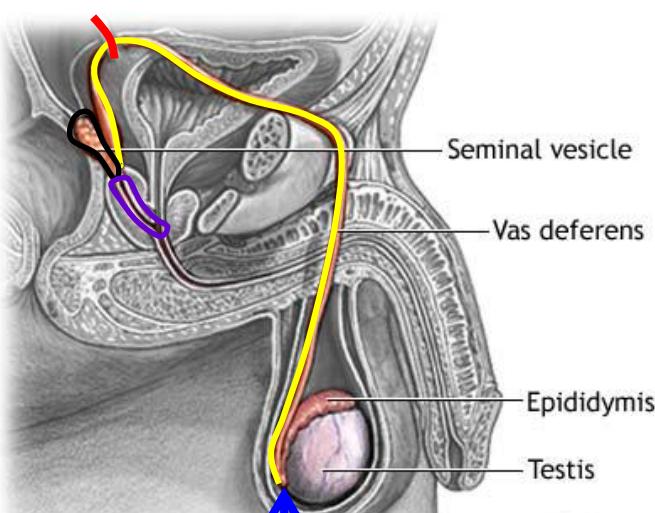
Mass of connective tissue at
the back of the testis that
encloses the rete testis

The caput epididymis receives
spermatozoa via the vasa efferentia
of the mediastinum testis.

HUMAN REPRODUCTIVE SYSTEM

THE VAS DEFERENCE / Ductus differentia

It is a long, narrow, muscular tube.



Cauda epididymis

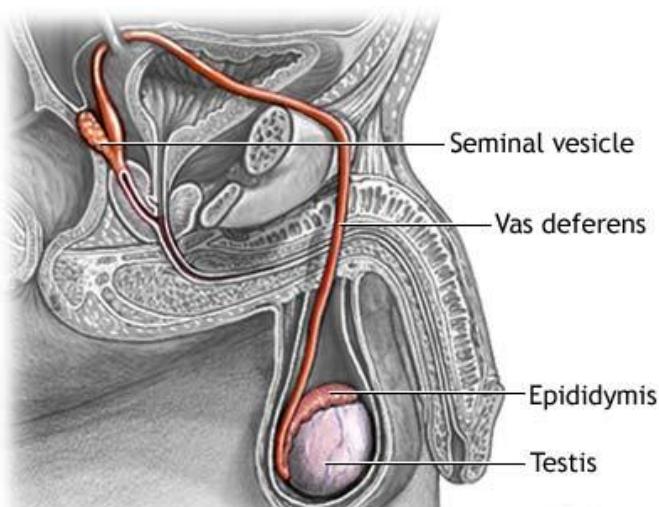
*It is lined by
pseudo stratified
columnar
epithelium and
Lamina propria*

*Areolar
connective
tissue*

HUMAN REPRODUCTIVE SYSTEM

VASA DEFERENTIA / Ductus differentia

It starts from the tail of the epididymis/ cauda epididymis.

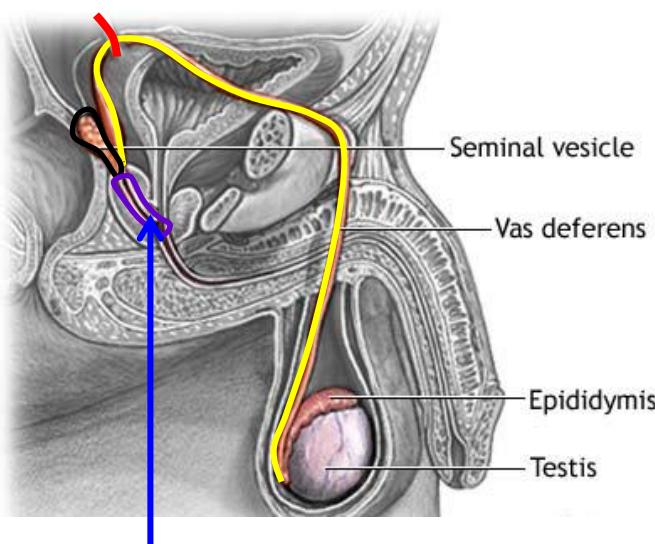


It passes through the inguinal canal into the abdomen and loops over the urinary bladder

HUMAN REPRODUCTIVE SYSTEM

VASA DEFERENTIA / Ductus differentia

It receives a duct from seminal vesicle.

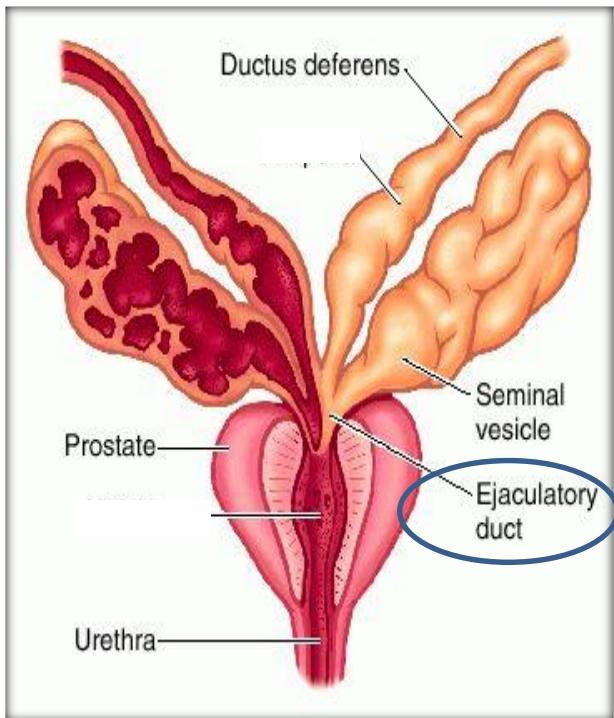


Ejaculatory duct

The vas deferens and the
duct of seminal vesicle
unite to form a short
**Ejaculatory duct/ Ductus
ejaculatorius.**

HUMAN REPRODUCTIVE SYSTEM

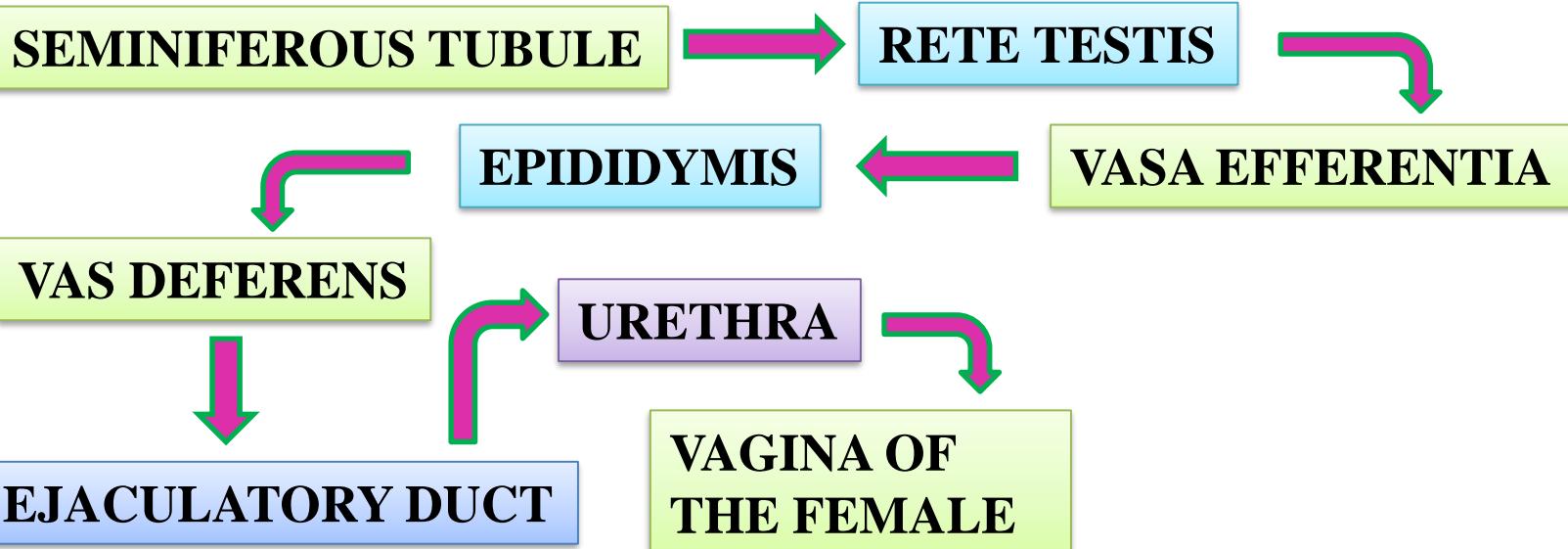
EJACULATORY DUCTS



- The two ejaculatory ducts converge in the centre of prostate and open into the urethra
- Carries sperms from vas deferentia and fluid from seminal vesicles into urethra, which transports the sperms to outside.

HUMAN REPRODUCTIVE SYSTEM

PASSAGE OF SPERMATOZOA



HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Epididymis is located on

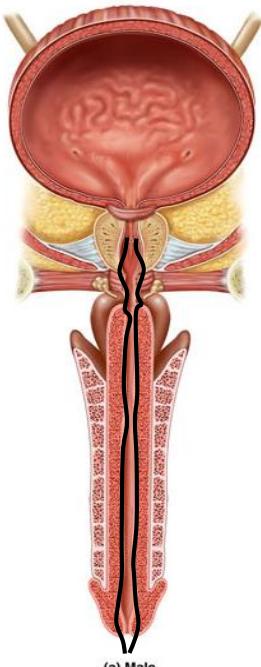
- 1) Anterior surface of testis
- 2)  Posterior surface of testis
- 3) Ventral to testis
- 4) Dorsal to testis

HUMAN REPRODUCTIVE SYSTEM

URETHRA

HUMAN REPRODUCTIVE SYSTEM

URETHRA/ URINOGENITAL DUCT



It is the shared terminal duct of the reproductive and urinary systems.

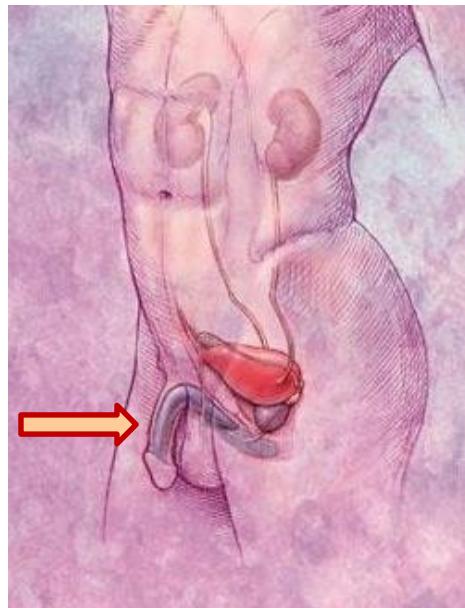
It originates from the urinary bladder and passes through penis.

It opens outside by an external opening called Urethral meatus.

HUMAN REPRODUCTIVE SYSTEM

PENIS

Male Copulatory Organ



Extra-abdominal

What are
male external
genitalia?

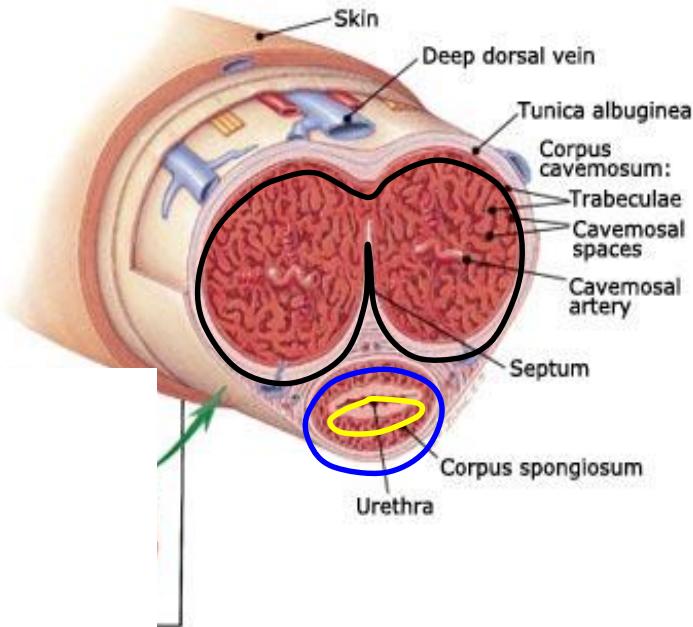
Penis and scrotum

It serves as urinary duct and also intromittent organ that transfers spermatozoa to the vagina of female.

HUMAN REPRODUCTIVE SYSTEM

PENIS

Made up of 3 columns of tissue.



Corpora Cavernosa

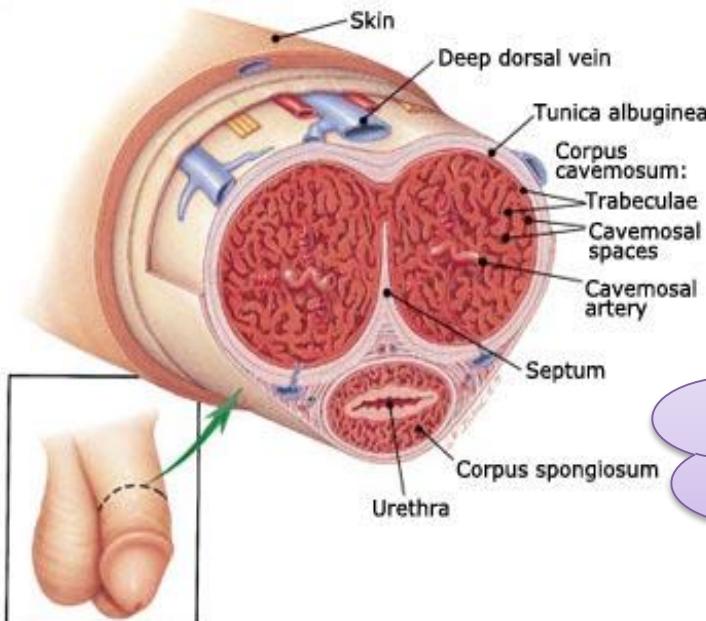
Paired, upper and
dorsal

Corpus Spongiosum

Single, ventral and
posses urethra

HUMAN REPRODUCTIVE SYSTEM

PENIS

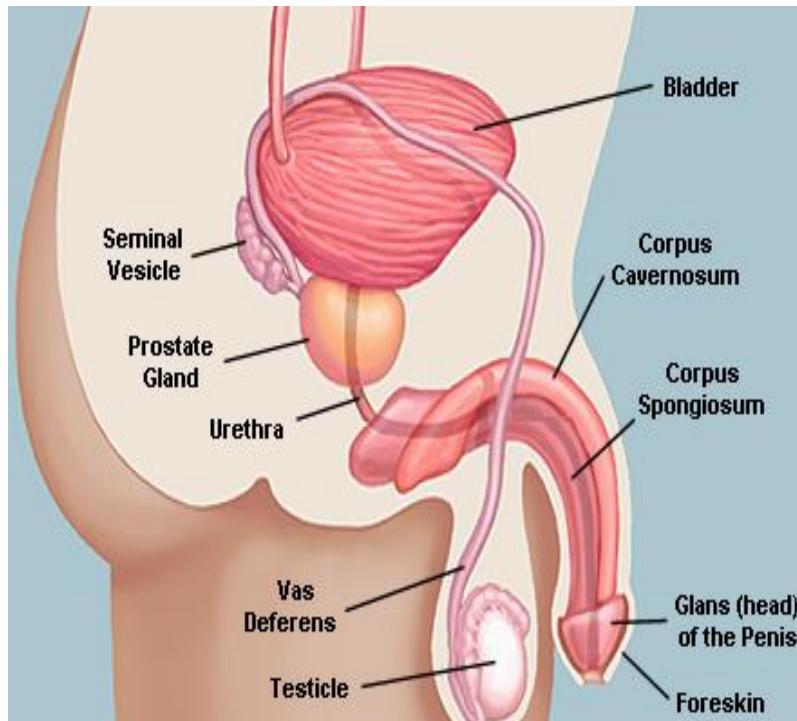


The copora cavernosa consists of special tissue with spaces that are filled with blood

They help in erection of penis to facilitate insemination.

HUMAN REPRODUCTIVE SYSTEM

PENIS



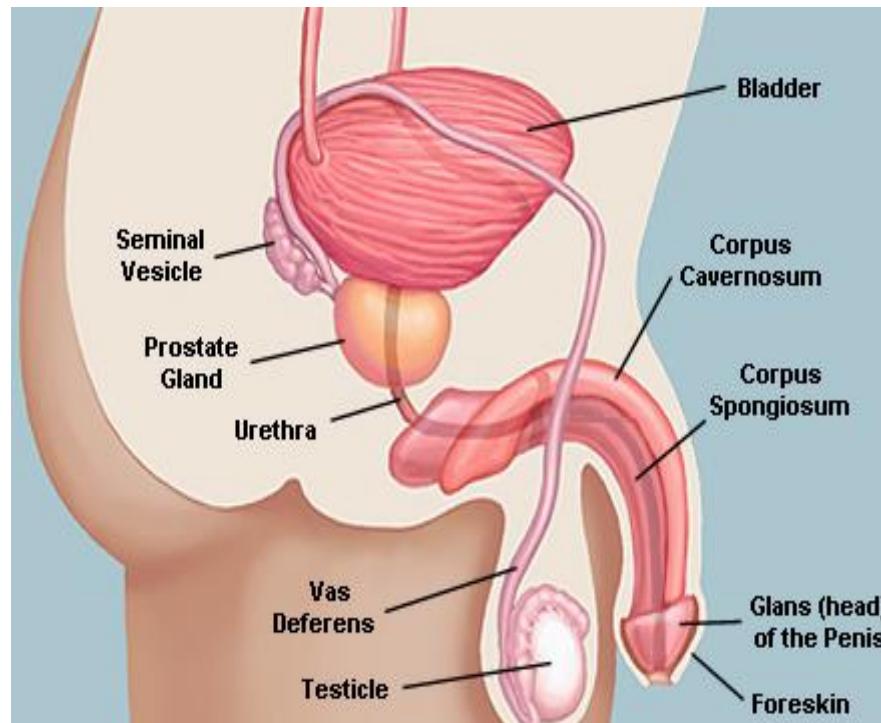
GLANS PENIS

At the tip of penis, corpus spongiosum is enlarged forming a bulbous structure called glans penis

Glans penis is covered by
Prepuce / Foreskin

HUMAN REPRODUCTIVE SYSTEM

MALE ACCESSORY GENITAL GLANDS



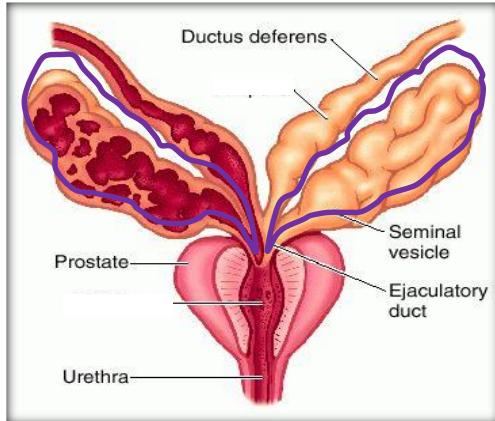
SEMINAL VESICLES

PROSTATE GLAND

COWPER'S or
BULBOURETHRAL
GLANDS

HUMAN REPRODUCTIVE SYSTEM

SEMINAL VESICLES

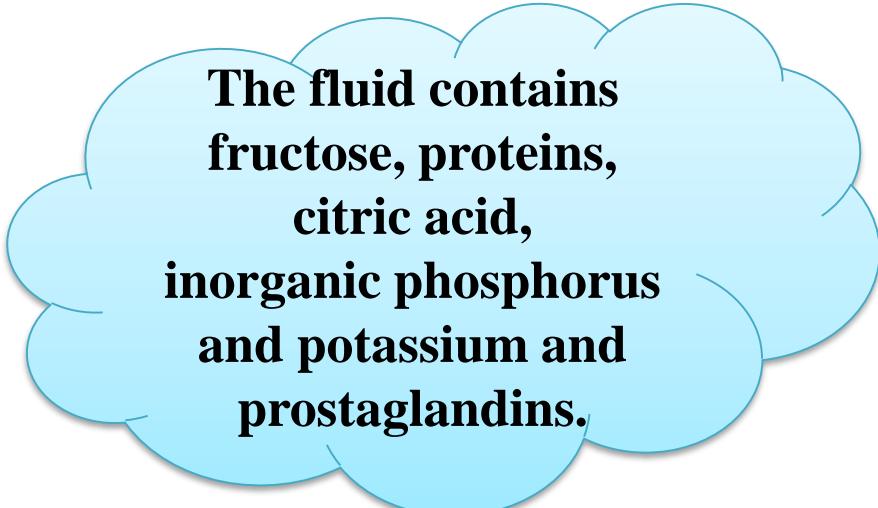


- Present postero-inferior to the urinary bladder
- Are a pair of simple tubular glands

HUMAN REPRODUCTIVE SYSTEM

SEMINAL VESICLES

The Seminal vesicles secrete alkaline viscous fluid that forms 60% of Semen.



The fluid contains fructose, proteins, citric acid, inorganic phosphorus and potassium and prostaglandins.

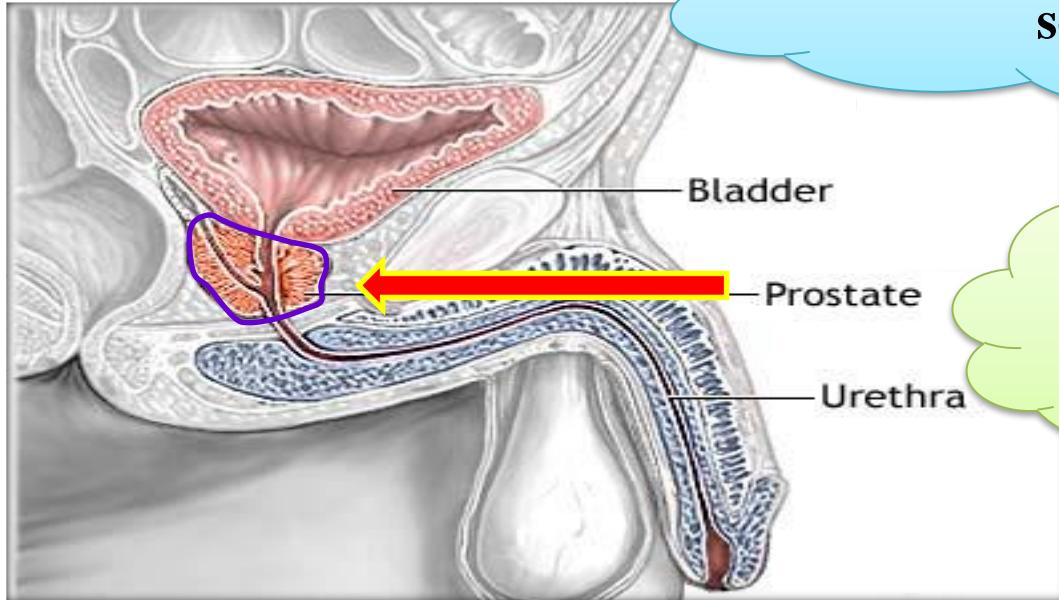
HUMAN REPRODUCTIVE SYSTEM

SEMINAL VESICLES

- Fructose acts as main energy source for the sperms outside the body.
- Prostaglandins cause mucous lining of the cervix to be more receptive to sperms as well as by aiding the movement of sperms towards the ovum with peristaltic contractions of uterus and fallopian tubes.

HUMAN REPRODUCTIVE SYSTEM

PROSTATE GLAND



Sinc

The prostate contributes
15 – 30 percent of the
semen.

Below the
urinary bladder

HUMAN REPRODUCTIVE SYSTEM

PROSTATE GLAND

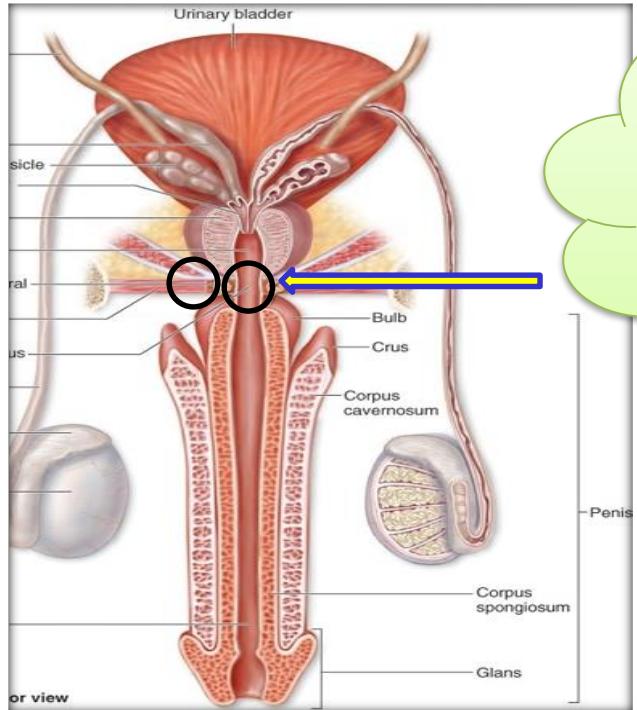


The fluid from the prostate is clear and slightly acidic.

The prostatic secretion ‘activates’ the spermatozoa and provides nutrition.

HUMAN REPRODUCTIVE SYSTEM

COWPER'S or BULBOURETHRAL GLANDS



Below the prostate
gland at the beginning
of the internal portion
of the penis.

HUMAN REPRODUCTIVE SYSTEM

COWPER'S or BULBOURETHRAL GLAND

- Secretes an alkaline fluid
- The secretion lubricates the urethra and acts as a flushing agent.
- It washes the acidic urinary residues present in the urethra before ejaculation.

HUMAN REPRODUCTIVE SYSTEM

1. Lubrication of penis is also due to the secretions of

.....

-  1) Bulbourethral glands
- 2) Sertoli cells
- 3) Leydig cells
- 4) Interstitial cells

MCQs

HUMAN REPRODUCTIVE SYSTEM



UNIT – VA

HUMAN

REPRODUCTIVE

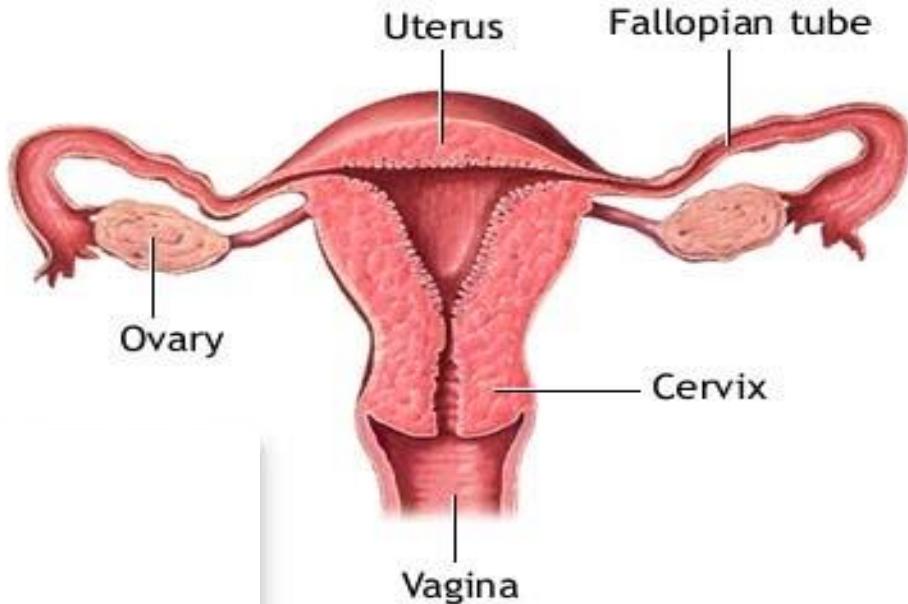
SYSTEM

HUMAN REPRODUCTIVE SYSTEM

FEMALE REPRODUCTIVE SYSTEM

HUMAN REPRODUCTIVE SYSTEM

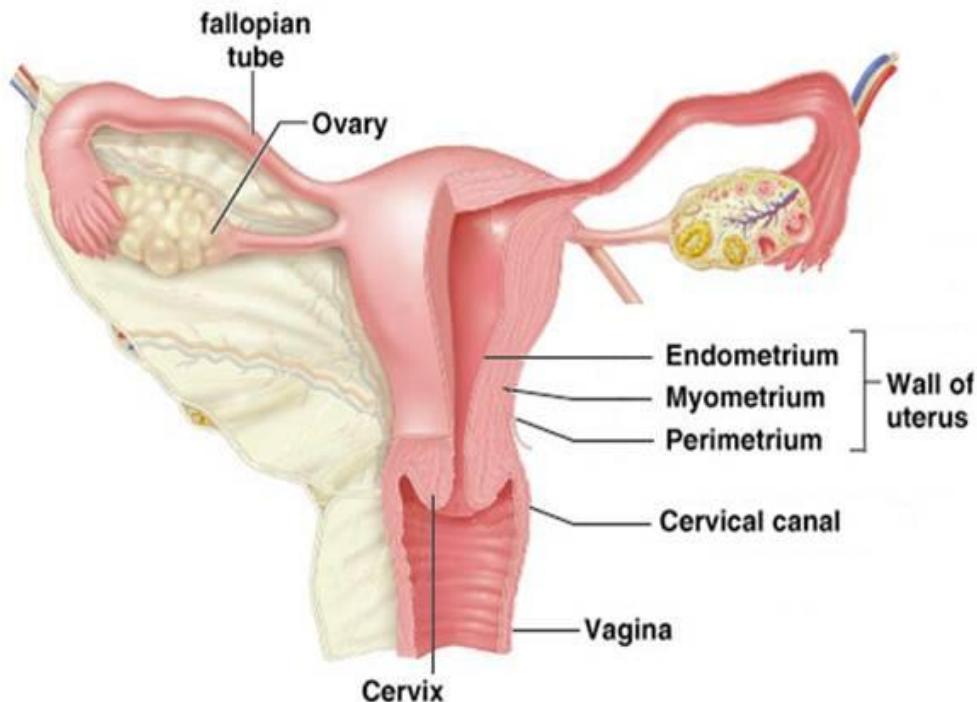
FEMALE REPRODUCTIVE SYSTEM



Front view

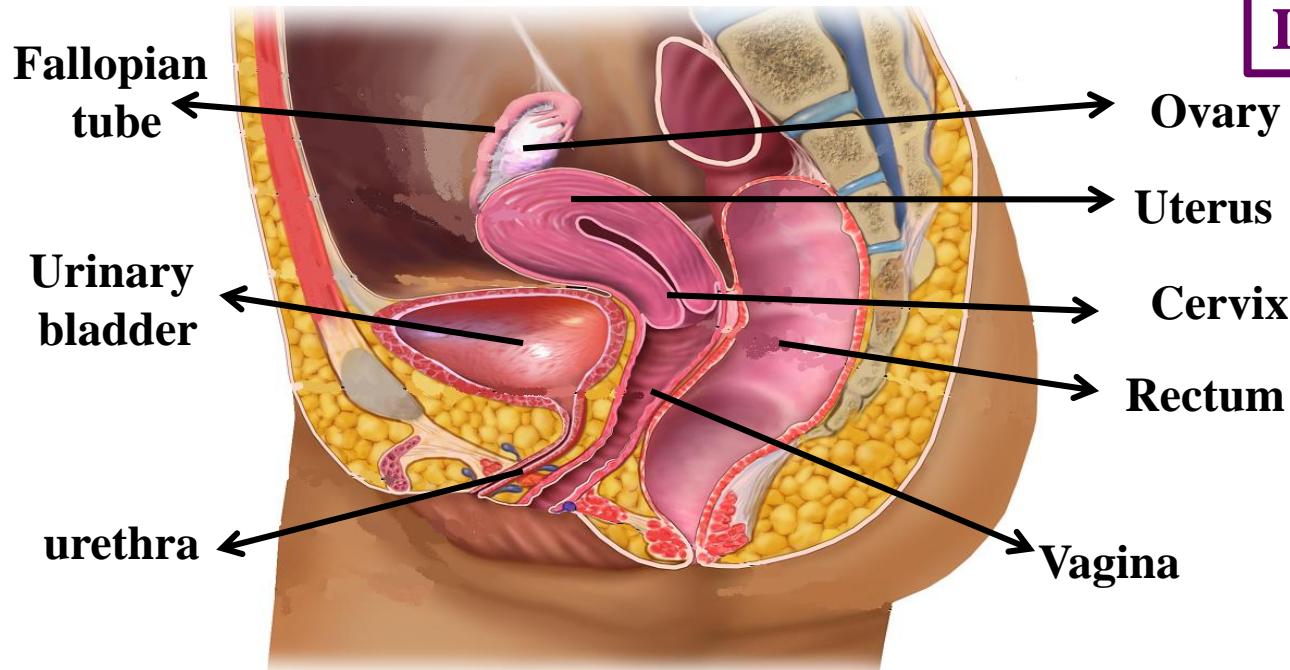
HUMAN REPRODUCTIVE SYSTEM

FEMALE REPRODUCTIVE SYSTEM



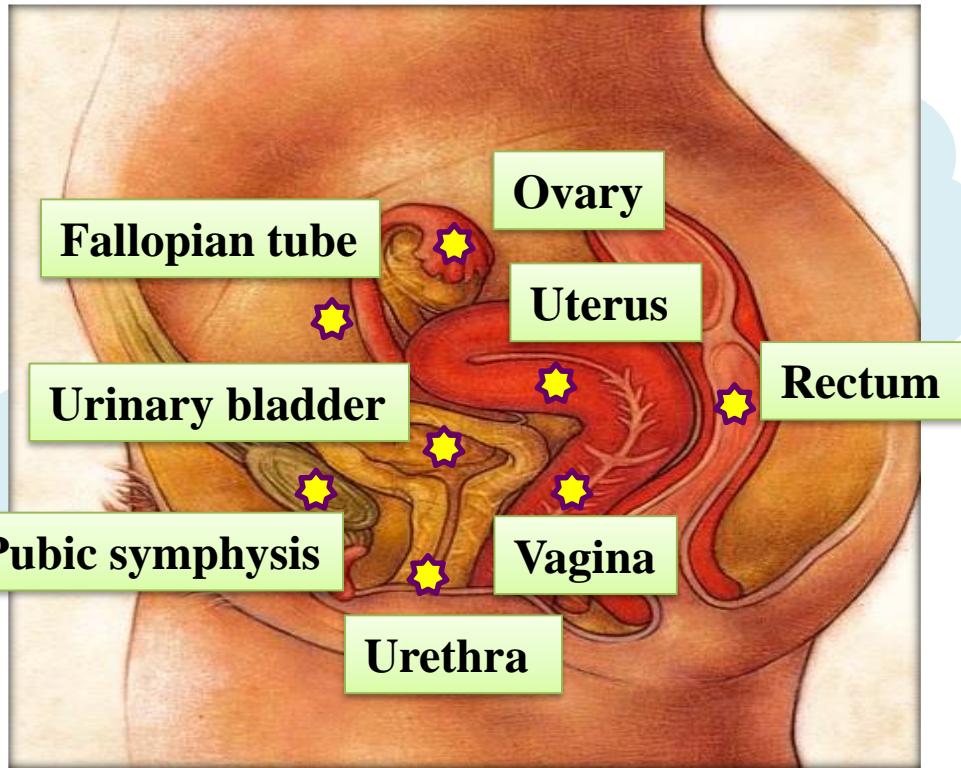
HUMAN REPRODUCTIVE SYSTEM

FEMALE REPRODUCTIVE SYSTEM



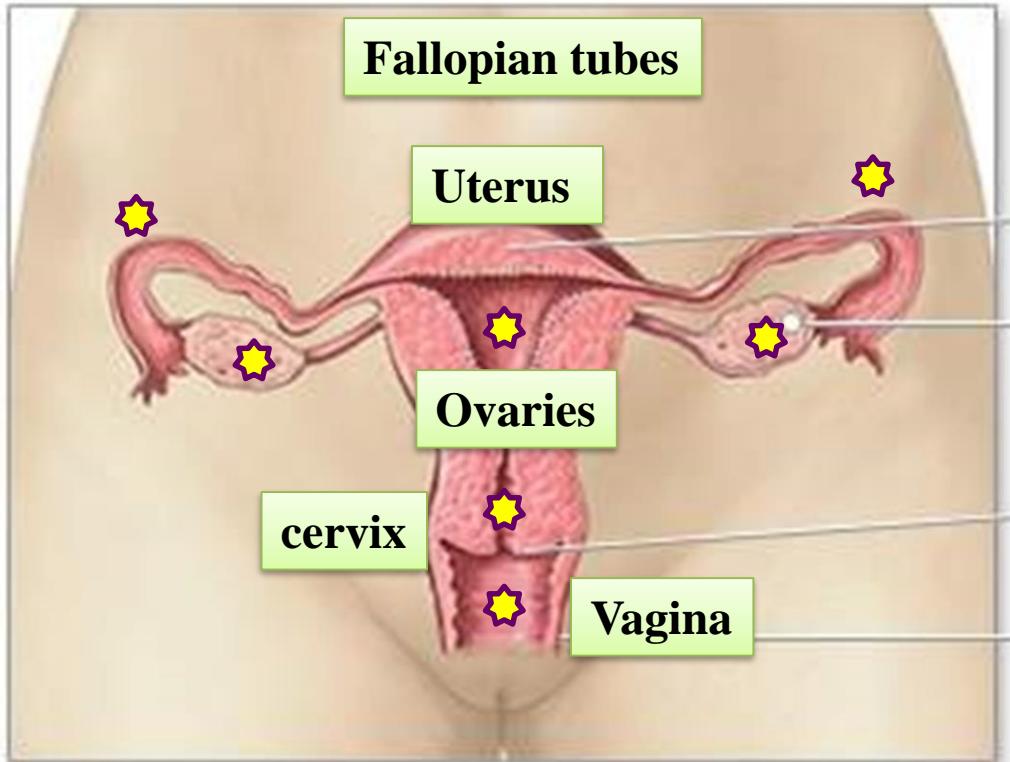
Lateral view

HUMAN REPRODUCTIVE SYSTEM



FEMALE REPRODUCTIVE SYSTEM

HUMAN REPRODUCTIVE SYSTEM



FEMALE
REPRODUCTIVE
SYSTEM

HUMAN REPRODUCTIVE SYSTEM

FEMALE REPRODUCTIVE SYSTEM

The female reproductive system consists of

- 1) A pair of ovaries
- 2) A pair of fallopian tubes
- 3) Uterus
- 4) Vagina

&

The external genitalia located in the pelvis region.

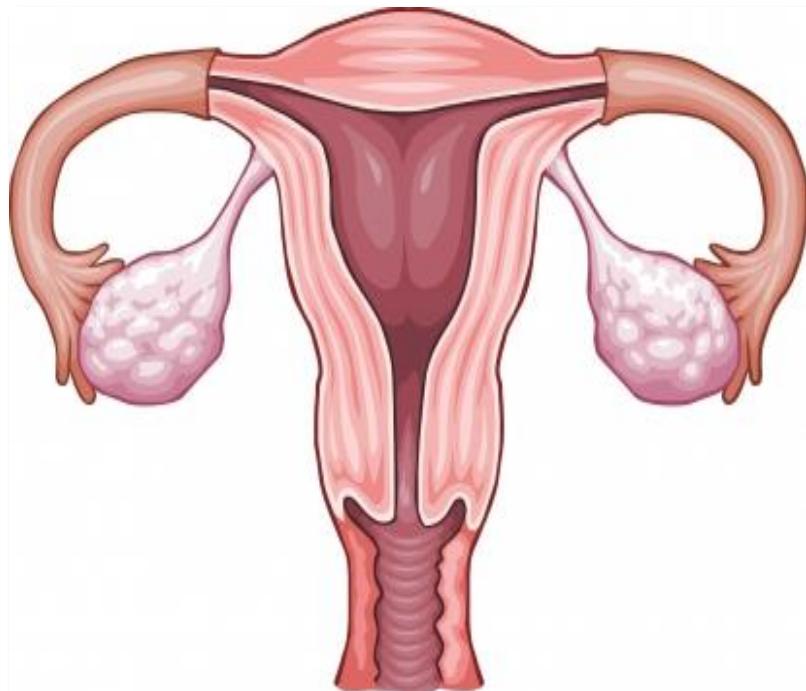
HUMAN REPRODUCTIVE SYSTEM

FEMALE REPRODUCTIVE SYSTEM

These parts of the system along with a pair of the mammary glands are integrated structurally and functionally to support the process of ovulation, fertilization, pregnancy, birth and child care.

HUMAN REPRODUCTIVE SYSTEM

OVARIES



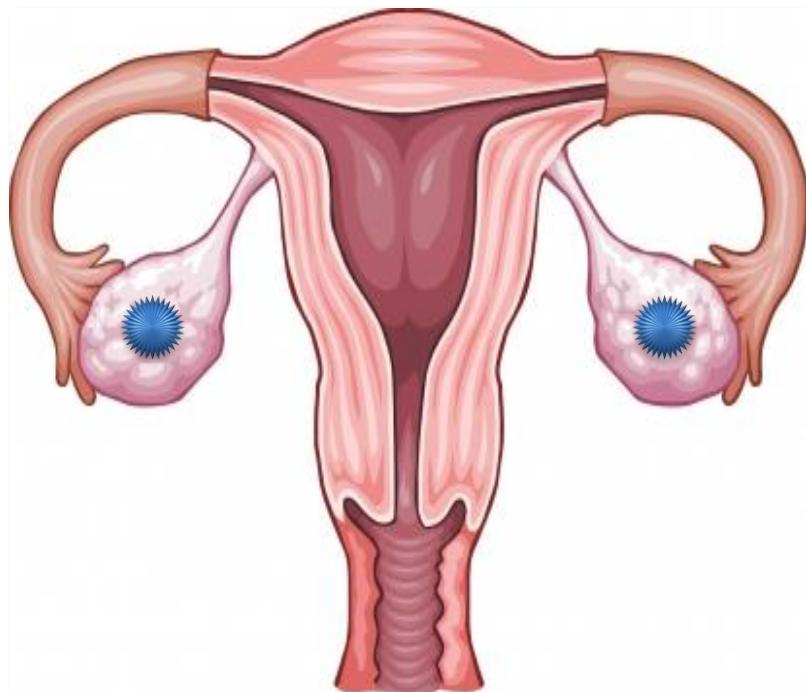
Ova

Ovaries are the primary female sex organs that produce the female gametes and steroid hormones.

Ovarian hormones

HUMAN REPRODUCTIVE SYSTEM

OVARIES

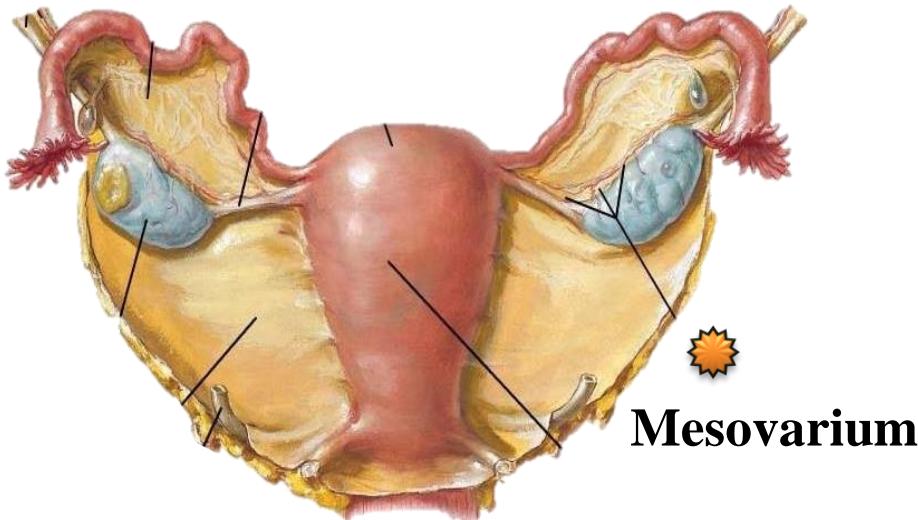


Paired ovaries are located one on each side of the lower abdomen.

HUMAN REPRODUCTIVE SYSTEM

OVARIES

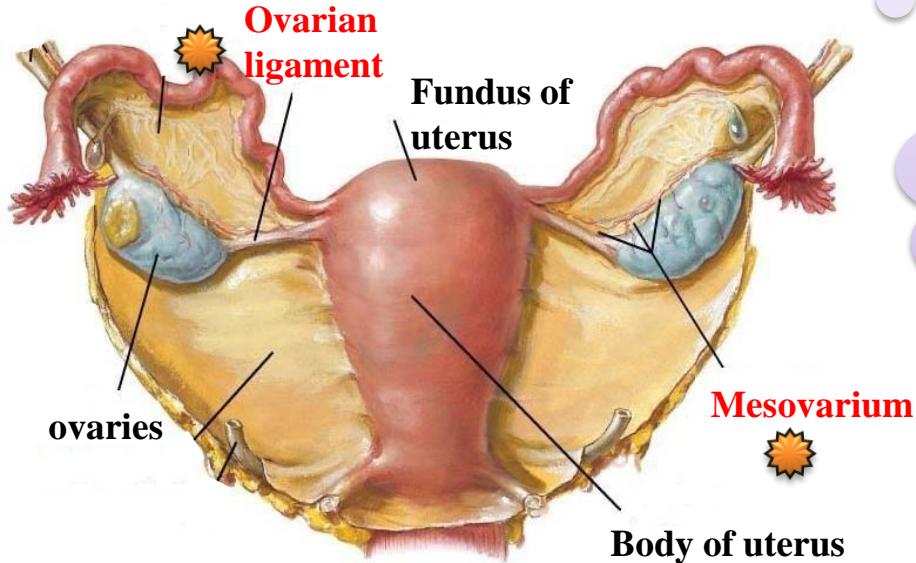
The double layered fold of peritoneum, **mesovarium** connects ovary with the wall of the abdominal cavity.



HUMAN REPRODUCTIVE SYSTEM

OVARIES

The ovaries are covered on the outside by a layer of simple cuboidal epithelium called **germinal (ovarian) epithelium**.



Visceral peritoneum that envelopes the ovaries.

HUMAN REPRODUCTIVE SYSTEM

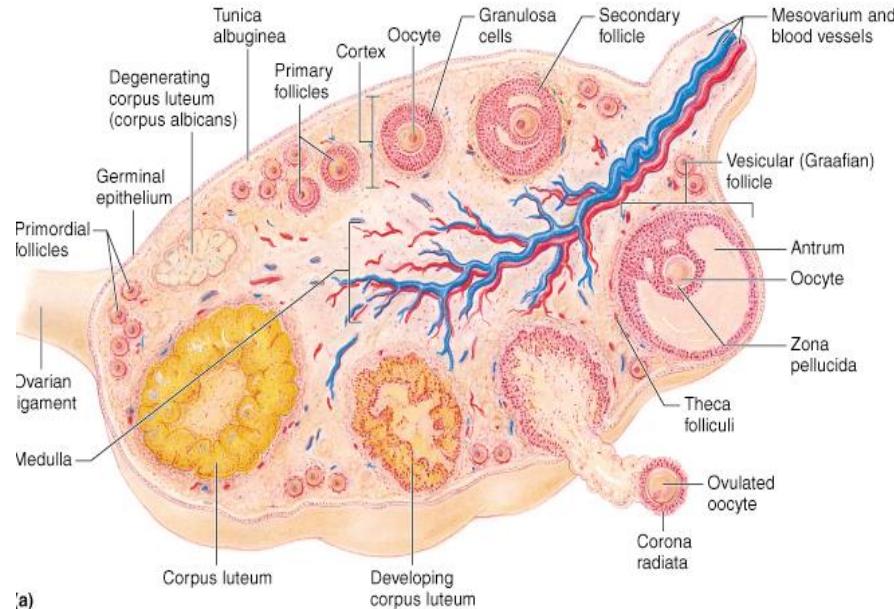
OVARIES

Underneath this germinal epithelium there is a dense connective tissue capsule, the tunica albuginea.

HUMAN REPRODUCTIVE SYSTEM

OVARIES

The ovarian stroma is divided into an outer cortex and an inner medulla.



Outer cortex

Inner medulla

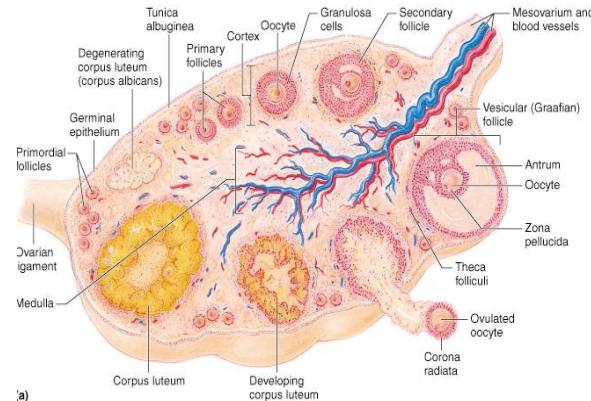
HUMAN REPRODUCTIVE SYSTEM

OVARIES

- The **cortex** appears **more dense and granular** due to the presence of ovarian follicles in various stages of development.
- The **medulla** is a **loose connective tissue** with abundant blood vessels, lymphatic vessels, and nerve fibres.
- The **follicles** are formed by the **infolding** of the germinal epithelium.

Outer cortex

Inner medulla



HUMAN REPRODUCTIVE SYSTEM

MCQs

- 1. One pair of ovaries is located**
 - 1) One on each side of lower abdomen**
 - 2) In pelvic region**
 - 3) Both 1 & 2**
 - 4) In upper abdomen**

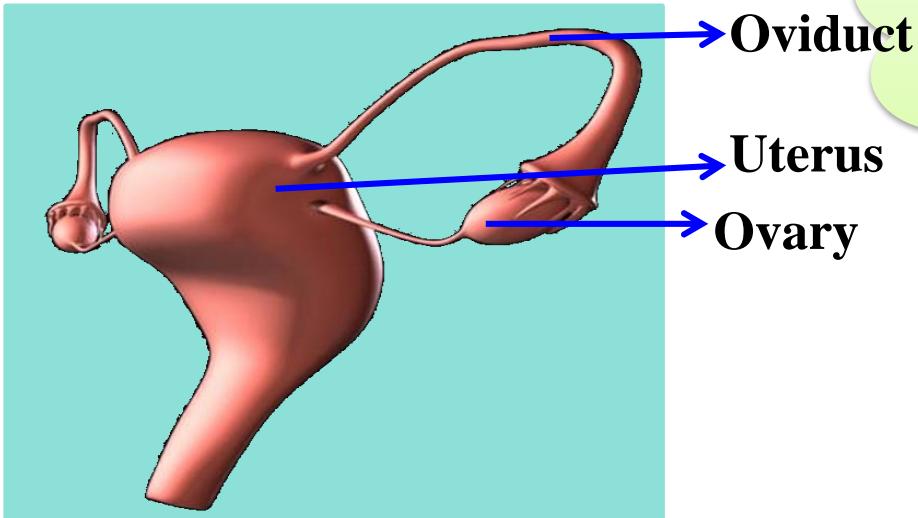


HUMAN REPRODUCTIVE SYSTEM

OVIDUCTS

HUMAN REPRODUCTIVE SYSTEM

FALLOPIAN TUBES (Oviducts)



Each fallopian tube extends from the periphery of each ovary to the uterus .

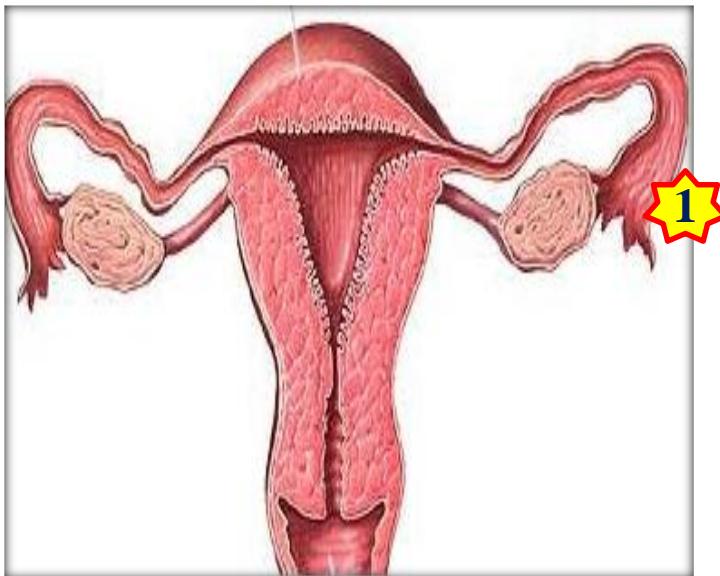
HUMAN REPRODUCTIVE SYSTEM

FALLOPIAN TUBES

It has three parts

1) Infundibulum

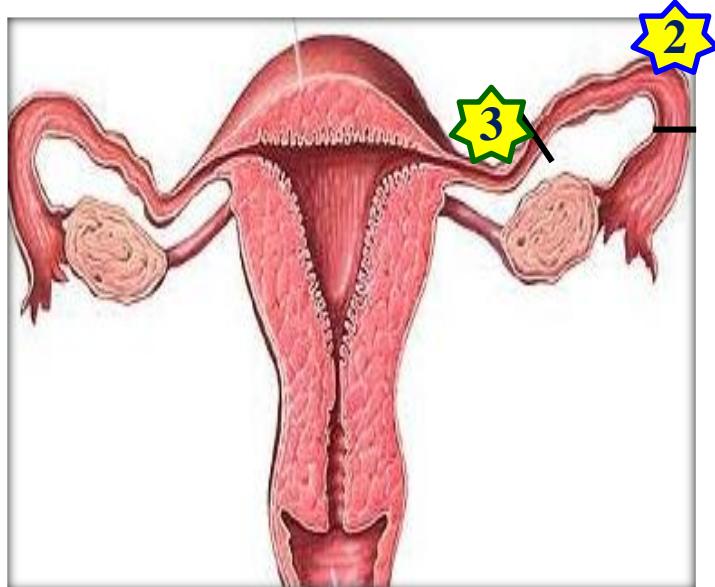
Funnel
shaped part



The edges of the infundibulum possess finger like projections, the **fimbriae**.

HUMAN REPRODUCTIVE SYSTEM

FALLOPIAN TUBES



2) Ampulla

Middle
wider part

3) Isthmus

Narrow last
part

Opens into
the uterus

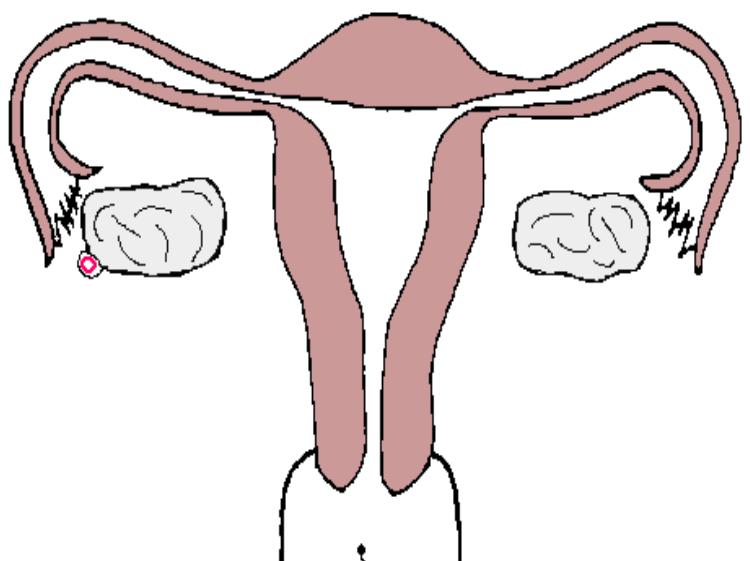
HUMAN REPRODUCTIVE SYSTEM

FALLOPIAN TUBES (Oviducts)

It is the site for fertilization

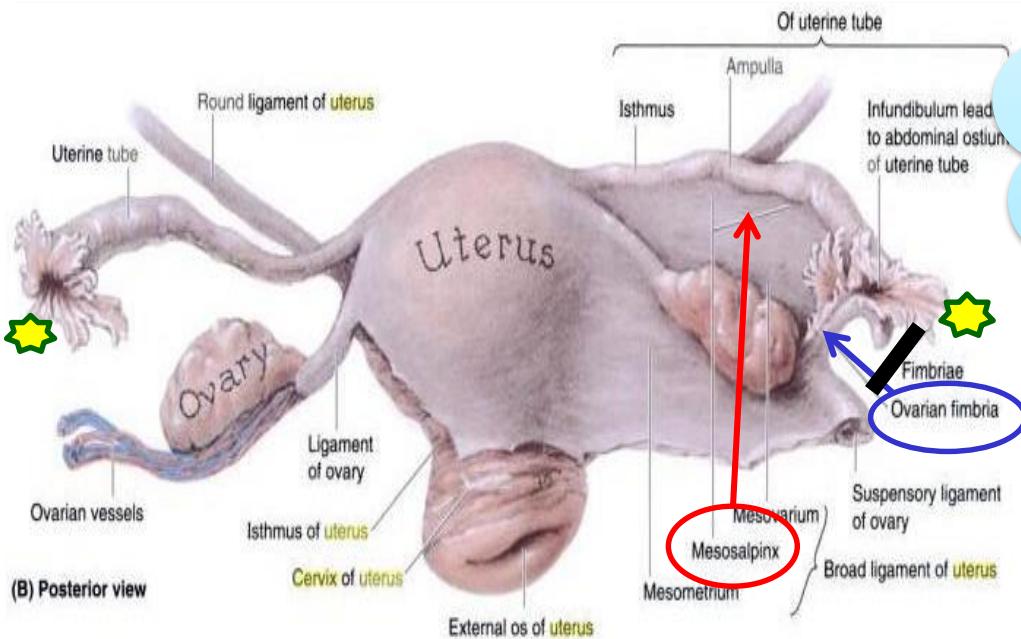
Ampulla- isthmus junction

It conducts the ovum or zygote towards the uterus by peristalsis.



HUMAN REPRODUCTIVE SYSTEM

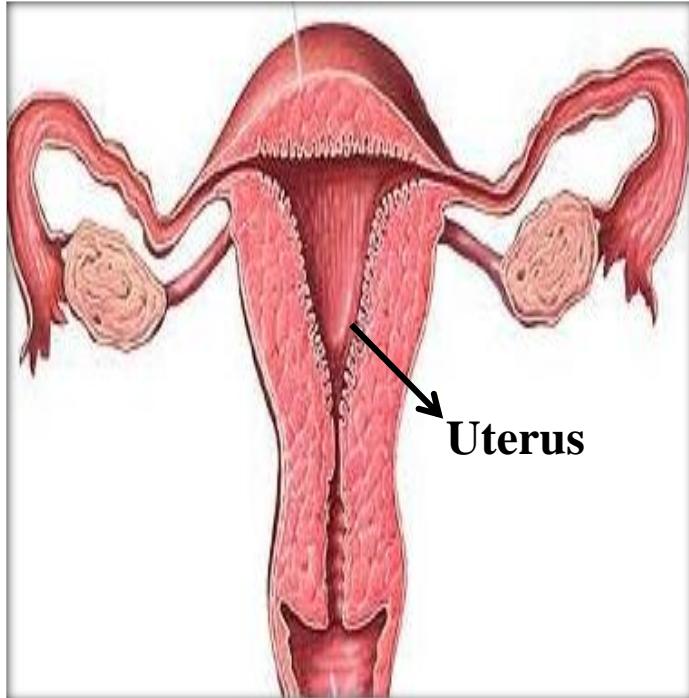
FALLOPIAN TUBES (Oviducts)



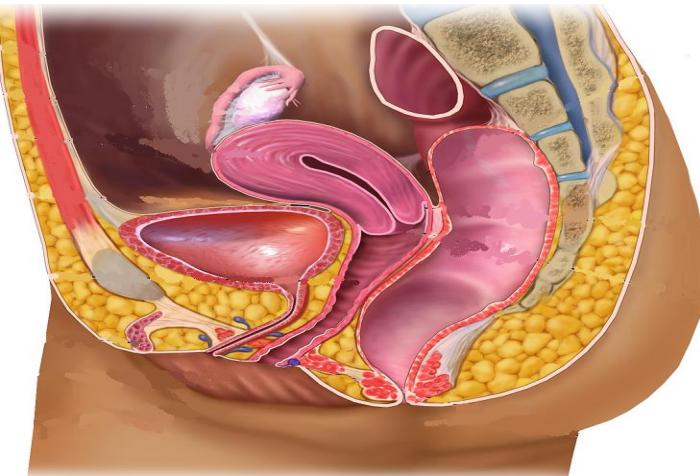
The fallopian tube is attached to the abdominal wall by a peritoneal fold called **mesosalpinx**.

HUMAN REPRODUCTIVE SYSTEM

UTERUS OR WOMB

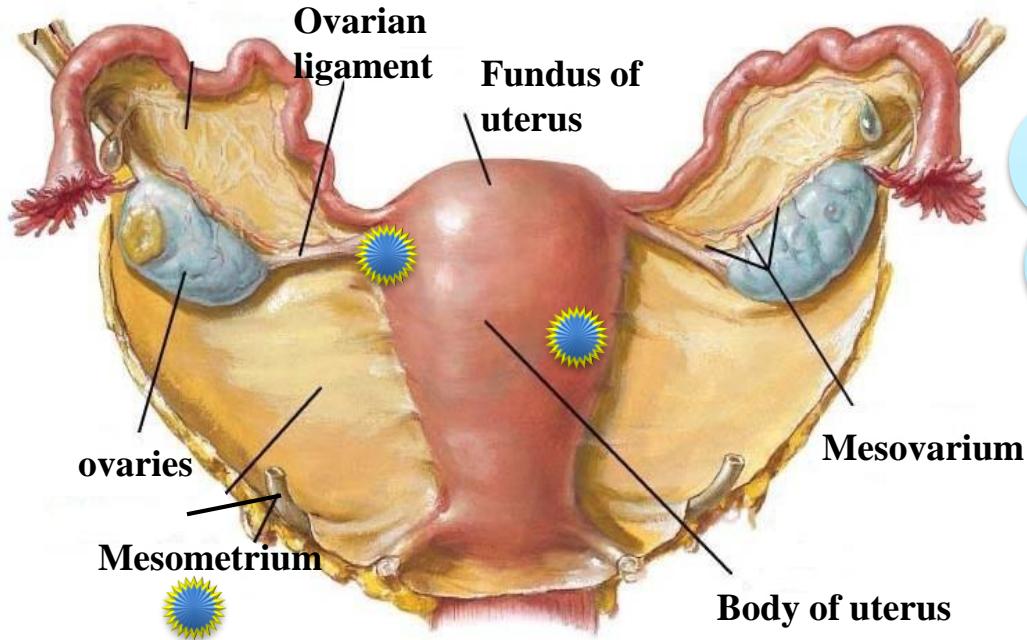


- It is single large, muscular and highly vascular and inverted pear shaped.
- It is present in the pelvis between the bladder and rectum.



HUMAN REPRODUCTIVE SYSTEM

UTERUS OR WOMB

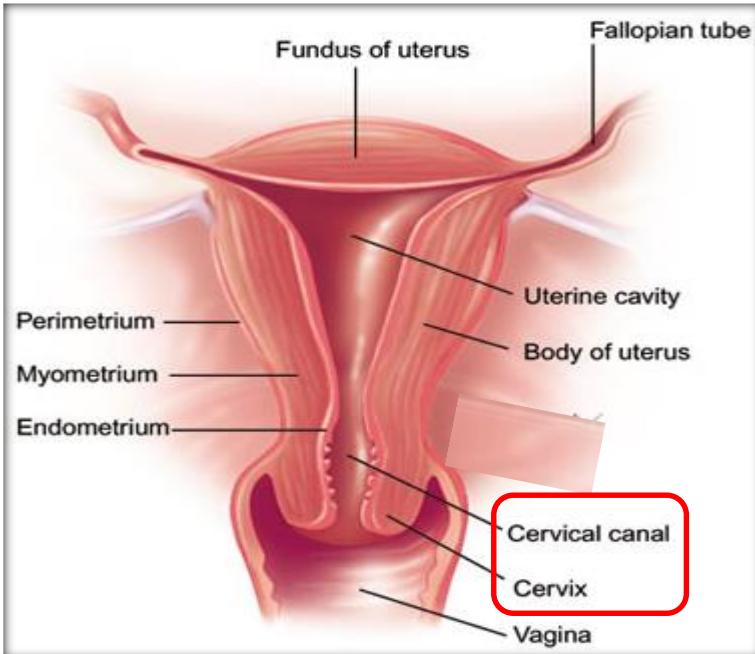


Suspensory
ligament

Attached to the
abdominal wall
by the peritoneal
fold called
mesometrium.

HUMAN REPRODUCTIVE SYSTEM

UTERUS OR WOMB

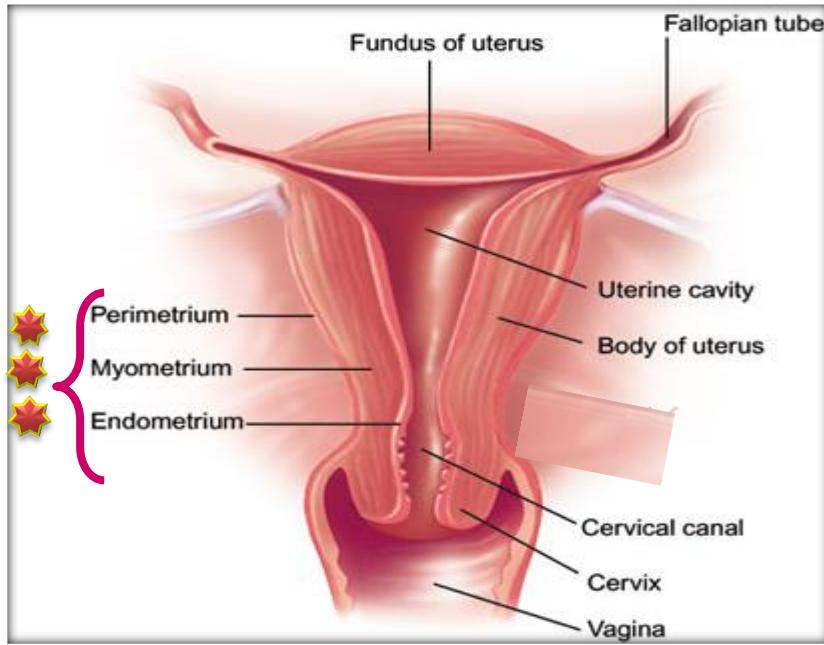


- The lower, narrow part through which the uterus opens into the **vagina** is **cervix**.
- The cavity of the cervix is called **cervical canal**.
- The **cervical canal** along with **vagina** forms the **birth canal**.

HUMAN REPRODUCTIVE SYSTEM

UTERUS OR WOMB

The wall of uterus is formed by 3 layers.



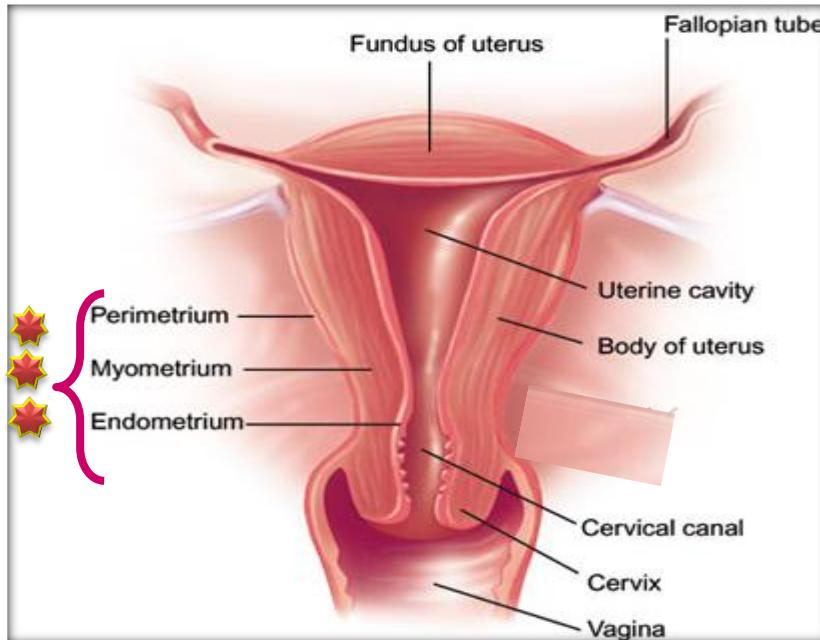
PERIMETRIUM : External thin membrane.

MYOMETRIUM : Layer of smooth muscles .

ENDOMETRIUM : Layer of highly vascular and glandular connective tissue.

HUMAN REPRODUCTIVE SYSTEM

UTERUS OR WOMB



The endometrium undergoes cyclic changes during menstrual cycle.

The myometrium exhibits strong contraction during parturition.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. The wider part of oviduct into which infundibulum opens is

1) Isthmus



2) Ampulla

3) Fimbriae

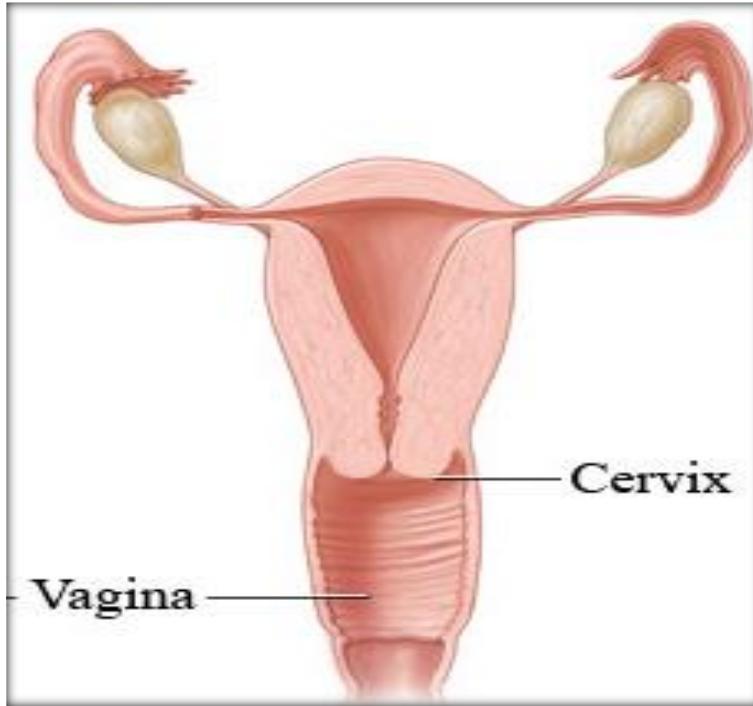
4) Uterus

HUMAN REPRODUCTIVE SYSTEM

VAGINA

HUMAN REPRODUCTIVE SYSTEM

Vagina

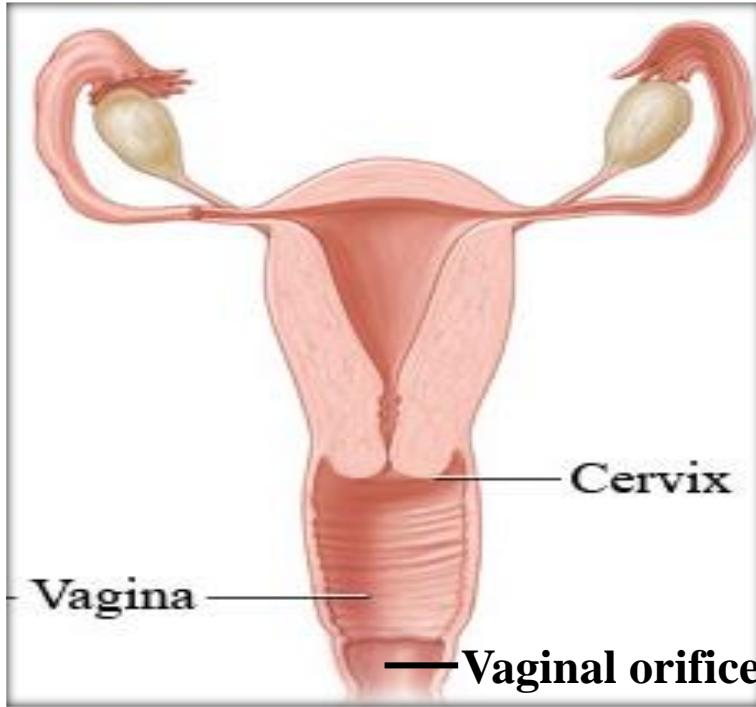


Large median fibro muscular tube extends from cervix to **vestibule** (space between the labia minora).

Lined by non-keratinised stratified squamous epithelium.

HUMAN REPRODUCTIVE SYSTEM

Vagina



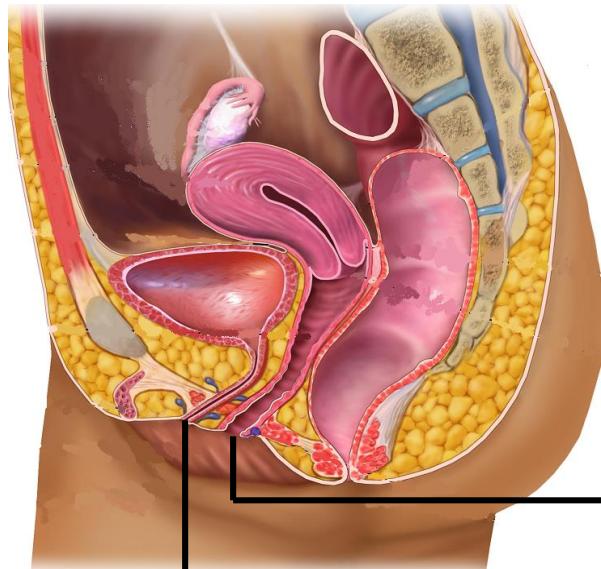
Highly vascular
and opens into
vestibule through
vaginal orifice.

The vaginal orifice is
partially covered by a
mucus membrane
called **HYMEN**.

HUMAN REPRODUCTIVE SYSTEM

FEMALE EXTERNAL GENITALIA / VULVA/ PUDENDUM

The **vestibule** is a space with two apertures



Upper urethral orifice
(the opening of urethra)

Lower vaginal orifice
(the opening of vagina)

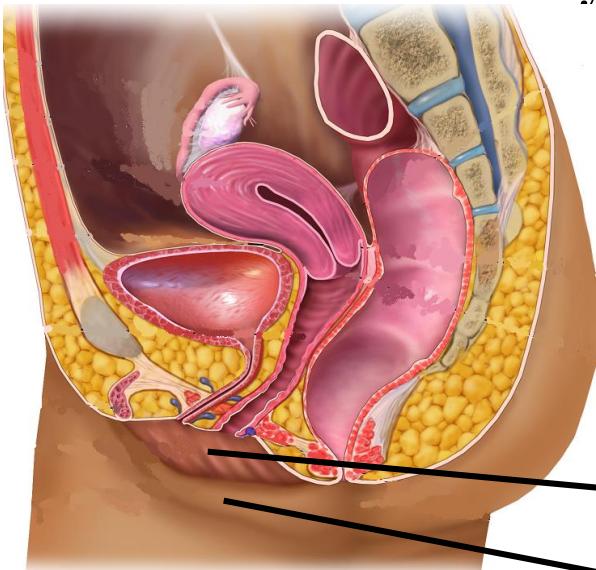
→ **Vaginal orifice**

→ **Urethral orifice**

HUMAN REPRODUCTIVE SYSTEM

FEMALE EXTERNAL GENITALIA / VULVA/ PUDENDUM

The vestibule is bound by two pairs of fleshy folds of tissue



- Labia minora (inner, smaller)
- Labia majora (larger, outer).

→Labia minora

→Labia majora

HUMAN REPRODUCTIVE SYSTEM

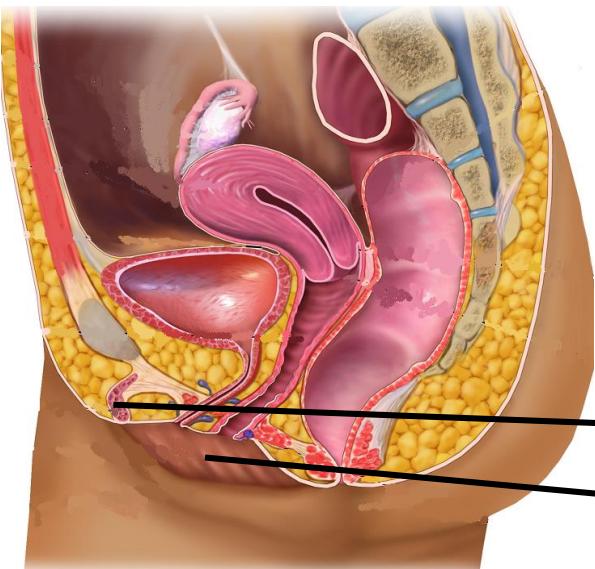
Clitoris

It is a sensitive, erectile structure.

It lies at the upper junction of the two labia minora above the urethral orifice.

It is **homologous** to the penis of males as both are supported by **corpora cavernosa** internally.

Mons pubis is a cushion of fatty tissue covered by skin and pubic hair present above the labia majora.



→ Clitoris

→ Labia minora

HUMAN REPRODUCTIVE SYSTEM

Female Accessory Reproductive Glands

Bartholin's or Greater vestibular glands

Skene's glands or Lesser Vestibular glands

Mammary Glands

HUMAN REPRODUCTIVE SYSTEM

Female Accessory Reproductive Glands

Bartholin's or (Greater vestibular glands)

- These are paired glands.
- They are located slightly posterior and to the left and right sides of vaginal orifice.
- They secrete mucus to lubricate the vagina.
- They are homologous to bulbourethral glands of the male reproductive system.

HUMAN REPRODUCTIVE SYSTEM

Female Accessory Glands

Skene's glands (Lesser Vestibular glands)

They are located on the anterior wall of the vagina, around the lower end of the urethra.

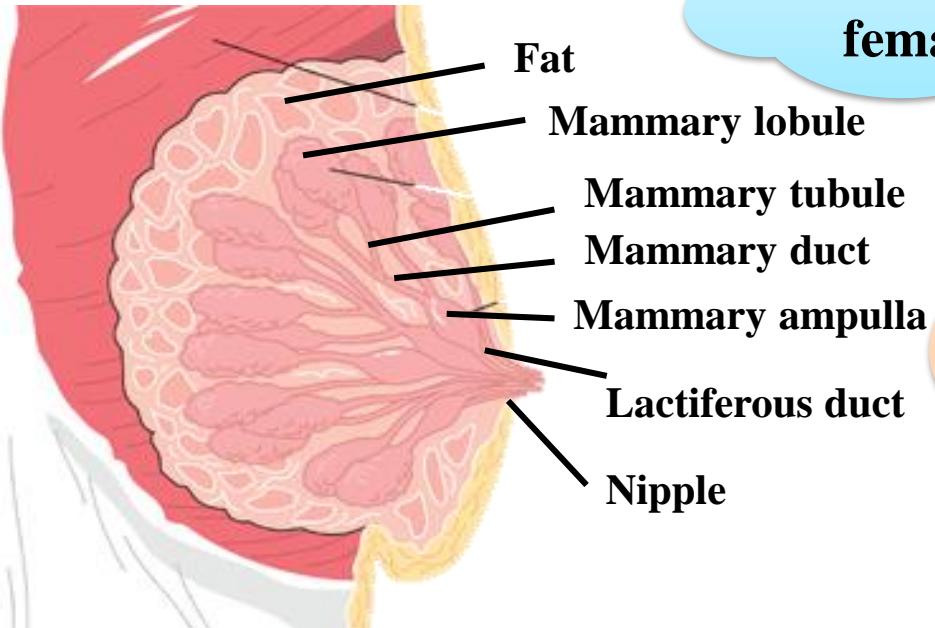
They secrete a lubricating fluid when stimulated.

They are **homologous** to the **prostate gland** of male.

HUMAN REPRODUCTIVE SYSTEM

Female Accessory Glands

Mammary Glands



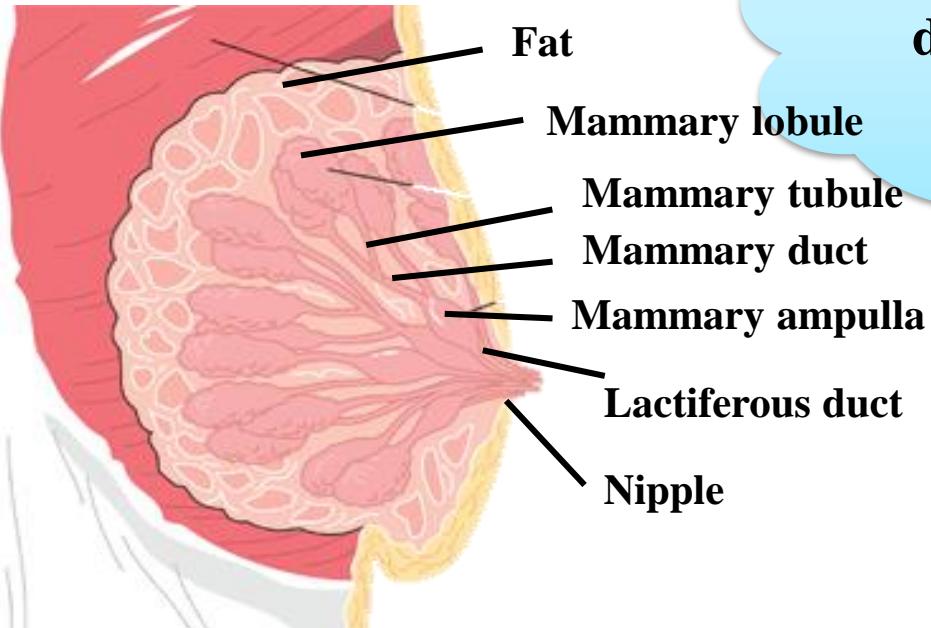
Functional
mammary glands are
characteristic of all
female mammals.

These are paired
structures (brush)
that contain
glandular tissue
and variable
amount of fat.

HUMAN REPRODUCTIVE SYSTEM

Female Accessory Glands

Mammary Glands



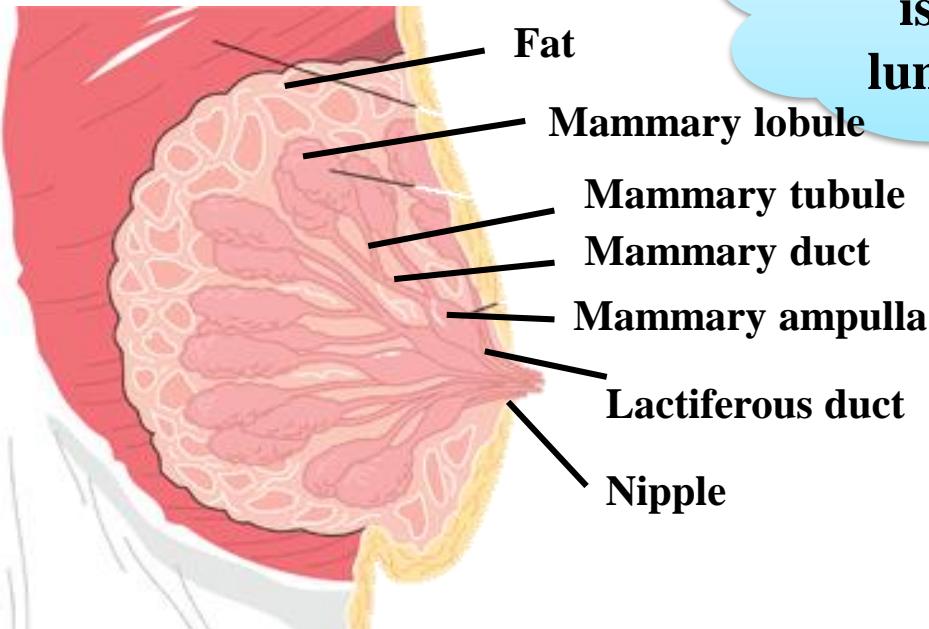
The glandular tissue of each breast is divided into 15 – 20 mammary lobes

Each mammary lobe consists of clusters of cells called alveoli.

HUMAN REPRODUCTIVE SYSTEM

Female Accessory Glands

Mammary Glands



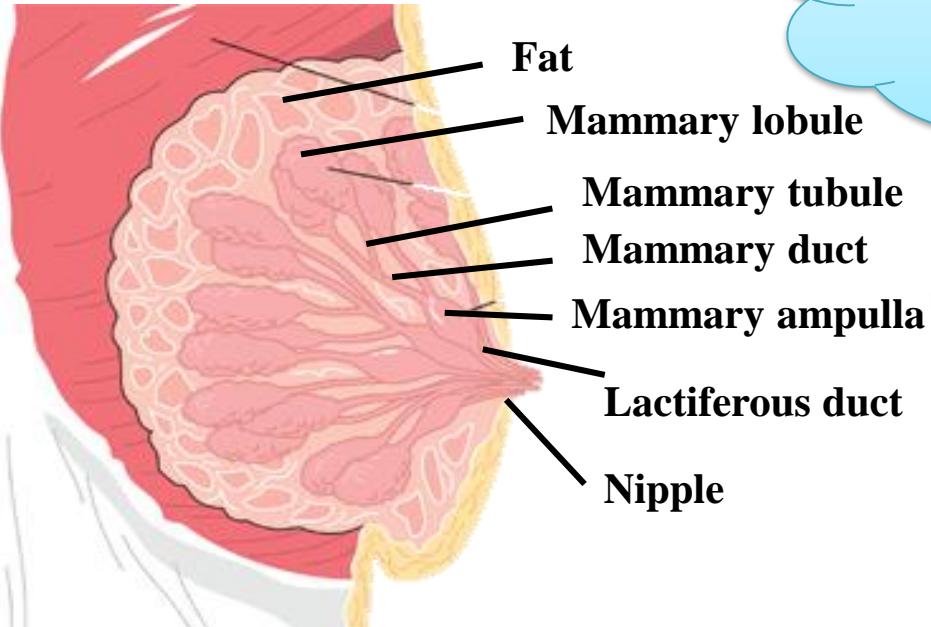
The cells of alveoli secrete milk which is stored in the lumens of alveoli.

The alveoli open into mammary tubules.

HUMAN REPRODUCTIVE SYSTEM

Female Accessory Glands

Mammary Glands



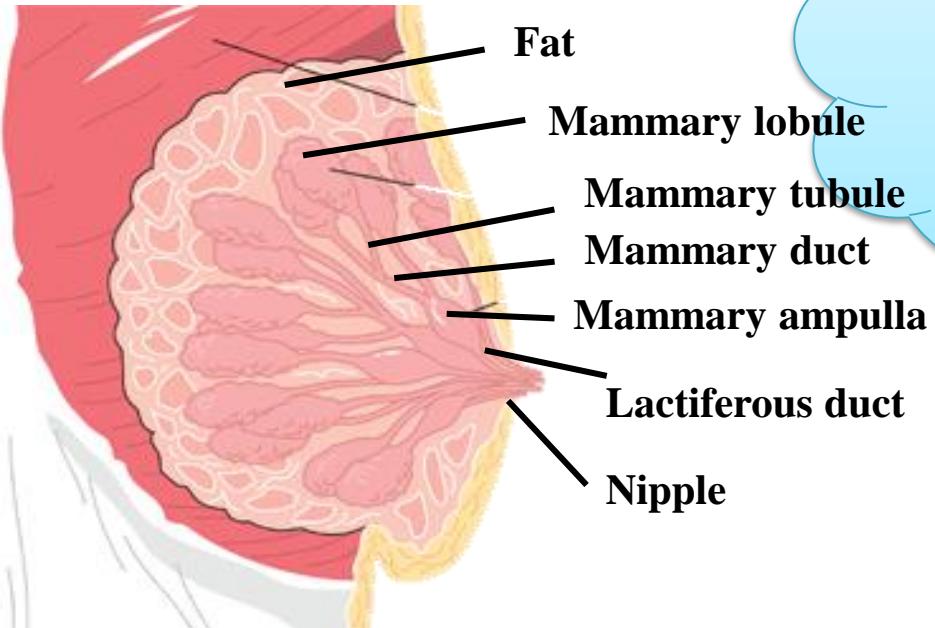
Mammary tubules
of each lobe join to
form mammary
duct.

Several mammary
ducts join to form
a wider mammary
ampulla.

HUMAN REPRODUCTIVE SYSTEM

Female Accessory Glands

Mammary Glands

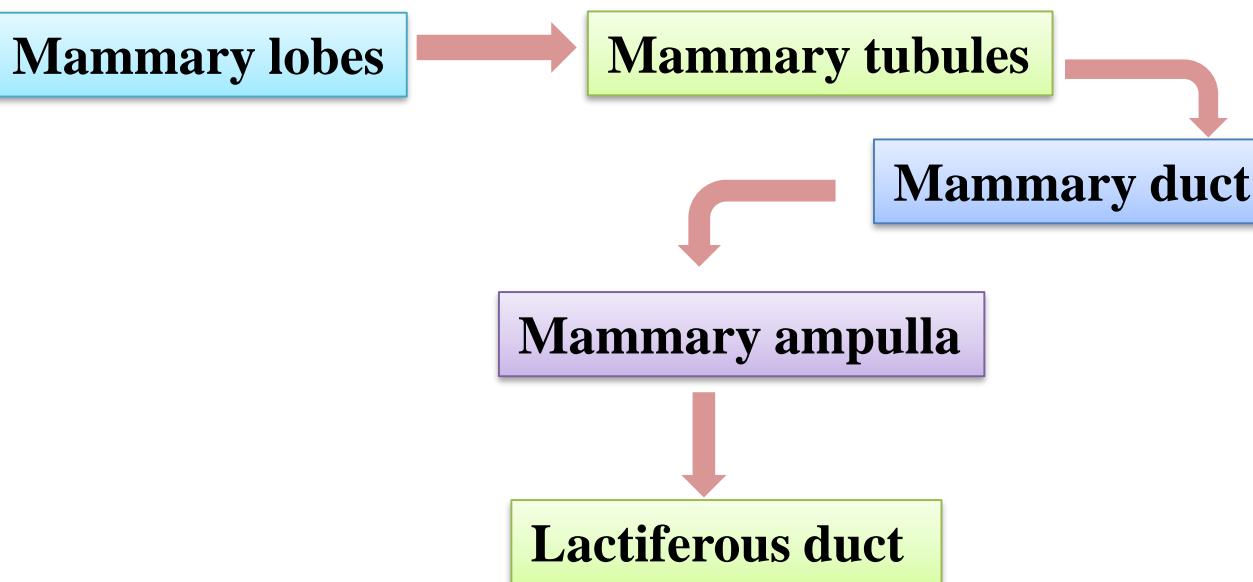


Mammary ampulla is connected to lactiferous duct in the nipple through which milk is sucked out by the baby.

HUMAN REPRODUCTIVE SYSTEM

Female Accessory Glands

Mammary glands



HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Birth canal is formed by

-  1) Vagina and cervical canal
- 2) Vagina and uterus
- 3) Fallopian tube and vagina
- 4) Fallopian tube and cervix

HUMAN REPRODUCTIVE SYSTEM



UNIT – VA

HUMAN

REPRODUCTIVE

SYSTEM

HUMAN REPRODUCTIVE SYSTEM

GAMETOGENESIS- SPERMATOGENESIS

HUMAN REPRODUCTIVE SYSTEM

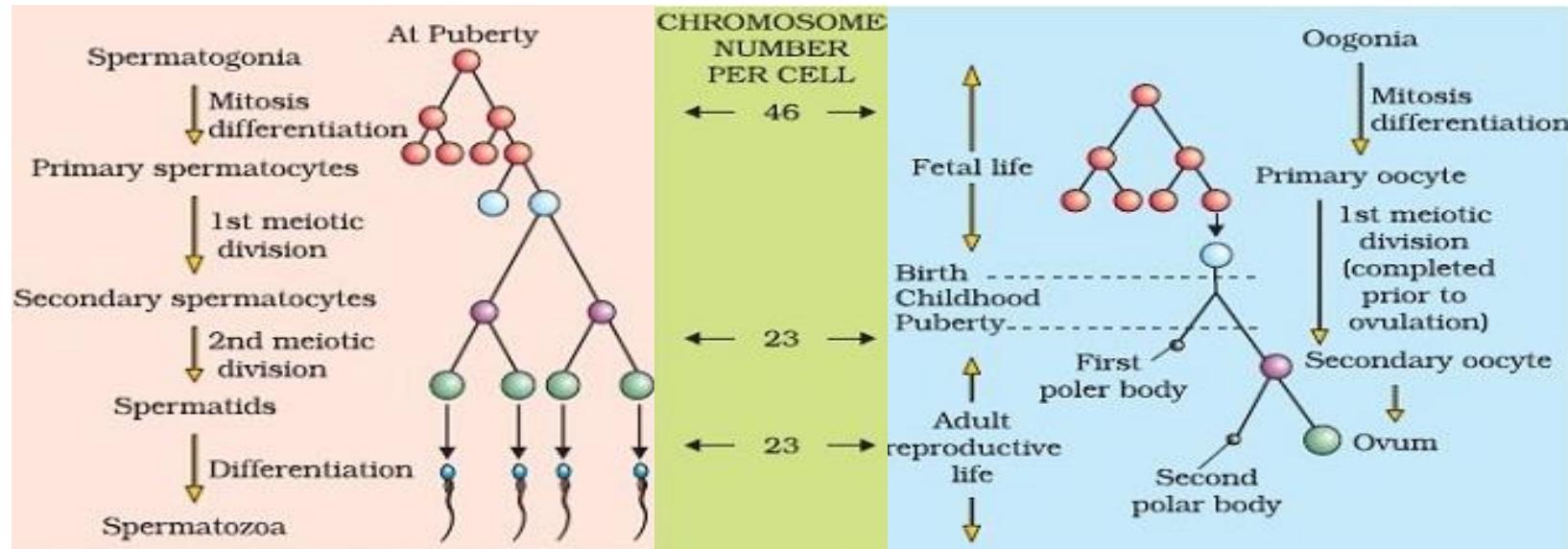
GAMETOGENESIS

Gametogenesis is the process of formation of gametes i.e. sperms and ova from the primary sex organs, the testes and ovaries respectively.

Gametogenesis in **male** is called **spermatogenesis** and that in a **female** is called **oogenesis**.

HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS AND OOGENESIS

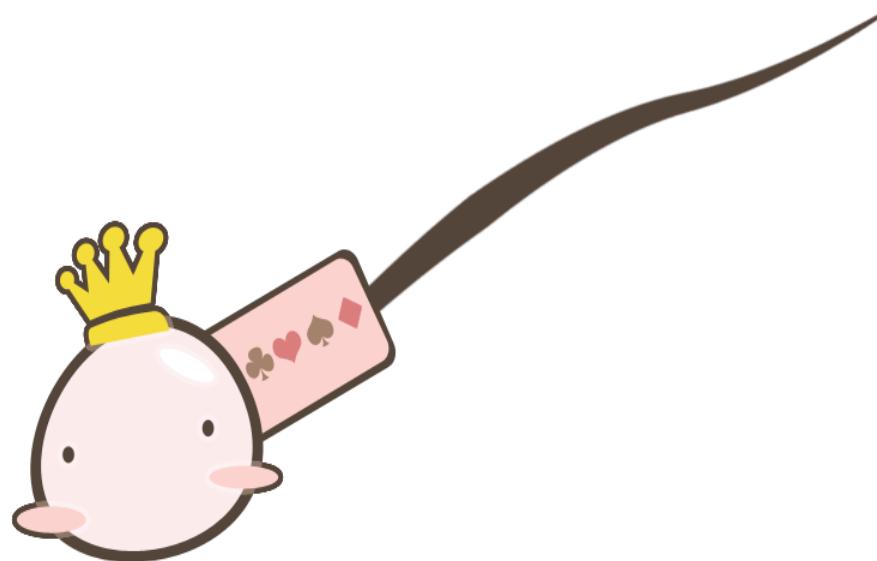


Spermatogenesis

Oogenesis

HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS



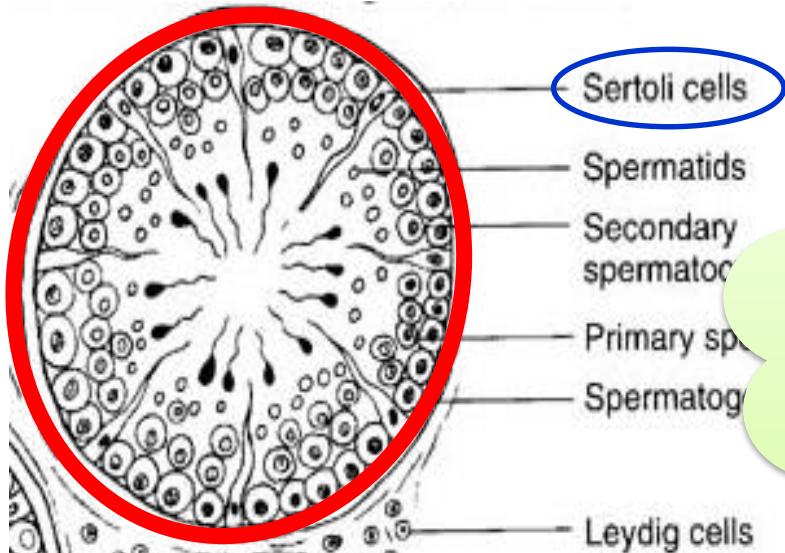
HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS

- In the testis, the immature male germ cells, spermatogonia produce sperms by spermatogenesis that begins at puberty.
- The spermatogonial cells (present in the seminiferous tubules) multiply by mitotic divisions and increase in numbers.
- Each spermatogonial sperm cell is diploid and contains 46 chromosomes.

HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS

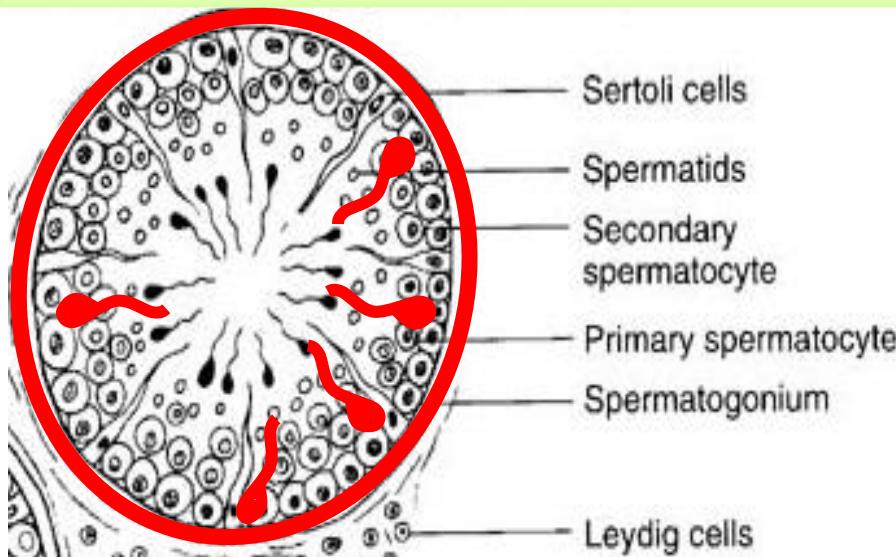


**Some of the
spermatogonial stem
cells develop into
primary spermatocytes
which undergo meiosis
periodically.**

HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS

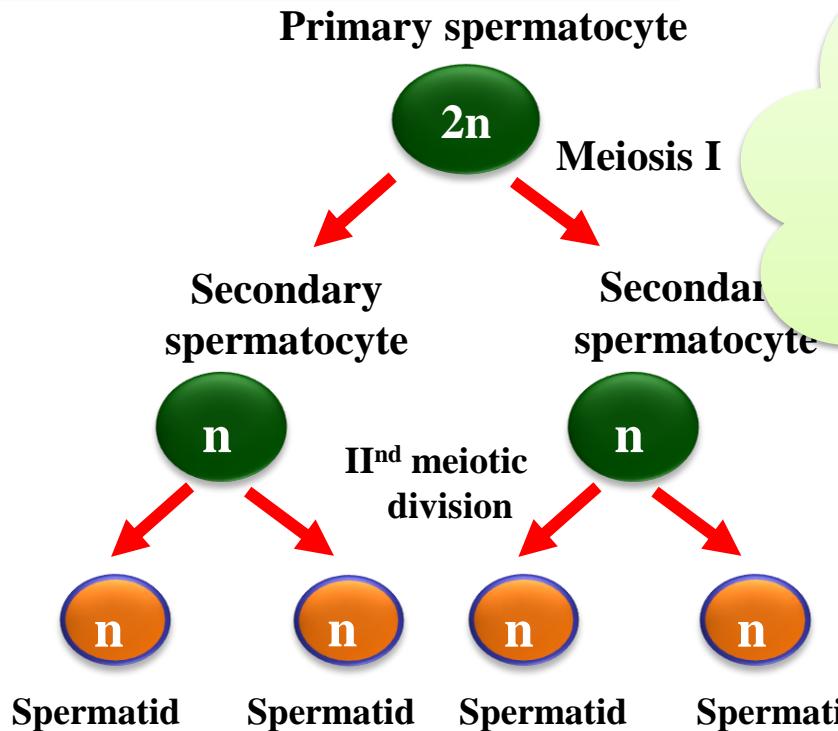
A primary spermatocyte completes the first meiotic division (Meiosis-I) leading to formation of two equal sized, haploid cells called secondary spermatocytes.



Each secondary spermatocyte is haploid (n), and have only 23 chromosomes.

HUMAN REPRODUCTIVE SYSTEM

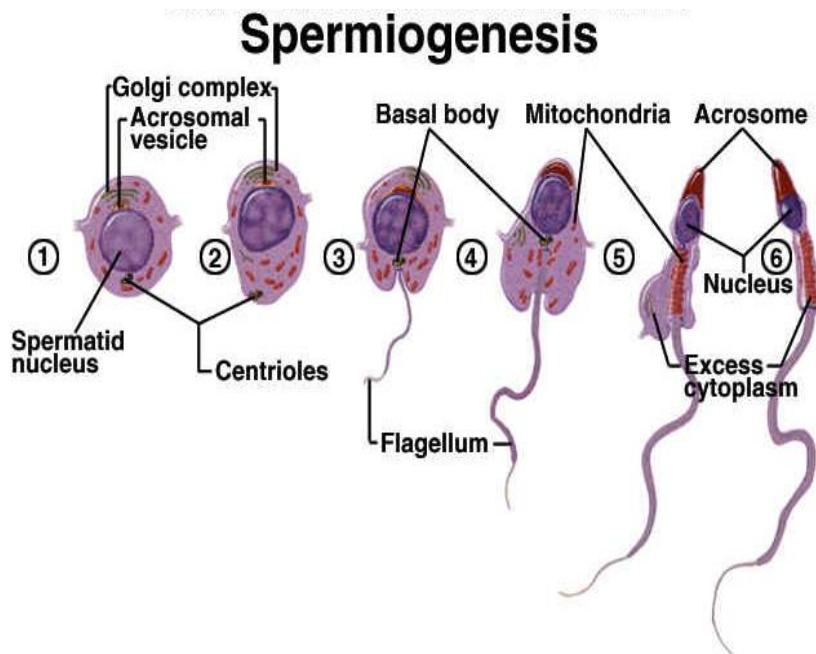
SPERMATOGENESIS



The secondary spermatocytes undergo the second meiotic division (Meiosis-II) to produce four equal sized haploid spermatids.

HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS



The spermatids are transformed into spermatozoa (sperms) by the process called **spermiogenesis**.

HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS

After spermiogenesis, sperm heads become embedded in the sertoli cells, and are finally released from the seminiferous tubules by the process called spermiation.

HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS

Spermatogenesis starts at the age of puberty due to significant increase in the secretion of gonadotropin releasing hormone (GnRH) which is a hypothalamic hormone.

The increased levels of GnRH then acts on the adenohypophysis of pituitary gland and stimulates secretion of two types of gonadotropins- luteinizing hormone (LH) and follicle stimulating hormone (FSH).

HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS

LH acts on the Leydig cells and stimulates secretion of androgens.

Androgens in turn stimulate the process of spermatogenesis.

FSH acts on the Sertoli cells and stimulates secretion of some factors which help in the process of spermiogenesis.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. In males spermatogenesis occurs at

- 1) Foetal stage
- 2) Embryonic stage
- 3) Puberty
- 4) Both foetal and embryonic stage

HUMAN REPRODUCTIVE SYSTEM

MCQs

2. The number of sperms produced from single spermatogoneal cell is.....



1) Four and haploid

2) Four and diploid

3) Six and haploid

4) Six and diploid

HUMAN REPRODUCTIVE SYSTEM

STRUCTURE OF A MATURE SPERMATOZOOON

HUMAN REPRODUCTIVE SYSTEM

STRUCTURE OF SPERM



HUMAN REPRODUCTIVE SYSTEM

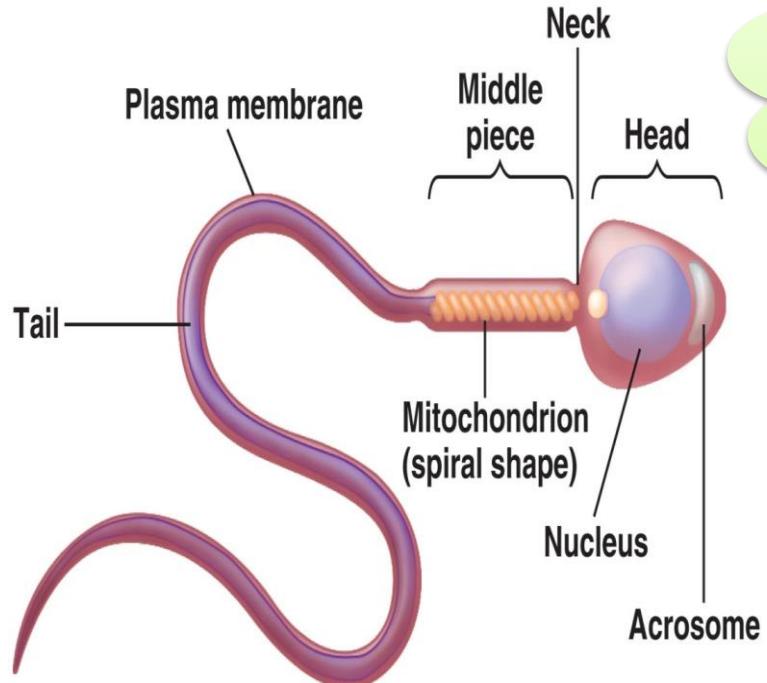
Sperm / Spermatozoon



**Sperm = Seed ;
Zoan = Animal**

HUMAN REPRODUCTIVE SYSTEM

Sperm / Spermatozoon



The spermatozoon is a microscopic structure composed of head, neck, middle piece and a tail

HEAD

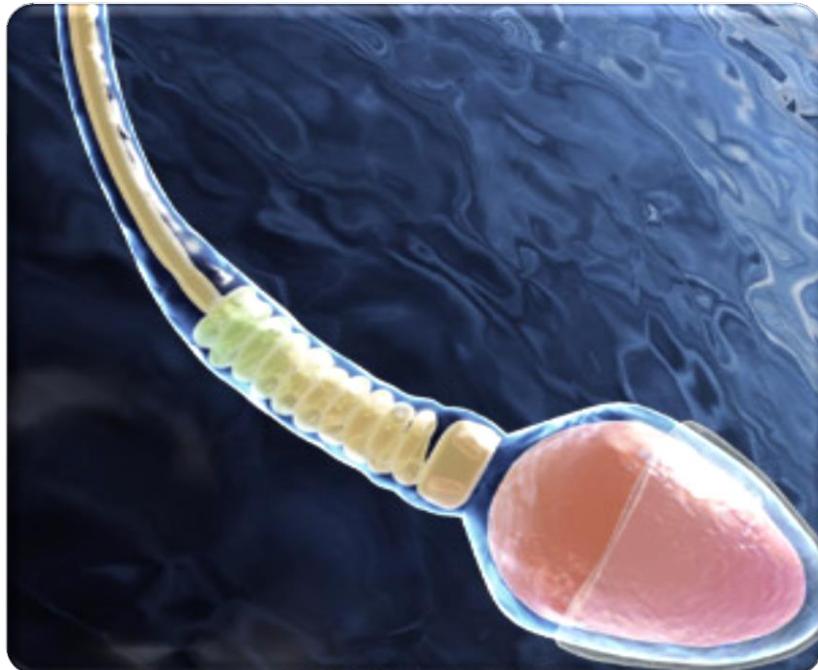
NECK

MIDDLE PIECE

TAIL

HUMAN REPRODUCTIVE SYSTEM

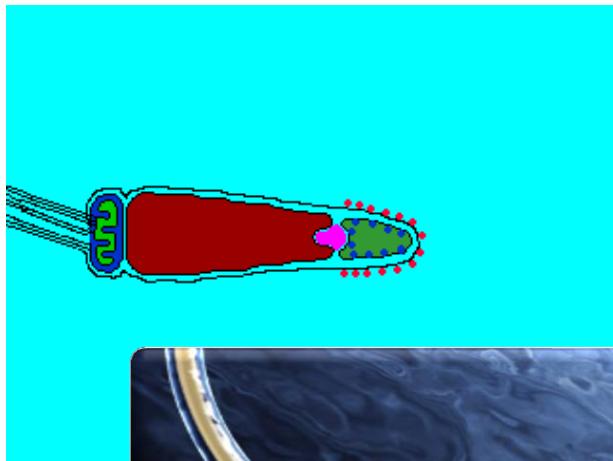
Sperm / Spermatozoon



A plasma membrane
envelops the whole
body of
spermatozoon.

HUMAN REPRODUCTIVE SYSTEM

Sperm / Spermatozoon

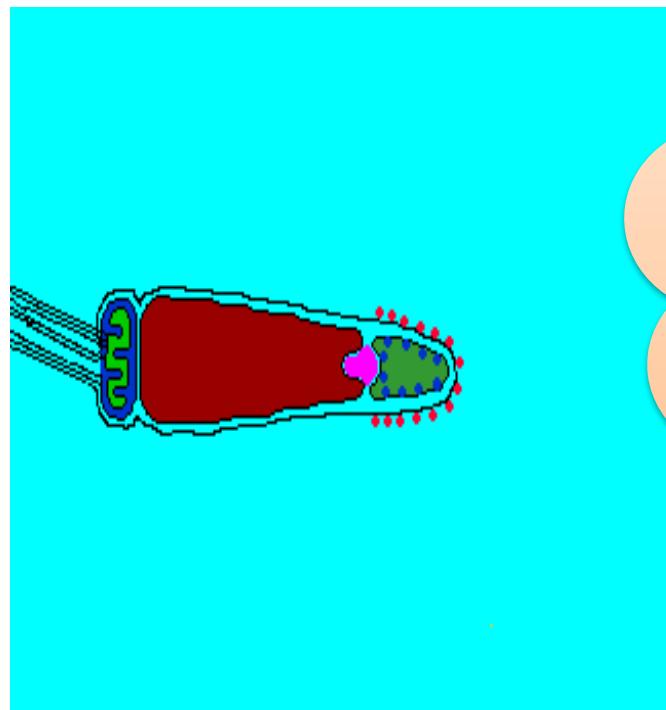


The head of a spermatozoon contains an elongated haploid nucleus.

The head is covered by a cap like structure, the acrosome.

HUMAN REPRODUCTIVE SYSTEM

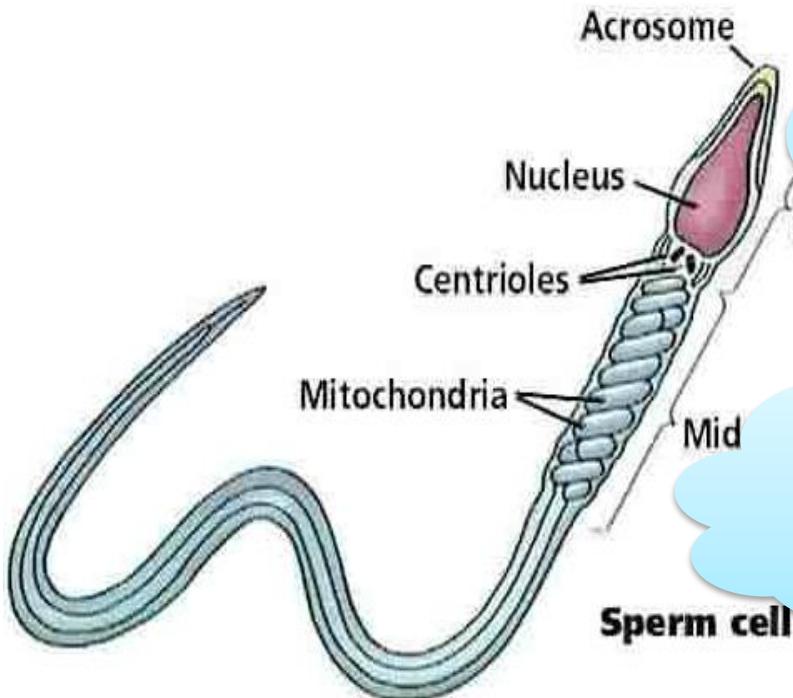
Sperm / Spermatozoon



The acrosome contains numerous enzymes (proteases, acid phosphatase, hyaluronidase etc.) that help fertilisation of the ovum (penetration into the ovum).

HUMAN REPRODUCTIVE SYSTEM

Sperm / Spermatozoon

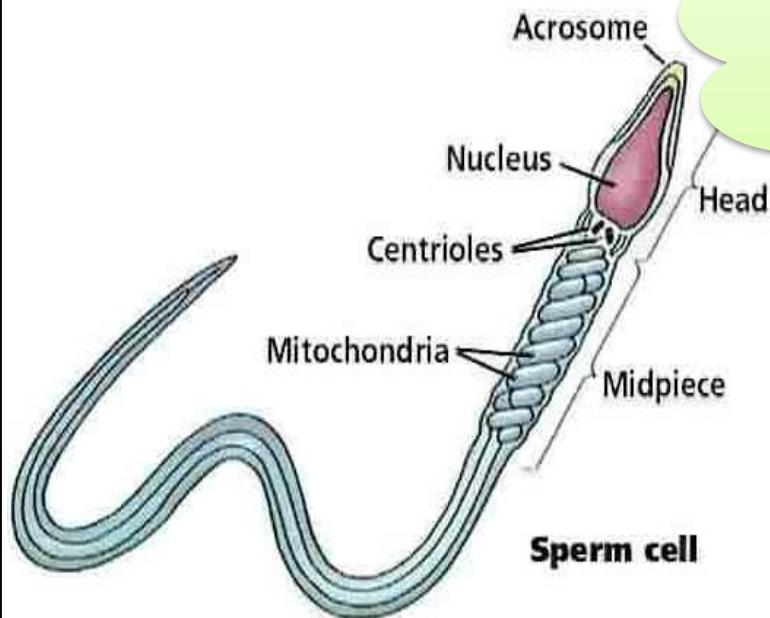


The middle piece possesses numerous mitochondria which produce energy for the movement of the tail.

Sperm mobility is essential for fertilization.

HUMAN REPRODUCTIVE SYSTEM

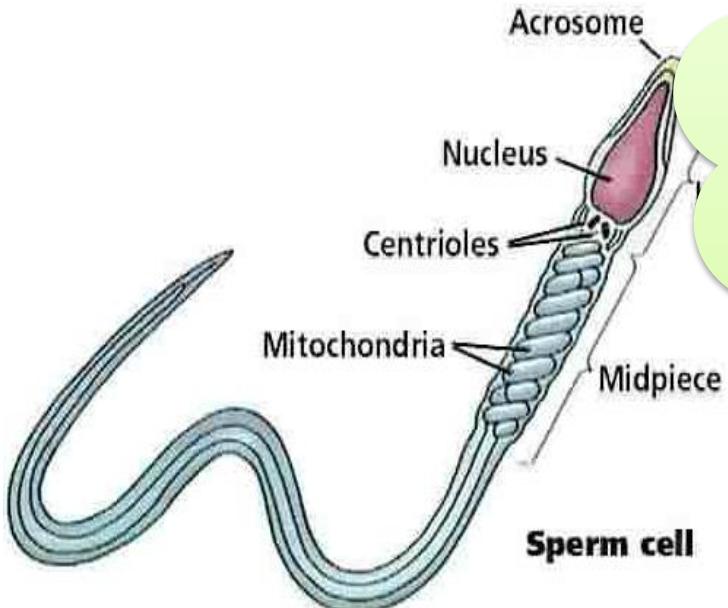
Sperm / Spermatozoon



A human male ejaculates about 200-300 million sperms during coitus.

HUMAN REPRODUCTIVE SYSTEM

Sperm / Spermatozoon



At least 60 percent of sperms must have normal shape and size and at least 40 percent of them must show vigorous motility, for normal fertility.

HUMAN REPRODUCTIVE SYSTEM

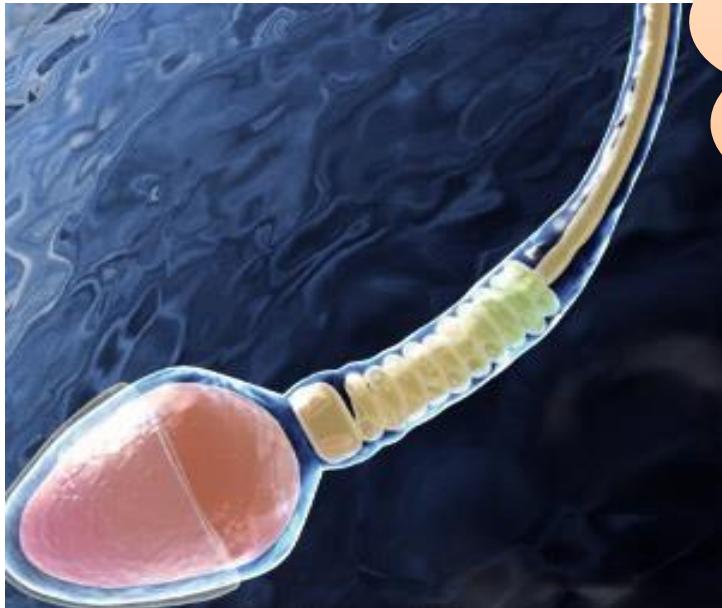
Sperm / Spermatozoon



**Sperms released from
the seminiferous
tubules are transported
by the accessory ducts**

HUMAN REPRODUCTIVE SYSTEM

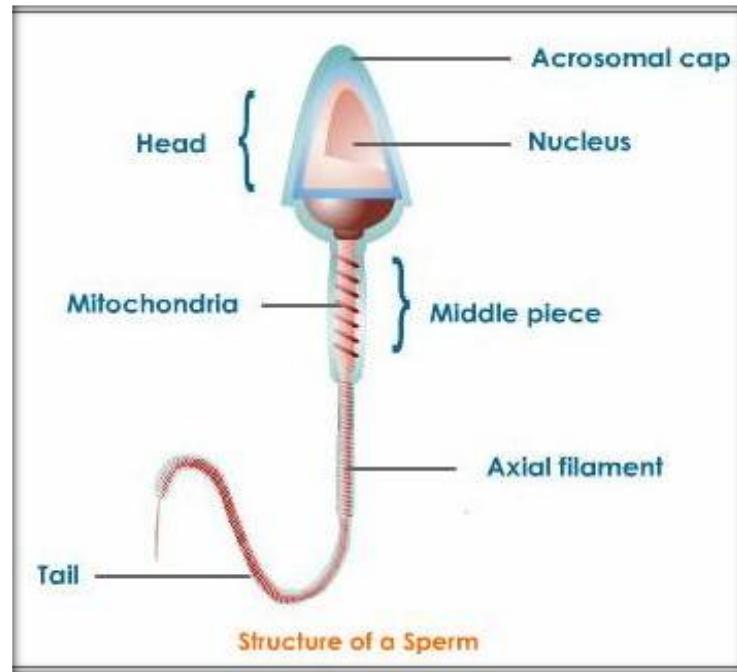
Sperm / Spermatozoon



Secretions of epididymis,
vas deferens, seminal
vesicles and prostate are
essential for maturation
and motility of sperms.

HUMAN REPRODUCTIVE SYSTEM

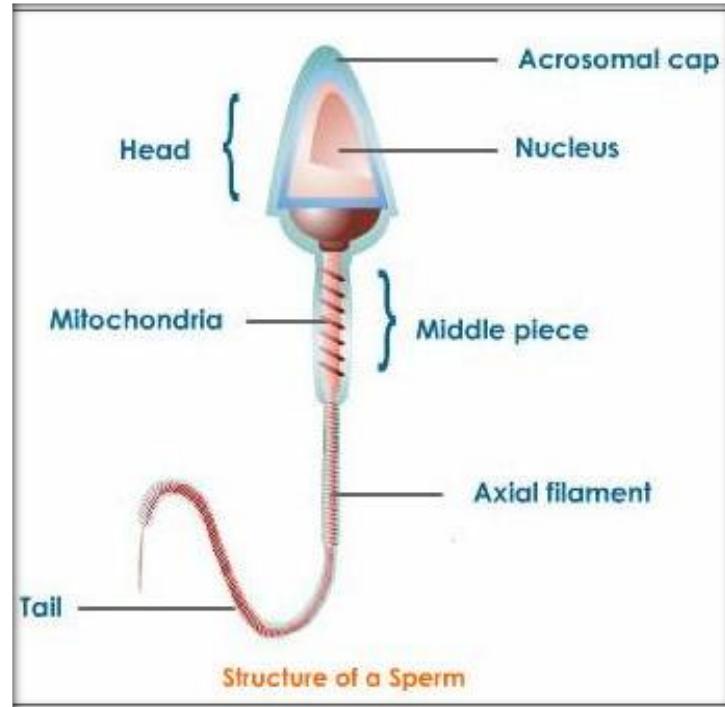
Sperm / Spermatozoon



The seminal plasma along with the sperms constitutes the semen.

HUMAN REPRODUCTIVE SYSTEM

Sperm / Spermatozoon



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

HUMAN REPRODUCTIVE SYSTEM

1. The secretions of which part of sperm helps to enter the ovum???

1) Middle piece

2) Tail



3) Acrosome

4) Neck

MCQs

HUMAN REPRODUCTIVE SYSTEM



UNIT – VA

HUMAN

REPRODUCTIVE

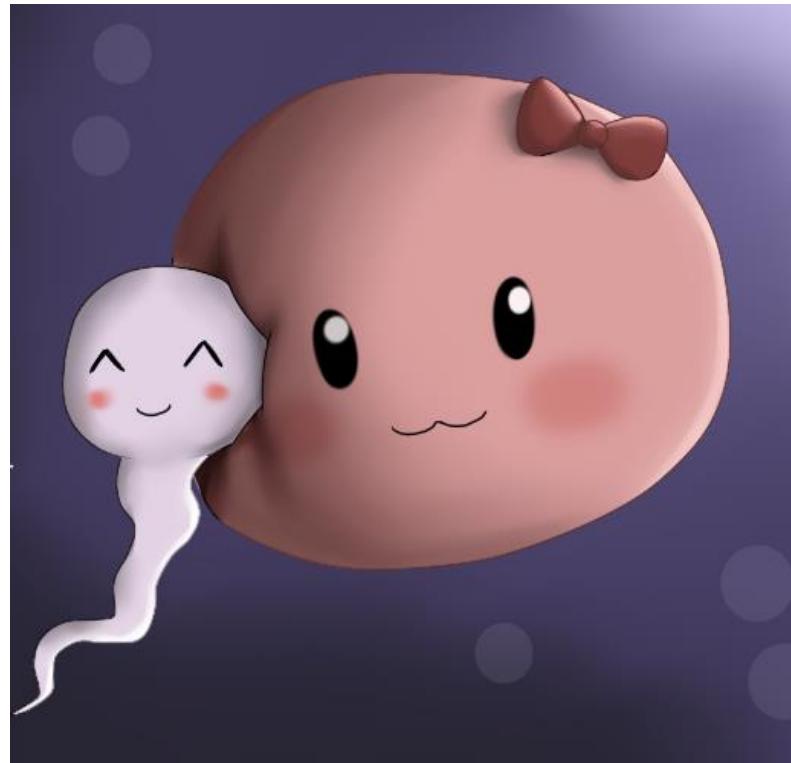
SYSTEM

HUMAN REPRODUCTIVE SYSTEM

OOGENESIS

HUMAN REPRODUCTIVE SYSTEM

OOGENESIS



HUMAN REPRODUCTIVE SYSTEM

Oogenesis

Oogenesis is initiated during the embryonic development when a couple of million gamete mother cells (oogonia) are formed within each foetal ovary and do not multiply thereafter.

The process of formation of a mature female gamete is called oogenesis.

HUMAN REPRODUCTIVE SYSTEM

Oogenesis

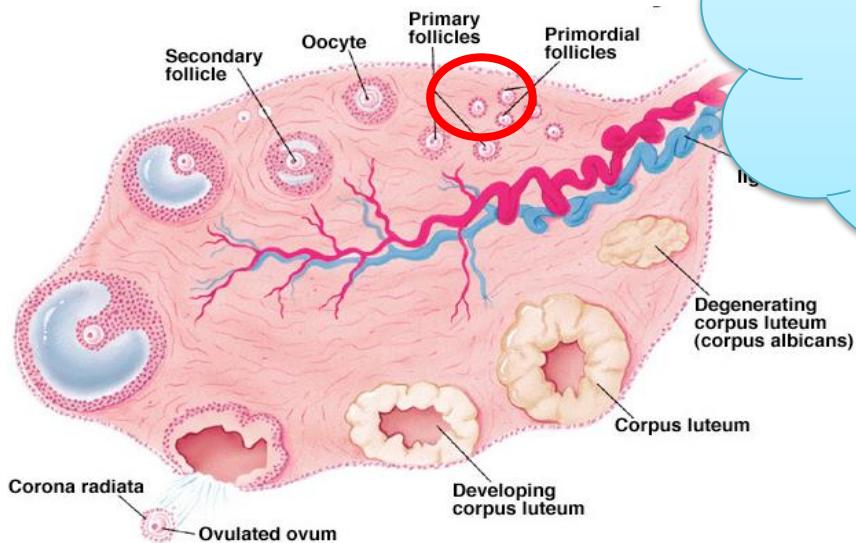
These cells start division and stop the process at prophase-I of the meiosis.

At this stage these are called primary oocytes.

HUMAN REPRODUCTIVE SYSTEM

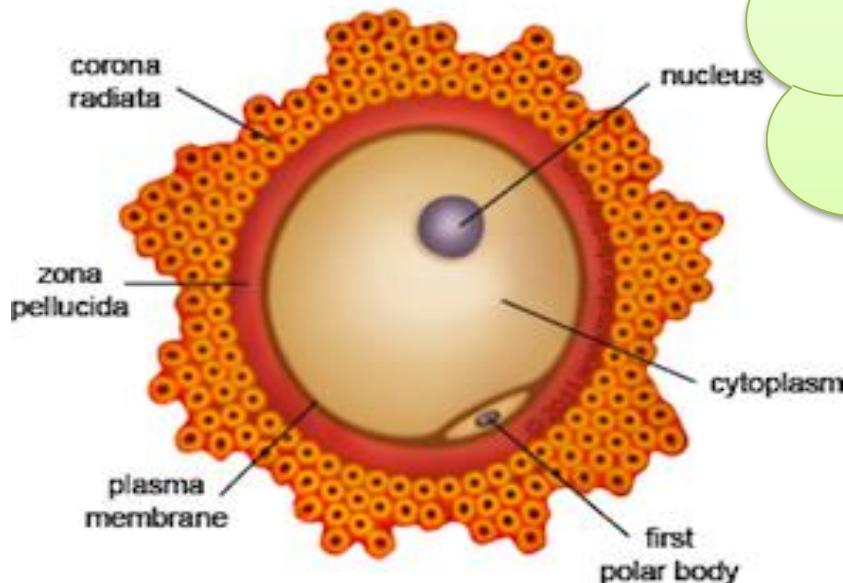
Formation of ovarian follicles

Each primary oocyte then gets surrounded by flattened layer of follicular(squamous) cells. It is called the primordial follicle.



HUMAN REPRODUCTIVE SYSTEM

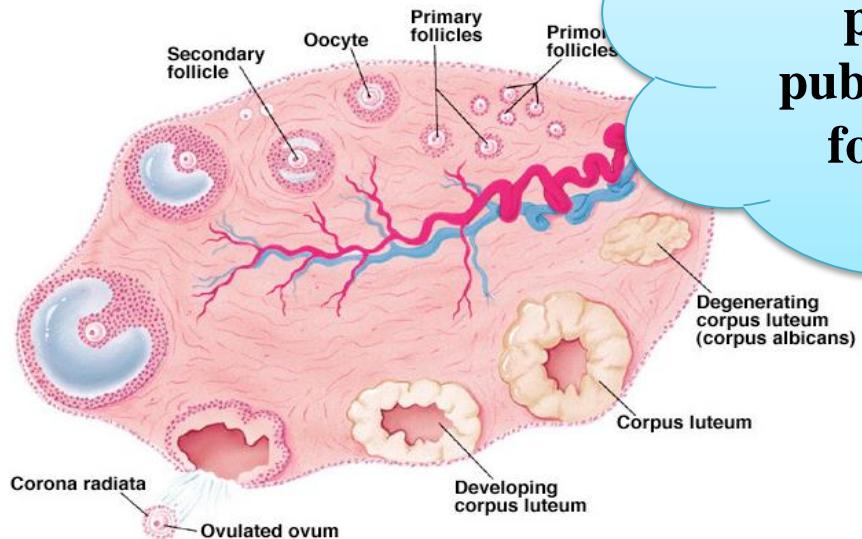
Formation of ovarian follicles



The innermost layer of granulosa cells are firmly attached to zona pellucida forming the corona radiata.

HUMAN REPRODUCTIVE SYSTEM

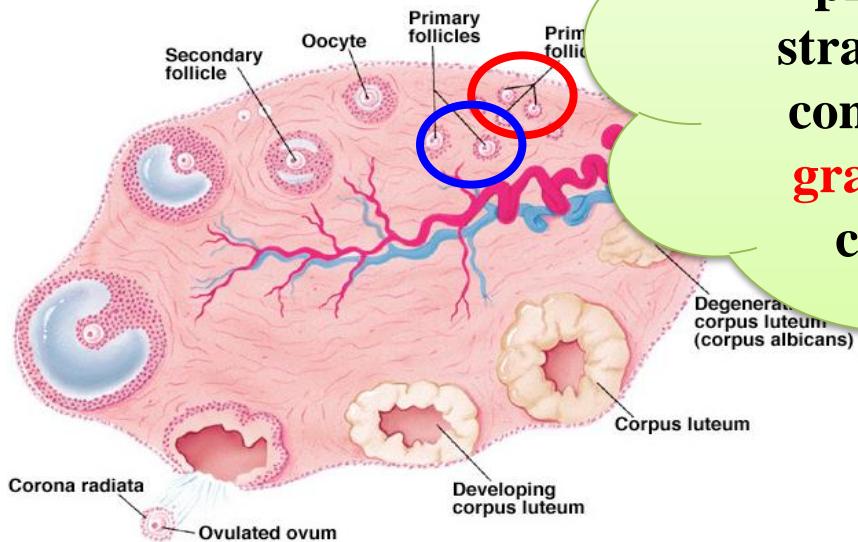
Formation of ovarian follicles



A large number of these follicles degenerate during the period from birth to puberty. Therefore at puberty only 60,000-80,000 follicles are left in each ovary.

HUMAN REPRODUCTIVE SYSTEM

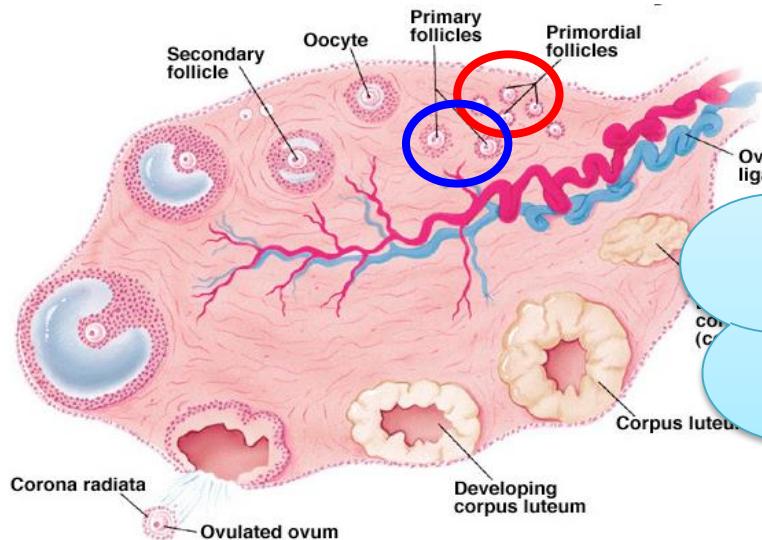
Formation of ovarian follicles



Later the flattened follicular cells become cuboidal and proliferate to produce a stratified epithelium which constitutes the **membrana granulosa**. These cells are called **granulosa cells**.

HUMAN REPRODUCTIVE SYSTEM

Formation of ovarian follicles

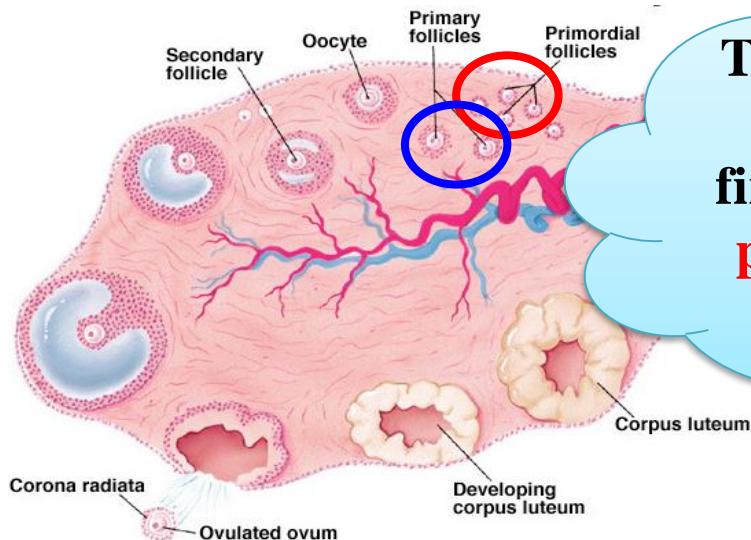


Follicles at this stage of development are called **primary follicles**.

A homogenous membrane, the **zona pellucida** (glycoprotein layer), appears between the primary oocyte and granulosa cells.

HUMAN REPRODUCTIVE SYSTEM

Formation of ovarian follicles

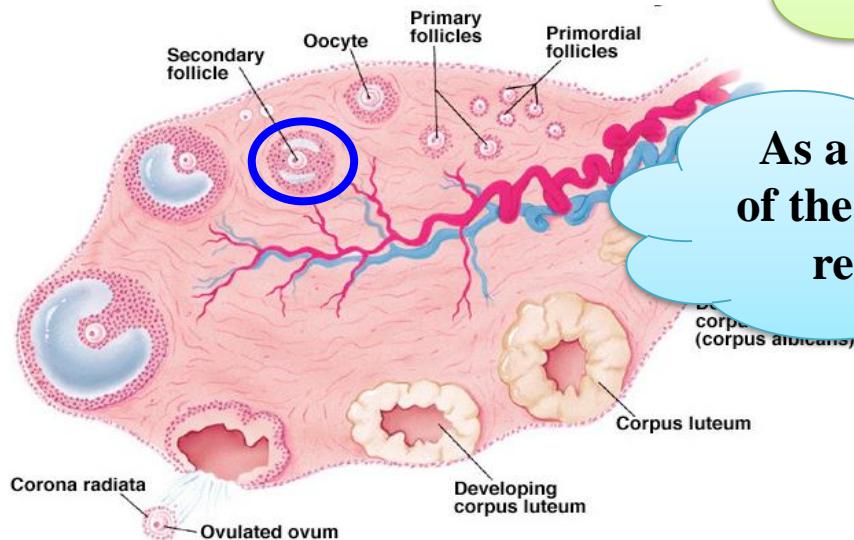


Zona pellucida is a membrane derived from the ovum.

The innermost layer of granulosa cells are firmly attached to **zona pellucida** forming the **corona radiata**.

HUMAN REPRODUCTIVE SYSTEM

Formation of ovarian follicles

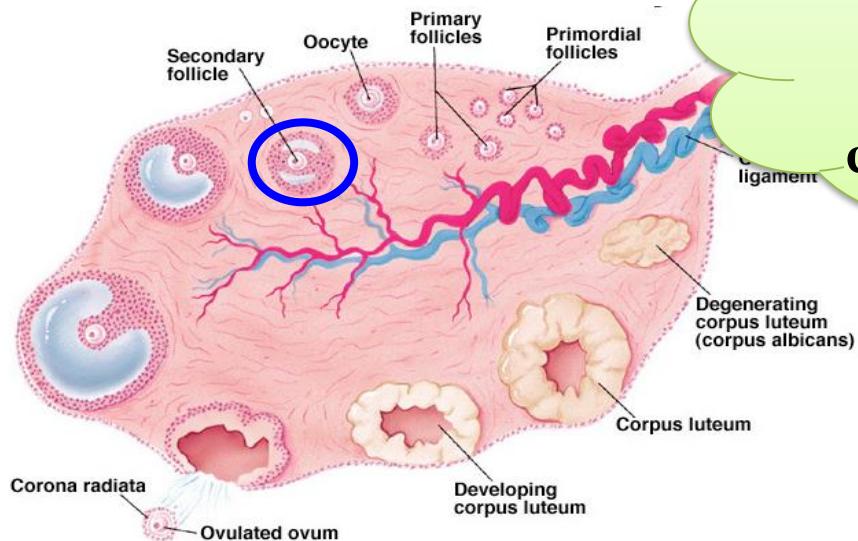


A cavity (antrium) appears within the membrane granulosa. The follicular cavity increases in size.

As a result, the wall of the follicle becomes relatively thin.

HUMAN REPRODUCTIVE SYSTEM

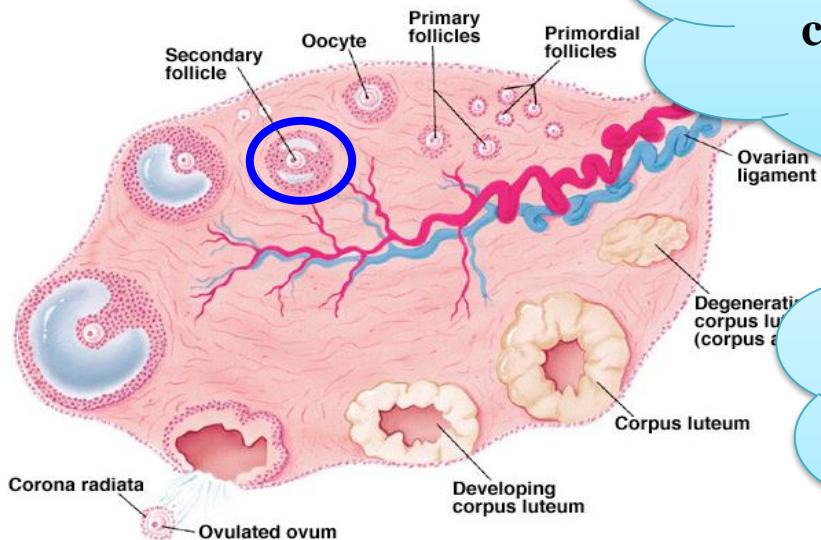
Formation of ovarian follicles



The oocyte now lies eccentrically in the follicle surrounded by some granulosa cells called **cumulus oophorus**.

HUMAN REPRODUCTIVE SYSTEM

Formation of ovarian follicles

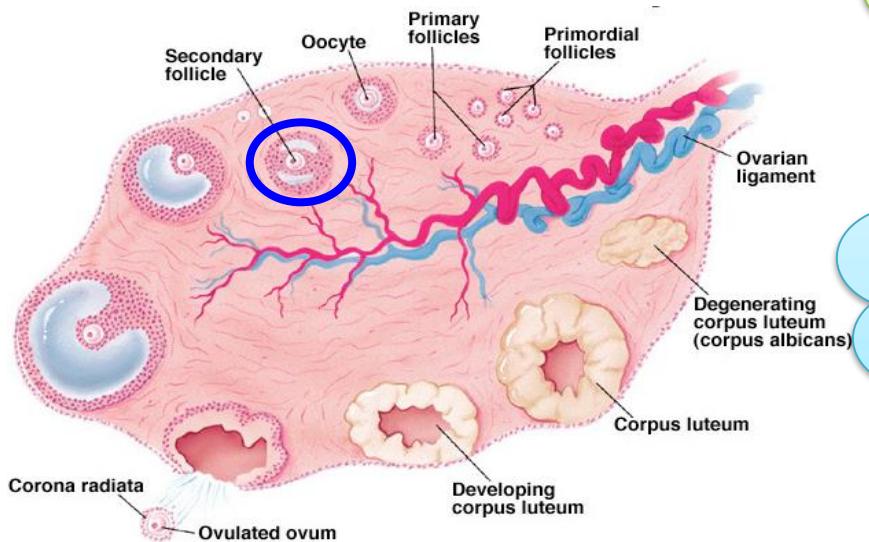


As the follicle expands the stromal cells surrounding the membrane granulosa become condensed to form a covering called the **theca interna**.

Outside the theca interna some fibrous tissue become condensed to form another covering called **theca externa**.

HUMAN REPRODUCTIVE SYSTEM

Formation of ovarian follicles



Now, these follicles are called **secondary follicles**.

The cells of **theca interna** later secrete a hormone called **oestrogen**.

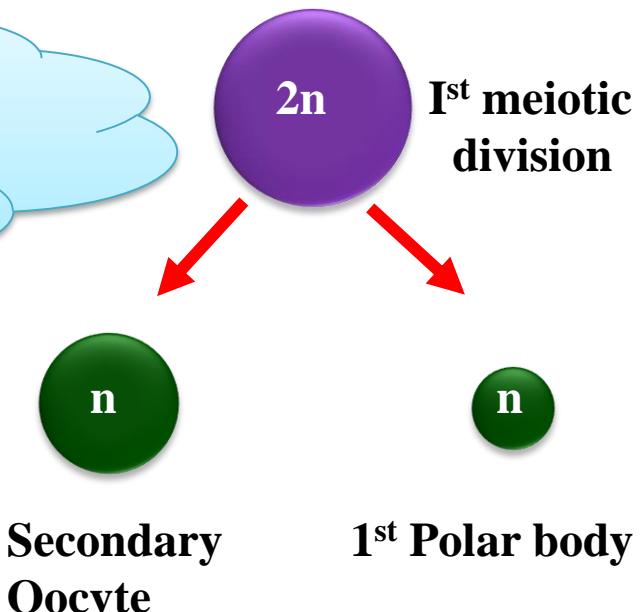
HUMAN REPRODUCTIVE SYSTEM

Formation of ovarian follicles

At this stage, the primary oocyte within the secondary follicle grows in size and completes Meiosis I.

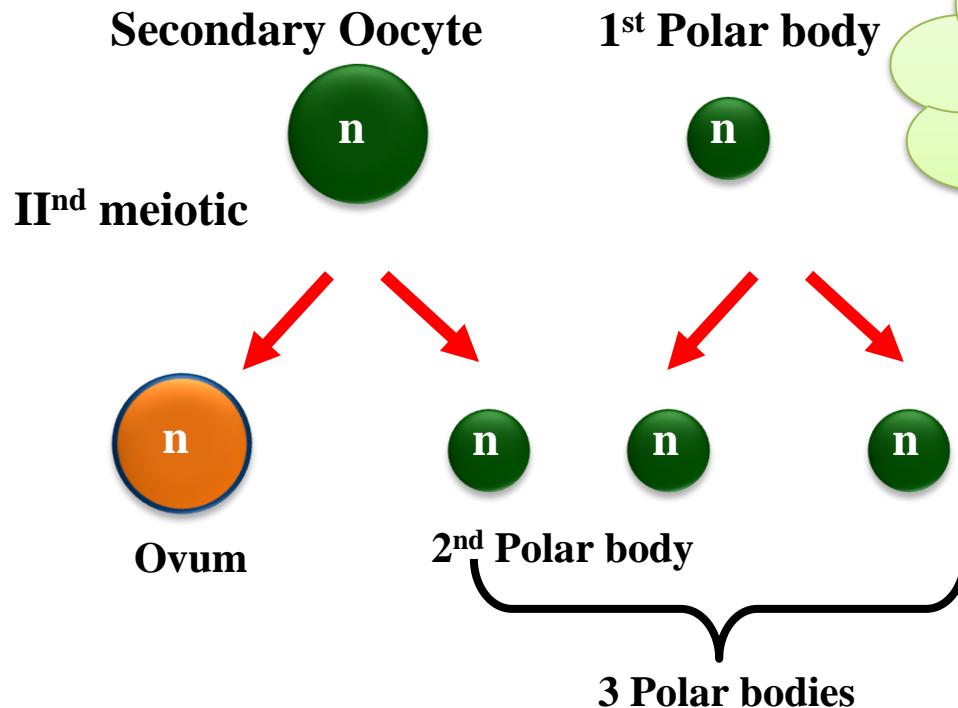
It is an unequal division resulting in the formation of a large haploid secondary oocyte and a tiny first polar body (haploid).

Primary Oocyte



HUMAN REPRODUCTIVE SYSTEM

Formation of ovarian follicles

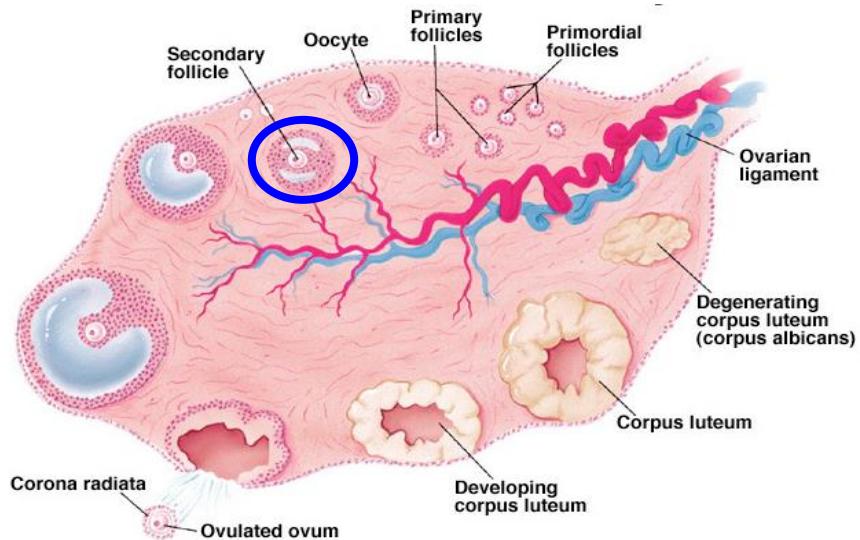


The secondary oocyte retains bulk of the cytoplasm (nutrient rich) of the primary oocyte.

Then the second meiotic begins, but stops at metaphase-II.

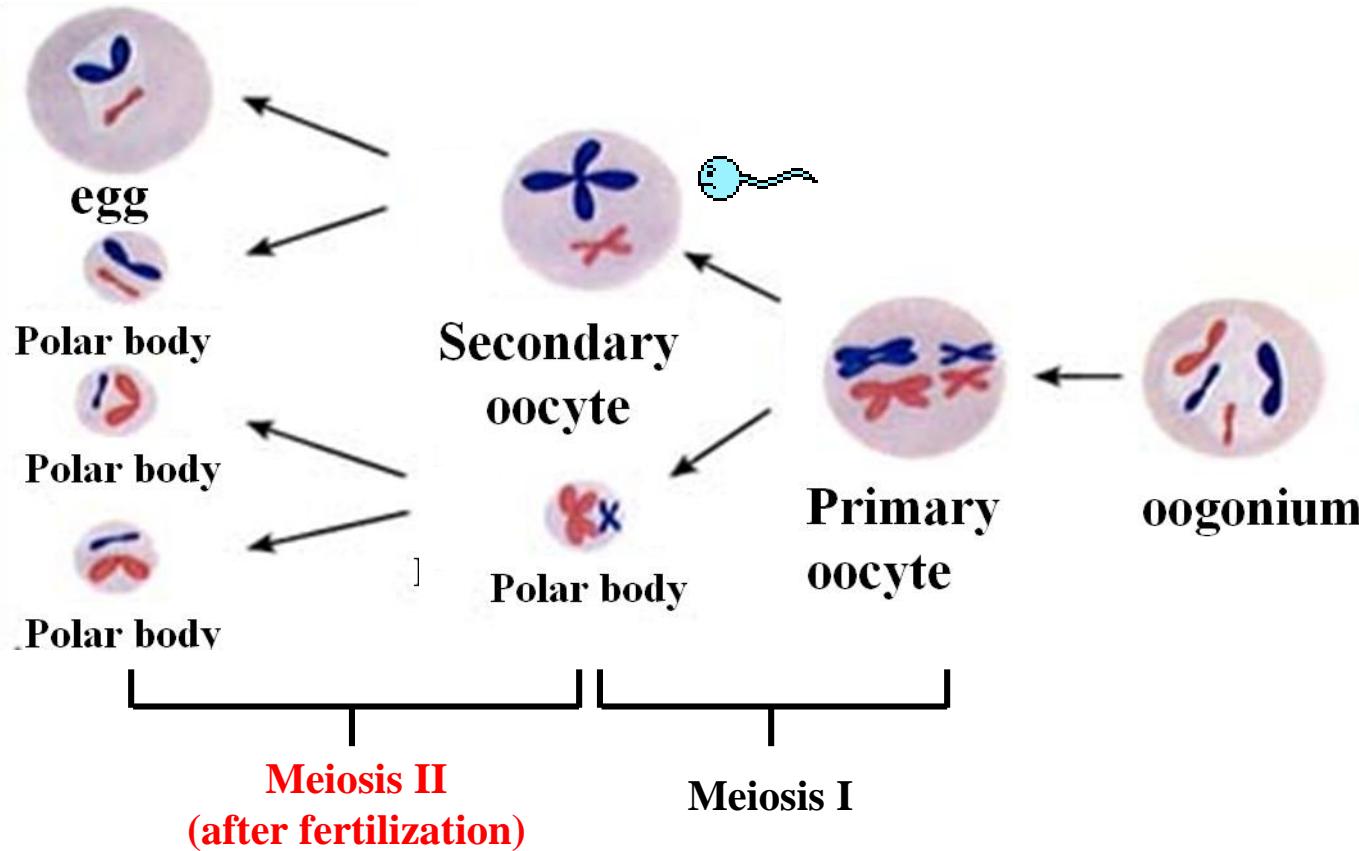
HUMAN REPRODUCTIVE SYSTEM

Formation of ovarian follicles



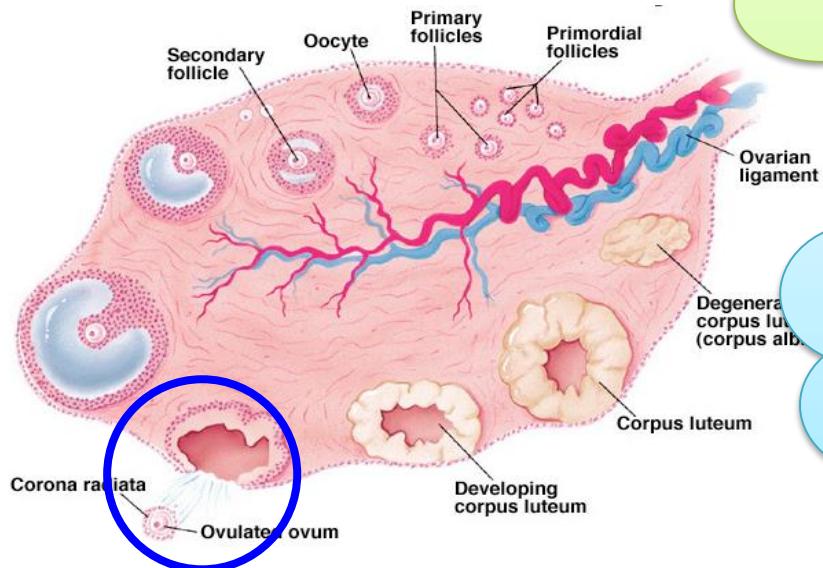
The secondary follicle further changes into the mature follicle called **Graafian follicle** or **Tertiary follicle**.

HUMAN REPRODUCTIVE SYSTEM



HUMAN REPRODUCTIVE SYSTEM

Ovulation

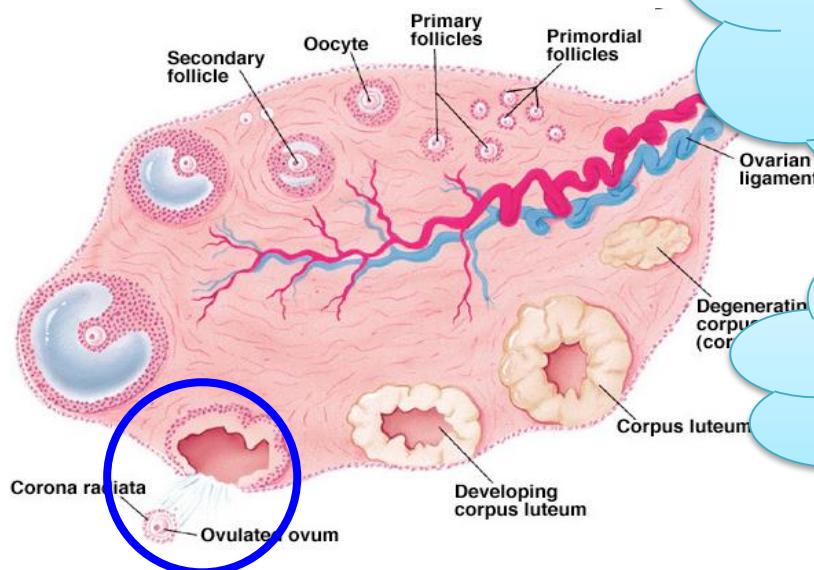


The release of ovum
(secondary oocyte)
from the ovary is called
ovulation.

The graafian follicle is
at first very small
compared to the
thickness of the cortex
of the ovary.

HUMAN REPRODUCTIVE SYSTEM

Ovulation



As it enlarges, it becomes so big that it not only reaches the surface of the ovary, but also forms a bulging in this situation.

Ultimately, the follicle ruptures releasing the ovum.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. In human females, the oogonia starts cell division during the embryonic development stage and stops the process at

- 
- 1) prophase-I of meiosis-I
 - 2) metaphase-I of meiosis-I
 - 3) anaphase-I of meiosis-I
 - 4) telophase-I of meiosis-I

HUMAN REPRODUCTIVE SYSTEM

MCQs

2. ‘Ovulation’ is

- 1) Releasing of primary oocyte from ovary
- 2) Releasing of secondary oocyte from ovary
- 3) Releasing of tertiary oocyte from ovary
- 4) Releasing of graafian follicle

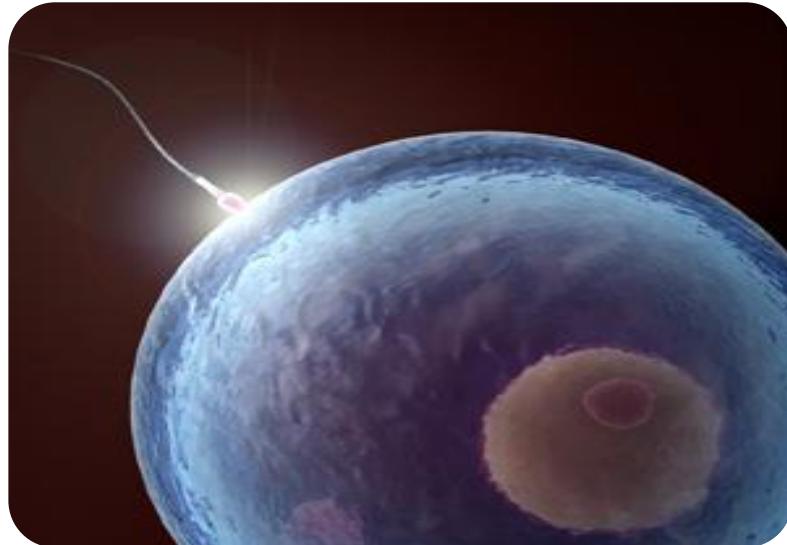


HUMAN REPRODUCTIVE SYSTEM

STRUCTURE OF OVUM

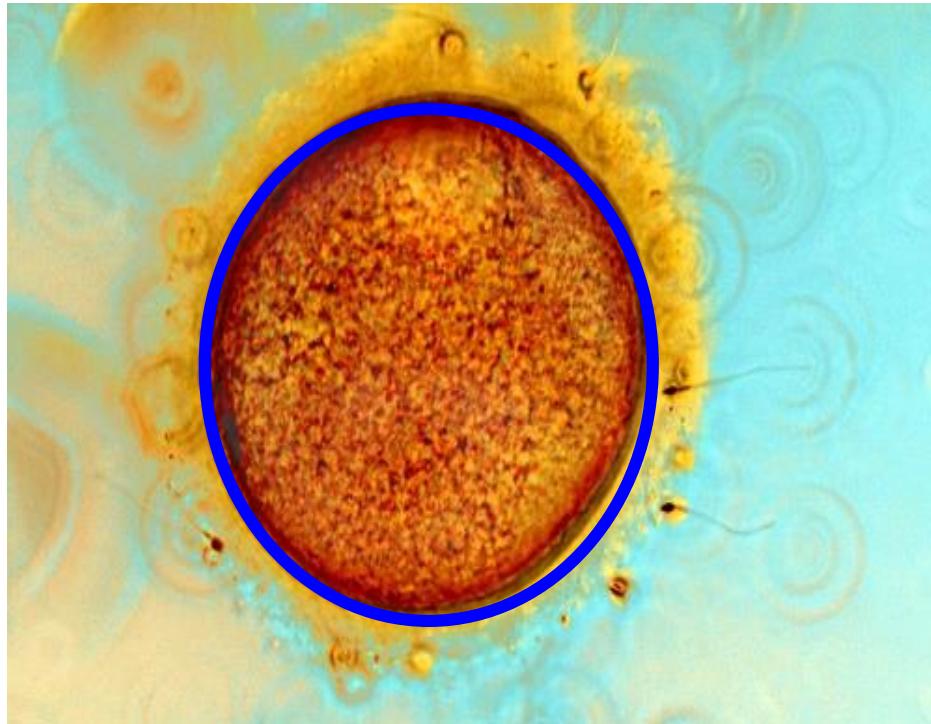
HUMAN REPRODUCTIVE SYSTEM

STRUCTURE OF OVUM



The ovum that is shed from ovary is not mature (it is arrested in the metaphase-II of the maturation division-Meiosis-II).

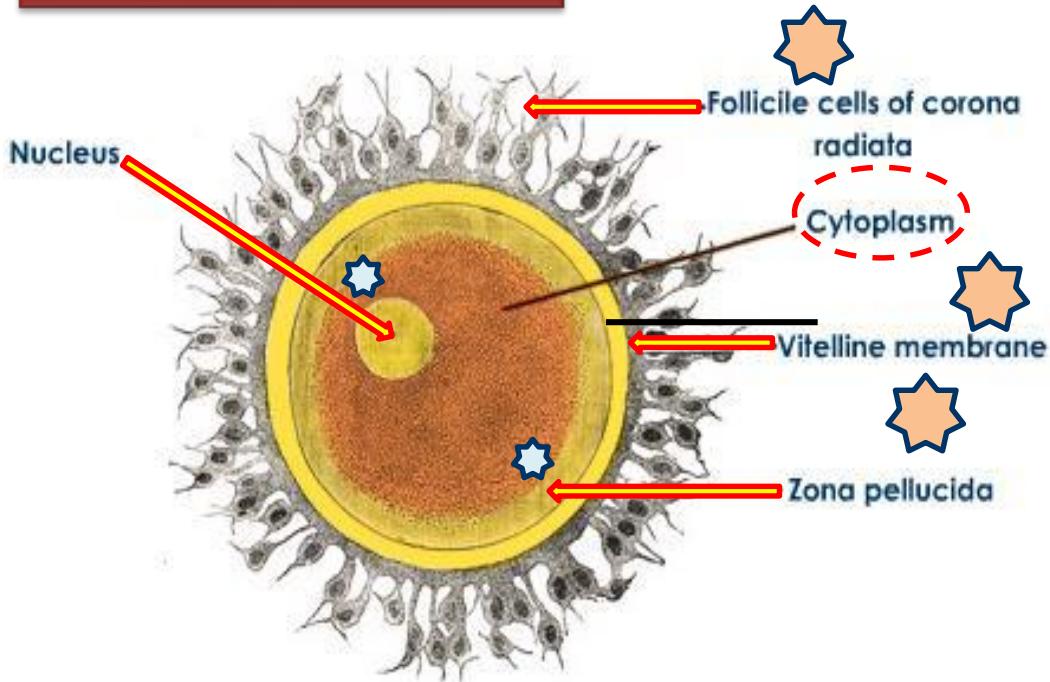
HUMAN REPRODUCTIVE SYSTEM



It is surrounded by zona pellucida.

HUMAN REPRODUCTIVE SYSTEM

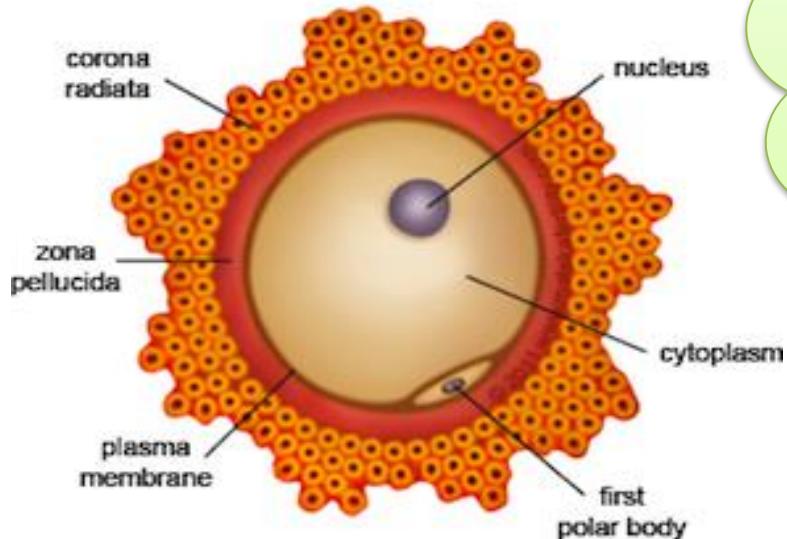
HUMAN OVUM



A distinct space is seen between the cell membrane(vitelline membrane) and the zona pellucida, **perivitelline space**.

HUMAN REPRODUCTIVE SYSTEM

STRUCTURE OF OVUM



The first polar body, which separates from the ovum during the first meiotic division is seen in the perivitelline space.

HUMAN REPRODUCTIVE SYSTEM

MCQs

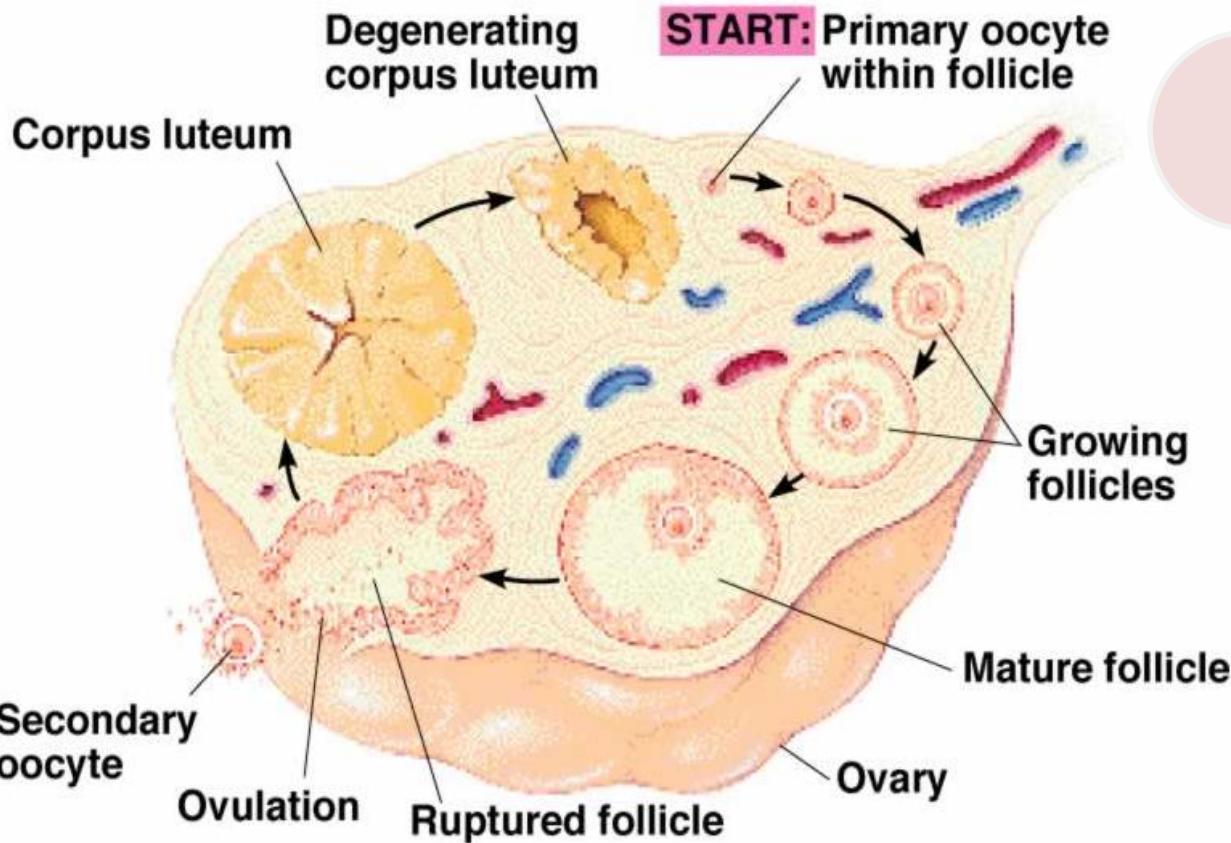
1. The membrane presents immediately around the secondary oocyte is.....

- 1) Corona radiata
- 2) Theca
-  3) Zona pellucida
- 4) Germinal epithelium

HUMAN REPRODUCTIVE SYSTEM

CORPUS LUTEUM

HUMAN REPRODUCTIVE SYSTEM

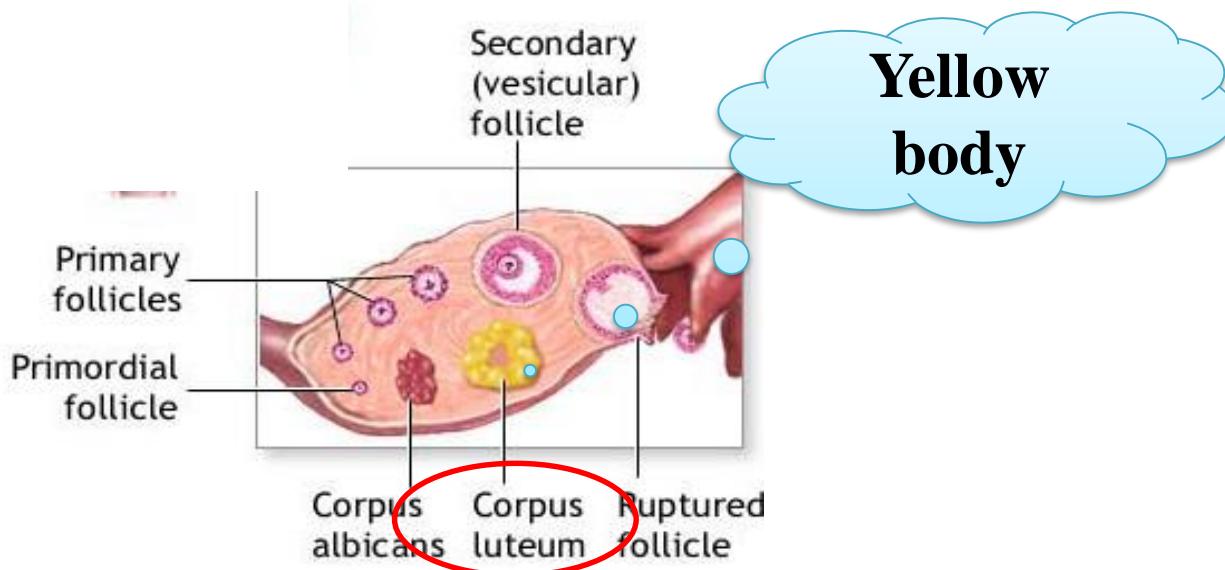


**CORPUS
LUTEUM**

HUMAN REPRODUCTIVE SYSTEM

CORPUS LUTEUM

After ovulation, the granulosa cells in the follicle proliferate are transformed into a yellowish glandular mass called corpus luteum.

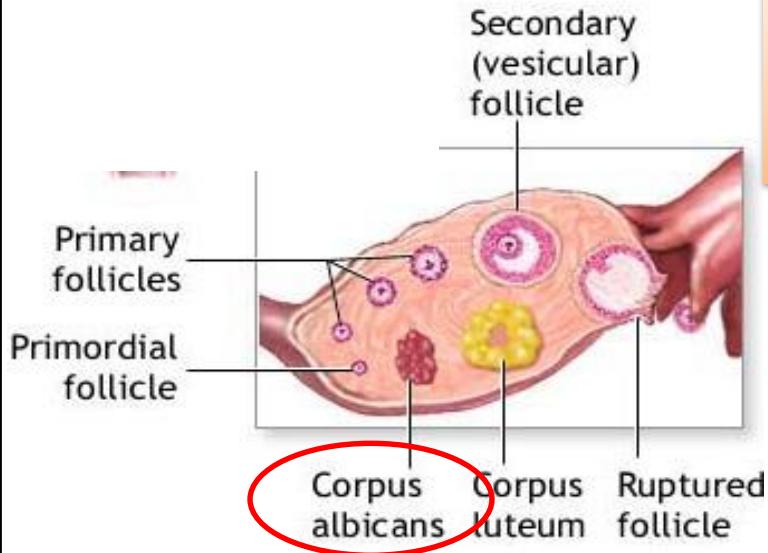


HUMAN REPRODUCTIVE SYSTEM

CORPUS LUTEUM

If the **ovum** is not fertilised, the **corpus luteum** persists for about **14 days**.

During this period it secretes progesterone.

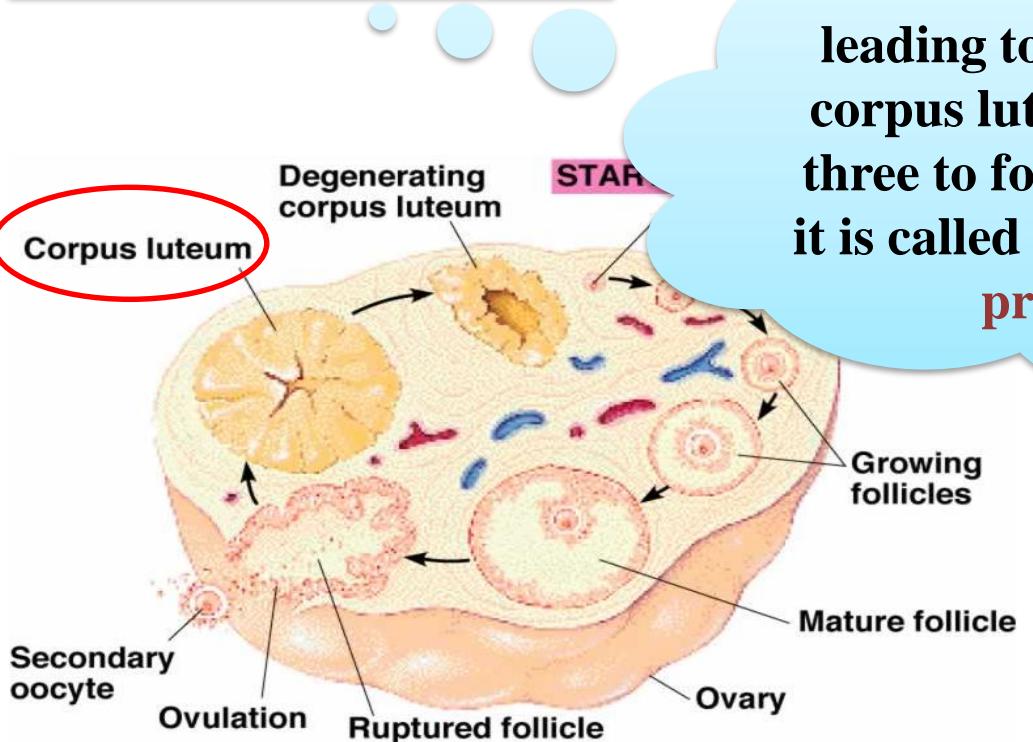


At the end of its functional life, it degenerates and forms a mass of fibrous tissue called the **corpus albicans**.

White body

HUMAN REPRODUCTIVE SYSTEM

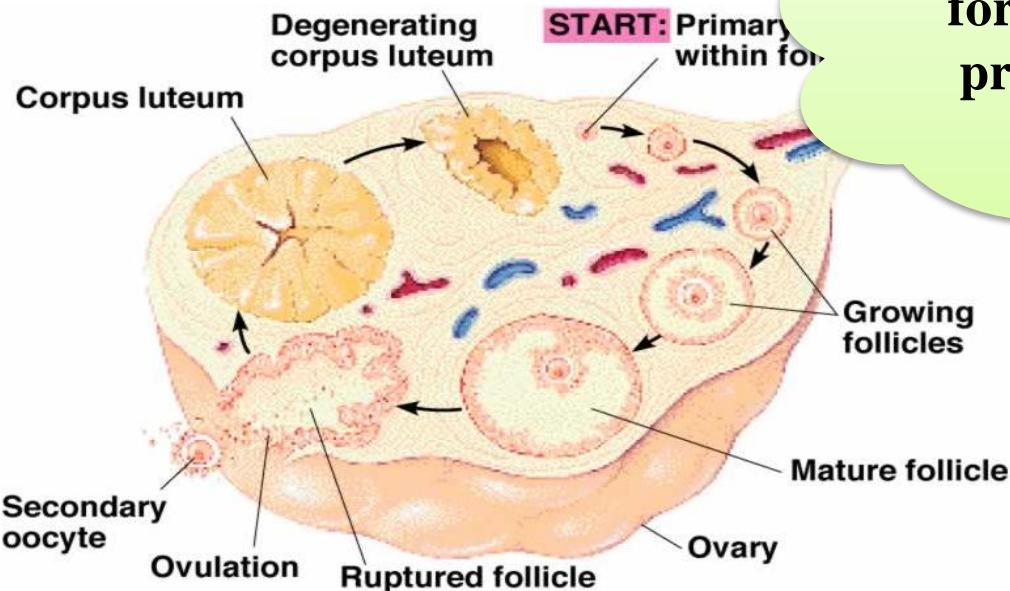
CORPUS LUTEUM



If the ovum is fertilized leading to pregnancy, the corpus luteum persists for three to four months. Now, it is called **corpus luteum of pregnancy**.

HUMAN REPRODUCTIVE SYSTEM

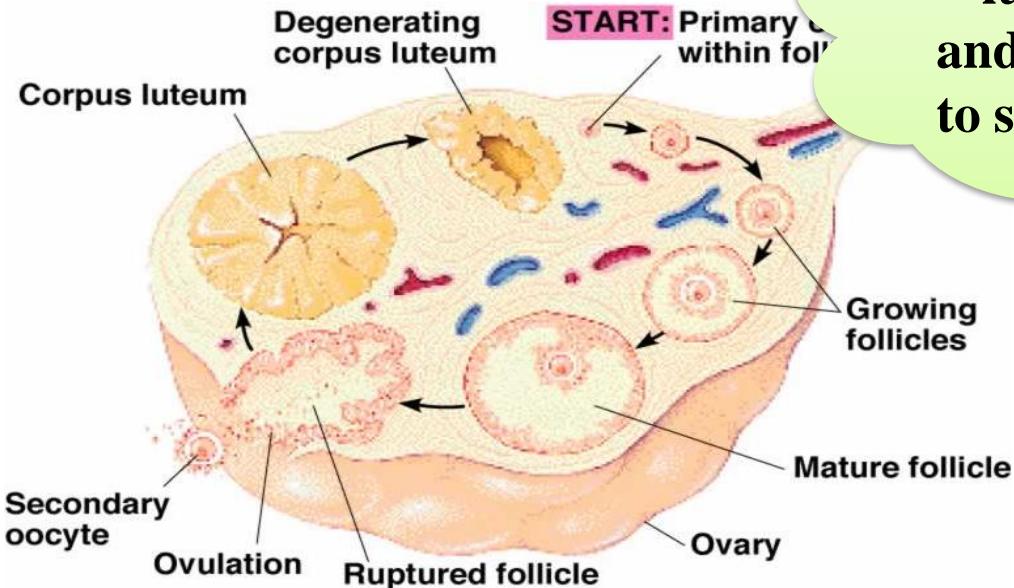
CORPUS LUTEUM



The **progesterone** secreted by it is essential for the maintenance of pregnancy in the first few months.

HUMAN REPRODUCTIVE SYSTEM

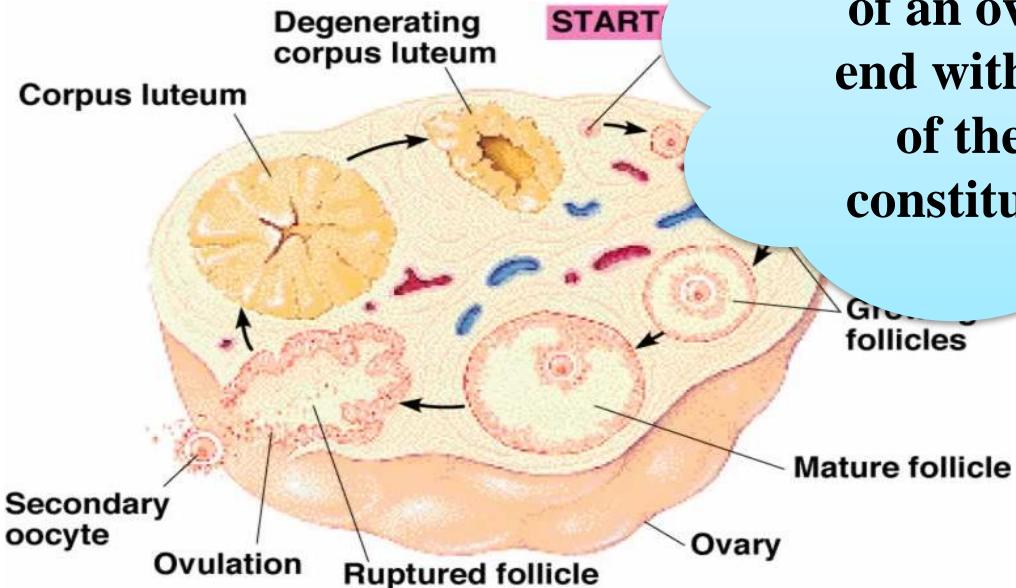
CORPUS LUTEUM



After the fourth month, the corpus luteum degenerates and the **placenta** begins to secrete progesterone.

HUMAN REPRODUCTIVE SYSTEM

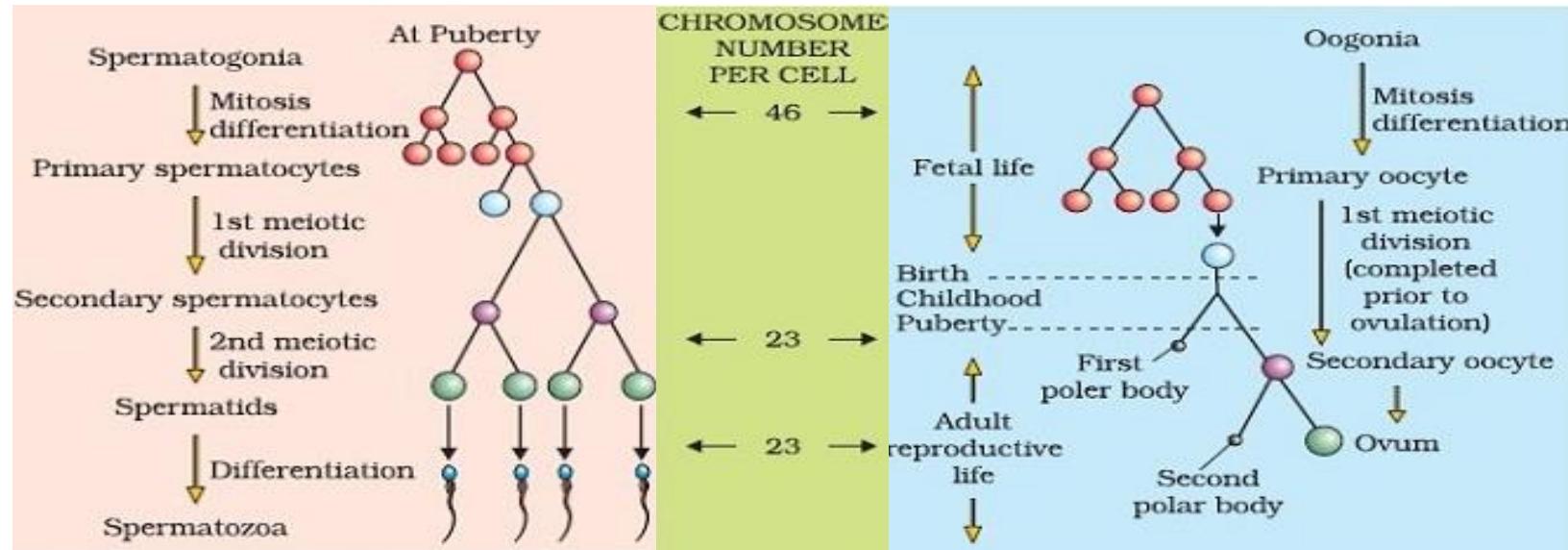
CORPUS LUTEUM



The series of changes that begins with the formation of an ovarian follicle and end with the degeneration of the corpus luteum constitutes ovarian cycle.

HUMAN REPRODUCTIVE SYSTEM

SPERMATOGENESIS AND OOGENESIS



Spermatogenesis

Oogenesis

HUMAN REPRODUCTIVE SYSTEM

REPRODUCTIVE PERIOD

10 to 14
years

- The formation of gametes takes place only during the reproductive period which begins at the age of puberty in an individual.
- In women the reproductive period ends between 45 and 50 years with the onset of menopause and in man it extends much longer.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. At the end of functional life, corpus luteum forms as a mass of fibrous tissue called as



- 1) Corpus albicans
- 2) Progesterone
- 3) Oestrogen
- 4) Graafian follicle

HUMAN REPRODUCTIVE SYSTEM



UNIT – V A

HUMAN

REPRODUCTIVE

SYSTEM

HUMAN REPRODUCTIVE SYSTEM

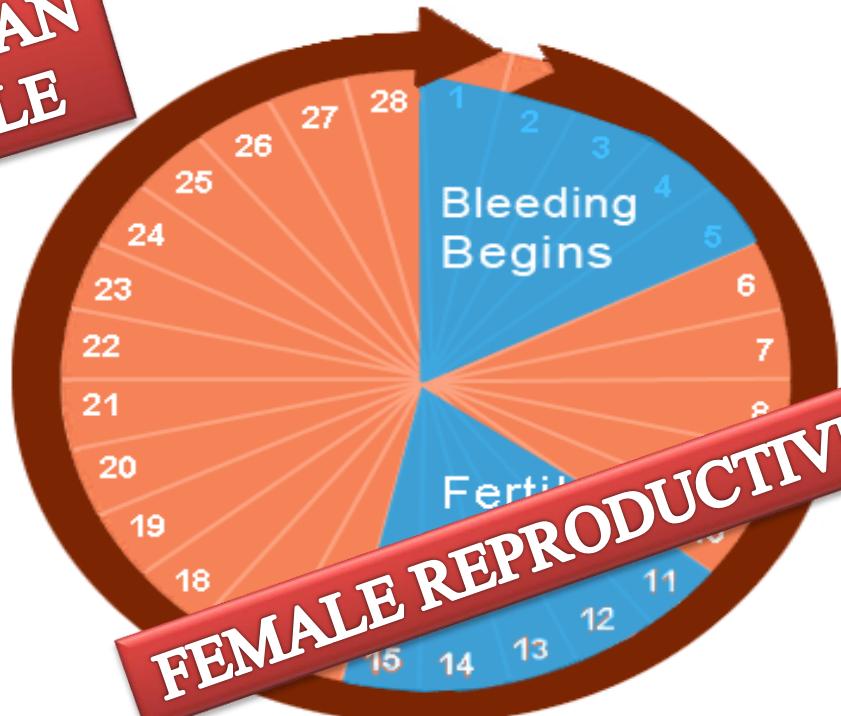
MENSTRUAL CYCLE

HUMAN REPRODUCTIVE SYSTEM

The Menstrual Cycle

OVARIAN CYCLE

FEMALE REPRODUCTIVE CYCLE



HUMAN REPRODUCTIVE SYSTEM

MENSTRUAL CYCLE

The reproductive cycle in the female primates (e.g. monkeys, apes and human beings) is called menstrual cycle

The term menstrual cycle is applied to cyclic changes that occur in the endometrium every month
(mensem:month).

In human females, menstruation is repeated at an average interval of about 28/ 29 days.

HUMAN REPRODUCTIVE SYSTEM

MENSTRUAL CYCLE

- ❖ The first menstruation begins at puberty and is called **menarche**.
- ❖ One ovum is released (ovulation) during the middle of each menstrual cycle.
- ❖ The major events of menstrual cycle are

➤ Menstrual phase

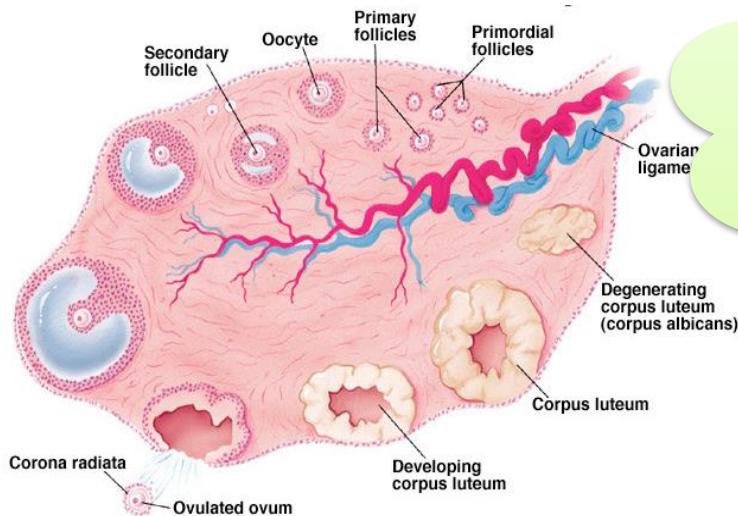
➤ Follicular phase

➤ Ovulatory phase

➤ Luteal phase

HUMAN REPRODUCTIVE SYSTEM

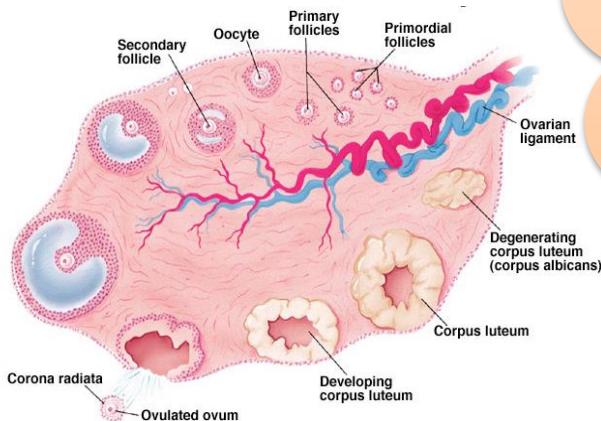
MENSTRUAL PHASE



The cycle starts with the menstrual phase (menstruation or menses), when menstrual flow occurs and it lasts for 3-5 days.

HUMAN REPRODUCTIVE SYSTEM

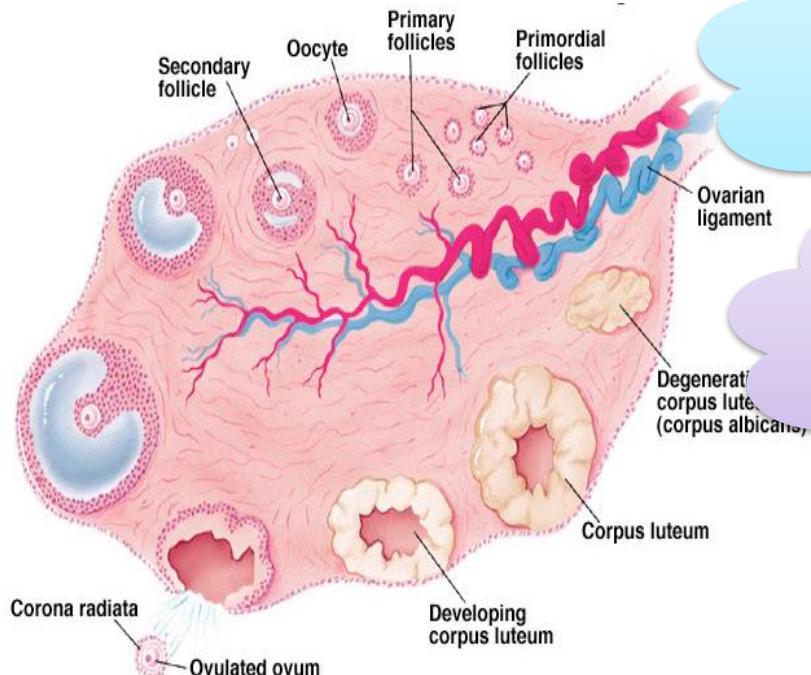
MENSTRUAL PHASE



The menstrual flow results due to the breakdown of endometrial lining of the uterus and its blood vessels which forms a fluid that comes out through the vagina.

HUMAN REPRODUCTIVE SYSTEM

MENSTRUAL PHASE

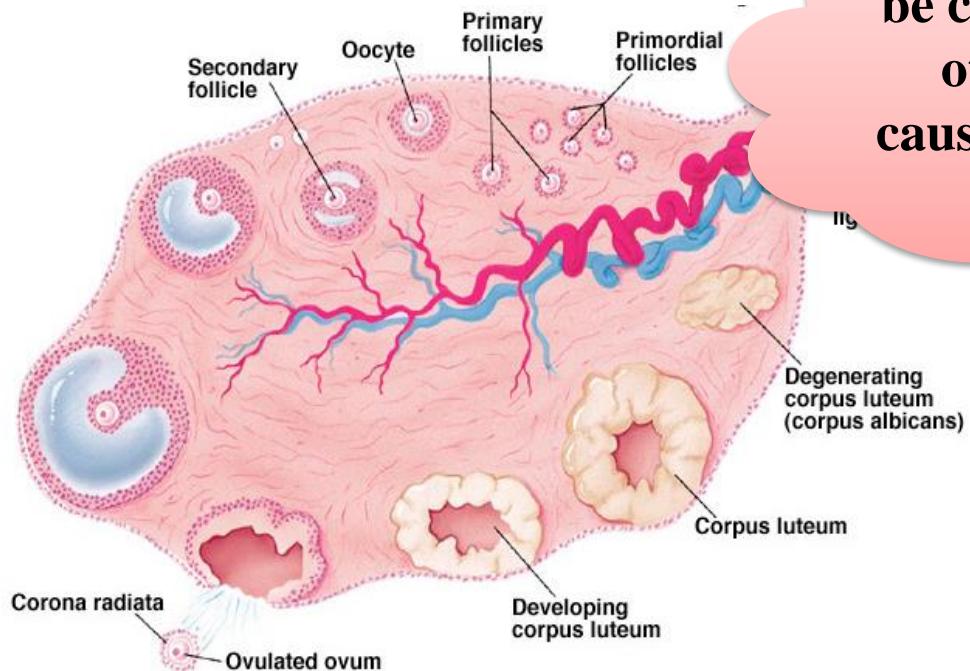


Menstruation occurs
only if the released
ovum is not fertilised.

Lack of
menstruation may
be indicative of
pregnancy.

HUMAN REPRODUCTIVE SYSTEM

MENSTRUAL PHASE

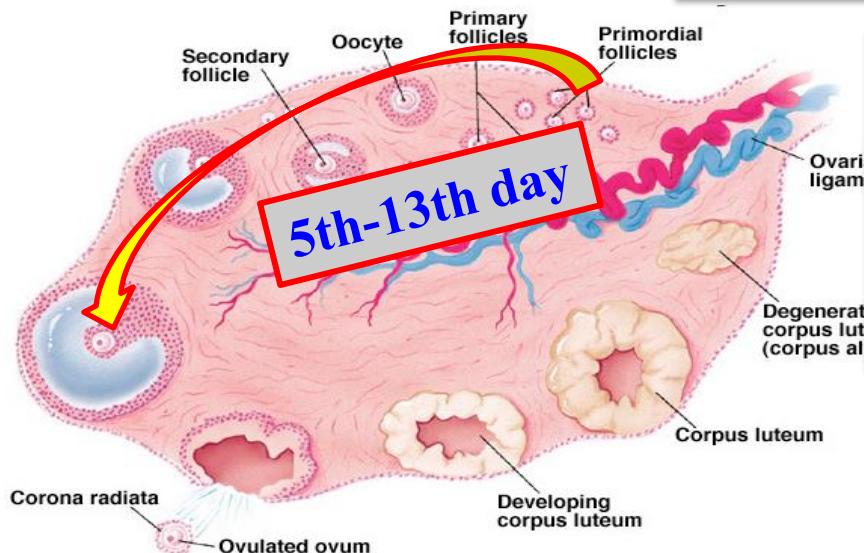


However, it may also be caused due to some other underlying causes like stress, poor health etc.

HUMAN REPRODUCTIVE SYSTEM

FOLLICULAR PHASE

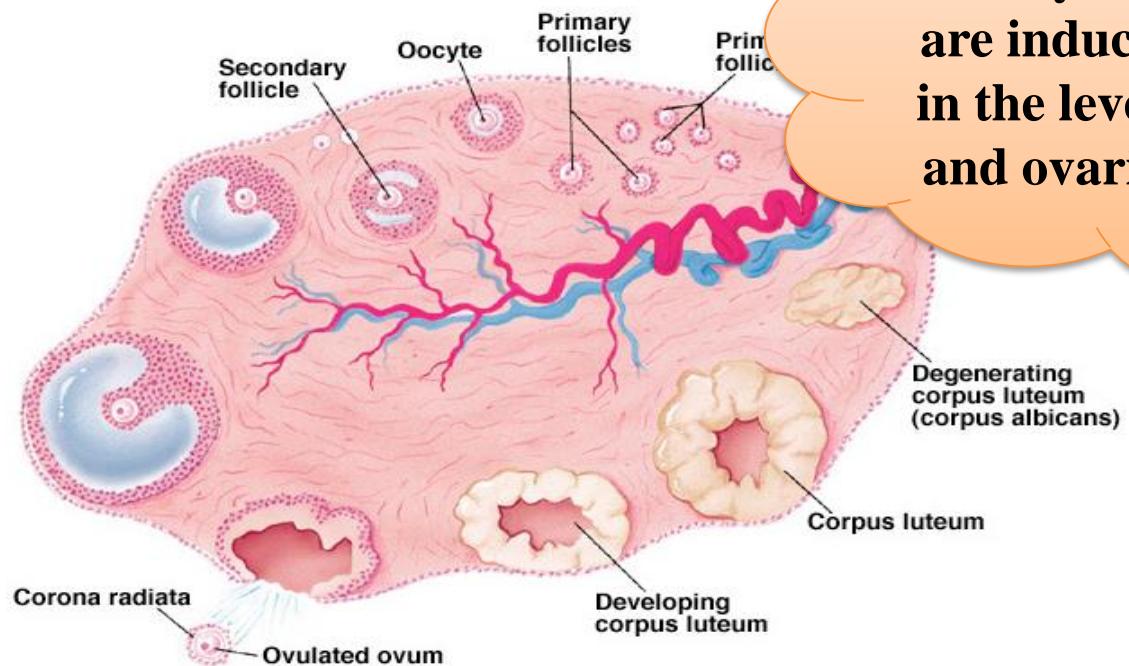
The primary follicles in the ovary grow to become a fully mature Graafian follicles during this phase.



Simultaneously, the endometrium of the uterus regenerates through proliferation.

HUMAN REPRODUCTIVE SYSTEM

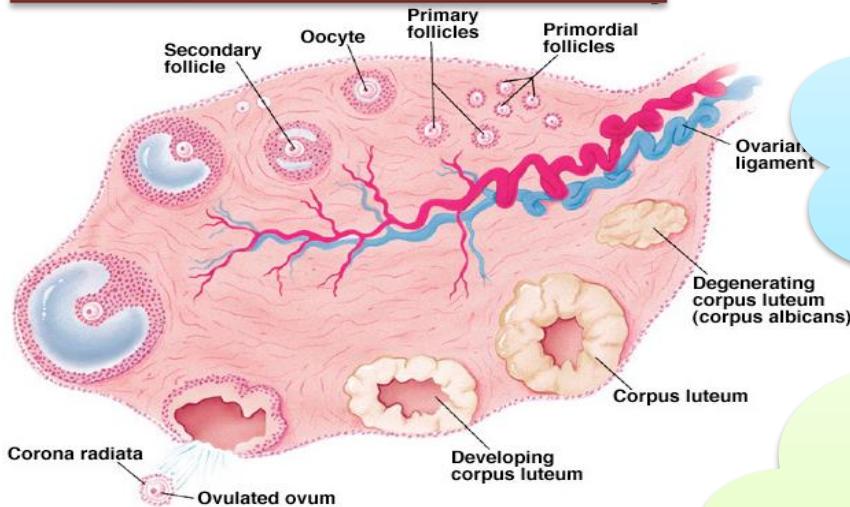
FOLLICULAR PHASE



These changes in the ovary and the uterus are induced by changes in the levels of pituitary and ovarian hormones.

HUMAN REPRODUCTIVE SYSTEM

FOLLICULAR PHASE

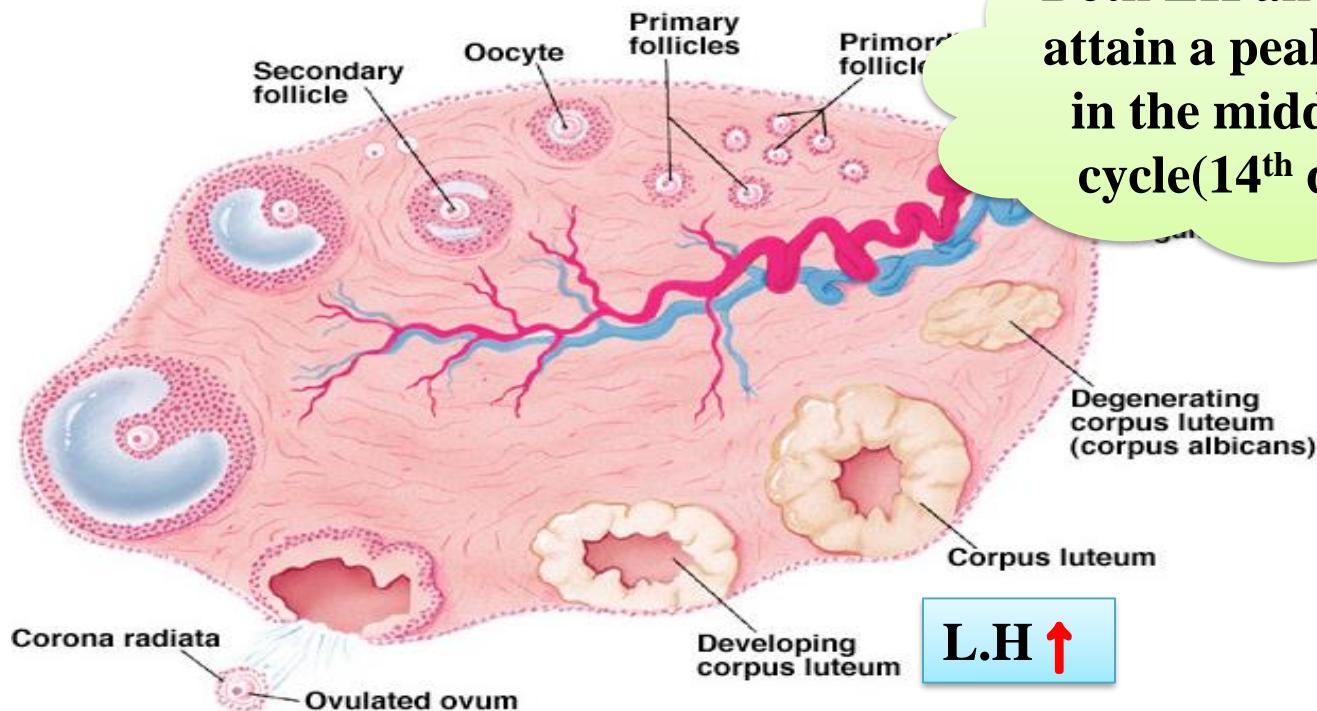


The secretion of gonadotropins (LH and FSH) increases towards the end of the follicular phase.

Gonadotropins in turn stimulates follicular development as well as secretion of estrogens by the growing follicles.

HUMAN REPRODUCTIVE SYSTEM

OVULATORY PHASE

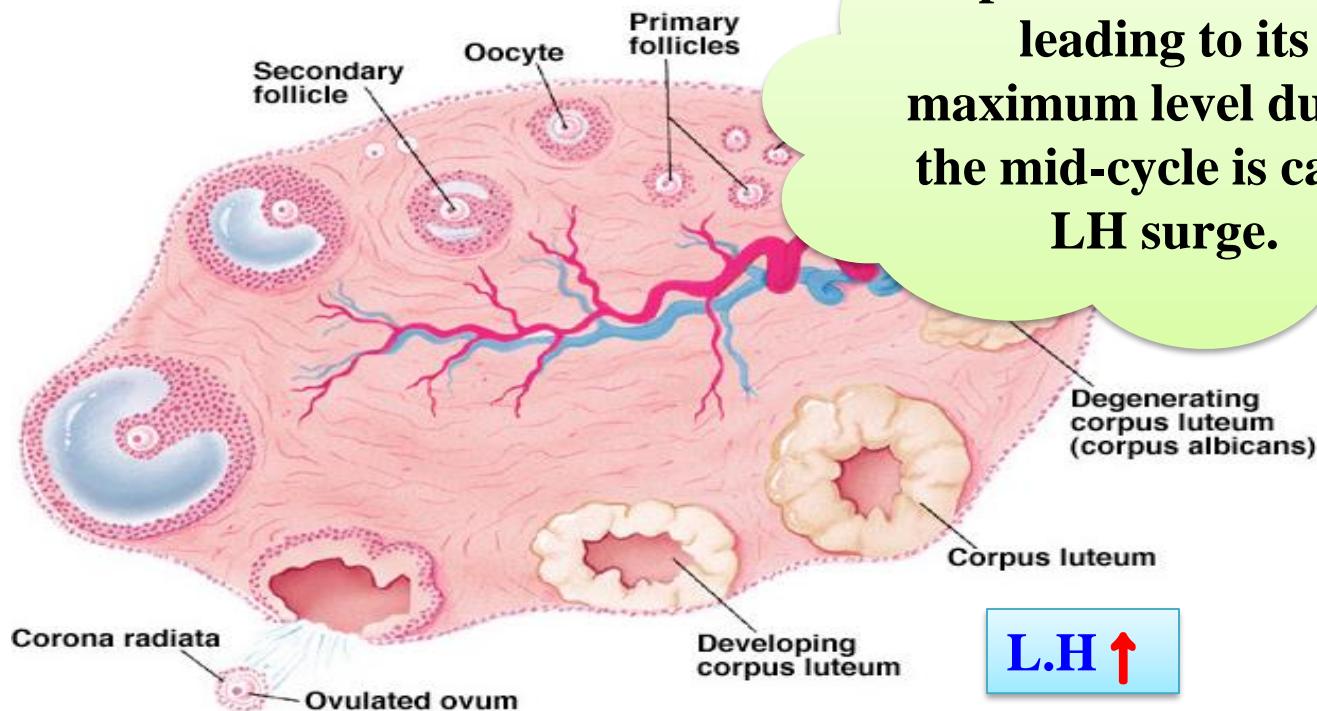


Both LH and FSH attain a peak level in the middle of cycle(14th day).

L.H ↑

HUMAN REPRODUCTIVE SYSTEM

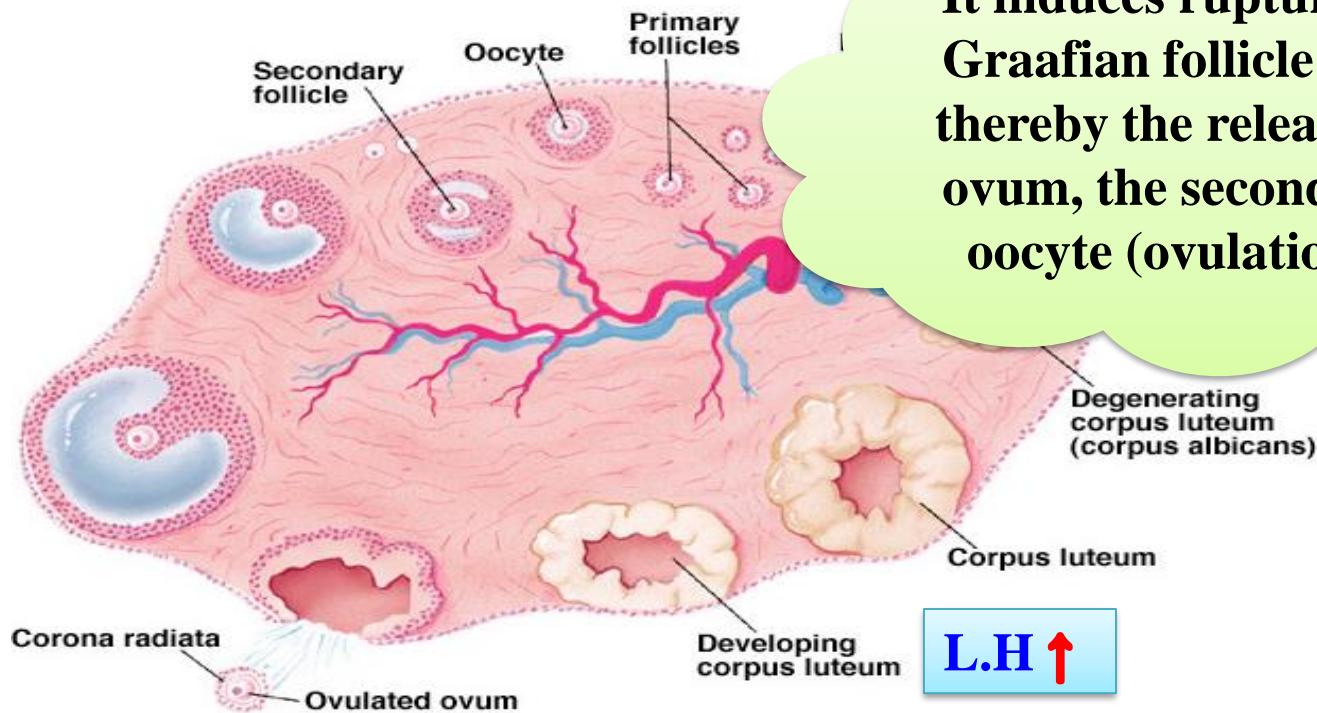
OVULATORY PHASE



Rapid secretion of LH leading to its maximum level during the mid-cycle is called LH surge.

HUMAN REPRODUCTIVE SYSTEM

OVULATORY PHASE

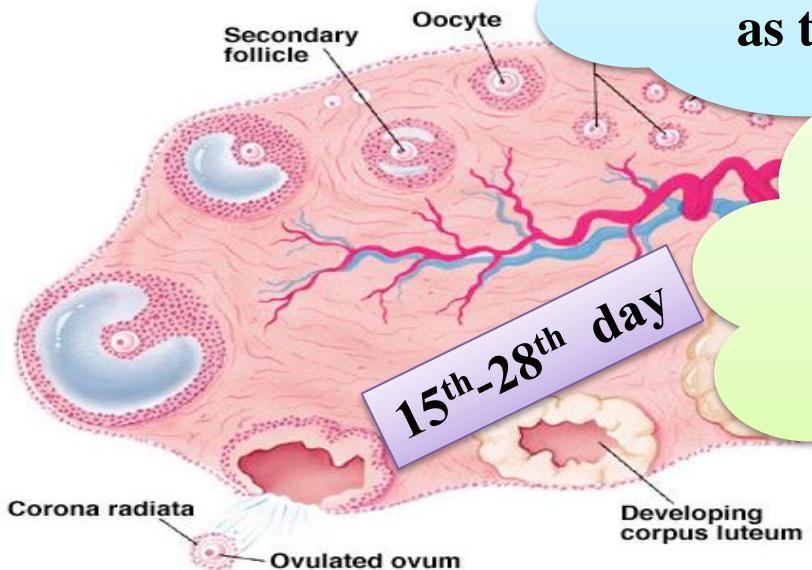


It induces rupture of Graafian follicle and thereby the release of ovum, the secondary oocyte (ovulation).

L.H ↑

HUMAN REPRODUCTIVE SYSTEM

LUTEAL PHASE

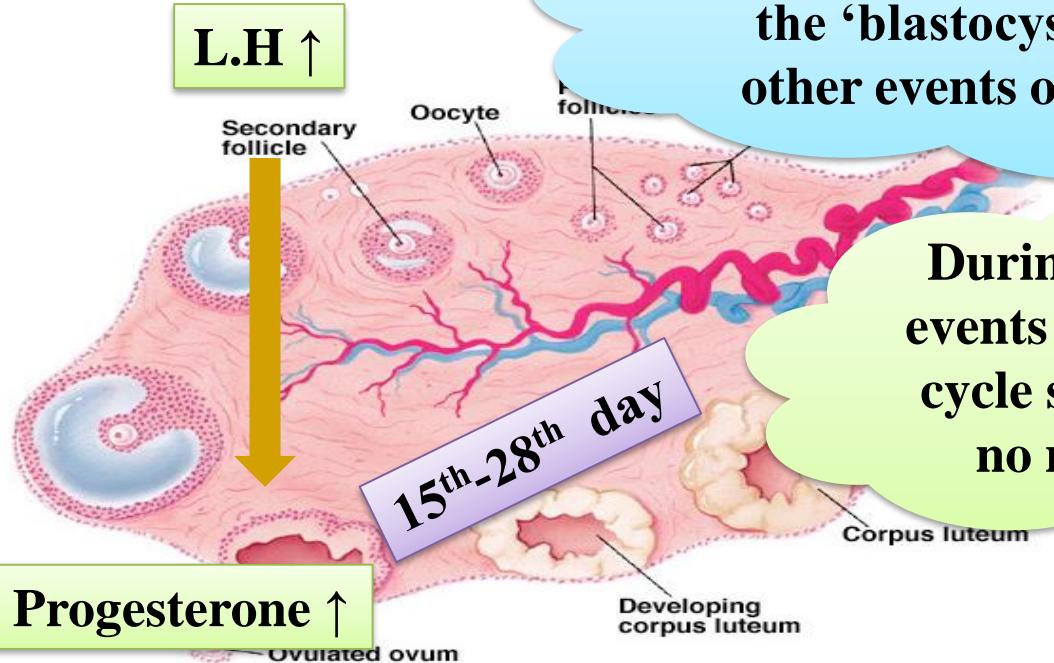


During luteal phase the remaining parts of the Graafian follicle transform as the corpus luteum.

The corpus luteum secretes large amounts of progesterone which is essential for maintenance of the uterine endometrium.

HUMAN REPRODUCTIVE SYSTEM

LUTEAL PHASE

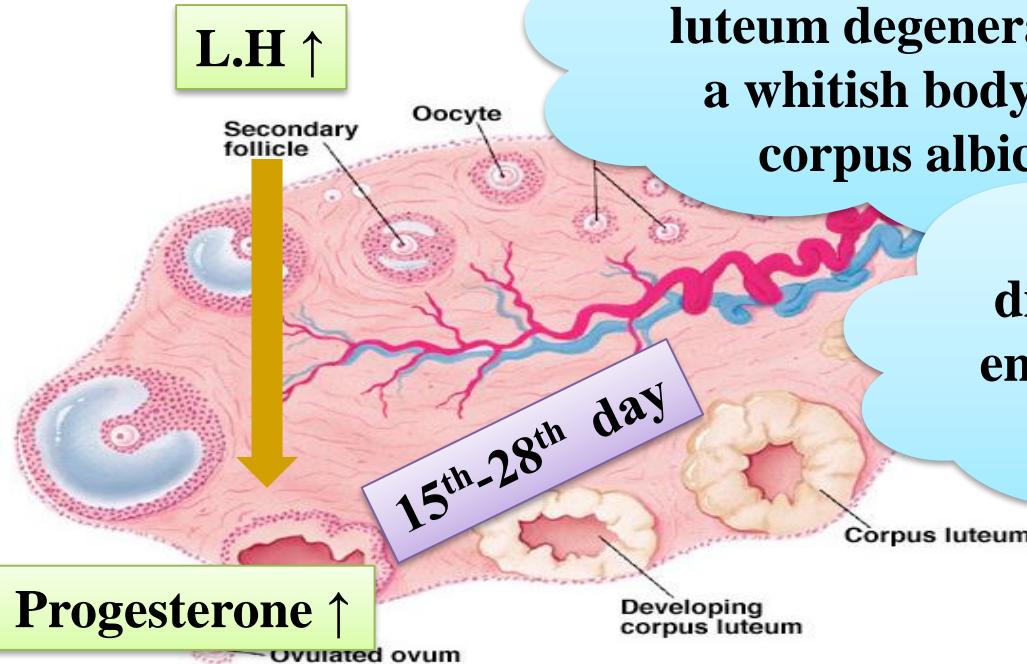


Such an endometrium is necessary for implantation of the 'blastocyst' stage and other events of pregnancy.

During pregnancy all events of the menstrual cycle stop and there is no menstruation.

HUMAN REPRODUCTIVE SYSTEM

LUTEAL PHASE

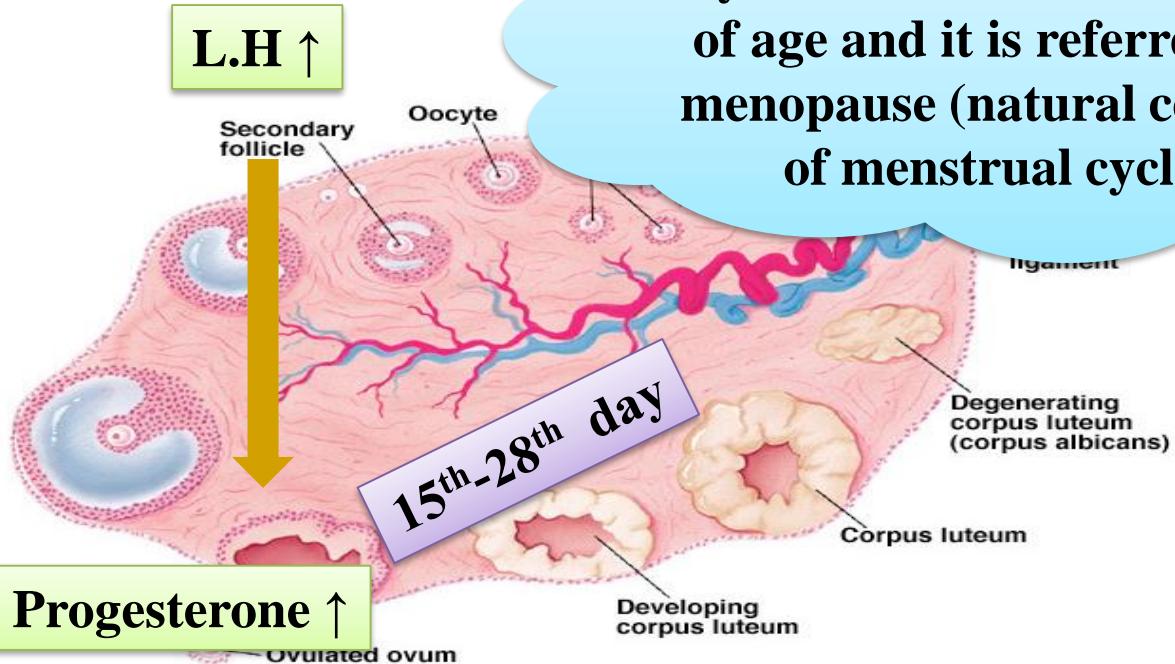


In the absence of fertilization, the corpus luteum degenerates into a whitish body called corpus albicans.

This causes disintegration of the endometrium leading to menstruation.

HUMAN REPRODUCTIVE SYSTEM

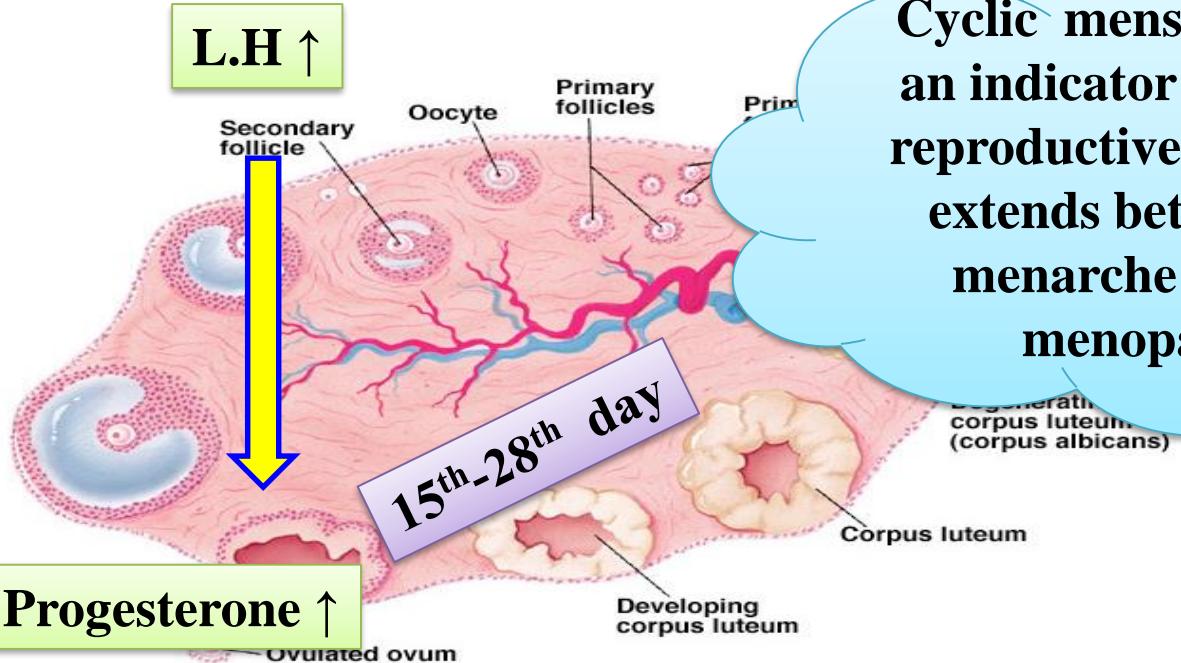
LUTEAL PHASE



In human beings, menstrual cycles cease around 50 years of age and it is referred to as menopause (natural cessation of menstrual cycles).

HUMAN REPRODUCTIVE SYSTEM

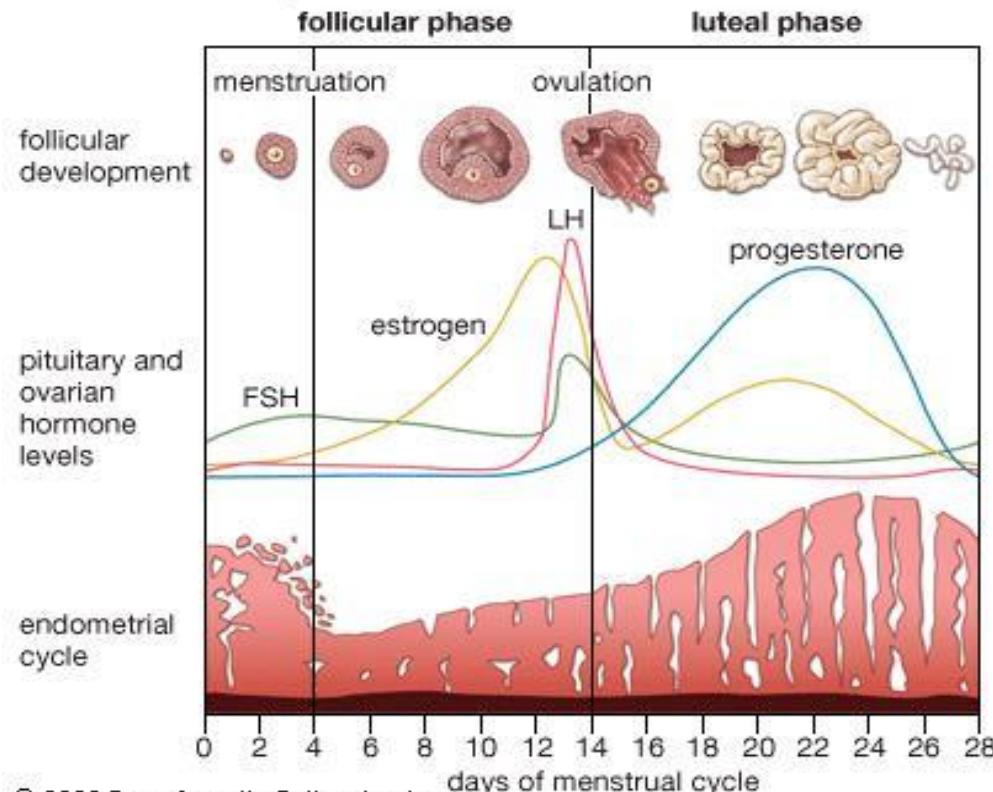
LUTEAL PHASE



Cyclic menstruation is an indicator of normal reproductive phase and extends between the menarche and the menopause.

HUMAN REPRODUCTIVE SYSTEM

The menstrual cycle



HUMAN REPRODUCTIVE SYSTEM

The first menstruation begins at puberty and is called Menarche.

Reproductive period of female

The permanent cessation of menstrual cycle is called MENOPAUSE.



HUMAN REPRODUCTIVE SYSTEM

MCQs

1. The first menstruation is called as

1) Menopause

2)  Menarche

3) Viropause

4) Andropause

HUMAN REPRODUCTIVE SYSTEM

2. During mid-cycle, the rapid secretion of LH results in



- 1) Ovulation
- 2) Development of oogonia
- 3) Development of secondary and tertiary follicles
- 4) Formation of polar bodies

HUMAN REPRODUCTIVE SYSTEM



UNIT – VA

HUMAN

REPRODUCTIVE

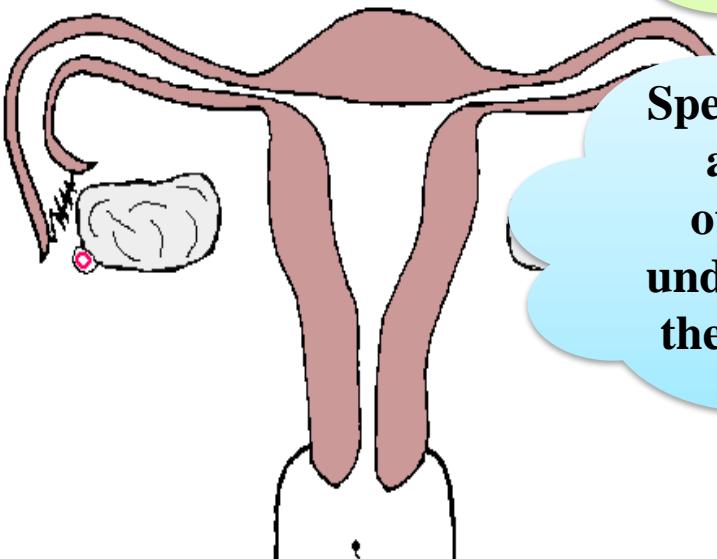
SYSTEM

HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION AND DEVELOPMENT

HUMAN REPRODUCTIVE SYSTEM

COPULATION

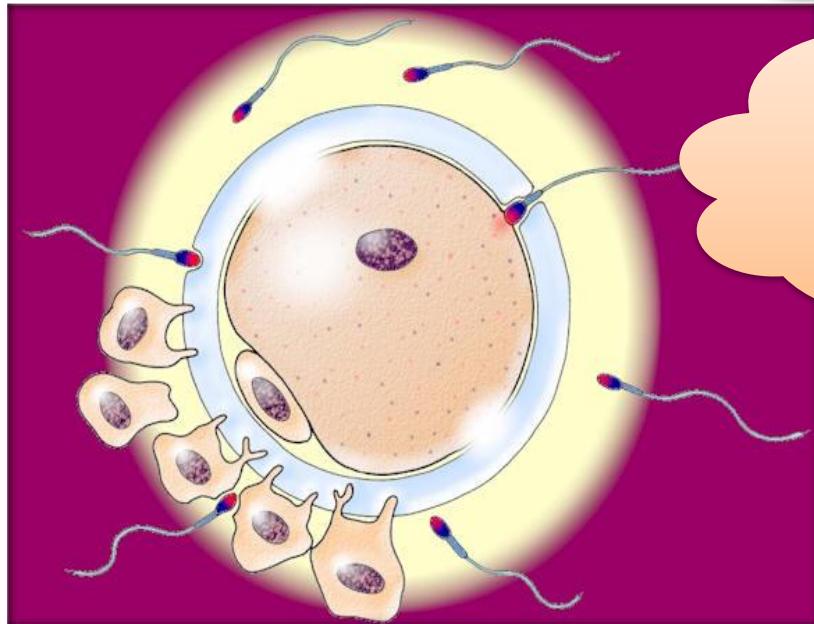


During copulation (coitus) semen is ejaculated through the penis into the vagina (insemination).

Spermatozoa acquire the ability to fertilize the ovum only after they undergo some changes in the female genital tract.

HUMAN REPRODUCTIVE SYSTEM

COPULATION



These changes are called capacitation.

The changes in the properties of the zona pellucida constitute the zona reaction.

HUMAN REPRODUCTIVE SYSTEM

Note

- Sperm capacitation refers to the physiological changes that the spermatozoa must undergo in order to penetrate and fertilize an egg.
- Changes take place in the membranes over the acrosome and enable release of lysosomal enzymes. This is called acrosome reaction.
- The acrosomal vesicle at the tip of the head fuses with the plasma membrane of the egg, releasing enzymes from the tip of the sperms.

HUMAN REPRODUCTIVE SYSTEM

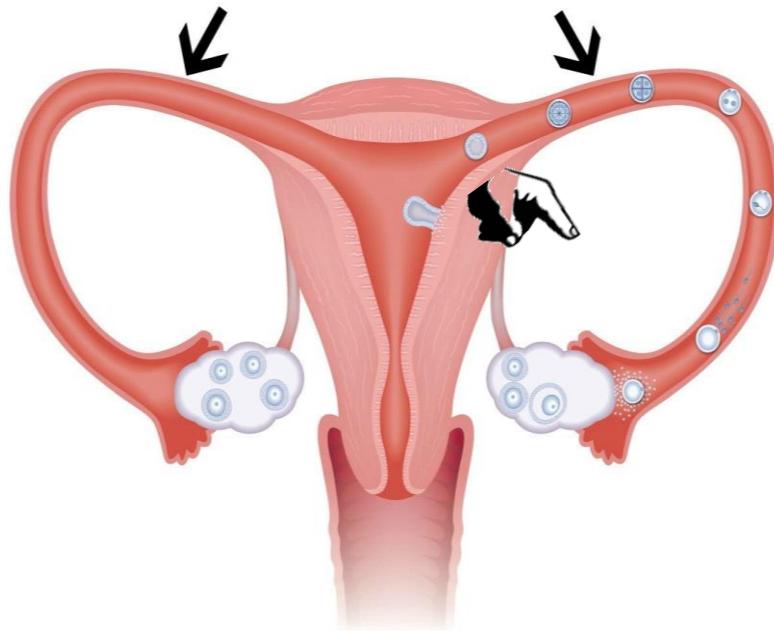
FERTILIZATION



Fertilization

HUMAN REPRODUCTIVE SYSTEM

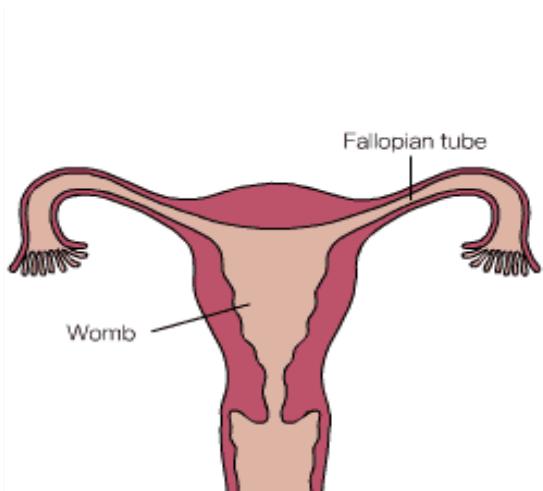
FERTILIZATION



HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION AND DEVELOPMENT

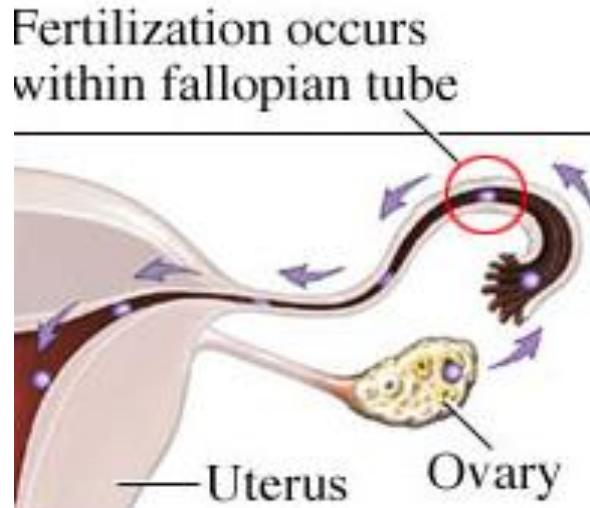
The motile sperms swim rapidly, pass through the cervix, enter the uterus and finally reach ampullary-isthmic junction of the fallopian tube.



HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION

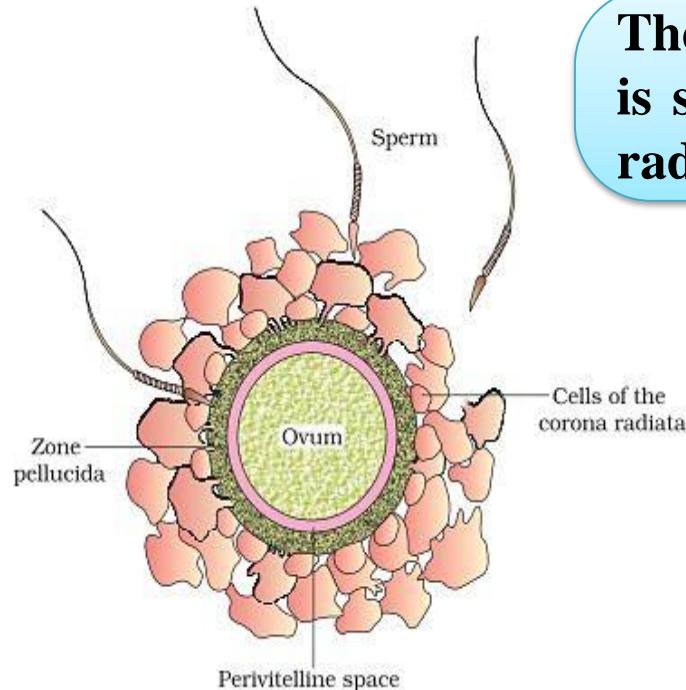
The ovum released by the ovary is also transported to the fallopian tube where fertilisation takes place.



conception
in humans

HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION

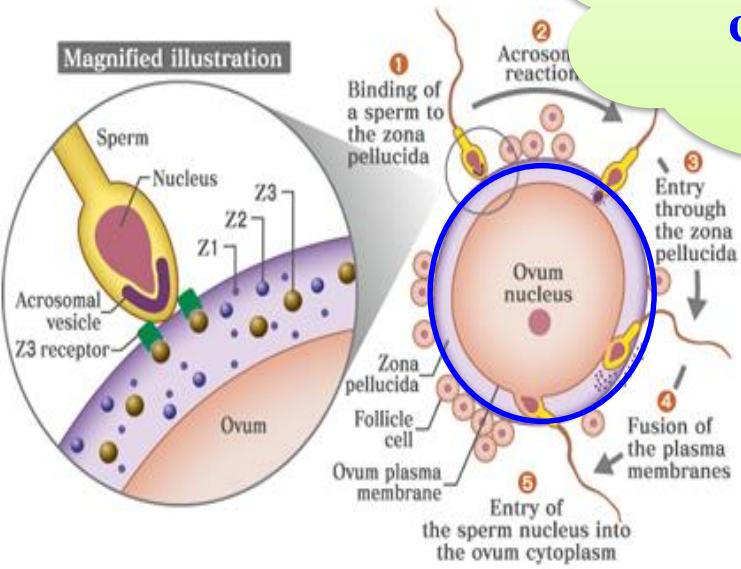


The oocyte-cumulus complex of the female is surrounded by a zona pellucida, corona radiata, and cumulus layer.

HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION

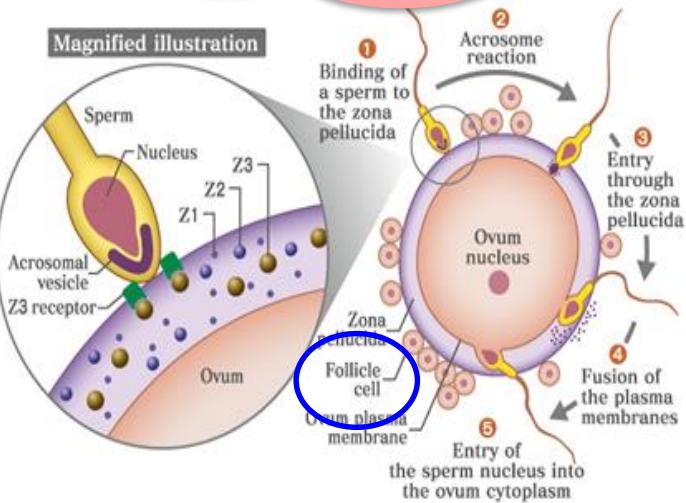
When a motile sperm reaches the ovum, it makes its way through **corona radiata** and **zona pellucida**.



HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION

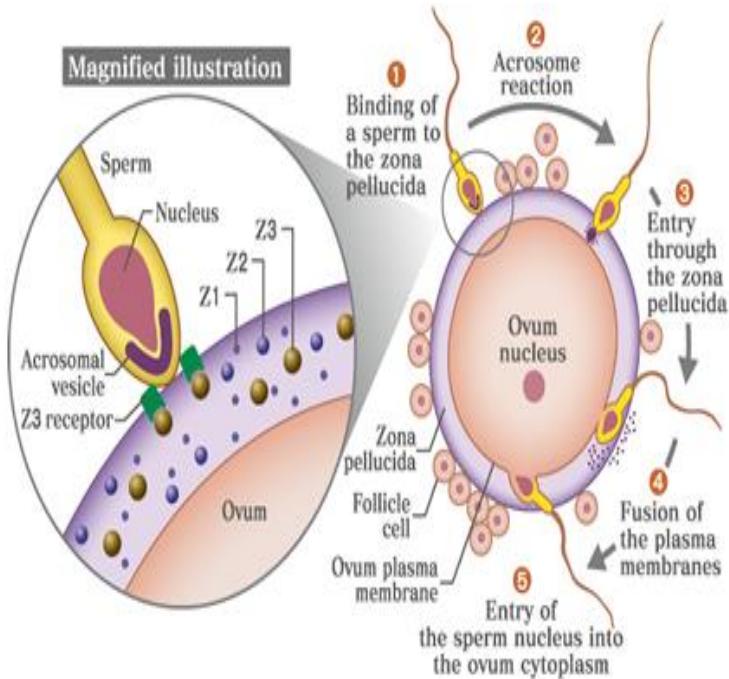
It also helps in penetrating through corona radiata.



In this process, the enzyme **hyaluronidase** released by the acrosome of a sperm helps in dissolving the **hyaluronic acid** in the ground substance of the follicle cells.

HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION

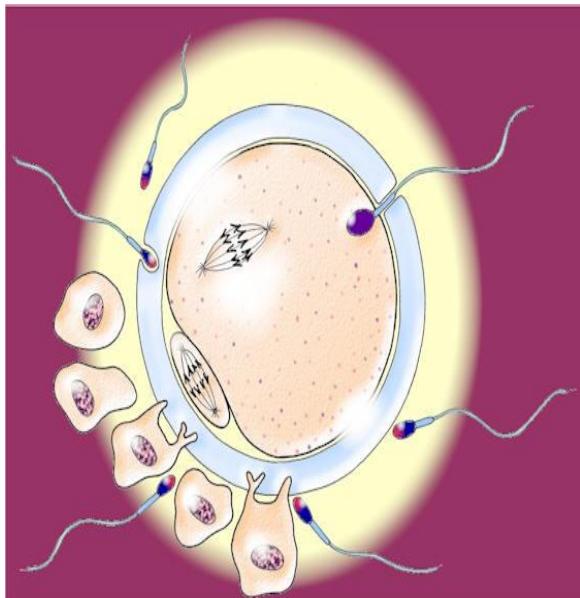


The enzyme acrosin is released from the acrosome as an effect of acrosome reaction.

It dissolves/digests the **zona pellucida** to facilitate penetration of the sperm.

HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION

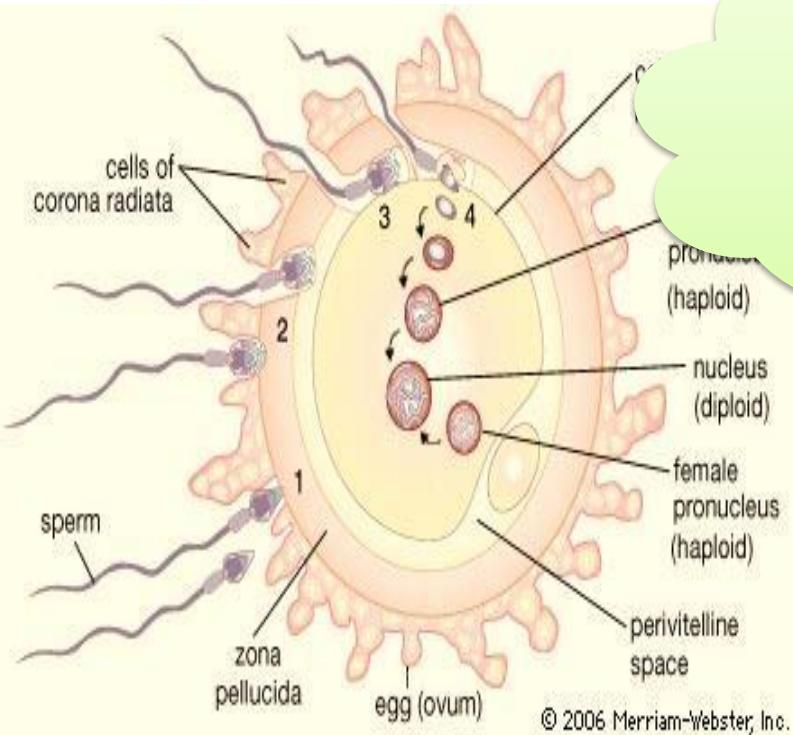


Though several sperms penetrate through the zona pellucida into the perivitalline space, only one sperm enters the ovum.



HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION

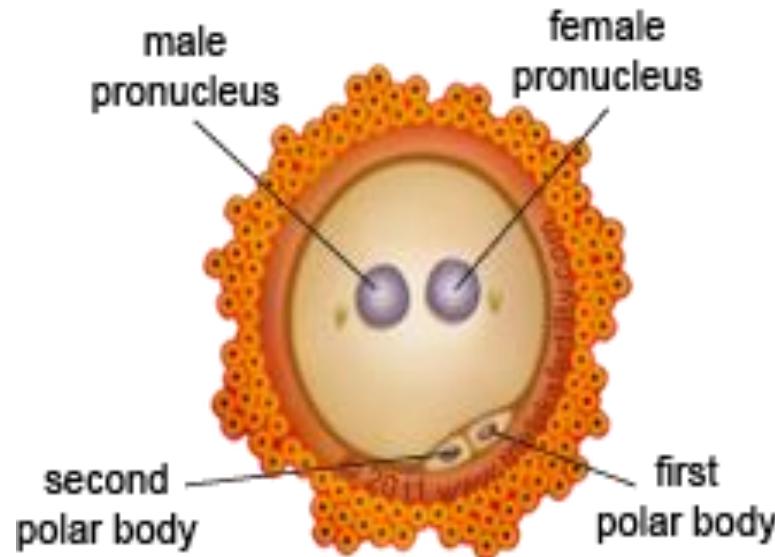


The entry of sperm induces the completion of the **meiosis-II** of the secondary oocyte (ovum).

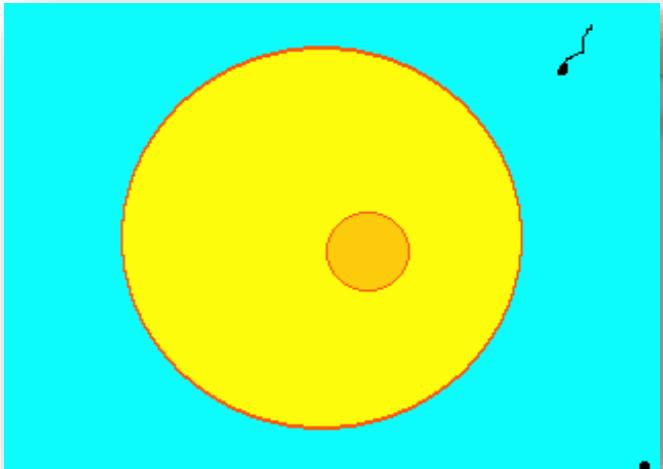
HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION

- The second meiotic division is also unequal and results in the formation of a **second polar body** and an **ovum (ootid)**.



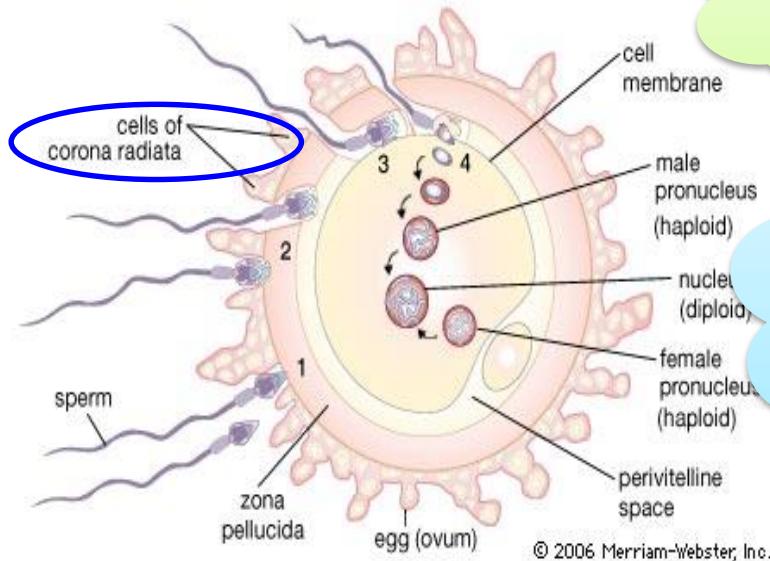
HUMAN REPRODUCTIVE SYSTEM



The fusion of
gametes is called
syngamy or
amphimixis.

HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION



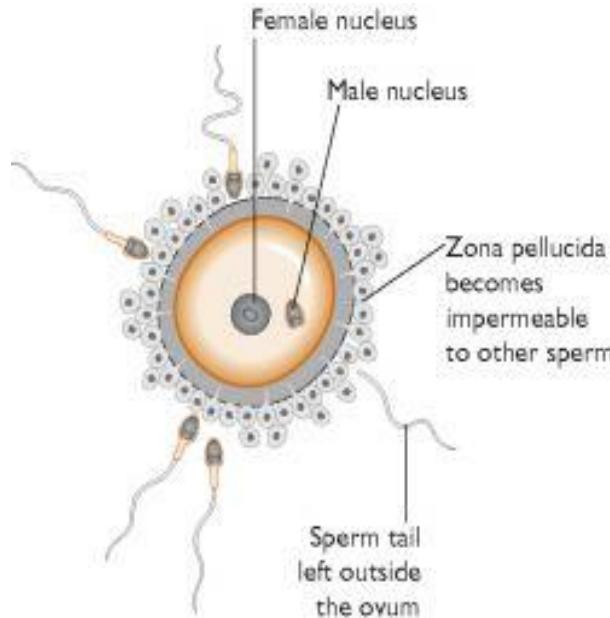
Corona radiata
disappears after
fertilisation.

The nuclear union
results in the
formation of
**synkaryon (zygotic
nucleus).**

HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION

The entry of sperm causes release of calcium which blocks the entry of other sperms.



A parallel reaction is the 'zonal reaction'.

HUMAN REPRODUCTIVE SYSTEM

NOTE

- ❖ One has to remember that the sex of the baby has been decided at the time of fertilization itself.



Let us see
how ??

- ❖ As you know the chromosome pattern in the human female is XX and that in the male is XY.

HUMAN REPRODUCTIVE SYSTEM

NOTE

- ❖ Therefore, all the haploid gametes produced by the female (ova) have the sex X, whereas the male gametes (sperms) have either X chromosome or Y chromosome (50 percent of sperms carry the X chromosome while the other 50 percent carry the Y chromosome).

- ❖ After fusion of the male and female gametes the zygote would carry either XX or XY depending on what type of sperm fertilised the ovum.

HUMAN REPRODUCTIVE SYSTEM

NOTE

- ❖ The zygote carrying 'XX' would develop into a female child and that with 'XY' would form a male child.
- ❖ So, the sex of a child depends on the male parent (heterogametic parent).

HUMAN REPRODUCTIVE SYSTEM

1. Releasing of semen into vagina during coitus is

MCQs

- 1) Spermiation
- 2) Spermiogenesis
- 3) Insemination
- 4) Both 1 & 2

HUMAN REPRODUCTIVE SYSTEM

2. In humans, female fertilization takes place in

1) Ampulla

2) Isthmus



3) Ampullary- Isthmus junction

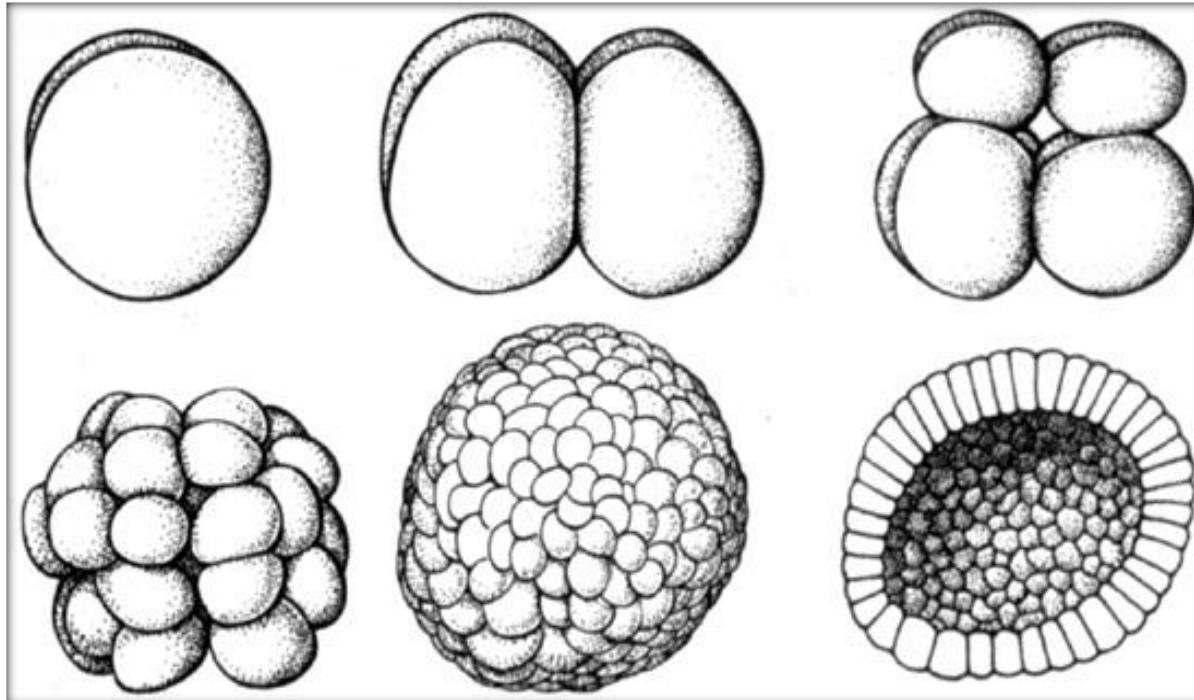
4) Uterus

HUMAN REPRODUCTIVE SYSTEM

CLEAVAGE

HUMAN REPRODUCTIVE SYSTEM

CLEAVAGE



HUMAN REPRODUCTIVE SYSTEM

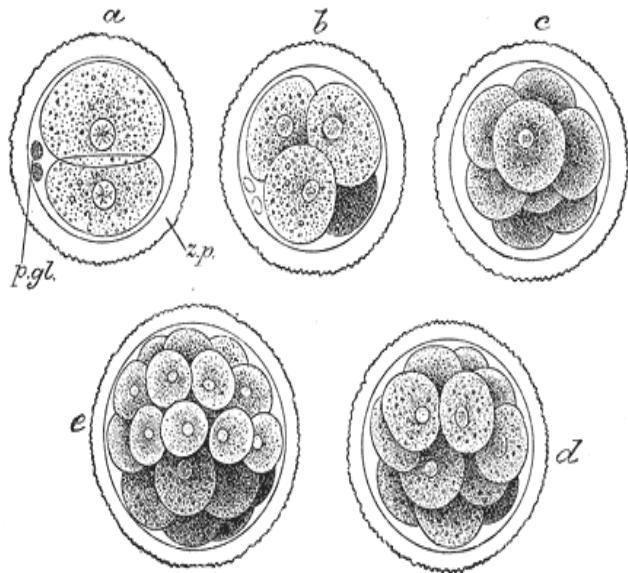
CLEAVAGES

Human embryology is the study of human development during the first eight weeks after fertilization.

From the beginning of the 9th week, the developing young one is called foetus.

HUMAN REPRODUCTIVE SYSTEM

CLEAVAGE



- The type of cleavage is holoblastic, because of the microlecithal condition of egg, and indeterminate.
- The first division (cleavage) occurs at about 36 hours after fertilization.
- The blastomeres are equal in size.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Cleavage in human zygote is



- 1) Holoblastic, radial and indeterminate
- 2) Holoblastic, spiral and indeterminate
- 3) Holoblastic, radial and determinate
- 4) Holoblastic, spiral and determinate

HUMAN REPRODUCTIVE SYSTEM

MORULA

HUMAN REPRODUCTIVE SYSTEM

MORULA

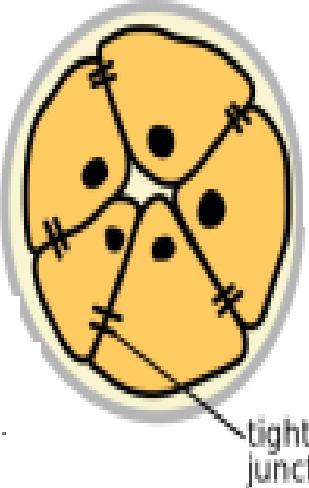
When the number of blastomeres is 16-32, the solid ball of cells is called morula.



It looks like a
'mulberry'.

HUMAN REPRODUCTIVE SYSTEM

MORULA



Compaction

At this stage the cells start to bind firmly together and this process is called compaction.

The cells of the morula become bound tightly together and the outer surface of blastomeres 'flatten' against each other.

HUMAN REPRODUCTIVE SYSTEM

MORULA

- This tightly packed arrangement is stabilized by ‘tight junctions’ that forms between the outer cells of the morula.

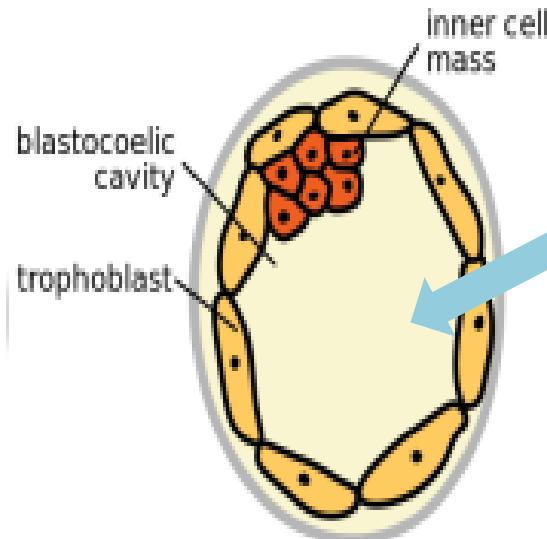
- The cells within the sphere form ‘gap junctions’, which help in better passage of substances between them.

- The tiny embryo is still surrounded by zona pellucida.

HUMAN REPRODUCTIVE SYSTEM

MORULA

- ❖ At the completion of cleavage/ blastulation, the embryo has a central cavity called ‘blastocoel’.

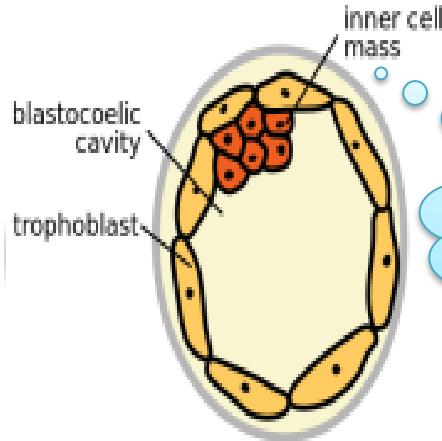


The process of formation of blastocoel is called cavitation.

HUMAN REPRODUCTIVE SYSTEM

MORULA

- ❖ Now, the embryo has a superficial flat cell layer and an ‘inner cell mass’.



Inner cell
mass.

The superficial cell layer on the exterior of this early embryo develops into the trophoblast or trophectoderm (the outer epithelium of the blastocyst).

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Embryo with 8-16 blastomeres is called

-  1) Morula
- 2) Blastula
- 3) Early gastrula
- 4) Late gastrula

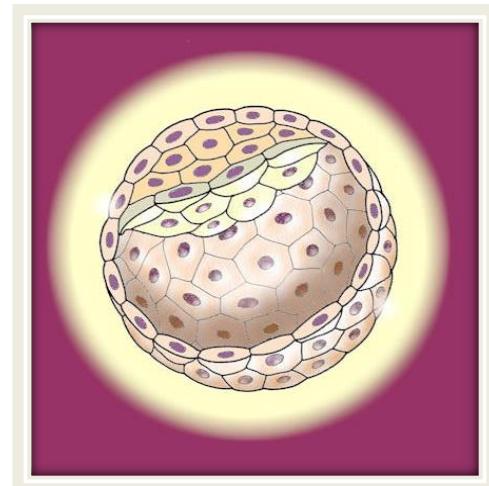
HUMAN REPRODUCTIVE SYSTEM

BLASTOCYST

HUMAN REPRODUCTIVE SYSTEM

Blastocyst

- ❖ Some fluid is secreted into blastocoel (the cavity of embryo).
- ❖ As the quantity of the fluid increases, the embryo acquires the shape of a ‘cyst’.



HUMAN REPRODUCTIVE SYSTEM

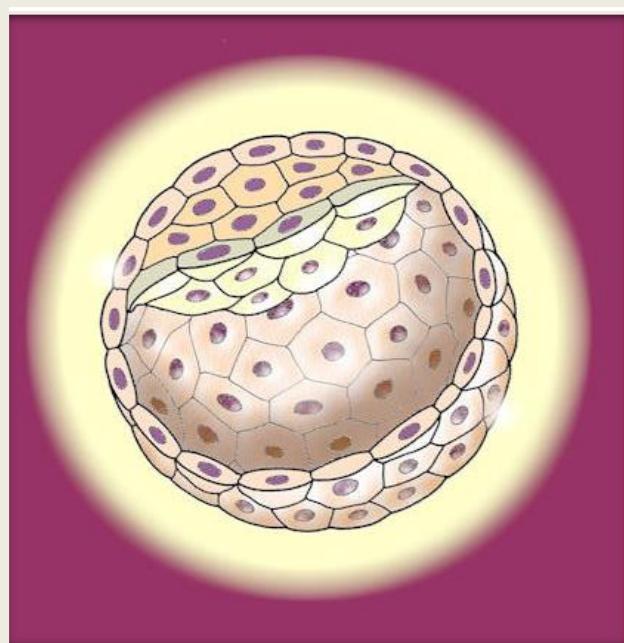
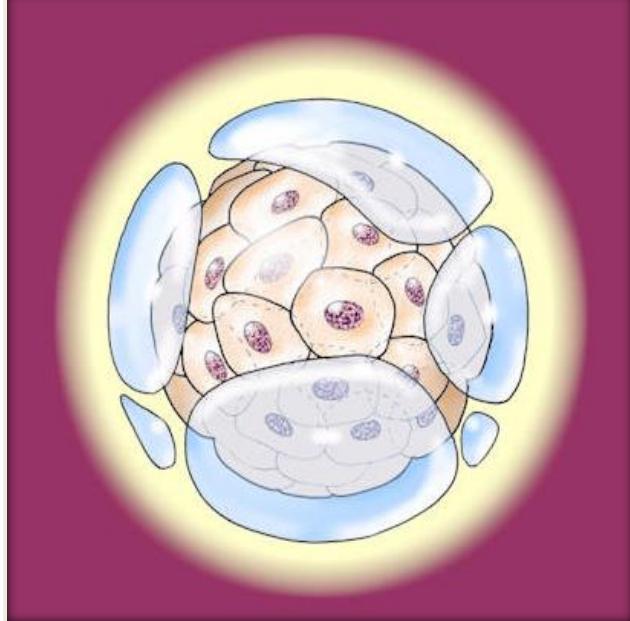
Blastocyst

- ❖ The ‘inner cell mass / ‘formative cells’, give rise to the ‘embryo proper’ and some fetal membranes.
- ❖ They are the source of all the pluripotent ‘embryonic stem cell lines’.
- ❖ In addition to the embryo proper, the inner cell mass gives rise to the extra-embryonic membranes also.
- ❖ The **blastocyst** is formed while the early embryo passes through the fallopian tube.

hence
constitute the
‘embryoblast’.

HUMAN REPRODUCTIVE SYSTEM

BLASTULA / BLASTOCYST



HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Blastocyst attaches to of the uterus.

- 1) Myometrium**
- 2) Perimetrium**
- 3) Endometrium**
- 4) Both 1 & 2**



HUMAN REPRODUCTIVE SYSTEM



UNIT – VA

HUMAN

REPRODUCTIVE

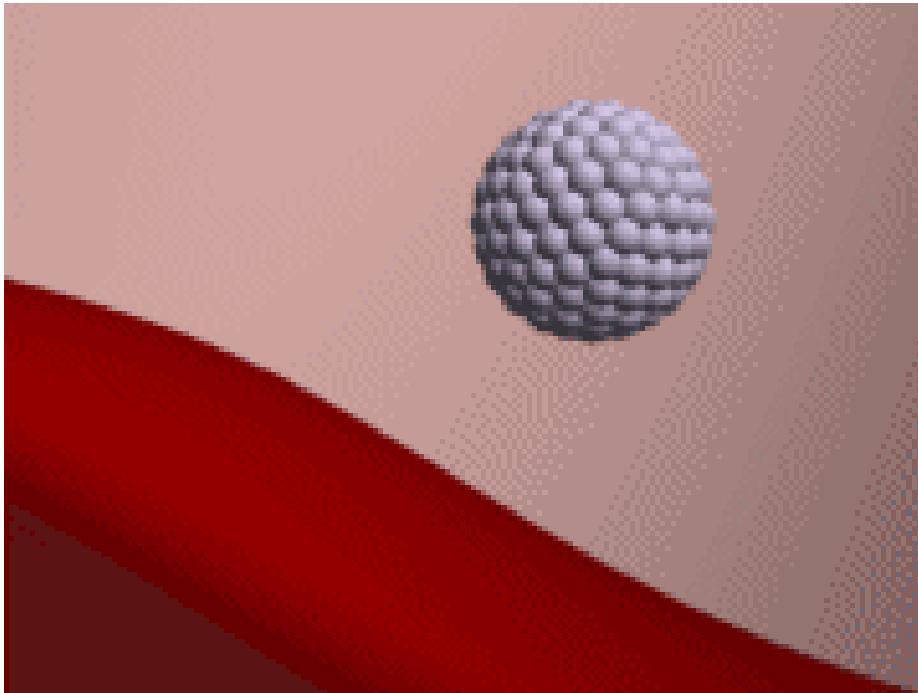
SYSTEM

HUMAN REPRODUCTIVE SYSTEM

IMPLANTATION

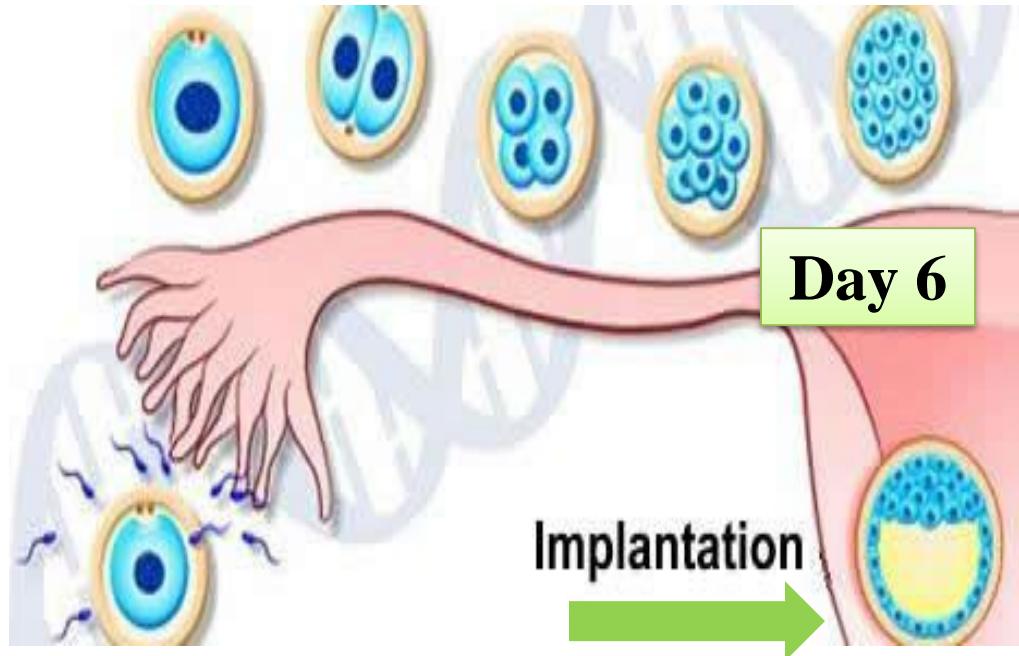
HUMAN REPRODUCTIVE SYSTEM

IMPLANTATION



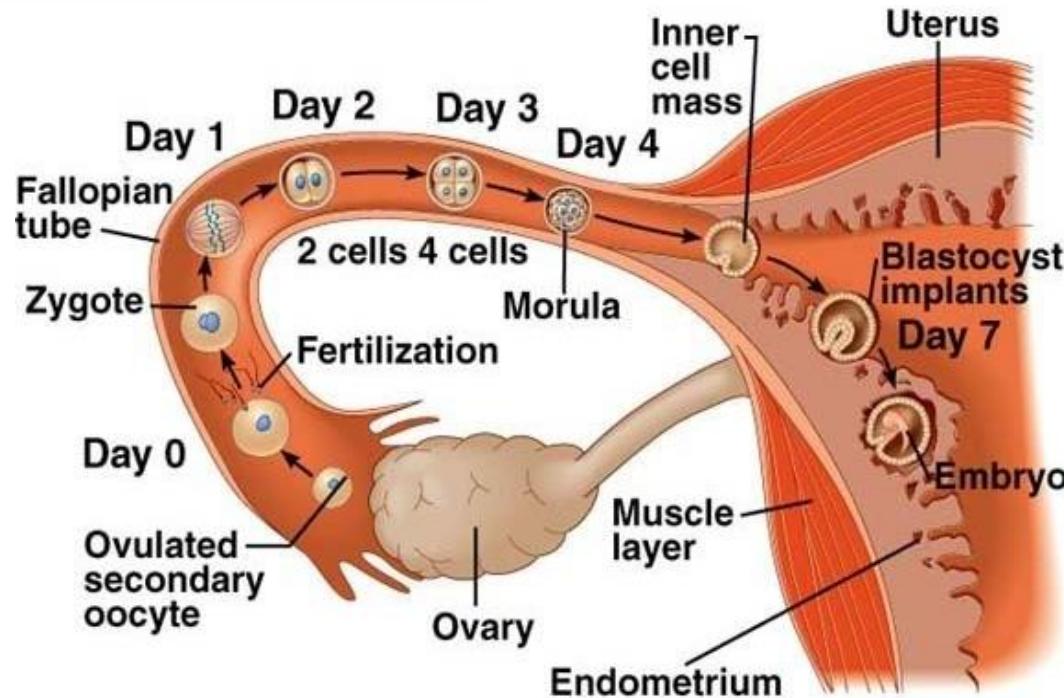
HUMAN REPRODUCTIVE SYSTEM

IMPLANTATION



HUMAN REPRODUCTIVE SYSTEM

IMPLANTATION

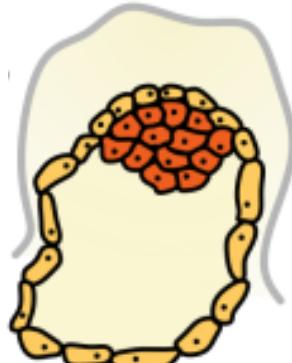


HUMAN REPRODUCTIVE SYSTEM

IMPLANTATION

The blastocyst ‘hatches’ out / comes out of the envelope, the zona pellucida, by lysing its wall with the help of the enzyme called

Strypsin

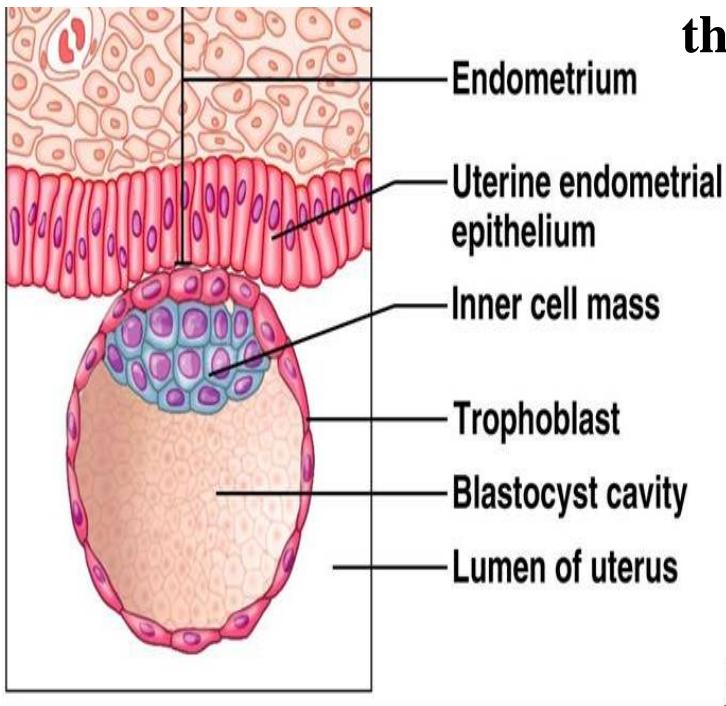


Day 6: Zona hatching

Later the cells of the zona pellucida gradually disappear.

HUMAN REPRODUCTIVE SYSTEM

IMPLANTATION

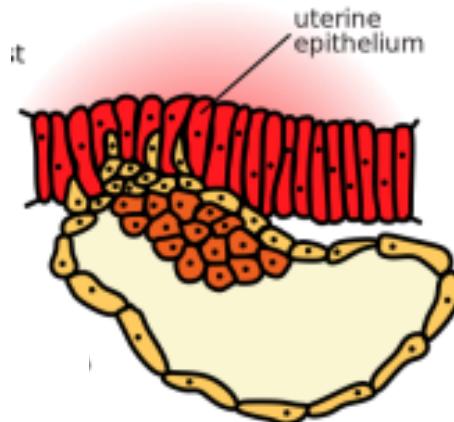


- ❖ The cells of the trophoblast stick to the uterine endometrium and form a part of the ‘foetal part’ of the ‘placenta’ later.
- ❖ The trophoblast invades the endometrium of the uterus.
- ❖ The process of implantation begins on the 6th day after fertilization.
- ❖ The process of implantation is aided by proteolytic enzymes produced by the cells of trophoblast.

HUMAN REPRODUCTIVE SYSTEM

IMPLANTATION

- ❖ The trophoblast thickens through cell division.
- ❖ Now, the wall of the trophoblast develops villi ('trophoblastic villi) that branch and project into the highly vascular uterine endometrium.



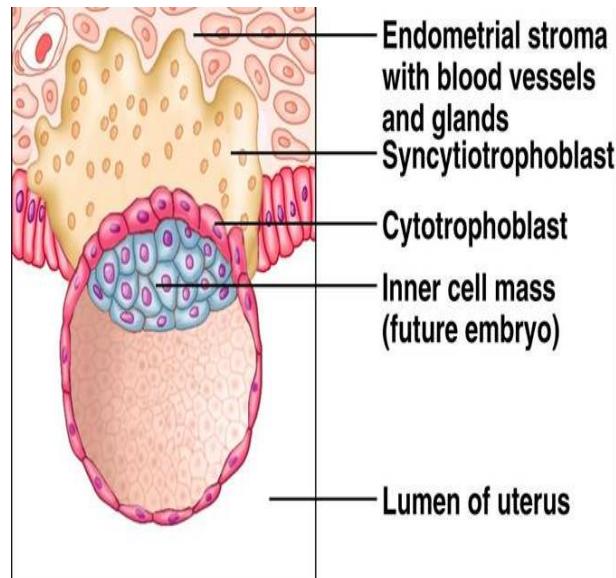
To draw
'nourishment'
for the embryo.

HUMAN REPRODUCTIVE SYSTEM

IMPLANTATION

❖ The trophoblast differentiates into

(i) An inner cellular layer called ‘cyto-trophoblast’



or

‘Layer of Langhans’ made
of **cuboidal epithelial cells**,

(ii) Outer ‘Syncytio-trophoblast’

The embryo along with its
membranes is called **conceptus**.

Cellular
trophoblast
a layer of
fused cells

HUMAN REPRODUCTIVE SYSTEM

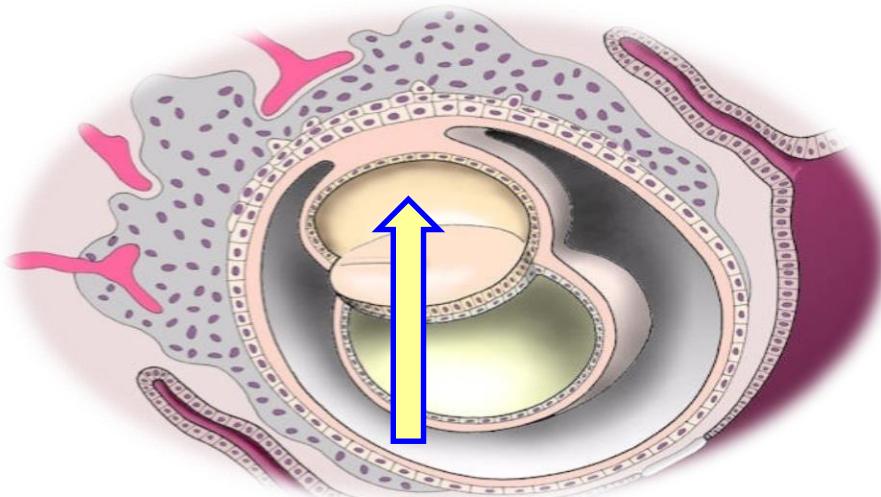
1. The strong attachment of blastocyst to endometrium is called
- MCQs
- 1) Parturition
 - 2) Compaction
 - 3) Delamination
 - 4) Implantation
- 

HUMAN REPRODUCTIVE SYSTEM

FORMATION OF BILAMINAR EMBRYONIC DISC

HUMAN REPRODUCTIVE SYSTEM

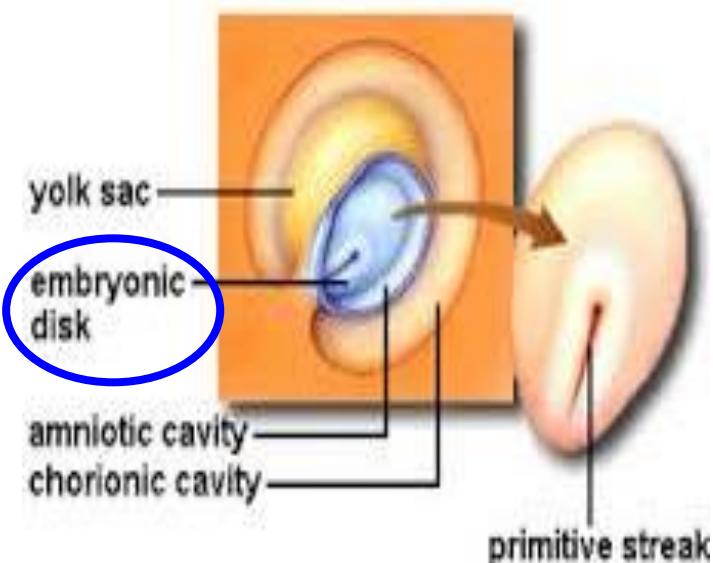
FORMATION OF BILAMINAR EMBRYONIC DISC



HUMAN REPRODUCTIVE SYSTEM

FORMATION OF BILAMINAR EMBRYONIC DISC

- Implantation of the **blastocyst** is completed by the end of the second week.

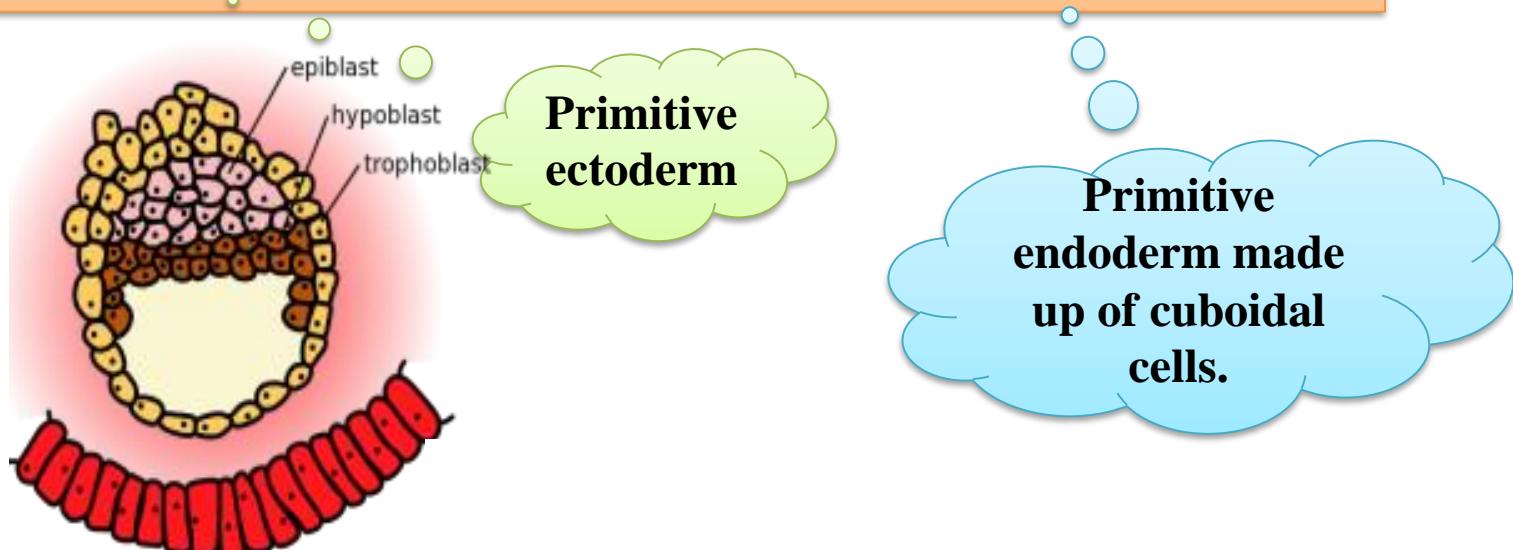


The inner cell mass forms into a disc called embryonic disc or germinal disc.

HUMAN REPRODUCTIVE SYSTEM

FORMATION OF BILAMINAR EMBRYONIC DISC

The embryonic disc has an outer group of cells called the 'EPIBLAST' and inner layer of cells, the 'HYPOBLAST'.



HUMAN REPRODUCTIVE SYSTEM

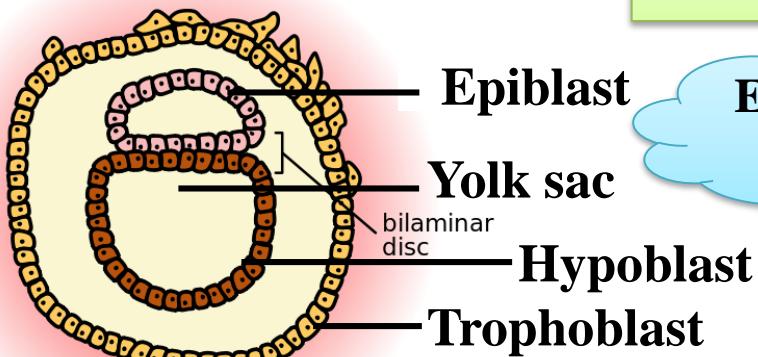
FORMATION OF BILAMINAR EMBRYONIC DISC

- ❖ The hypoblast lines surface facing the blastocyst cavity.
- ❖ It is the future extra embryonic endoderm.

Delamination

Bilaminar disc formation

The hypoblast is pushed down and it forms the lining of the ‘yolk sac’.

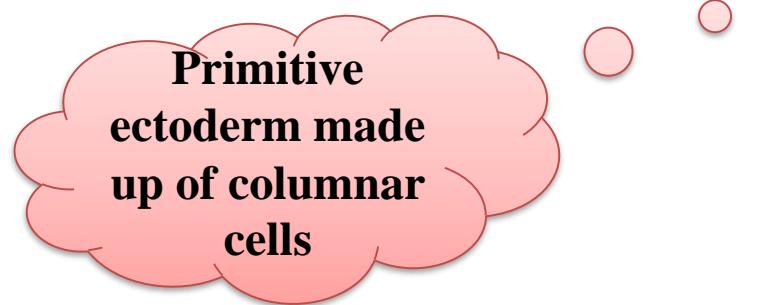


Exocoelomic cavity

HUMAN REPRODUCTIVE SYSTEM

FORMATION OF BILAMINAR EMBRYONIC DISC

- ❖ The remaining part of the embryonic disc is called the epiblast.



- ❖ Now, the embryonic disc is called bilaminar embryonic disc.
- ❖ Further development involves 'gastrulation'.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Bilaminar embryonic disc consists of



- 1) Epiblast and Hypoblast
- 2) Ectoderm and Mesoderm
- 3) Endoderm and Mesoderm
- 4) Hypoblast and Endoderm

HUMAN REPRODUCTIVE SYSTEM

MCQs

2. Hypoblast layer below the trophoblast encloses a cavity called

- 1) Yolk sac
- 2) Blastocoel
- 3) Extra coelomic cavity
- 4) Both 1 & 2



HUMAN REPRODUCTIVE SYSTEM

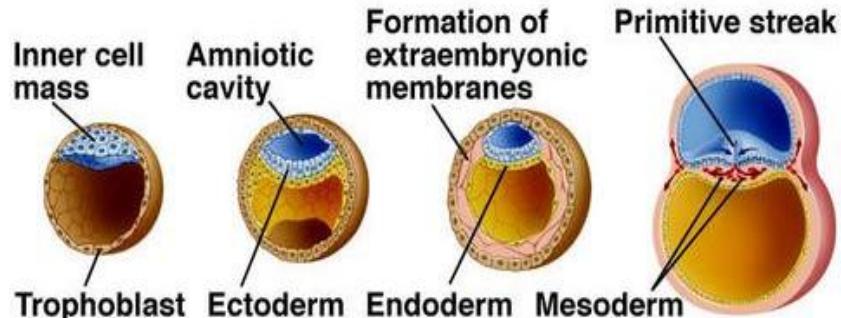
GASTRULATION

HUMAN REPRODUCTIVE SYSTEM

GASTRULATION

- Gastrulation is an important ‘dynamic process’ in the development of the early embryo.
- It involves movement of cell masses to their definitive positions in the embryo and form the three primary germinal layers.

Gastrulation - Mammal

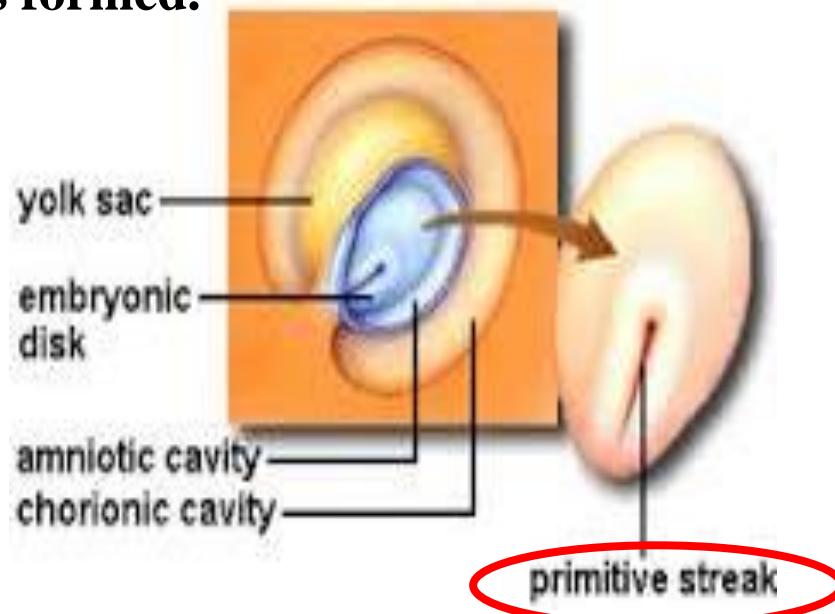


These movements are called morphogenetic movements

HUMAN REPRODUCTIVE SYSTEM

GASTRULATION

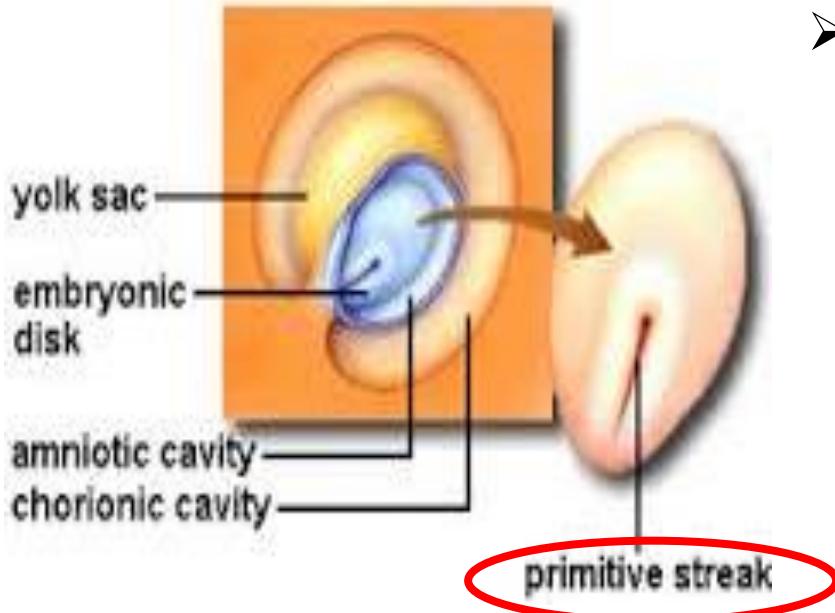
- Along the longitudinal axis of the embryonic disc, a primitive streak is formed.



HUMAN REPRODUCTIVE SYSTEM

GASTRULATION

- Formation of the **primitive streak** marks the beginning of **gastrulation**.

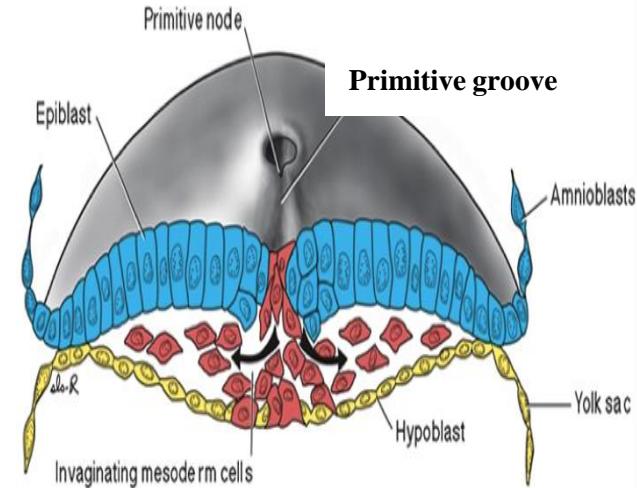


- A longitudinal furrow known as **primitive groove** forms along the middle of the primitive streak.

HUMAN REPRODUCTIVE SYSTEM

GASTRULATION

- On either side of it are the primitive folds.
- Anteriorly the primitive streak has a shallow primitive pit.
- The region in front of the primitive streak becomes thickened.
- This thickened part of the streak is called the primitive knot or Hensen's node.



HUMAN REPRODUCTIVE SYSTEM

GASTRULATION

- The primitive streak and Hensen's node provide places / avenues for the migration / ingressions of the future mesodermal and chorda-mesodermal cells to their respective places for further differentiation.
- This process of migration of cells is called '**gastrulation**'.
- The process of gastrulation transforms the two layered embryo into a three-layered embryo.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. A primitive pit is formed



- 1) Anterior to primitive streak
- 2) Posterior to primitive knot
- 3) Anterior to primitive node
- 4) Posterior to Hensen's node

HUMAN REPRODUCTIVE SYSTEM

MCQs

2. Primitive folds are formed on

- 1) Either side of primitive knot**
- 2) Either side of primitive node**
- 3) Either side of primitive streak**
- 4) Either side of primitive pit**



HUMAN REPRODUCTIVE SYSTEM



UNIT – VA

HUMAN

REPRODUCTIVE

SYSTEM

HUMAN REPRODUCTIVE SYSTEM

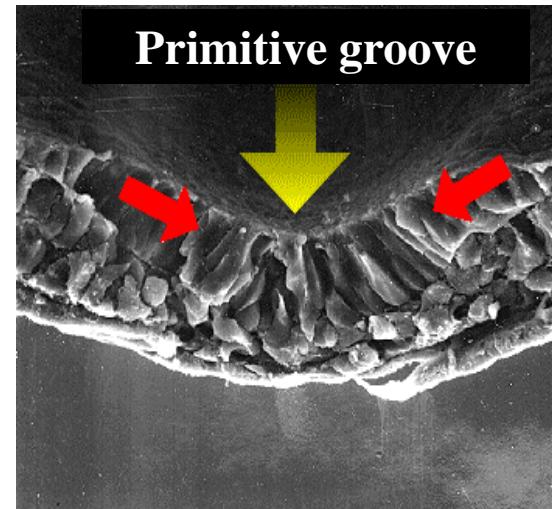
TRILAMINAR EMBRYO- FORMATION OF PRIMARY GERM LAYERS

HUMAN REPRODUCTIVE SYSTEM

TRILAMINAR EMBRYO - FORMATION OF PRIMARY GERM LAYERS

Ingression of the future endodermal cells from the epiblast, replaces the hypoblast and forms the endoderm of the embryo.

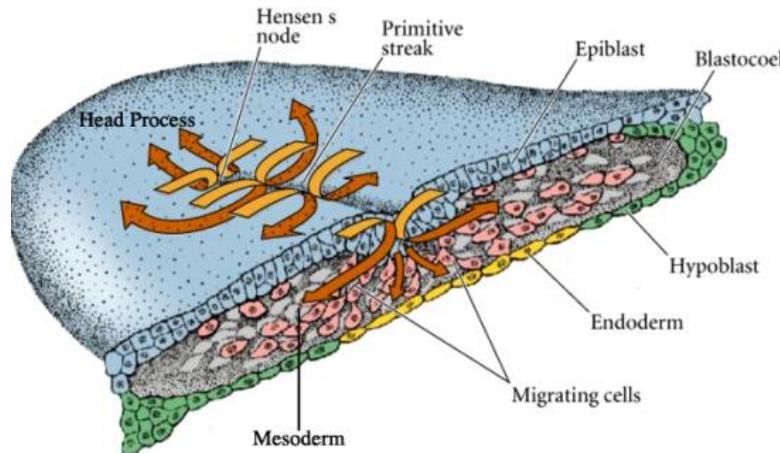
The future mesodermal cells converge towards the primitive folds, move through the primitive groove and reach between epiblast and endoderm.



HUMAN REPRODUCTIVE SYSTEM

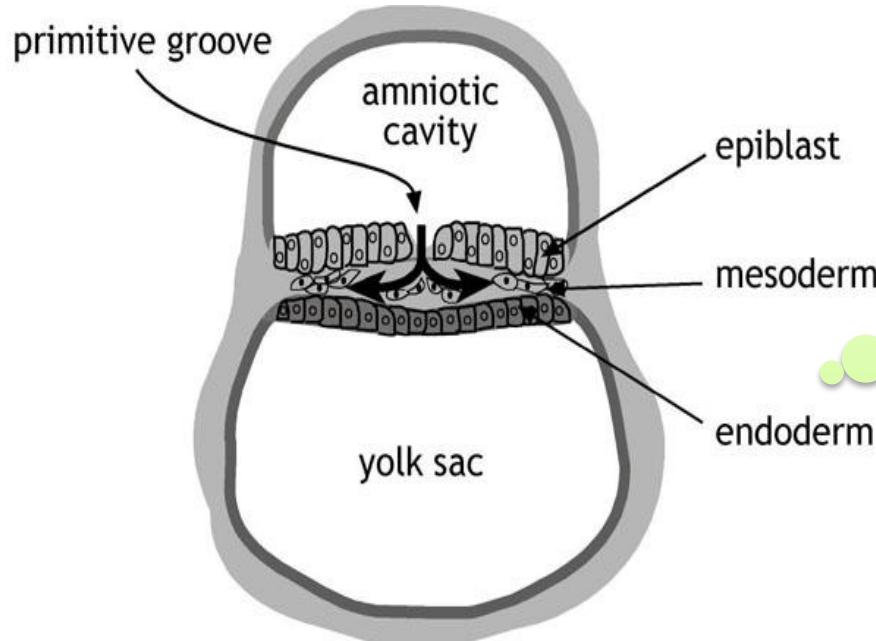
TRILAMINAR EMBRYO - FORMATION OF PRIMARY GERM LAYERS

- The remaining epiblast now constitutes the ectoderm.
- Thus the three germinal layers namely ectoderm, mesoderm and endoderm are all derived from the undifferentiated cells of the epiblast.



HUMAN REPRODUCTIVE SYSTEM

TRILAMINAR EMBRYO - FORMATION OF PRIMARY GERM LAYERS



Thus the bilaminar embryonic disc is transformed into a trilaminar embryonic disc.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. The invasion of epiblast cells into the space between epiblast and hypoblasts is called

- 1) Blastulation
-  2) Gastrulation
- 3) Organogenesis
- 4) Embryogenesis

HUMAN REPRODUCTIVE SYSTEM

MCQs

2. Trilaminar embryonic disc consists of

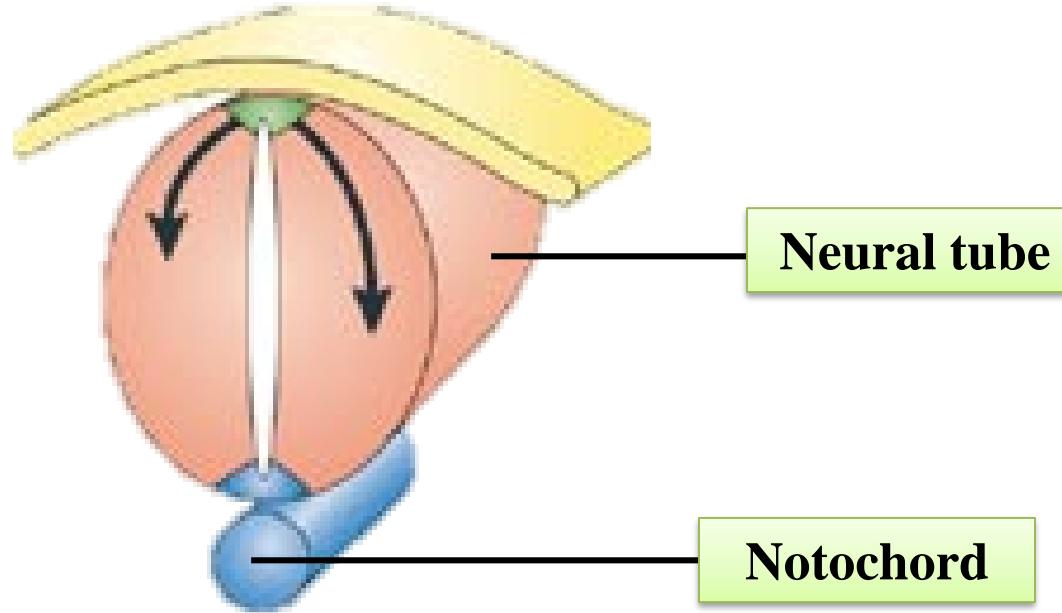
- 
- 1) Ecto, endo and mesoderms
 - 2) Ecto, endo and hypoblast
 - 3) Epiblast, hypoblast and mesoblasts
 - 4) Ectoderm, mesoblast and endoderm

HUMAN REPRODUCTIVE SYSTEM

ORGANOGENESIS

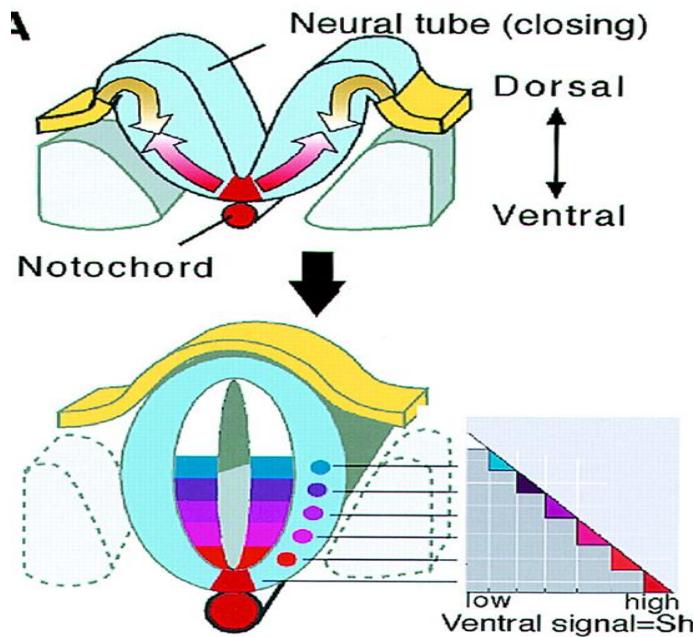
HUMAN REPRODUCTIVE SYSTEM

FORMATION OF NOTOCHORD AND NEURAL TUBE



HUMAN REPRODUCTIVE SYSTEM

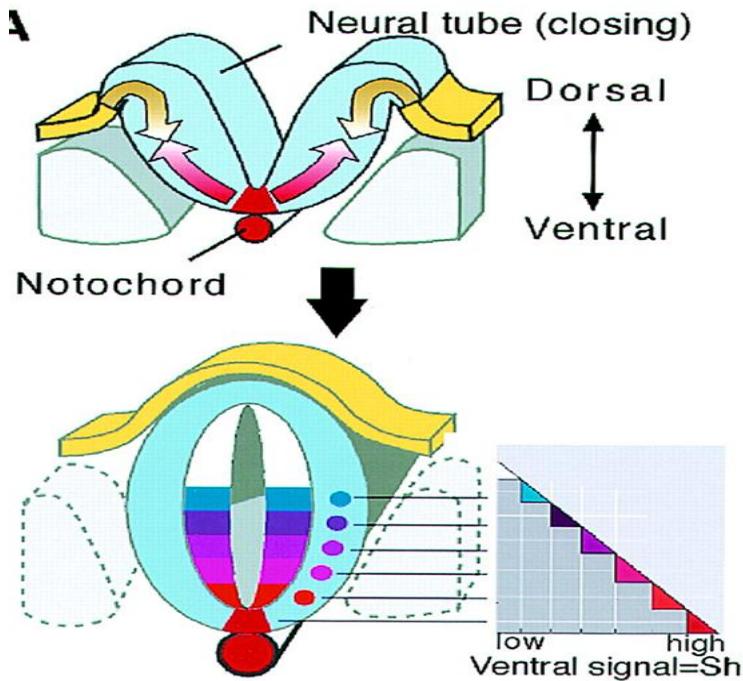
FORMATION OF NOTOCHORD AND NEURAL TUBE



- The **chorda mesodermal cells** present in the epiblast of the embryo converge and involute through the Hensen's node and extend 'forward' as notochordal process / notochordal rudiment.

HUMAN REPRODUCTIVE SYSTEM

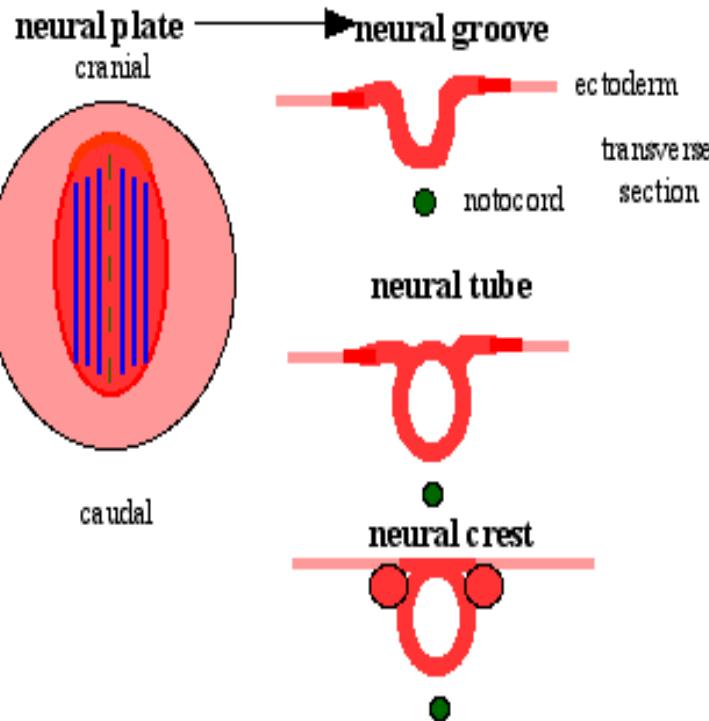
FORMATION OF NOTOCHORD AND NEURAL TUBE



- This is later transformed into a solid rod the notochord, the embryonic axial skeleton which is replaced by the ‘vertebral column’.

HUMAN REPRODUCTIVE SYSTEM

Induction

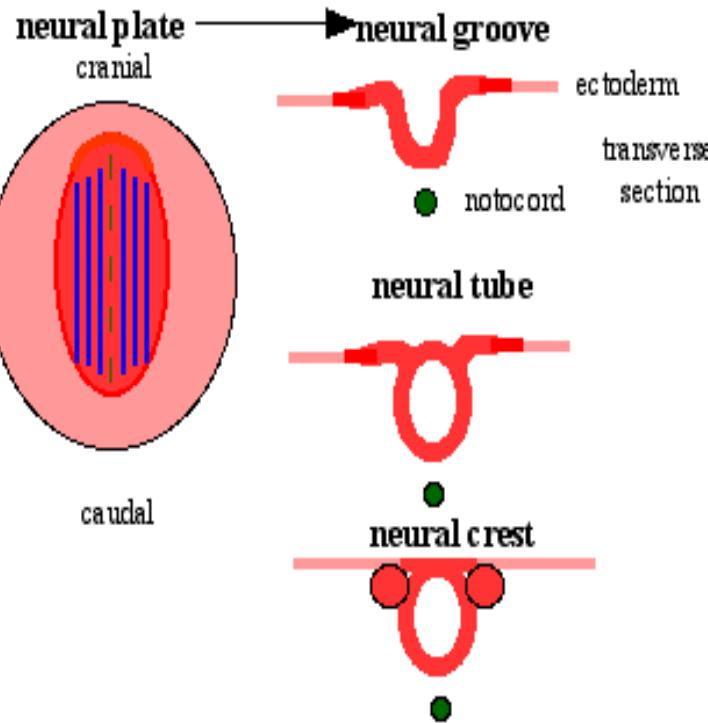


*The Notochordal mesoderm induces the ‘overlying ectodermal cells’ to form the neural plate. This is a good example of **induction**.*

Where one tissue induces the formation of another.

HUMAN REPRODUCTIVE SYSTEM

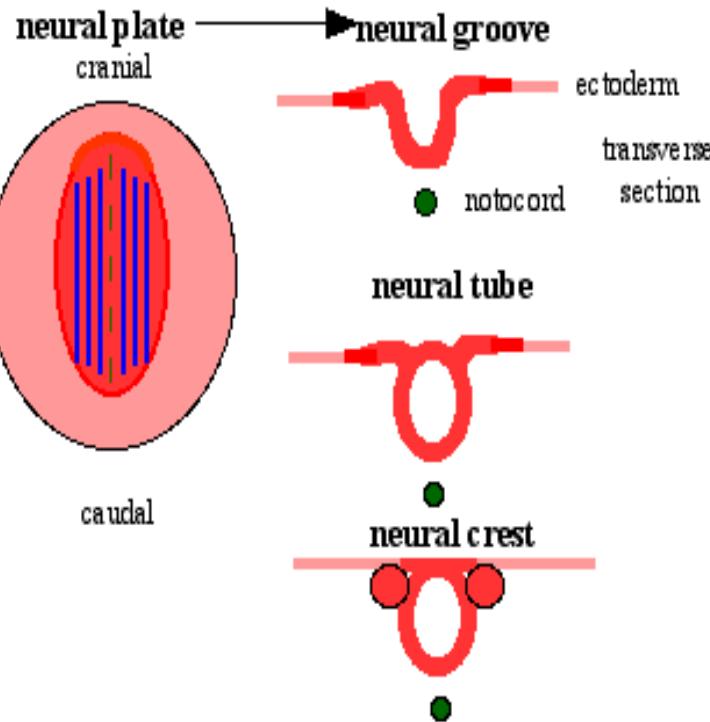
Induction



The neural plate invaginates towards the notochord to form a neural groove, which deepens progressively to form a tube by fusion of the lateral neural folds.

HUMAN REPRODUCTIVE SYSTEM

Induction

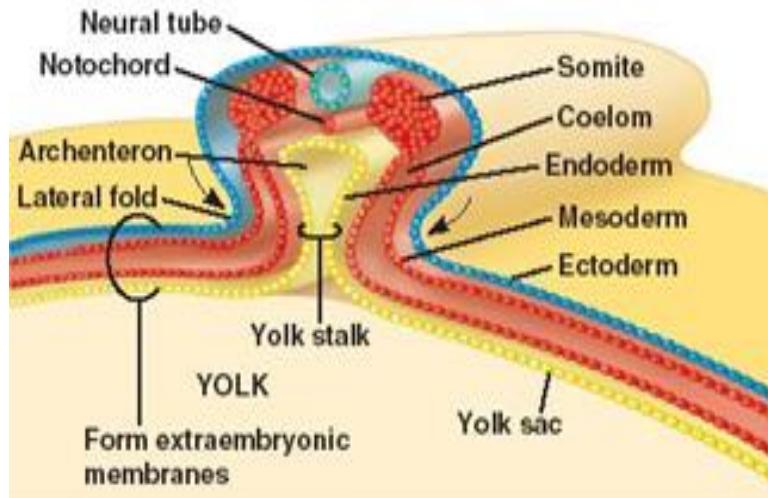


The process of formation of **neural tube** is referred to as **neurulation**.

HUMAN REPRODUCTIVE SYSTEM

DIFFERENTIATION OF MESODERM AND FORMATION OF COELOM

The intra embryonic mesoderm spreads in all directions between the outer ectoderm and inner endoderm.



The mesoderm adjacent to the notochord and neural tube is called epimere.

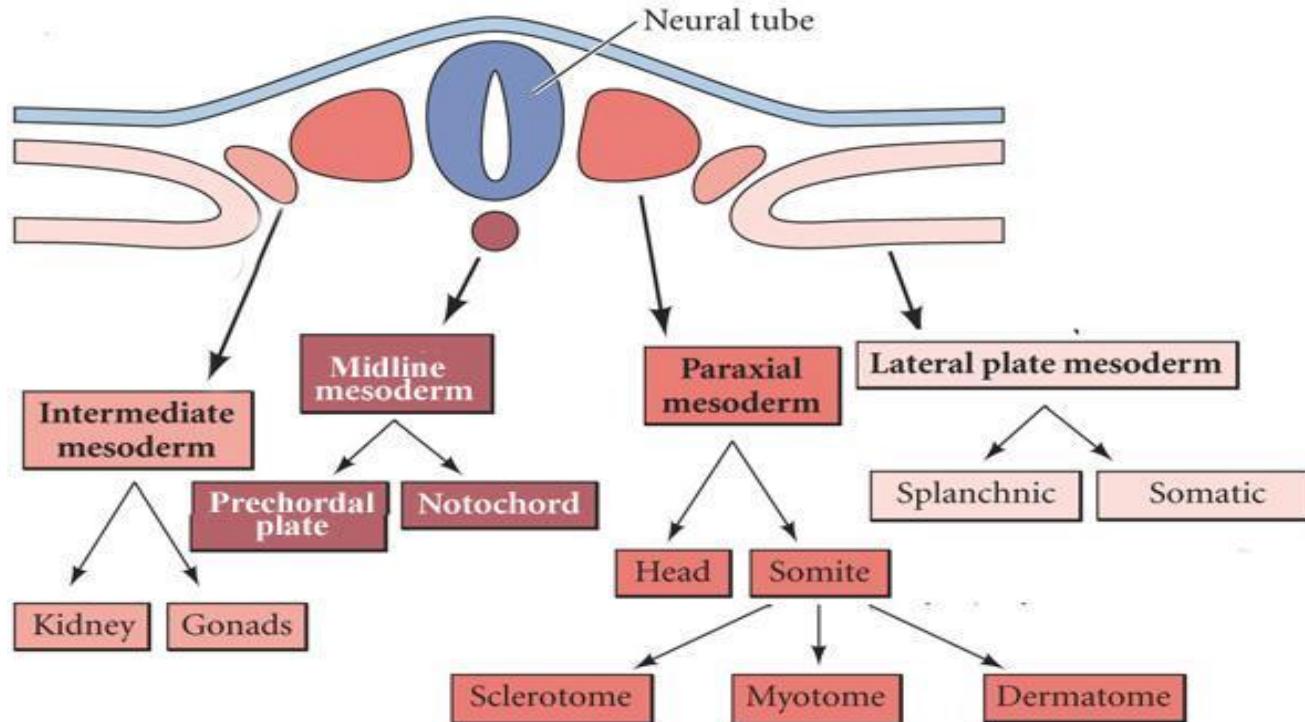
HUMAN REPRODUCTIVE SYSTEM

DIFFERENTIATION OF MESODERM AND FORMATION OF COELOM

- ❖ The longitudinal column of mesoderm adjacent to the notochord and neural tube on either side is called epimere (paraxial mesoderm).
- ❖ The mesoderm around the gut is the hypomere (lateral plate mesoderm).
- ❖ The mesoderm in between these two is the mesomere (intermediate mesoderm).

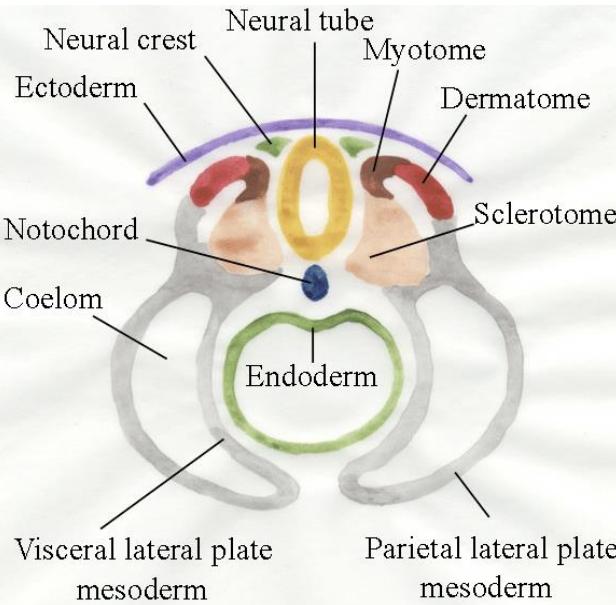
HUMAN REPRODUCTIVE SYSTEM

DIFFERENTIATION OF MESODERM AND FORMATION OF COELOM



HUMAN REPRODUCTIVE SYSTEM

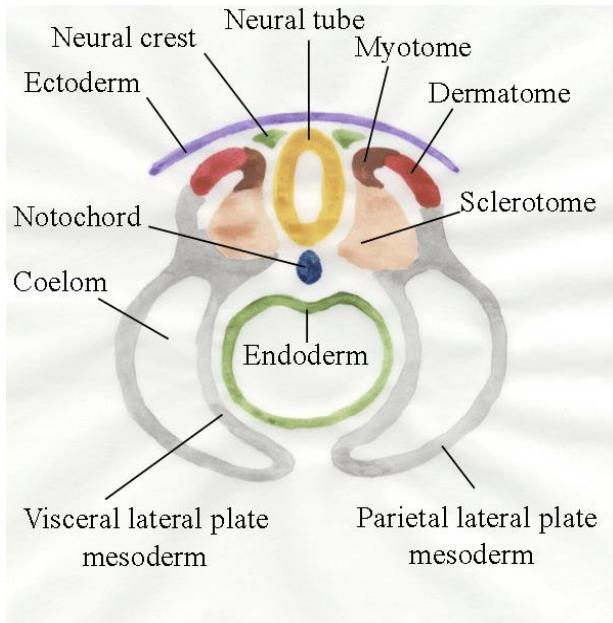
DIFFERENTIATION OF MESODERM AND FORMATION OF COELOM



- The epimere is segmented into cubical blocks called **somites or metameres**.
- Each somite differentiates into **sclerotome, myotome and dermatome**.

HUMAN REPRODUCTIVE SYSTEM

DIFFERENTIATION OF MESODERM AND FORMATION OF COELOM



- **The sclerotome forms the vertebral column.**
- **The myotome forms the voluntary muscles.**
- **The dermatome forms the dermis of the skin and other connective tissues.**

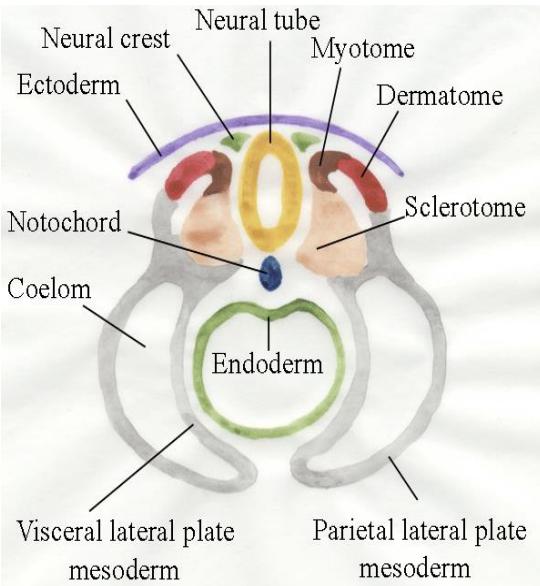
HUMAN REPRODUCTIVE SYSTEM

DIFFERENTIATION OF MESODERM AND FORMATION OF COELOM

The mesomere
forms the
urogenital organs
and their ducts.

HUMAN REPRODUCTIVE SYSTEM

DIFFERENTIATION OF MESODERM AND FORMATION OF COELOM



- The hypomere splits into outer somatic and inner splanchnic mesodermal layers.
- Intra embryonic coelom is formed between these two layers.
- It gives rise to pericardial, pleural, peritoneal cavities etc.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. The part of embryonic mesoderm from which the vertebral column develops is.....

1) Dermatome

 2) Sclerotome

3) Myotome

4) Mesomere

HUMAN REPRODUCTIVE SYSTEM

Thank you...



UNIT – VA

HUMAN

REPRODUCTIVE

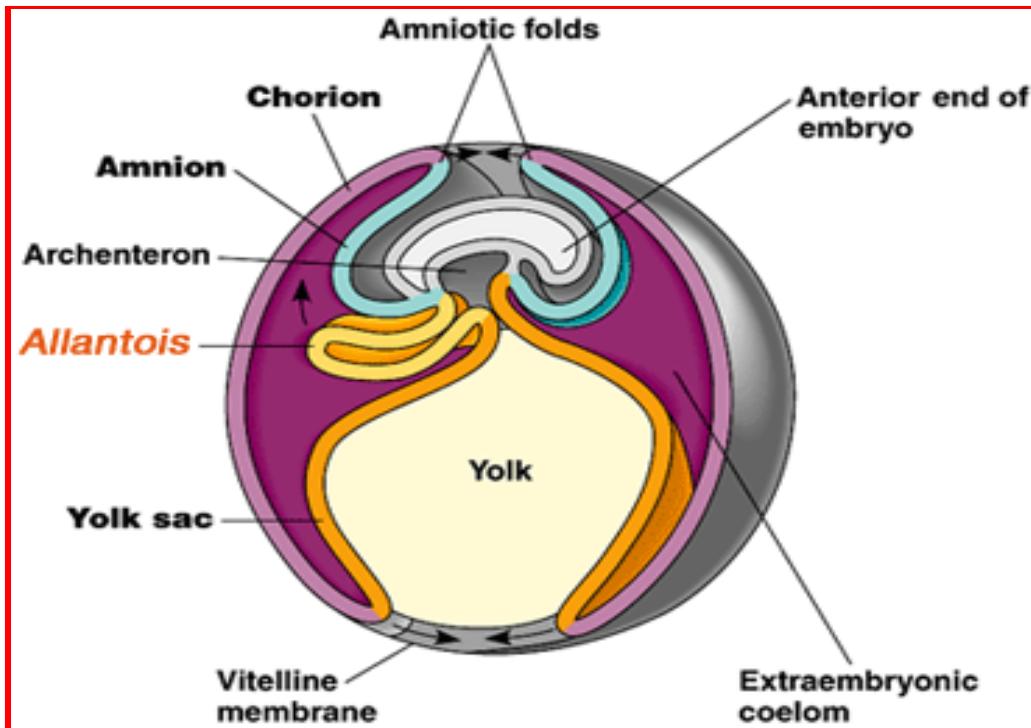
SYSTEM

HUMAN REPRODUCTIVE SYSTEM

EXTRA EMBRYONIC MEMBRANES

HUMAN REPRODUCTIVE SYSTEM

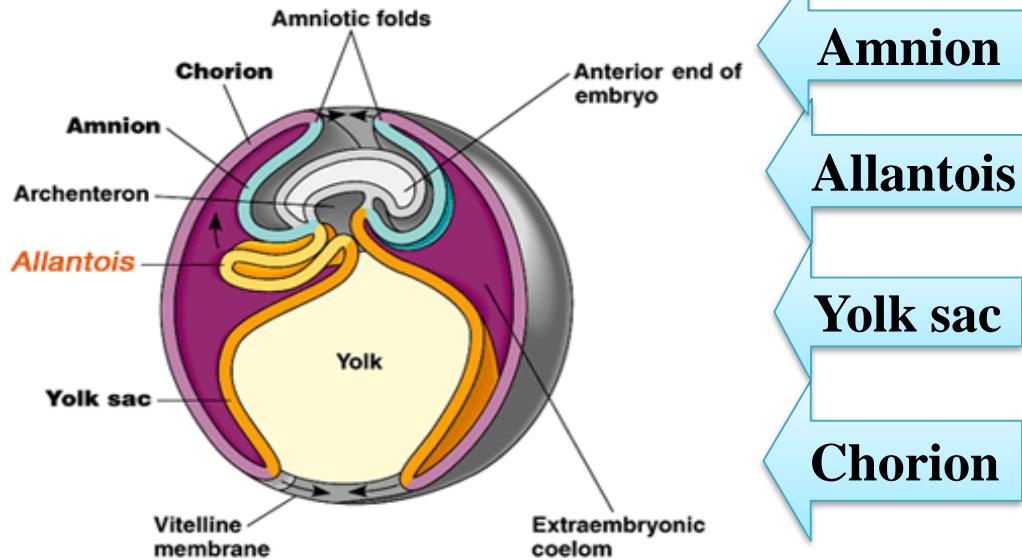
EXTRA EMBRYONIC MEMBRANES



HUMAN REPRODUCTIVE SYSTEM

EXTRA EMBRYONIC MEMBRANES

During the development of the human embryo four extraembryonic or *foetal membranes* are formed.

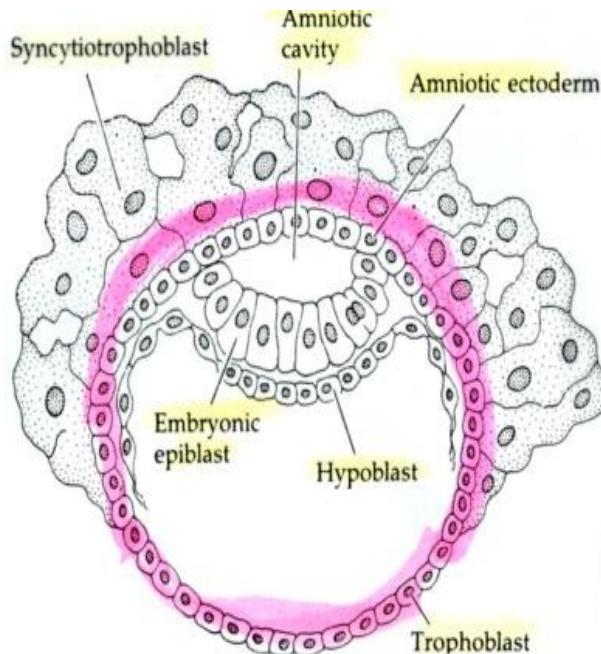


HUMAN REPRODUCTIVE SYSTEM

- ❖ EXTRA EMBRYONIC MEMBRANES
- ❖ Development of the foetal / extra-embryonic membranes helps to protect the embryo from
 - Desiccation
 - Mechanical shock
 - Exchange of gases
 - Absorption of nutrients &
 - Elimination of wastes
- ❖ (Note : The formation of amnion and chorion in human embryos is different from that in the other amniotes).

HUMAN REPRODUCTIVE SYSTEM

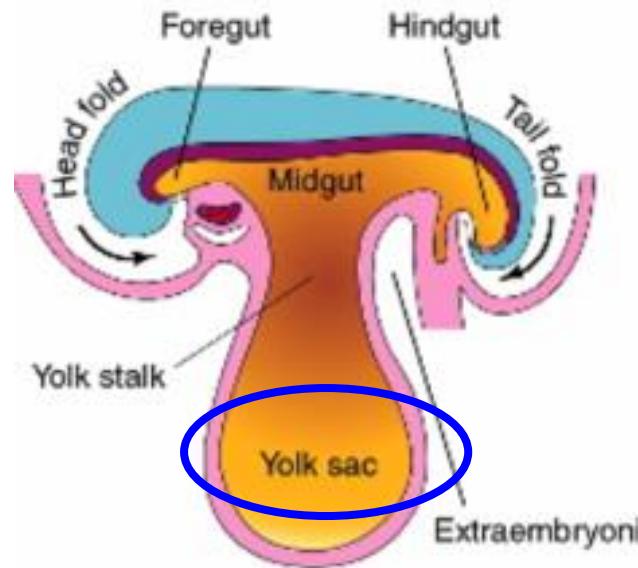
❖ EXTRA EMBRYONIC MEMBRANES



- ❖ The epiblast adjacent to the trophoblast ‘migrates’ away from the ‘trophoblast’ forming the amniotic cavity.
- ❖ The lining of the amniotic cavity is made up of cells called ‘amnioblasts’, derived from the ‘epiblast’.
- ❖ The amnion is filled with ‘water’ (amniotic fluid).

HUMAN REPRODUCTIVE SYSTEM

❖ EXTRA EMBRYONIC MEMBRANES

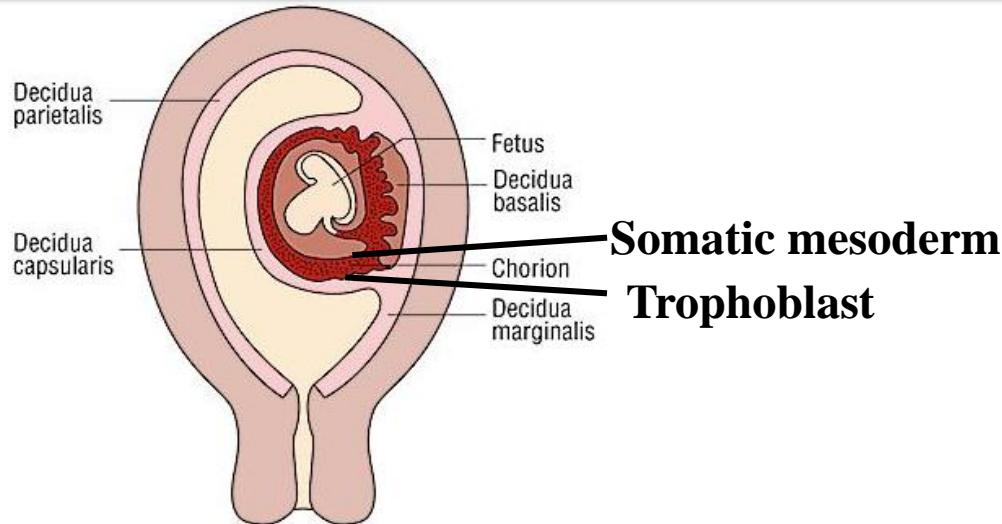


The hypoblast is pushed 'down' forming the lining of a cavity called **yolk sac**.

HUMAN REPRODUCTIVE SYSTEM

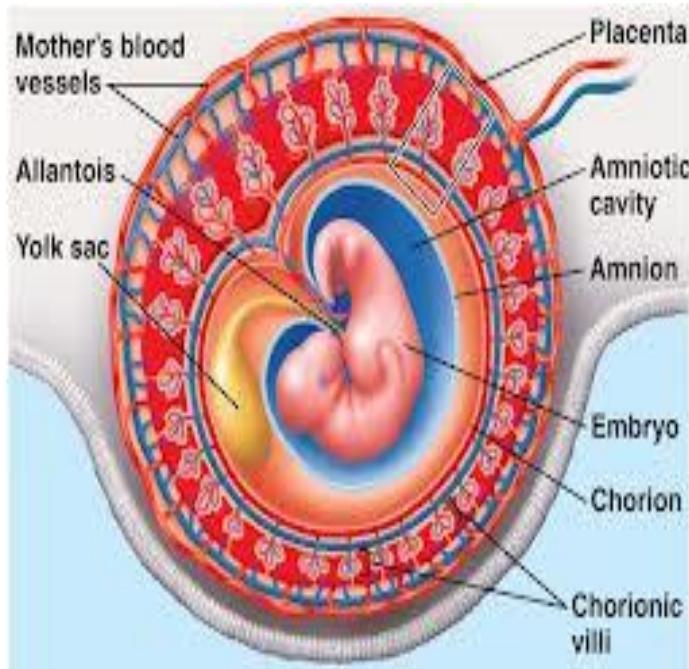
❖ EXTRA EMBRYONIC MEMBRANES

The chorion consists of an outer layer formed by the primitive ectoderm or trophoblast, and an inner by the somatic mesoderm / extraembryonic mesoderm from which the chorionic cavity is formed.



HUMAN REPRODUCTIVE SYSTEM

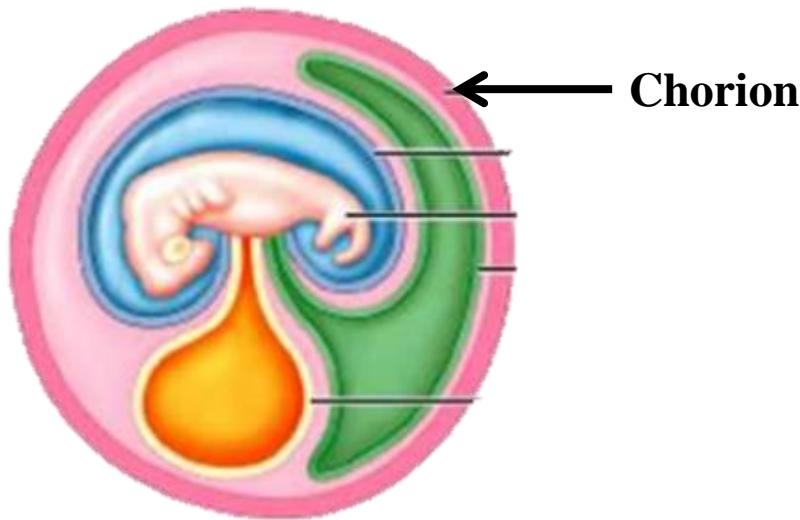
❖ EXTRA EMBRYONIC MEMBRANES



- ❖ The chorion undergoes rapid proliferation of cells and forms chorionic villi.
- ❖ The chorionic villi invades the endometrium and helps in the transfer of nutrients and oxygen from maternal blood to foetal blood.

HUMAN REPRODUCTIVE SYSTEM

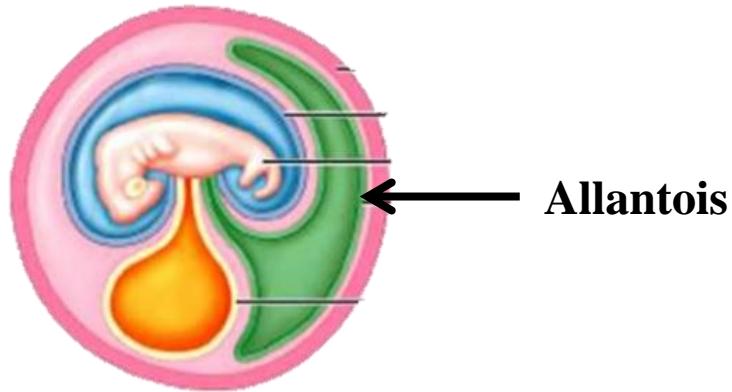
- ❖ EXTRA EMBRYONIC MEMBRANES
- ❖ The chorion surrounds the embryo and other membranes.



HUMAN REPRODUCTIVE SYSTEM

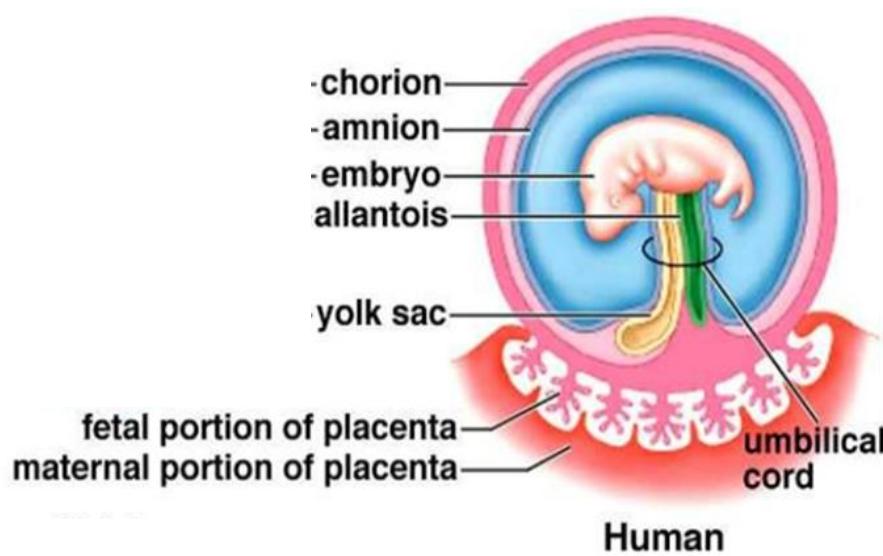
❖ EXTRA EMBRYONIC MEMBRANES

- ❖ Soon, a fourth membrane called allantois develops as an outgrowth from the ‘embryonic hindgut’ (splanchnopleure consisting of outer mesodermal layer and inner endoderm).
- ❖ The membrane of the allantois meets the inner surface of the chorion and forms a highly vascularised region called allanto-chorion.



HUMAN REPRODUCTIVE SYSTEM

- ❖ EXTRA EMBRYONIC MEMBRANES
- ❖ The allanto-chorion contributes the ‘foetal part’ of the placenta.



HUMAN REPRODUCTIVE SYSTEM

❖ EXTRA EMBRYONIC MEMBRANES

- ❖ The placenta facilitates a more effective and efficient part for exchange / passage of nutrients, respiratory gases, hormones, antibodies etc. between the foetus and mother by the 12th week of pregnancy.
- ❖ During organogenesis, regions of the three embryonic germ layers develop into the rudiments of organs.

HUMAN REPRODUCTIVE SYSTEM

1. The fluid that acts as a shock absorber and prevents the embryo from desiccation is

- 1) Pleural fluid
- 2) Cerebral fluid
- 3) Amniotic fluid
- 4) Chorionic fluid

MCQs



HUMAN REPRODUCTIVE SYSTEM

2. The chorion develops a rich supply of blood vessels and forms an intimate association with....

- 1) Somatopleure
-  2) Splanchnopleure
- 3) Mesentopleure
- 4) Both 1 & 2

HUMAN REPRODUCTIVE SYSTEM



UNIT – VA

HUMAN

REPRODUCTIVE

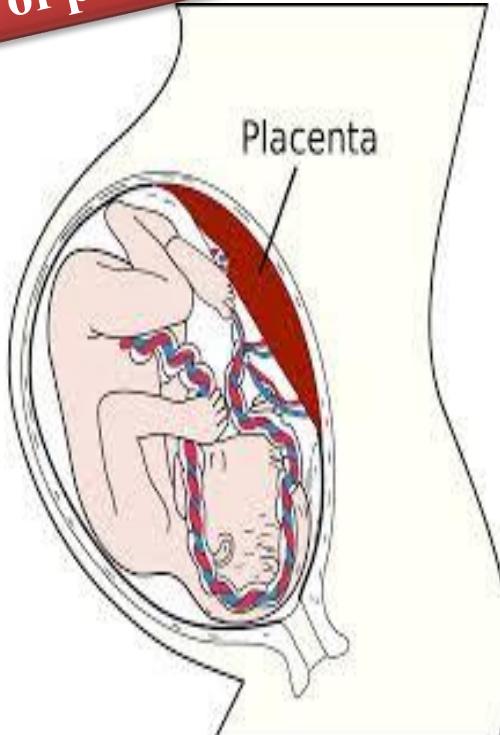
SYSTEM

HUMAN REPRODUCTIVE SYSTEM

PLACENTA FORMATION

HUMAN REPRODUCTIVE SYSTEM

Formation of placenta



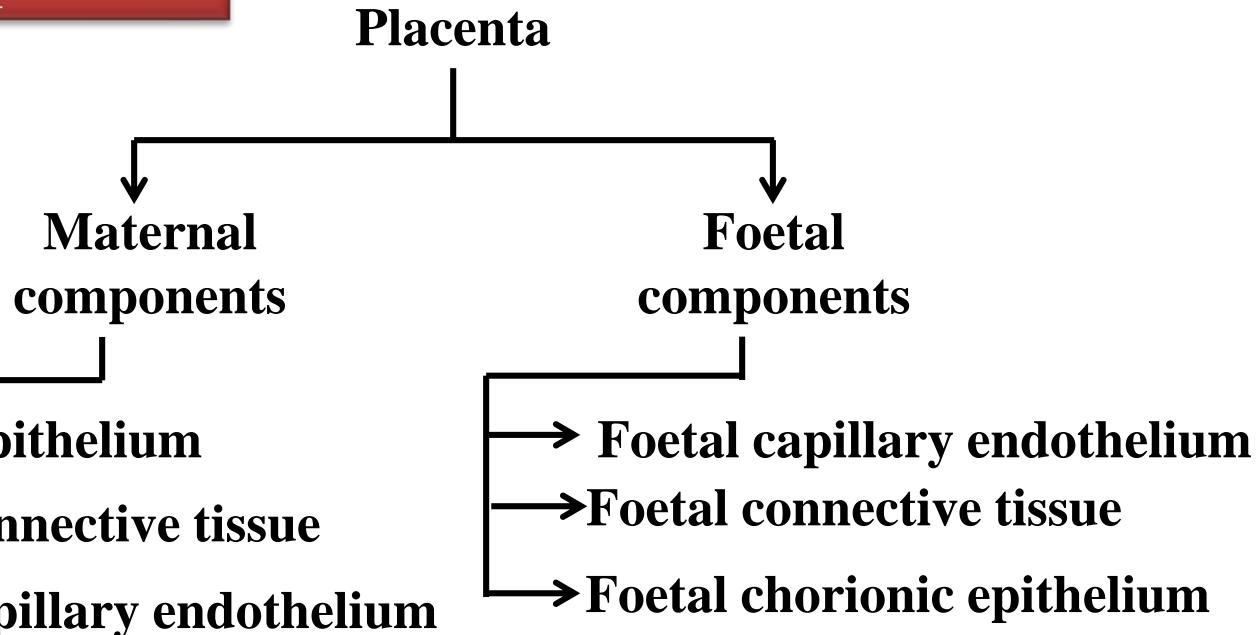
HUMAN REPRODUCTIVE SYSTEM

Formation of placenta

- ❖ The placenta consists of two essential portions; they are Maternal part and Foetal part.
 - (i) Maternal part of the placenta is derived from the endometrium of the uterus.
 - (ii) Foetal part of the placenta is derived from foetal membranes.

HUMAN REPRODUCTIVE SYSTEM

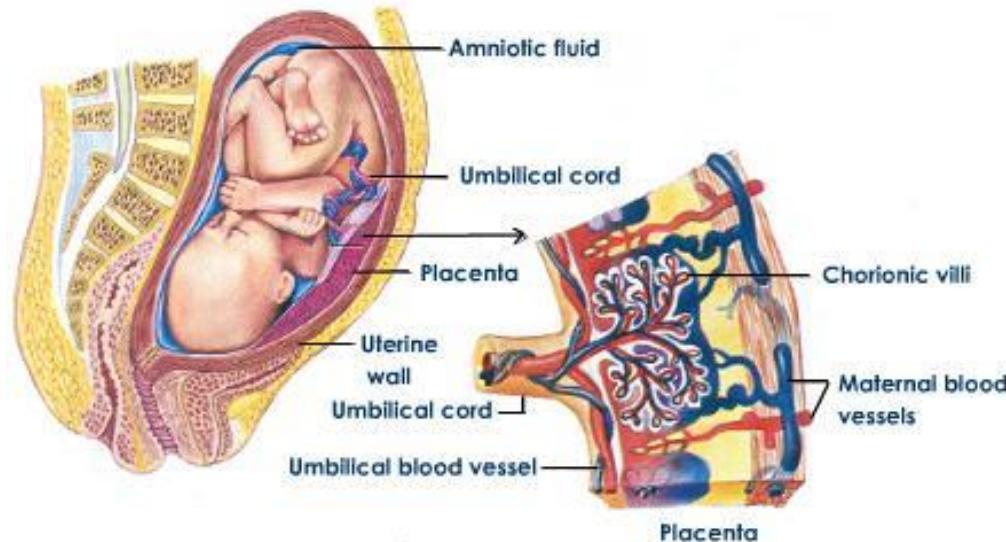
Formation of placenta



HUMAN REPRODUCTIVE SYSTEM

Formation of placenta

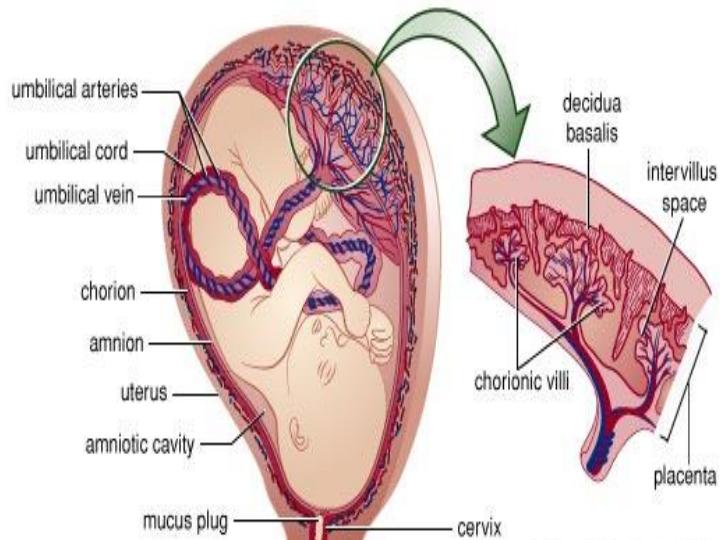
- ❖ The inner region of the chorionic villi develops a network of capillaries of the umbilical artery and umbilical vein.
- ❖ These vessels run in the tough umbilical cord.



HUMAN REPRODUCTIVE SYSTEM

Formation of placenta

The placenta of humans is called chorioallantoic placenta as allantois also fuses with the chorion in the process of vascularisation.



Placenta is described as haemochorial as the maternal blood comes into direct contact with the membrane of the foetal chorionic villi.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Type of placenta in human female is

- 1) Choriovitelline
- 2) Chorioallontoic
- 3) Yolk sac
- 4) Both 1 & 2



HUMAN REPRODUCTIVE SYSTEM

2. Placenta is formed by

- 1) Chorionic villi only
- 2) Uterine tissue only
- 3) Both 1 & 2
- 4) Amniotic layer

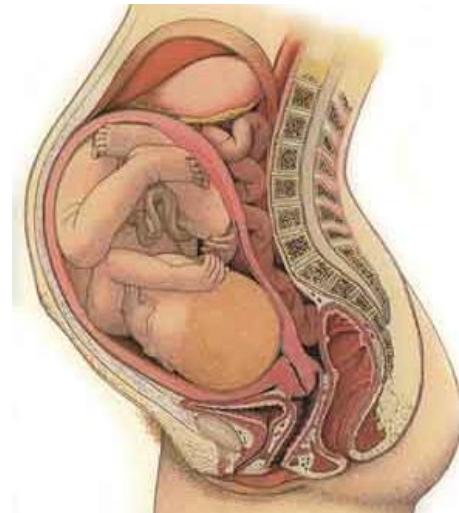
HUMAN REPRODUCTIVE SYSTEM

PREGNANCY

HUMAN REPRODUCTIVE SYSTEM

PREGNANCY

Pregnancy is the period of intra uterine development of the embryo or foetus in a woman's uterus.



Gestation
period

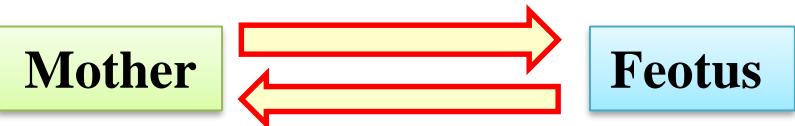
Human pregnancy averages 266 days (38 weeks) from fertilization of the egg, or 40 weeks from the start of the last menstrual cycle.

HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF PLACENTA

HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF PLACENTA



HUMAN REPRODUCTIVE SYSTEM

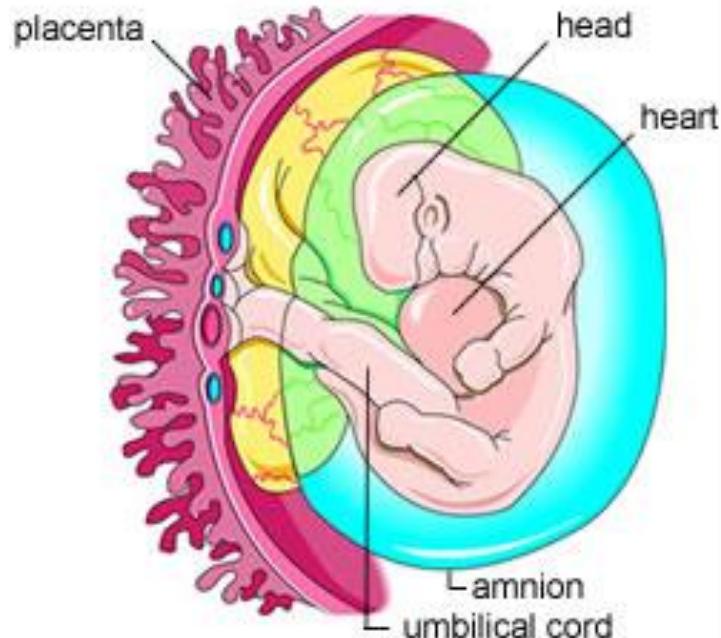
FUNCTIONS OF PLACENTA



The placenta facilitates the supply of oxygen and nutrients to the embryo and also the removal of carbon dioxide and excretory materials produced by the embryo.

HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF PLACENTA



The placenta is connected to the embryo through an **umbilical cord**, which helps in the transport of substances to and from the embryo.

HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF PLACENTA

Progesterone secreted by
the placenta is essential
for the maintenance of
pregnancy after the 4th
month.

*when the
corpus luteum
degenerates*

HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF PLACENTA

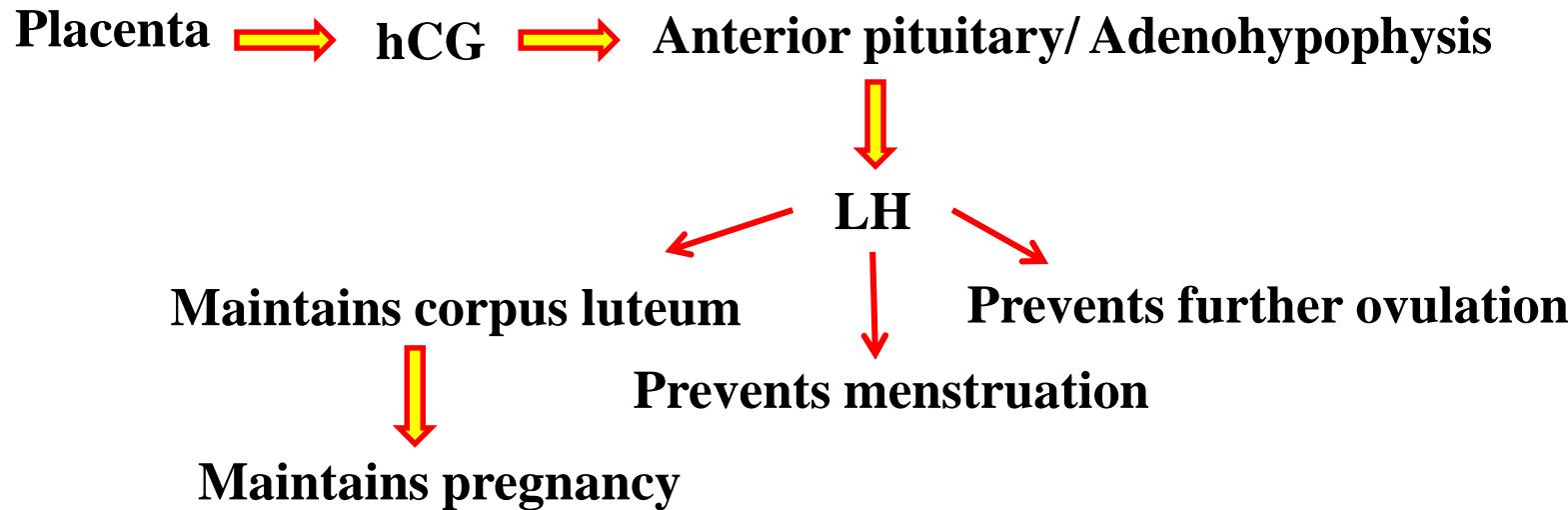
Oestrogens (mainly estradiol) reach maternal blood and promote uterine growth and development of the mammary glands.

Human chorionic gonadotropin (hCG) is similar in its actions to luteinizing hormone (LH).

HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF PLACENTA

Human chorionic gonadotropin sends the message of pregnancy to the master endocrine system so that LH is secreted to maintain corpus luteum and to prevent menstruation and further ovulation.



HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF PLACENTA



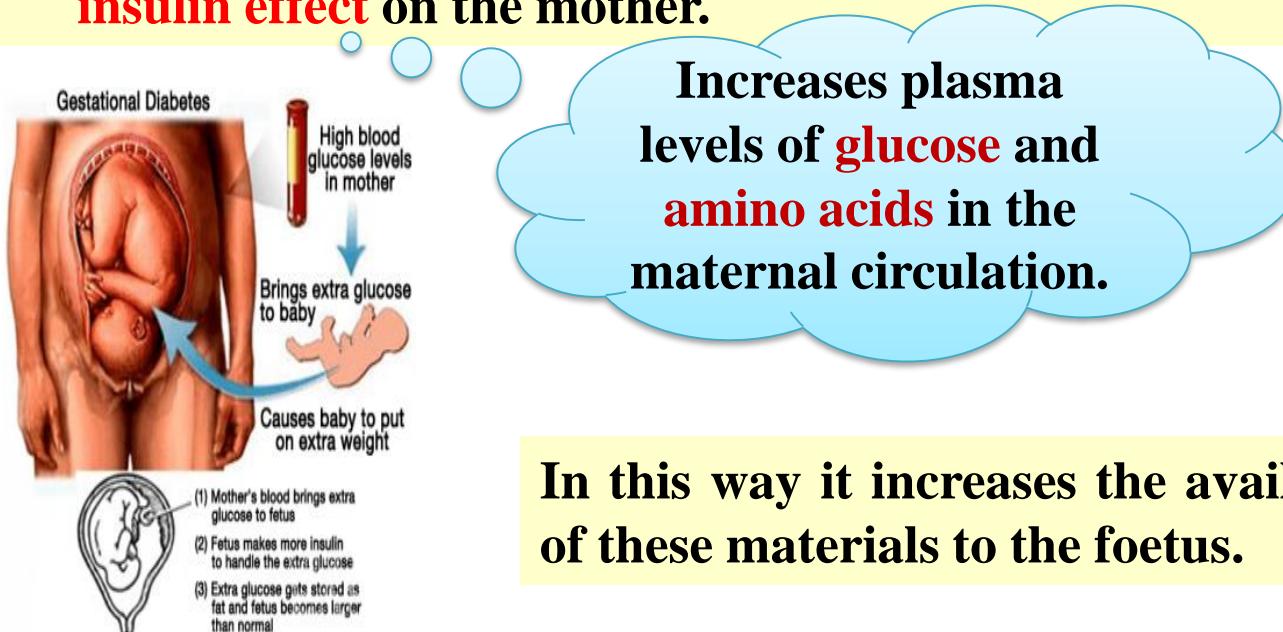
Gonadotropins are excreted through maternal urine.

Their presence in urine is used as a test to detect a pregnancy in the early stages.

HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF PLACENTA

- **Somatotropin**, also called ‘placental lactogen’ has an **anti-insulin effect** on the mother.



In this way it increases the availability of these materials to the foetus.

HUMAN REPRODUCTIVE SYSTEM

FUNCTIONS OF PLACENTA

- The placenta protects the foetus from the relatively high blood pressure of the maternal circulation.
- The foetal tissue having paternal chromosomal effect, acts as **foreign structure** to the mother who produces **antibodies**.
- The foetus sustains such a rejection for about 38-40 weeks by producing certain immunosuppressant substances.

Antigenic
allograft

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Type of placenta in human female is

1) Choriovitelline



2) Chorioallontoic

3) Yolk sac

4) Both 1 & 2

HUMAN REPRODUCTIVE SYSTEM



UNIT – VA

HUMAN

REPRODUCTIVE

SYSTEM

HUMAN REPRODUCTIVE SYSTEM

TIME TABLE OF SOME EVENTS DURING PREGNANCY

HUMAN REPRODUCTIVE SYSTEM

TIMETABLE OF SOME EVENTS DURING PREGNANCY:



**Human gestation can
be divided for
convenience into three
trimesters of about
three months each.**

HUMAN REPRODUCTIVE SYSTEM

Timetable of some events during pregnancy

First trimester

The first trimester is the main period of organogenesis, the development of the body organs.

First month

In human beings, after one month of pregnancy, the embryo's heart is formed.

Second month

The foetus develops limbs and digits by the end of the second month

Third month

Most of the major organ systems are formed, for e.g., the limbs and external genital organs are well-developed by the end of 12 weeks (first trimester).

HUMAN REPRODUCTIVE SYSTEM

First trimester



HUMAN REPRODUCTIVE SYSTEM

Timetable of some events during pregnancy

Second trimester



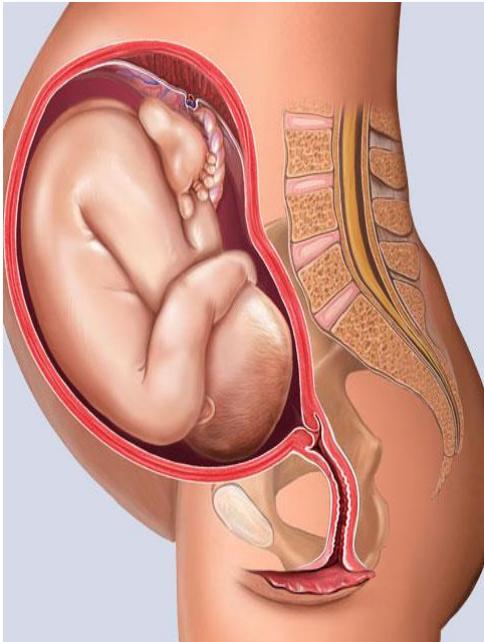
The first movements of the foetus and appearance of hair on the head are usually observed during the fifth month.

By the end of 24 weeks (second trimester), the body is covered with fine hair, eye-lids separate, and eyelashes are formed.

HUMAN REPRODUCTIVE SYSTEM

Timetable of some events during pregnancy

Third trimester



By the end of nine months of pregnancy (third trimester), the foetus is fully developed and is ready for delivery.

HUMAN REPRODUCTIVE SYSTEM

1. After one month of pregnancy, embryo develops....



1) Heart

2) Kidney

3) Liver

4) Eyelids

MCQs

HUMAN REPRODUCTIVE SYSTEM

PARTURITION

HUMAN REPRODUCTIVE SYSTEM

PARTURITION



HUMAN REPRODUCTIVE SYSTEM

PARTURITION:

Childbirth begins with labour, a series of strong, rhythmic uterine contractions that push the foetus and placenta out of the body.

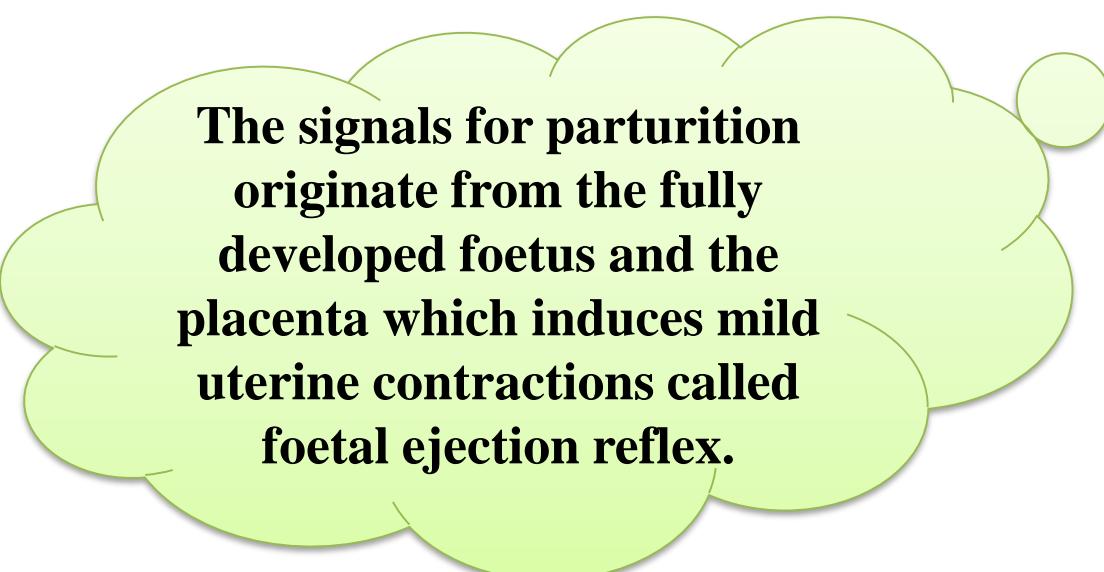


This process of delivery of the foetus (childbirth) is called parturition.

HUMAN REPRODUCTIVE SYSTEM

PARTURITION

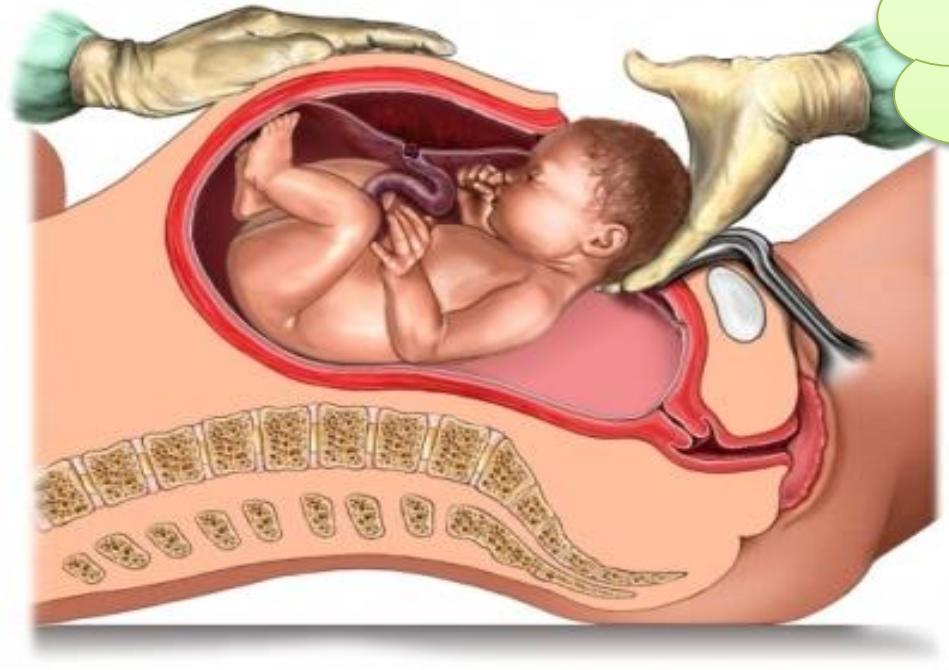
Parturition is induced by a complex neuroendocrine mechanism.



The signals for parturition originate from the fully developed foetus and the placenta which induces mild uterine contractions called foetal ejection reflex.

HUMAN REPRODUCTIVE SYSTEM

PARTURITION



This triggers release of oxytocin from the maternal pituitary.

HUMAN REPRODUCTIVE SYSTEM

PARTURITION

- Oxytocin acts on the uterine muscle and causes stronger uterine contractions, which in turn stimulate further secretion of oxytocin.

- The stimulatory reflex between the uterine contractions and oxytocin secretion continues resulting in increasingly stronger contractions.

HUMAN REPRODUCTIVE SYSTEM

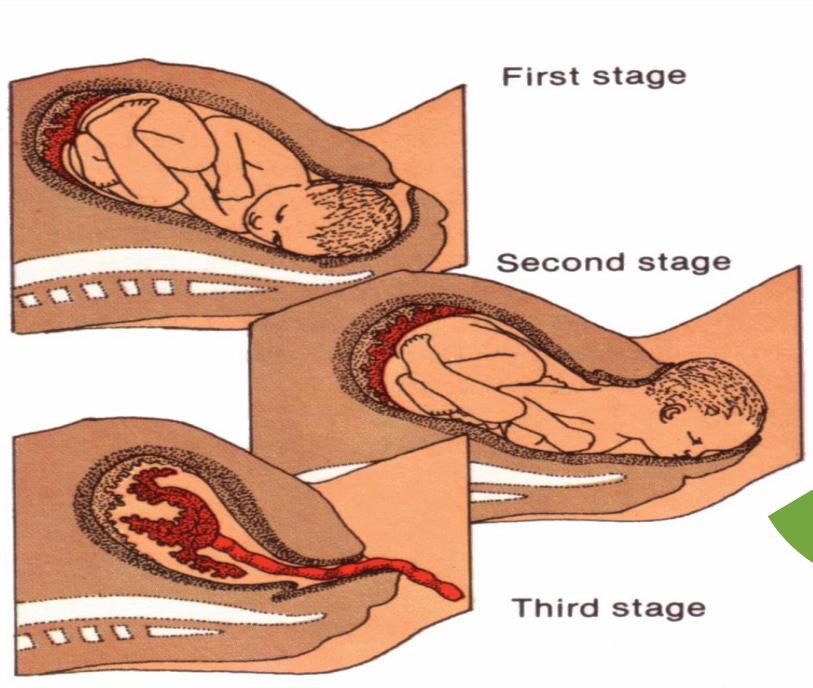
PARTURITION



This leads to
expulsion of the
baby out of the
uterus through the
birth canal.

HUMAN REPRODUCTIVE SYSTEM

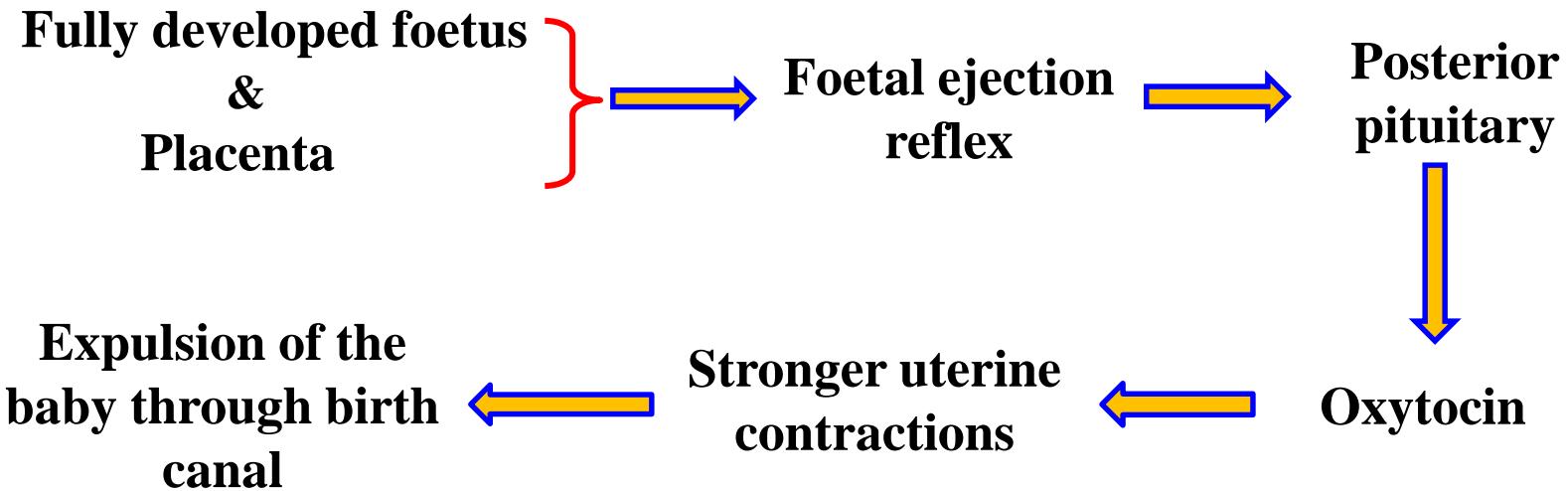
PARTURITION



Soon after the infant is delivered, the placenta along with decidua is also expelled out of the uterus.

HUMAN REPRODUCTIVE SYSTEM

PARTURITION



HUMAN REPRODUCTIVE SYSTEM

MCQs

1. The process of child birth is called....



1) Parturition

2) Implantation

3) Lactation

4) Gestation

HUMAN REPRODUCTIVE SYSTEM

LACTATION

HUMAN REPRODUCTIVE SYSTEM

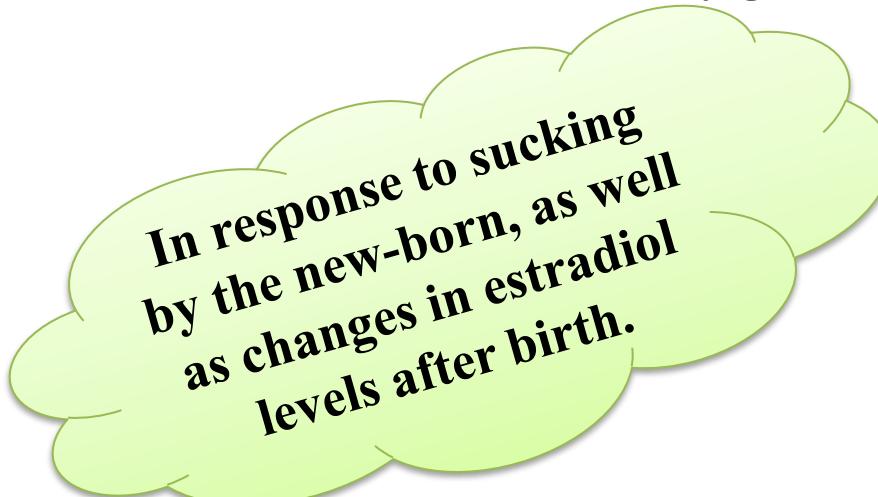
LACTATION

One aspect of **postnatal care**
(unique to mammals) is
lactation, the production of
mother's milk.

HUMAN REPRODUCTIVE SYSTEM

LACTATION

The hypothalamus signals the anterior pituitary to secrete prolactin, which stimulates the mammary glands to produce milk .



In response to sucking
by the new-born, as well
as changes in estradiol
levels after birth.

HUMAN REPRODUCTIVE SYSTEM

The mammary glands of the female undergo differentiation during pregnancy and start producing milk towards the end of pregnancy (lactation).

Lactation helps the mother in feeding the new-born.

HUMAN REPRODUCTIVE SYSTEM

LACTATION

- ❖ The milk produced during the initial few days of lactation is called **colostrum**.
- ❖ **Colostrum** contains **several antibodies (IgA)** absolutely essential to protect the newborn babies from initial sources of infections.
- ❖ Breast feeding during the initial period of infant growth is recommended by doctors for bringing up a healthy baby.

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. The initial milk produced after parturition is called as



- 1) Colostrum
- 2) Semen
- 3) Plasma
- 4) Serum

HUMAN REPRODUCTIVE SYSTEM



UNIT-VA

HUMAN

REPRODUCTIVE

SYSTEM

HUMAN REPRODUCTIVE SYSTEM

EXERCISE I

MALE REPRODUCTIVE SYSTEM

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. The male reproductive system includes

- 1) Testis
- 2) Accessory glands & their ducts
- 3) External genitalia
- 4) All the above



HUMAN REPRODUCTIVE SYSTEM

2. The testis are located outside this abdominal cavity with in the pouches called.....
- 1) Testicular lobes
 - 2) Testicular pouches
 -  3) Scrotal sacs
 - 4) Urethral meatus

HUMAN REPRODUCTIVE SYSTEM

3. The scrotal sacs help in.....

- 1) Maintenance of low temperature of testis
- 2) Maintenance of low temperatures of accessory glands
- 3) Maintenance of high temperature of Testis
- 4) Maintenance of high temperature of Accessory glands

HUMAN REPRODUCTIVE SYSTEM

4. Scrotal sacs maintain the temperature

- 1) 2–2.5⁰ C higher than the normal internal body temperature
- 2) 2–2.5⁰ C lower than the normal internal body temperature
- 3) 4–4.5⁰ C lower than the normal internal body temperature
- 4) 3–4.5⁰ C lower than the normal internal body temperature

HUMAN REPRODUCTIVE SYSTEM

5. Low temperature in scrotal sacs is essential for.....

1) Spermatogenesis

2) Spermiation

3) Fertilization

4) Ejaculation

HUMAN REPRODUCTIVE SYSTEM

6. In each testis the number of testicular lobules is

1) 350

2) 420

3) 250

4) 500

HUMAN REPRODUCTIVE SYSTEM

7. No. of seminiferous tubules in each lobule of testis is

1) 1-5

2) 1-3

3) 1-6

4) 2-4

HUMAN REPRODUCTIVE SYSTEM

8. Seminiferous tubule is lined by.....

1) Male germ cells only

2) Sertoli cells only

3) Both 1 & 2

4) Leydig cells only

HUMAN REPRODUCTIVE SYSTEM

9. Sperms produced from male germ cells by

- 1) Mitotic divisions
- 2) Meiotic divisions
- 3) Amitotic divisions
- 4) Parthenogenetically



HUMAN REPRODUCTIVE SYSTEM

10. Germ cells obtain nutrients from.....

- 1) Leydig cells
- 2) Interstitial cells
-  3) Sertoli cells
- 4) Both 1 & 2

HUMAN REPRODUCTIVE SYSTEM

11. The regions outside of the seminiferous tubules contain.....

- 1) Interstitial cells
- 2) Leydig cells
- 3) Small blood vessels
- 4) All



HUMAN REPRODUCTIVE SYSTEM

12. Leydig cells secrete male hormones.....



- 1) Androgens
- 2) Estrogens
- 3) Growth hormone
- 4) Follicle stimulating hormone

HUMAN REPRODUCTIVE SYSTEM

13. Seminiferous tubules of testis open into

- 1) Vas deferens
- 2) Spermatic cord
-  3) Vasa efferentia
- 4) Rete testis

HUMAN REPRODUCTIVE SYSTEM

14. The male sex accessory ducts are.....

- 1) Rete testis
- 2) Epididymis
- 3) Vasdeferens
- 4) All



HUMAN REPRODUCTIVE SYSTEM

15. Rete testis is present in between.....

- 1) Epididymis – vas deferens
- 2) Vasa efferentia – vas deferens
- 3) Vasa efferentia – scrotal sac
- 4) Seminiferous tubules – vasa efferentia



HUMAN REPRODUCTIVE SYSTEM

16. Epididymis is located on

- 1) Anterior surface of testis
-  2) Posterior surface of testis
- 3) Ventral to testis
- 4) Dorsal to testis

HUMAN REPRODUCTIVE SYSTEM

17. Epididymis opens into vas deferens, moves forward & loops over the

.....

- 1) Seminal vesicle
- 2) Urinary bladder
- 3) Uterus
- 4) Ureters

HUMAN REPRODUCTIVE SYSTEM

18. Ducts for storing & transporting the sperm from testis to outside are

.....

- 1) Seminal duct
- 2) Urinary duct
-  3) Ejaculatory duct
- 4) Urethral meatus

HUMAN REPRODUCTIVE SYSTEM

19. Urethra originates from & extends through ___ respectively.....

- 
- 1) Urinary bladder & penis
 - 2) Penis & urinary bladder
 - 3) Seminal vesicle & penis
 - 4) Rete testis & urinary bladder

HUMAN REPRODUCTIVE SYSTEM

20. Urethral meatus is found at the.....

-  1) Tip of copulatory organ
- 2) Tip of urinary bladder
- 3) Tip of ejaculatory duct
- 4) Tip of ureter

HUMAN REPRODUCTIVE SYSTEM

21. The male external genitalia is.....

- 1) Rete testis
- 2) Vasdeferens
- 3) Epididymis
- 4) Penis



HUMAN REPRODUCTIVE SYSTEM

22. The erectile tissue of penis facilitates

- 1) Spermiation
- 2) Insemination
- 3) Spermatogenesis
- 4) Micturition



HUMAN REPRODUCTIVE SYSTEM

23. Glans penis is covered by a loose fold of skin



- 1) Fore skin
- 2) Hyaline sheath
- 3) Tunica vaginalis
- 4) Tunica albuginea

HUMAN REPRODUCTIVE SYSTEM

24. Glans penis is.....

- 
- 1) Enlarged end of penis
 - 2) Enlarged end of testis
 - 3) Enlarged end of Vas deferens
 - 4) Enlarged end of Rete testis

HUMAN REPRODUCTIVE SYSTEM

25. Male accessory glands are.....

-  1) One pair of seminal vesicles, bulbourethral glands & a prostate gland
- 2) Paired bulbourethral & prostate gland
- 3) One seminal vesicle & two prostate glands
- 4) Unpaired seminal vesicle, bulbourethral & prostate gland

HUMAN REPRODUCTIVE SYSTEM

26. Seminal plasma is rich in.....

- 1) Fructose, sodium & certain enzymes
- 2) Fructose, calcium & certain enzymes
- 3) Sodium, calcium & certain enzymes
- 4) Fructose only

HUMAN REPRODUCTIVE SYSTEM

27. Lubrication of penis is also due to the secretions of

-  1) Bulbourethral glands
- 2) Sertoli cells
- 3) Leydig cells
- 4) Interstitial cells

HUMAN REPRODUCTIVE SYSTEM

FEMALE REPRODUCTIVE SYSTEM

HUMAN REPRODUCTIVE SYSTEM

28. The primary female sex organs are.....

1) Oviducts

 2) Ovaries

3) Mammary glands

4) Uterus

HUMAN REPRODUCTIVE SYSTEM

29. One pair of ovaries are located.....

1) One on each side of lower abdomen

2) In pelvis region

3) Both 1 & 2

4) In upper abdomen

HUMAN REPRODUCTIVE SYSTEM

30. Ovary is connected to pelvic wall & uterus by



- 1) Ligaments
- 2) Tendons
- 3) Isthmus
- 4) Oviduct

HUMAN REPRODUCTIVE SYSTEM

31. The parts of stroma of ovary are

- 
- 1) Cortex & medulla
 - 2) Tunica albuginea & vaginalis
 - 3) Fallopian tube & vagina
 - 4) Uterus & vagina

HUMAN REPRODUCTIVE SYSTEM

32. The female accessory ducts are.....

- 1) Uterus
- 2) Vagina
- 3) Oviducts
- 4) All



HUMAN REPRODUCTIVE SYSTEM

33. Fallopian tubes are extended between.....

-  1) Ovary & uterus
- 2) Ovary & vagina
- 3) Ovary & infundibulum
- 4) Ampulla & Fimbriae

HUMAN REPRODUCTIVE SYSTEM

34. The part of oviduct closer to the ovary

- 1) Funnel-shaped Isthmus
- 2) Funnel-shaped Fimbriae
- 3)  Funnel-shaped infundibulum
- 4) Funnel-shaped ampulla

HUMAN REPRODUCTIVE SYSTEM

35. Finger like projections of infundibulum help in.....

- 
- 1) Collection of ovum after ovulation
 - 2) Collection of ovum before ovulation
 - 3) Free movement of oviduct
 - 4) Free movement of sperms

HUMAN REPRODUCTIVE SYSTEM

36. The wider part of oviduct into which infundibulum opens is

1) Isthmus

2) Ampulla 

3) Fimbriae

4) Uterus

HUMAN REPRODUCTIVE SYSTEM

37. The shape of uterus/ womb is

- 1) Straight pear
- 2) Inverted pyramid
-  3) Inverted pear
- 4) Upright pyramid

HUMAN REPRODUCTIVE SYSTEM

38. Uterus opens into vagina through.....

- 1) A wide ampulla
- 2) A wide cervix
- 3) A narrow cervix
- 4) A narrow isthmus



HUMAN REPRODUCTIVE SYSTEM

39. Birth canal is formed by.....

- 
- 1) Vagina & cervical canal
 - 2) Vagina & uterus
 - 3) Fallopian tube & vagina
 - 4) Fallopian tube & cervix

HUMAN REPRODUCTIVE SYSTEM

40. The wall of uterus is composed of.....

1) Five layers

2) Two layers

3) Three layers

4) Four layers

HUMAN REPRODUCTIVE SYSTEM

41. The layer of uterus that undergoes cyclical changes during menstruation is

- 1) Outer perimetrium
- 2) Inner perimetrium
-  3) Inner Endometrium
- 4) Middle endometrium

HUMAN REPRODUCTIVE SYSTEM

42. Myometrium exhibits strong contractions during.....



- 1) Parturition
- 2) Fertilization
- 3) Gametogenesis
- 4) Gestation

HUMAN REPRODUCTIVE SYSTEM

43. A cushion of fatty tissue covered by skin & hair is

- 1) Hymen
- 2) Clitoris
-  3) Mons pubis
- 4) Labia majora

HUMAN REPRODUCTIVE SYSTEM

44. Labia majora are the fleshy folds of tissue extend.....



- 1) Down from mons pubis & surround the vaginal opening
- 2) Upwards from mons pubis & surround the uterus
- 3) Upwards from mons pubis & lower to uterus
- 4) Down from mons pubis & upper to uterus

HUMAN REPRODUCTIVE SYSTEM

45. Labia minora are located.....

- 1) Under the hymen
- 2) Under the labia majora
- 3) Inside the clitoris
- 4) Above the mons pubis

HUMAN REPRODUCTIVE SYSTEM

46. A tiny finger like projection which is located at the upper junction of the two labia minora is.....



1) Clitoris

2) Hymen

3) Vagina

4) Ampulla

HUMAN REPRODUCTIVE SYSTEM

47. The opening of vagina is often covered partially by a membrane.....

1) Plasma membrane



2) Hymen

3) Undulating membrane

4) Germinal layer

HUMAN REPRODUCTIVE SYSTEM

48. In each breast the number of mammary lobes is.....

- 
- 1) 15-20 lobes with alveoli
 - 2) 15-20 lobes without alveoli
 - 3) 20-30 lobes with alveoli
 - 4) 20-30 lobes without alveoli

HUMAN REPRODUCTIVE SYSTEM

49. The milk is sucked out through.....

1) Mammary duct

 2) Lactiferous duct

3) Alveolar duct

4) Both 1 & 3

GAMETOGENESIS

50. In males spermatogenesis occurs at.....

- 1) Foetal stage
- 2) Embryonic stage
-  3) Puberty
- 4) Both foetal & embryonic stages

HUMAN REPRODUCTIVE SYSTEM

51. Each spermatogonium is.....

1) Haploid with 26 chromosomes

2) Diploid with 44 chromosomes

3) Diploid with 46 chromosomes

4) Diploid with 40 chromosomes



HUMAN REPRODUCTIVE SYSTEM

52. The primary spermatocyte completes its 1st meiotic division & forms

- 
- 1) Haploid primary spermatocytes
 - 2) Diploid secondary spermatocytes
 - 3) Haploid secondary spermatocytes
 - 4) Diploid tertiary spermatocytes

HUMAN REPRODUCTIVE SYSTEM

53. The number of sperms produced with their chromosomes are

-  1) Four & haploid
- 2) Four & diploid
- 3) Six & haploid
- 4) Six & diploid

HUMAN REPRODUCTIVE SYSTEM

54. The process of spermatogenesis is stimulated by.....

 1) Androgens

2) Luteinizing hormones

3) GnRH

4) FSH

HUMAN REPRODUCTIVE SYSTEM

55. The whole body of sperm is enveloped by

- 1) Pellicle
- 2) Shell
-  3) Plasma membrane
- 4) Cellulose

HUMAN REPRODUCTIVE SYSTEM

56. A cap-like structure that covers the anterior part of a sperm is

- 1) Tail
- 2) Head
- 3) Acrosome
- 4) Neck

HUMAN REPRODUCTIVE SYSTEM

57. Numerous mitochondria are present in.....

- 1) Head of sperm
- 2) Neck of sperm
-  3) Middle piece of sperm
- 4) Tail of sperm

HUMAN REPRODUCTIVE SYSTEM

58. For normal fertility, a human male ejaculates about millions of sperms

 1) 200 - 300

2) 800 - 900

3) 100 - 1000

4) 500 - 1000

HUMAN REPRODUCTIVE SYSTEM

59. Semen is the secretion of.....

- 1) Epididymis, vas deferens & seminal vesicles only
- 2) Epididymis, vas deferens & prostate glands only
- 3) Epididymis & vas deferens only
- 4)  Seminiferous tubules, epididymis, vas deferens, seminal vesicles & prostate gland

HUMAN REPRODUCTIVE SYSTEM

OOGENESIS

60. Oogonia undergo division & enters into



- 1) Prophase –I of meiosis - I
- 2) Metaphase –I of meiosis - I
- 3) Anaphase –I of meiosis - I
- 4) Telophase –I of meiosis - I

HUMAN REPRODUCTIVE SYSTEM

61. The number of primordial follicles left at puberty is.....

- 1) 60,000 only
- 2) 60,000-80,000 only
- 3) 80,000-100000 only
- 4) 20,000-30,000 only

HUMAN REPRODUCTIVE SYSTEM

62. Primary follicle when surrounded by more layers of granulosa cells & a theca it forms into.....

- 1) Primordial follicle
- 2) Secondary follicle
- 3) Tertiary follicle
- 4) Primary oocyte



HUMAN REPRODUCTIVE SYSTEM

63. The primary oocyte completes its first meiotic division when it is in....
- 1) Primary follicle
 -  2) Secondary follicle
 - 3) Tertiary follicle
 - 4) Secondary oocyte

HUMAN REPRODUCTIVE SYSTEM

64. A large haploid secondary oocyte & a tiny first polar body are formed after.....
- 1) First mitotic division
 - 2) First meiotic division
 - 3) First amitotic division
 - 4) Before first meiotic division

HUMAN REPRODUCTIVE SYSTEM

65. The secondary oocyte is enveloped by a membrane.....

- 1) Corona radiata
- 2) Theca
- 3) Zona pellucida
- 4) Germinal epithelium

HUMAN REPRODUCTIVE SYSTEM

66. ‘Ovulation’ is

- 1) Releasing of primary oocyte from ovary
- 2) Releasing of secondary oocyte from ovary
- 3) Releasing of tertiary oocyte from ovary
- 4) Releasing of graffian follicle



HUMAN REPRODUCTIVE SYSTEM

MENSTRUAL CYCLE

67. Reproductive cycle is called menstrual cycle in.....

- 1) Human beings
- 2) Monkeys
- 3) Apes
- 4) All



HUMAN REPRODUCTIVE SYSTEM

68. The first menstruation is called.....

1) Menopause

 2) menarche

3) viropause

4) andropause

HUMAN REPRODUCTIVE SYSTEM

69. Menstrual cycle includes.....



- 1) Follicular phase from 7-14 days
- 2) Luteal phase from 10-14 days
- 3) Menstrual phase from 10-16 days
- 4) Both 1 & 2

HUMAN REPRODUCTIVE SYSTEM

70. At about 14th day the hormones rise to peak level are

- 
- 1) Both FSH & LH
 - 2) Only FSH
 - 3) Only LH
 - 4) ACTH

HUMAN REPRODUCTIVE SYSTEM

71. During mid-cycle, the rapid secretion of LH results in....

-  1) Ovulation
- 2) Development of oogonia
- 3) Development of secondary & tertiary follicles
- 4) Formation of polar bodies

HUMAN REPRODUCTIVE SYSTEM

72. Graafian follicle transforms into an yellow coloured

- 1) Corpus albicans
-  2) Corpus luteum
- 3) Corpus mammillae
- 4) Both 1 & 3

HUMAN REPRODUCTIVE SYSTEM

73. Identify the incorrect statement

- 1) Lack of menstruation may be indicative of pregnancy
- 2) LH & FSH increases gradually during follicular phase
- 3) Corpus luteum acts as a temporary endocrine gland
- 4) Oestrogens maintain endometrium



HUMAN REPRODUCTIVE SYSTEM

74. The last menstruation cycle at the age of 50 years is

- 1) Menarche
- 2) Menstrual phase
-  3) Menopause
- 4) Both 2 & 3

HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION & IMPLANTATION

75. Releasing of semen into vagina during coitus is.....

- 1) Spermiation
- 2) Spermiogenesis
-  3) Insemination
- 4) Both 1 & 2

HUMAN REPRODUCTIVE SYSTEM

76. In humans, female fertilization takes place in

- 1) Ampulla
- 2) Isthmus
- 3) Ampullary - Isthmic junction
- 4) Uterus

HUMAN REPRODUCTIVE SYSTEM

77. The sperm induces changes in the zona pellucida to block the entry of.....



1) Many sperms

2) One sperm

3) Acrosome of sperm only

4) Tail of a sperm only

HUMAN REPRODUCTIVE SYSTEM

78. The secretion of which part of sperm helps to enter the ovum?

1) Middle piece

2) Tail

3) Acrosome

4) Neck

HUMAN REPRODUCTIVE SYSTEM

79. Secondary oocyte completes the 2nd meiotic division with the

- 
- 1) Entry of sperm into ovum
 - 2) Entry of sperm into uterus
 - 3) Entry of sperm into fallopian tube
 - 4) Entry of sperm into ampulla

HUMAN REPRODUCTIVE SYSTEM

80. Blastocyst is formed in

- 1) Ovary
-  2) Fallopian tube
- 3) Uterus
- 4) ampulla

HUMAN REPRODUCTIVE SYSTEM

81. Cleavage in human zygote is.....

- 
- 1) Holoblastic, radial & indeterminate
 - 2) Holoblastic, spiral & indeterminate
 - 3) Holoblastic, radial & determinate
 - 4) Holoblastic, spiral & determinate

HUMAN REPRODUCTIVE SYSTEM

82. Embryo with 8 - 16 blastomeres is called.....



- 1) Morula
- 2) Blastula
- 3) Early gastrula
- 4) Late gastrula

HUMAN REPRODUCTIVE SYSTEM

83. The 2 types of cells in a blastocyst are.....

- 
- 1) Outer trophoblasts & inner cell mass
 - 2) Outer cells mass & inner trophoblasts
 - 3) Outer epiblast & inner trophoblasts
 - 4) Outer epiblast & inner cells mass

HUMAN REPRODUCTIVE SYSTEM

84. Blastocyst attaches to ___ of the uterus.

- 1) Myometrium
- 2) Perimetrium
-  3) Endometrium
- 4) Both 1 & 2

HUMAN REPRODUCTIVE SYSTEM

85. The strong attachment of blastocyst to endometrium is called

- 1) Parturition
- 2) Compaction
- 3) Delamination
- 4) Implantation



HUMAN REPRODUCTIVE SYSTEM

PREGNANCY & EMBRYONIC DEVELOPMENT

86. During the penetration of sperm into an ovum, the enzyme released by the acrosome to dissolve hyaluronic acid



- 1) Hyaluronidase**
- 2) Acrosin**
- 3) Cytolysin**
- 4) Nuclease**

HUMAN REPRODUCTIVE SYSTEM

87. Zona pellucida is dissolved by the enzyme.....

- 1) Cytolysin
- 2) Carboxylase
- 3) Acrosin
- 4) Hyaluronidase



HUMAN REPRODUCTIVE SYSTEM

88. The cells of trophoblast above the region of inner cell mass are called

- 1) Tropho ectoderm cells
- 2) Tropho endoderm cells
-  3) Cells of Rauber
- 4) Embryonic cells

HUMAN REPRODUCTIVE SYSTEM

89. After the process of implantation of embryo, uterine endometrium is differentiated into

1) Interstitial cells

2) Decidua

3) Somites

4) Mesomeses

HUMAN REPRODUCTIVE SYSTEM

90. The portion of the decidua where placenta is to be formed is ...

1) Decidua parietalis



2) Decidua basalis

3) Decidua capsularis

4) Decidua blastisis

HUMAN REPRODUCTIVE SYSTEM

91. Decidua parietalis is formed at

- 1) The lining of uterine cavity where only decidua basalis is absent
- 2) The lining of uterine cavity where only decidua capsularis is absent
-  3) Both 1 & 2
- 4) In the decidua basalis

HUMAN REPRODUCTIVE SYSTEM

92. Rauber cells disappear soon after the formation of....

- 
- 1) Embryonic disc
 - 2) Embryonic pole
 - 3) Embryonic disc with 3 layers
 - 4) Extra embryonic membranes

HUMAN REPRODUCTIVE SYSTEM

93. Bilaminar embryonic disc consists of

-  1) Epiblast & hypoblast
- 2) Ectoderm & Mesoderm
- 3) Endoderm & mesoderm
- 4) Hypoblast & Endoderm

HUMAN REPRODUCTIVE SYSTEM

94. Hypoblast layer below the trophoblast encloses a cavity called.....

- 1) Yolk sac
- 2) Blastocoel
- 3) Umbilical vesicle
- 4) Both 1 & 3



GASTRULATION

95. A primitive pit is formed



- 1) Anterior to primitive streak
- 2) Posterior to primitive knot
- 3) Anterior to primitive node
- 4) Posterior to Hensen's node

HUMAN REPRODUCTIVE SYSTEM

96. Primitive folds are formed on.....

- 1) Either side of primitive knot
- 2) Either side of primitive node
- 3) Either side of primitive streak
- 4) Either side of primitive pit



HUMAN REPRODUCTIVE SYSTEM

97. The formation of future endodermal cells of epiblast into endoderm of embryo involves the process of

- 1) Invagination
- 2) Ingression
- 3) Evagination
- 4) Epi & Emboly



HUMAN REPRODUCTIVE SYSTEM

98. The invasion of epiblast cells into the space between epi & hypoblasts is called

- 1) Blastulation
- 2)  Gastrulation
- 3) Organogenesis
- 4) Embryogenesis

HUMAN REPRODUCTIVE SYSTEM

99. Trilaminar embryonic disc consists of

-  1) Ecto, endo & mesoderms
- 2) Ecto , endo & hypoblast
- 3) Epiblast, hypoblast & mesoblasts
- 4) Ectoderm, mesoblast & endoderm

HUMAN REPRODUCTIVE SYSTEM

100. The extra embryonic membranes are.....

- 1) Amnion & Allantois only
- 2) Amnion & chorion only
- 3) Yolk sac & chorion only
- 4) Amnion, allantois, chorion & yolk sac



HUMAN REPRODUCTIVE SYSTEM

101. The somatopleure develops from

- 1) Head & Tail folds of amniotic folds
- 2) Head & lateral folds of amniotic folds
- 3) Lateral & tail folds of amniotic folds
- 4) Head, Tail & lateral folds of amniotic folds



HUMAN REPRODUCTIVE SYSTEM

102. The fluid that acts as a shock absorber & prevents the embryo from desiccation is

- 1) Pleural fluid
- 2) Cerebral fluid
- 3) Amniotic fluid
- 4) Chorionic fluid

HUMAN REPRODUCTIVE SYSTEM

103. Allantois & yolk sac are derived from....

- 1) Somatopleure
-  2) Splanchnopleure
- 3) Mensentopleure
- 4) Both 1 & 2

HUMAN REPRODUCTIVE SYSTEM

104. The chorion develops a rich supply of blood vessels & forms an intimate association with

- 1) Perimetrium of uterus
- 2) Myometrium of uterus
- 3) Endometrium of uterus
- 4) Both Myo & perimetrium of uterus

HUMAN REPRODUCTIVE SYSTEM

105. The embryonic axial skeleton which is replaced by vertebral column is
- 1) Neural tube
 - 2) Neural plates
 - 3) Notochord 
 - 4) Neural folds

HUMAN REPRODUCTIVE SYSTEM

106. The neural plates are formed from ...

- 1) Endodermal cells
- 2) Mesodermal cells
- 3) Ectodermal cells
- 4) Ecto-endo dermal cells

HUMAN REPRODUCTIVE SYSTEM

107. ‘Induction’ process is related to the initial formation of

-  1) Neural plate
- 2) Neural groove
- 3) Neural folds
- 4) Neural tube

HUMAN REPRODUCTIVE SYSTEM

108. The column of mesoderm present near the notochord & neural tube is called



1) Epimere

2) Mesomere

3) Metamere

4) Hypomere

HUMAN REPRODUCTIVE SYSTEM

109. Vertebral column develops from

- 1) Sclerotome of hypomere
- 2) Sclerotome of mesomere
- 3) Sclerotome of Epimere 
- 4) Sclerotome of Dermatomere

HUMAN REPRODUCTIVE SYSTEM

110. Dermis of skin & other connective tissues are formed from ...

- 1) Dermatome of hypomere
- 2) Dermatome of epimere 
- 3) Dermatome of metamere
- 4) Dermatome of mesomere

HUMAN REPRODUCTIVE SYSTEM

111. Myotome develops into



1) Voluntary muscles

2) Involuntary muscles

3) Visceral muscles

4) Cardiac muscles

HUMAN REPRODUCTIVE SYSTEM

112. Intraembryonic coelom is formed in between

-  1) Somatic & splanchnic mesodermal layers
- 2) Somatic & splanchnic ectodermal layers
- 3) Somatic & splanchnic endodermal layers
- 4) Somatic & splanchnic ecto – endodermal layers

HUMAN REPRODUCTIVE SYSTEM

113. In placenta as villi are restricted to the dorsal surface of blastodisc. It is called

1) Discoblastula



2) Discoidal

3) Haemochorial

4) Both 1 & 3

HUMAN REPRODUCTIVE SYSTEM

114. 'Haemochorionic' means

- 
- 1) When maternal blood comes into direct contact with foetal chorion
 - 2) When maternal blood comes into direct contact with foetal amnion
 - 3) When maternal blood comes into direct contact with foetal yolk sac
 - 4) When maternal blood comes into direct contact with foetal allantois

HUMAN REPRODUCTIVE SYSTEM

115. During parturition the placenta cast off with the loss of embryonic membranes & maternal tissues, causing haemorrhage, is called

- 
- 1) Deciduate placenta
 - 2) Placenta haemorrhage
 - 3) Haemochorrial
 - 4) Decidual haemorrhage

HUMAN REPRODUCTIVE SYSTEM

116. Type of placenta in human female is.....

1) Choriovitelline



2) Chorioallontoic

3) Yolk sac

4) Both 1 & 3

HUMAN REPRODUCTIVE SYSTEM

117. Placenta is formed by.....

1) Chorionic villi only

2) Uterine tissue only



3) Both 1 & 2

4) Amniotic layer

HUMAN REPRODUCTIVE SYSTEM

118. Placenta acts as endocrine tissue & secretes.....

- 1) hCG
- 2) PL
- 3) Oestrogens & progesterone
- 4) All



HUMAN REPRODUCTIVE SYSTEM

119. Relaxin is secreted by

1) Placenta



2) Ovary

3) Uterus

4) Pituitary

HUMAN REPRODUCTIVE SYSTEM

120. Hormones secreted only during pregnancy are ...

-  1) hCG, hPL & relaxin
- 2) hCG & Human placental lactogen only
- 3) hPL & relaxin only
- 4) Relaxin only

HUMAN REPRODUCTIVE SYSTEM

121. During pregnancy the levels of these hormones increase many times

- 1) oestrogens, progestogens, cortisol only
- 2) oestrogens, progestogens, cortisol, prolactin only
-  3) oestrogens, progestogens, cortisol, prolactin, thyroxine only
- 4) oestrogens, progestogens only

HUMAN REPRODUCTIVE SYSTEM

122. After implantation the inner cell mass develops into

- 1) Ectoderm
- 2) Endoderm
-  3) Both 1 & 2
- 4) Mesoderm

HUMAN REPRODUCTIVE SYSTEM

123. Gestation period in human beings is



- 1) 9 months
- 2) 12 months
- 3) 5 months
- 4) 16 months

HUMAN REPRODUCTIVE SYSTEM

124. After one month of pregnancy, embryo develops



1) Heart

2) Kidneys

3) Liver

4) Eyelids

HUMAN REPRODUCTIVE SYSTEM

125. Hair on the body & eye lashes are formed

- 1) 18 weeks
- 2) At the end of 20 weeks
-  3) At the end of 24 weeks
- 4) At the end of 12 weeks

HUMAN REPRODUCTIVE SYSTEM

126. By the end of 1st Trimester, the major organ systems formed are

- 
- 1) Limbs & external genital organs
 - 2) Limbs only
 - 3) External genital organs only
 - 4) Heart & limbs

HUMAN REPRODUCTIVE SYSTEM

127. The process of child birth is called.....



- 1) Parturition
- 2) Implantation
- 3) Lactation
- 4) Gestation

HUMAN REPRODUCTIVE SYSTEM

128. The signals for parturition originate from

 1) Fully developed foetus & placenta

2) Fully developed foetus only

3) Placenta only

4) Uterine wall only

HUMAN REPRODUCTIVE SYSTEM

129. The hormone that helps in parturition is

- 1) FSH
- 2) LH
- 3) Oxytocin
- 4) ADH



HUMAN REPRODUCTIVE SYSTEM

130. The mild uterine contractions are called.....

-  1) Foetal ejection reflex
- 2) Parturition
- 3) Implantation
- 4) Gestation

HUMAN REPRODUCTIVE SYSTEM



UNIT-VA

HUMAN

REPRODUCTIVE

SYSTEM

HUMAN REPRODUCTIVE SYSTEM

EXERCISE II

MALE REPRODUCTIVE SYSTEM

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Read the following

- i) Testes are located outside the abdomen in male human beings.
- ii) Scrotal sacs maintain low temperature of the testis.
- iii) Low temperature helps in spermatogenesis.

The correct combination



Only i & iii

2) Only ii & iii

3) Only i & iii

4) All

HUMAN REPRODUCTIVE SYSTEM

2. The function of inhibin is to

- 1) Stimulate the FSH
- 2) Stimulate the secretion of testosterone
- 3) Inhibit the secretion of testosterone
- 4) Inhibits the secretion of FSH



HUMAN REPRODUCTIVE SYSTEM

3. Read the following

- i) Each testicular lobe contains 340 seminiferous tubules.
- ii) Each testis is covered by a dense connective tissue covering.
- iii) Each lobule contains 1-3 seminiferous tubules.

The correct combination



1) Only i & iii

2) Only i & ii

3) Only i & iii

4) All

HUMAN REPRODUCTIVE SYSTEM

4. Read the following

- i) Each seminiferous tubule consists of two types of cells.
- ii) Male germ cells are also called spermatogonia.
- iii) Male germ cells undergo reduction division.

The correct combination

- 1) Only i & ii
- 2) Only ii & iii
- 3) i, ii, iii
- 4) Only i & iii

HUMAN REPRODUCTIVE SYSTEM

5. Read the following

- i) Sertoli cells supply nutrients to germ cells.
- ii) Leydig cells support the germ cells.
- iii) Interstitial cells produce enzymes.
- iv) Testosterone is an androgen.

The correct combination

- 1) Only i & ii
- 3) Only i & iii

- 2) Only i & iv
- 4) All

HUMAN REPRODUCTIVE SYSTEM

6. Read the following

- i) Epididymis opens into vasa efferentia.
- ii) Vas difference opens into Rete testis.
- iii) Rete testis opens into vasa efferentia.

The correct combination

1) Only i

2) Only ii

3) Only iii

4) Only I & ii



HUMAN REPRODUCTIVE SYSTEM

7. Read the following

- i) Ejaculatory duct transports the sperms from testis to outside.
- ii) Urethra originates from urinary bladder.
- iii) Urethra opens out through urethral meatus.

The correct combination

- 1) Only i
- 2) Only i & ii
- 3) Only i, ii & iii
- 4) i & iii



HUMAN REPRODUCTIVE SYSTEM

8. Read the following

- i) The male external genitalia is penis.
- ii) The enlarged end of penis is glans penis.
- iii) The glans penis is covered by fore skin.

The correct combination



- 1) All
- 2) Only i & ii
- 3) Only i & iii
- 4) ii & iii

HUMAN REPRODUCTIVE SYSTEM

9. Read the following male accessory glands

- i) One pair seminal vesicles is present.
- ii) One pair of bulbourethral is present.
- iii) Only one prostate gland is present.

The correct combination

- 1) Only i
- 3) Only iii

- 2) Only ii



- 4) all

HUMAN REPRODUCTIVE SYSTEM

10. Read the following & arrange them in a sequence from outer to inner surface

a) Testis

b) Seminiferous tubule

c) lobule

d) Dense covering

1) A → B → C → D

2)  D → A → C → B

3) B → A → C → D

4) C → A → B → D

HUMAN REPRODUCTIVE SYSTEM

11. Read the following & arrange them in a sequence from inner to outer

a) Rete testis

b) Vasa efferentia

c) Seminal vesicles

d) Vas deferens

e) Seminiferous tubule

f) Urethral meatus

1) e → a → b → d → c → f

2) e → a → c → f → d → b

3) c → d → e → f → a → b

4) b → d → a → f → c → e



HUMAN REPRODUCTIVE SYSTEM

12. Read the following & arrange them in a sequence based on their number in ascending order

- a) Bulbourethral
- b) Prostate gland
- c) Testicular lobules



1) b → a → c

2) a → b → c

3) c → b → a

4) a → c → b

HUMAN REPRODUCTIVE SYSTEM

13. Match the following

List - I

- A) Testicular lobes
- B) Male germ cells
- C) Sertoli cells
- D) Leydig cells

A B C D

- 1) I II IV III
- 2) IV I II III
- 3) I IV II III
- 4) II III IV I

List - II

- I) spermatogonia
- II) Nourishment
- III) Testosterone
- IV) 250 lobules



HUMAN REPRODUCTIVE SYSTEM

14. Match the following

List - I

- A) Rete testis
- B) Androgen
- C) Ejaculatory duct
- D) Urethral opening

List - II

- I) Urethral meatus
- II) Transport sperm
- III) Accessory duct
- IV) Testosterone

A B C D

- 1) III IV II I
- 2) II III I IV
- 3) IV II III I
- 4) II I III IV



HUMAN REPRODUCTIVE SYSTEM

15. Match the following

List - I

- A) Penis
- B) Erectile tissue
- C) Glans penis
- D) Fore skin

List - II

- I) Facilities insemination
- II) Loose skin fold
- III) External genitalia
- IV) Tip of penis

HUMAN REPRODUCTIVE SYSTEM

- A B C D
- 1) III I IV II
- 2) II III IV I
- 3) I III II IV
- 4) I II III IV

HUMAN REPRODUCTIVE SYSTEM

16. Match the following

List - I

A) Seminal vesicles

B) Bulbourethral secretions

C) Prostate

D) Fructose

A B C D

1) I IV III II

2) II III I IV

3) II IV I III

4) IV II III I

List - II

I) Only one

II) One pair

III) Seminal plasma

IV) lubrication

HUMAN REPRODUCTIVE SYSTEM

17. Assertion (A) : Testes are located in scrotum out side the abdomen.

Reason (R) : Scrotum maintains low temperature than body temperature.

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

HUMAN REPRODUCTIVE SYSTEM

18. Assertion (A) : Scrotum maintains temperature of $2.0\text{--}2.5^{\circ}\text{C}$ lower than the normal internal body temperature.

Reason (R) : Low temperature helps in spermatogenesis.

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

HUMAN REPRODUCTIVE SYSTEM

19. Assertion (A) : Leydig cells secrete testosterone.

Reason (R) : Leydig cells act as temporary endocrine cells.

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

HUMAN REPRODUCTIVE SYSTEM

20. Assertion (A) : Sertoli cells nourish the germ cells.

Reason (R) : Germ cells are present in seminiferous tubule.

a) A and R are true and R is the correct explanation of A



b) A and R are true and R is not the correct explanation of A

c) A is true, R is false

d) A is false, R is true

HUMAN REPRODUCTIVE SYSTEM

21. Assertion (A) : Penis has an erectile tissue in it.

Reason (R) : Erectile tissue of penis help in insemination.



A and R are true and R is the correct explanation of A

b) A and R are true and R is not the correct explanation of A

c) A is true, R is false

d) A is false, R is true

HUMAN REPRODUCTIVE SYSTEM

22. Assertion (A) : Seminal plasma is rich in Fructose, calcium etc.

Reason (R) : Seminal plasma is released by accessory glands.

a) A and R are true and R is the correct explanation of A



b) A and R are true and R is not the correct explanation of A

c) A is true, R is false

d) A is false, R is true

HUMAN REPRODUCTIVE SYSTEM

FEMALE REPRODUCTIVE SYSTEM

23. Read the following

- i) Ovaries are the primary female sex organs.
- ii) Ovaries not only release ova but also secrete.
- iii) The ovaries are filled with stroma.

The correct combination



All

2) i & ii

3) ii & iii

4) i & iii

HUMAN REPRODUCTIVE SYSTEM

24. Read the following

- i) Each ovary measures about 2-4 cm in length.
- ii) The stroma consists of outer cortex & inner medulla.
- iii) Ovaries are located one on each side of the lower abdomen.

The correct combination

1) i & ii

3) i & ii

2) ii & iii



all

HUMAN REPRODUCTIVE SYSTEM

25. Read the following

- i) Each fallopian tube is about 10-12 cm long.
- ii) Infundibulum is a funnel shaped part of fallopian tube.
- iii) Infundibulum possesses finger like projections called fimbriae.
- iv) Fimbriae helps in the collection of ova.

The correct combination

1) i & ii only

3) i & iv only

2) ii & iii only

4) all



HUMAN REPRODUCTIVE SYSTEM

26. Read the following & choose the correct combinations

- i) Isthmus is the last part of oviduct.
- ii) The cavity of cervix is called cervical canal.
- iii) Vagina & cervical canal forms birth canal.
- iv) Uterus is attached to pelvic wall through ligaments.

The correct combination



1) all

2) i & ii only

3) ii & iv only

4) i & iv only

HUMAN REPRODUCTIVE SYSTEM

27. Read the following

- i) Perimetrium is the external thin membrane of uterus.
- ii) Myometrium is middle thick layer of smooth muscles of uterus.
- iii) Endometrium is the inner glandular layer of uterus.

The correct combination

- 1) Only i & iii
- 2) Only i
- 3) Only i & ii
- 4) All



HUMAN REPRODUCTIVE SYSTEM

28. Arrange parts of the oviducts in a sequence

A) Isthmus

B) Infundibulum

C) Uterine cavity

D) Fimbriae

E) Ampulla

F) Cervical canal



1) D-B-E-A-C-F

2) D-E-B-C-F-A

3) D-F-C-E-A-B

4) D-A-B-C-E-F

HUMAN REPRODUCTIVE SYSTEM

29. Arrange the 3 different layers of uterine wall from outer to inner surface

A) Endometrium

B) Perimetrium

C) Myometrium



1) B-C-A

2) A-B-C

3) C-B-A

4) A-C-B

HUMAN REPRODUCTIVE SYSTEM

30. Read the following & arrange them in a sequence

A) Glandular tissue of mammary gland

B) Mammary lobules

C) Mammary tubules

D) Lactiferous duct

E) Ampulla



1) A-B-C-E-D

2) A-C-B-E-D

3) A-E-D-C-B

4) A-D-E-B-C

HUMAN REPRODUCTIVE SYSTEM

31. Assertion (A) : Ovaries are endocrine in function.

Reason (R) : Ovaries produce several steroid hormones.



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

HUMAN REPRODUCTIVE SYSTEM

32. Assertion (A) : Infundibulum of oviduct is funnel shaped.

Reason (R) : It collects the ovum after ovulation.

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

HUMAN REPRODUCTIVE SYSTEM

33. Assertion (A) : A single womb is present in female human beings.

Reason (R) : Cavity of cervix is called cervical canal.

a) A and R are true and R is the correct explanation of A

 b) A and R are true and R is not the correct explanation of A

c) A is true, R is false

d) A is false, R is true

HUMAN REPRODUCTIVE SYSTEM

34. Assertion (A) : Endometrium undergoes cyclical changes during menstrual cycle.

Reason (R) : Degeneration & regeneration of endometrium takes place during menstrual cycle.

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

HUMAN REPRODUCTIVE SYSTEM

GAMETOGENESIS

35. Read the following

- i) Sperms & ovum are the gametes produced by primary sex organs of male & female respectively.
- ii) Spermatogonia undergoes mitotic divisions & increase in number.
- iii) Each spermatogonium is haploid & contains 46 chromosomes.

The correct combination is



- 1) Only i & ii
- 3) Only i

- 2) Only i & iii
- 4) All

HUMAN REPRODUCTIVE SYSTEM

36. Read the following statements

- i) Primary spermatocytes undergo meiosis.
- ii) Primary spermatocyte completes first meiotic division & produce two unequal secondary spermatocytes.
- iii) Secondary spermatocytes undergo second meiotic division & produce 4 equal haploid spermatids.

The correct combination is

1) Only i & ii

2) Only ii & iii

3) Only i & iii

4) i, ii, iii



HUMAN REPRODUCTIVE SYSTEM

37 Read the following statements:

- i) After spermatogenesis, sperm heads still present in sertoli cells.
- ii) Releasing of sperm from sertoli cells is called Spermatogenesis.
- iii) Spermatogenesis starts at the age of puberty.

The correct combination

1) i & ii only

3) i & iii



2) i, ii & iii

4) Only i

HUMAN REPRODUCTIVE SYSTEM

38 Read the following statements

- i) LH acts at the leydig cells & stimulates synthesis & secretion of androgens
- ii) Androgens stimulate spermatogenesis
- iii) FSH acts on sertoli cells & stimulates the secretions to help in spermatogenesis

The correct combination

1) all

2) i & ii

3) i & iii

4) ii only

HUMAN REPRODUCTIVE SYSTEM

39. Read the following.....

- a) Sperm
- b) Spermatogonia
- c) Secondary spermatocyte
- d) Primary spermatocyte
- e) Spermatids

Arrange them in a sequence based on their development



1) b-d-c-e-a

2) c-b-a-d-e

3) b-a-d-c-e

4) a-b-d-c-e

HUMAN REPRODUCTIVE SYSTEM

40. Read the following & arrange them in a sequence

- | | |
|---|-------------|
| a) Head | b) Tail |
| c) Middle piece | d) Acrosome |
| 1) c-d-b-a | 2) b-d-c-a |
|  | 3) d-a-c-b |
| | 4) a-c-d-b |

HUMAN REPRODUCTIVE SYSTEM

41. Match the following

List - A

A) Spermatogonia

B) Primary spermatocytes

C) Spermatocytes

D) Spermiogenesis

List - B

I) Sperms

II) Production of sperms

III) Meiosis

IV) Mitosis

A B C D

- 1) IV III I II
- 2) IV I II III
- 3) I II III IV
- 4) II III I IV

HUMAN REPRODUCTIVE SYSTEM

42. Match the following

List - A

- A) LH
- B) FSH
- C) GnRH
- D) Androgen

List - B

- I) Act at anterior pituitary
- II) Act at leydig cells
- III) Act on sertoli cells
- IV) Spermatogenesis

A	B	C	D
---	---	---	---

1) II I III IV

 2) IV I II III

3) I II III IV

4) II III I IV

HUMAN REPRODUCTIVE SYSTEM

43. Match the following

List - A

- A) Head of sperm
- B) Acrosome
- C) Middle piece
- D) Cap - like



List - B

- I) Haploid nucleus
- II) Filled with enzymes
- III) Many mitochondria
- IV) Acrosome

- | | A | B | C | D |
|----|-----|-----|-----|----|
| 1) | I | II | III | IV |
| 2) | II | III | IV | I |
| 3) | III | IV | I | II |
| 4) | IV | III | II | I |

HUMAN REPRODUCTIVE SYSTEM

44. Assertion (A) : Spermatogonia produces sperms by spermatogenesis

Reason (R) : Spermatogenesis starts at the age of puberty

a) A and R are true and R is the correct explanation of A

 **b) A and R are true and R is not the correct explanation of A**

c) A is true , R is false

d) A is false , R is true

HUMAN REPRODUCTIVE SYSTEM

45. Assertion (A) : Release of sperm heads from seminiferous tubules is called spermiation.

Reason (R) : Transformation of spermatids into spermatozoa is called spermiogenesis.

a) A and R are true and R is the correct explanation of A

 b) A and R are true and R is not the correct explanation of A

c) A is true , R is false

d) A is false , R is true

HUMAN REPRODUCTIVE SYSTEM

46. Assertion (A) : FSH acts on sertoli cells & stimulates spermiogenesis indirectly.

Reason (R) : FSH is a gonadotropin hormone.

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

HUMAN REPRODUCTIVE SYSTEM

47. Assertion (A) : Sperm motility is essential for fertilization.

Reason (R) : Many mitochondria help in motility.

a) A and R are true and R is the correct explanation of A

 **b) A and R are true and R is not the correct explanation of A**

c) A is true , R is false

d) A is false , R is true

HUMAN REPRODUCTIVE SYSTEM

48. Assertion (A) : Human male ejaculates about 200-300 million sperms.

Reason (R) : At least 80% of sperms must have normal shape & size.

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



HUMAN REPRODUCTIVE SYSTEM

OOGENESIS

49. Read the following

- i) Oogonia are not formed & added after birth.
- ii) When primary oocyte is surrounded by a layer of granulosa cells, it is called the primary follicle.
- iii) At puberty only 60,000 – 80,000 primary follicles are left in the ovary.

The correct combinations.....



1) All

2) Only i & ii

3) i & iii only

4) iii only

HUMAN REPRODUCTIVE SYSTEM

50. Read the following

- i) Primary follicles are surrounded by many layers of granulosa cells & theca
- ii) Secondary follicles are surrounded by theca
- iii) Antrum is formed at Tertiary follicle stage

The correct combinations.....

- 1) Only i
- 3) Only iii

- 2) Only ii
-  i, ii & iii only

HUMAN REPRODUCTIVE SYSTEM

51. Read the following

- i) Secondary oocyte is haploid
- ii) Zona pellucida is present around secondary oocyte
- iii) Primary oocyte retains bulk of the nutrient rich cytoplasm of secondary oocyte

The correct combinations....

1) Only i & iii



2) Only i & ii

3) All

4) Only iii

HUMAN REPRODUCTIVE SYSTEM

52. Assertion (A) : Primary oocyte develops into secondary oocyte

Reason (R) : Secondary oocyte is released into body cavity

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



HUMAN REPRODUCTIVE SYSTEM

53. Assertion (A) : Primary oocyte completes its first meiotic division in tertiary follicle

Reason (R) : Antrum develops during secondary follicular stage

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



HUMAN REPRODUCTIVE SYSTEM

54. Read the following & arrange them in a sequence

- a) Ova
- b) oogonia
- c) Primary oocyte
- d) Secondary oocyte
- e) Graffian follicle

1) a-c-b-d-e

2) c-d-e-a-b

3) b-d-c-e-a

 b-c-d-e-a

HUMAN REPRODUCTIVE SYSTEM

55. Read the following & arrange them in a sequence from inner to outer surface of the ovum

a) Theca externa b) Zona pellucida c) Theca Interna

d) Layer of granulosa cells e) Primary oocyte



1) e-b-d-c-a

2) c-a-b-d-e

3) a-d-e-b-c

4) e-d-b-a-c

HUMAN REPRODUCTIVE SYSTEM

56. Match the following

List - A

- A) In foetal ovary
- B) At puberty
- C) Ovulation
- D) Ist polar body

List - B

- i) After Ist meiotic division
- ii) Couple of million gametes
- iii) Single ovum
- iv) 60,000 – 80, 000 Primordial follicles



- | | A | B | C | D |
|----|-----|-----|-----|-----|
| 1) | ii | iv | iii | i |
| 2) | ii | iii | iv | i |
| 3) | iii | ii | iv | i |
| 4) | iv | i | ii | iii |

HUMAN REPRODUCTIVE SYSTEM

MENSTRUAL CYCLE

57. Read the following

- i) The first menstruation is called menarche
- ii) The last menstruation is called menopause
- iii) The reproductive phase extends between menarche & menopause

The correct combination is

- 
- 1) All
 - 2) i & ii
 - 3) i & iii
 - 4) Only ii

HUMAN REPRODUCTIVE SYSTEM

58. Read the following

- i) Menstruation cycle has 4 phases
- ii) Luteal phase is called secretory phase
- iii) Follicular phase is also called proliferative phase
- iv) Primary Follicles grow to fully mature graafian follicle in follicular phase

The correct combinations..

- 1) Only i & ii
- 2) Only i & iii
- 3) Only i & iv



4) All

HUMAN REPRODUCTIVE SYSTEM

59. Read the following

- i) Gonadotropins increases gradually during follicular phase
- ii) Rapid secretion of LH during the mid-cycle is called LH surge
- iii) Graffian follicle transform as corpus luteum after ovulation
- iv) During pregnancy all events of the menstrual cycle stop & there is no mensuration

The correct combination...

- 1) Only i & ii
- 2) Only i & iii
- 3) Only i & iv
- 4) All



HUMAN REPRODUCTIVE SYSTEM

60. Read the following & arrange them in a sequence

- a) Luteal phase b) Menstrual phase c) Follicular phase



1) b-c-a

2) a-b-c

3) b-a-c

4) c-a-b

HUMAN REPRODUCTIVE SYSTEM

61. Read the following and arrange them in a sequence

- a) Menopause b) Menarche c) Reproductive phase

1) a-b-c

2) c-b-a

 3) b-c-a

4) c-a-b

HUMAN REPRODUCTIVE SYSTEM

62. Match the following

List - A

- A) Menstrual phase
- B) Follicular phase
- C) Luteal phase
- D) Menarche
- E) Menopause

List - B

- I) 7-14 days
- II) 15-28 days
- III) 50 years
- IV) 3-5 days
- V) 10-14 years

A B C D E

- 1) IV I V II III
- 2) IV I II V III
- 3) I III IV II V
- 4) V I II III IV



HUMAN REPRODUCTIVE SYSTEM

FERTILIZATION & IMPLANTATION

63. Read the following

- i) The sperms move to ampullary-isthmic junction for fertilization
- ii) Fertilization occurs in uterus
- iii) The process of fusion of a sperm with an ovum is called fertilization
- iv) Ovum is enveloped by zona pellucida

The correct combination....

- 1) All
- 2) Only i & ii
- 3) Only i, iii & iv
- 4) Only i & iv



HUMAN REPRODUCTIVE SYSTEM

64. Read the following

- i) Sperm induces changes in corona radiata to prevent polyspermy.
- ii) Only one sperm enters into ovum to fertilize it.
- iii) Acrosome penetrates into ovum with its secretion.
- iv) Sperm penetrates through zona pellucida & plasma membrane of the ovum.

The correct combination....



1) All except (i)

2) All except (ii)

3) All expect (iii)

4) All expect (iv)

HUMAN REPRODUCTIVE SYSTEM

65. Read the following.....

- i) The Ist & IInd meiotic divisions are unequal.
- ii) Ist & IInd polar bodies are tiny in structure.
- iii) Ootid is haploid in condition.

The correct combination is

- 1) Only i & ii
- 2) Only ii & iii
- 3) Only ii & iii
- 4) All



HUMAN REPRODUCTIVE SYSTEM

66. Assertion (A) : Fertilization can only occur if the ovum & sperms are transported to ampullary-Isthmic junction.

Reason (R) : Fertilization occurs in ampulla.

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

HUMAN REPRODUCTIVE SYSTEM

67. Assertion (A) : Motility of sperm depends on the no. of mitochondria.

Reason (R) : Motile sperms swim rapidly through cervix.

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



HUMAN REPRODUCTIVE SYSTEM

68. Assertion (A) : Polyspermy is inhibited by zona pellucida.

Reason (R) : Sperm induces changes in zona pellucida.



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

HUMAN REPRODUCTIVE SYSTEM

69. Assertion (A) : Blastocyst is with 8-16 blastomeres.

Reason (R) : In cleavage zygote undergoes mitotic division.

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



HUMAN REPRODUCTIVE SYSTEM

70. Read the following & arrange them in a sequence of passage of sperms

- a) Cervix
- b) isthmus
- c) ampulla
- d) sperm
- e) Ampillary isthmic junction
- f) uterus

1) d-a-f-b-c-e

2) a-b-c-d-e-f

3) c-b-a-d-e-f

4) f-a-b-d-c-e

HUMAN REPRODUCTIVE SYSTEM

71. Read the following and arrange them in a sequence

- a) Implantation
- b) Blastomeres
- c) Zygote
- d) Morula
- e) Cleavage
- f) Blastocyst

1) c-a-b-d-e-f

 c-e-b-d-f-a

3) b-d-a-c-f-e

4) b-e-f-d-a-c

HUMAN REPRODUCTIVE SYSTEM

72. Match the following

List - A

- A) Fertilization
- B) Blastocyst
- C) Morula
- D) Inner group of cells
- E) Outer cells

List - B

- I) Inner mass of cells
- II) 8-16 blastomeres
- III) Isthmus-Ampullary junction
- IV) Implantation
- V) Trophoblasts

HUMAN REPRODUCTIVE SYSTEM

- | | A | B | C | D | E |
|----|-----|----|-----|----|---|
| 1) | III | IV | II | I | V |
| 2) | III | II | I | IV | V |
| 3) | I | II | III | IV | V |
| 4) | II | IV | III | V | I |



HUMAN REPRODUCTIVE SYSTEM

PREGNANCY & EMBRYONIC DEVELOPMENT

73. Read the statements

- i) Hyaluronic acid in the ground substance of follicle cells is dissolved by hyaluronidase enzyme
- ii) Acrosin enzyme helps in dissolving zona pellucida
- iii) Hyaluronidase is secreted by acrosome

The correct combinations are

- 1) Only i & iii
- 2) Only i & ii
- 3) Only i
- 4) i, ii & iii



HUMAN REPRODUCTIVE SYSTEM

74. Read the statements

- i) The cavity in blastocyst is called blastocoel
- ii) The side of blastocyst to which inner cell mass is attached embryonic pole
- iii) The opposite side if embryonic pole region is called abembryonic pole

The correct combinations are



1) i, ii & iii

2) i & ii only

3) i & iii Only

4) iii only

HUMAN REPRODUCTIVE SYSTEM

75. Read the statements

- i) In humans , Implantation begins on 6th day after fertilization
- ii) Implantation of the blastocyst is completed by the end of second week after fertilization
- iii) Soon after the embryonic disc formation, the cells of Rauber disappear

The correct combination is

- 1) i, ii only
- 2) ii & iii only
- 3) all
- 4) i only

HUMAN REPRODUCTIVE SYSTEM

76. Read the statements

- i) The portion of decidua where the placenta is to be formed is called decidua basalis
- ii) The part of decidua that separates the embryo from the uterine lumen is called decidua parietalis
- iii) The part lining the rest of the uterus cavity is called decidua parietalis

The correct combinations are

 1) Only i & iii

2) Only i & iii

3) i, ii & iii

4) Only iii

HUMAN REPRODUCTIVE SYSTEM

77. Read the statements

- i) Bilaminar embryonic disc contains Epi & Hypoblasts
- ii) Trilaminar embryonic disc contains Ecto, endo & Mesoderms
- iii) Extra embryonic membranes are of three varieties only

The correct combinations are

- 1) Only i & iii
- 2) Only i & ii
- 3) Only i
- 4) All are correct

HUMAN REPRODUCTIVE SYSTEM

78. Read the statements

- i) Allantois & yolk sac are derived from splanchnopleure.
- ii) Allonotis & chorion are fused & chori-allontoic membrane is connected to umbilical cord.
- iii) Yolk sac has no nutritive values.

The correct combinations are

- 1) i, ii & iii
- 2) Only i & ii
- 3) Only i & iii
- 4) Only iii



HUMAN REPRODUCTIVE SYSTEM

79. Read the statements

- i) Epimere is present near notochord.
- ii) Hypomere is present around the gut.
- iii) Mesomere is present in between Epi & Hypomeres.

The correct combinations are

 1) i, ii & iii

2) Only i & ii

3) Only i & iii

4) Only iii

HUMAN REPRODUCTIVE SYSTEM

80. Read the statements...

- i) Myotome develops voluntary muscles
- ii) Sclerotome forms vertebral column
- iii) Dermatome forms dermis of skin only

The correct combinations are



1) Only i & ii

2) Only i & iii

3) Only ii & iii

4) i, ii & iii

HUMAN REPRODUCTIVE SYSTEM

81. Read the following

- i) The finger like projections of trophoblasts are chorionic villi
- ii) Chorionic villi & uterine tissue together form placenta
- iii) Placenta is connected to embryo through umbilical cord
- iv) Placenta secrets various hormones

The correct combinations are

1) Only i & ii

3) Only iii & iv

2) Only ii & iii



4) all

HUMAN REPRODUCTIVE SYSTEM

82. Read the following

- i) hPL, hCG & relaxin are produced only during pregnancy
- ii) Certain hormones like thyroxine, prolactin etc. help in foetal growth
- iii) Ecto & endoderm are found before implantation
- iv) The inner cell – mass contains stem cells

The correct combinations are

1) All except i



2) All except ii

3) All except iii

4) All except iv

HUMAN REPRODUCTIVE SYSTEM

83. Read the following

- i) By the end of 2nd month of pregnancy limbs form
- ii) In 5th month of pregnancy hair on head of foetus develop
- iii) By the end IInd trimester body develop hair, eye-lids separation occurs
- iv) By the end Ist trimester major organ system develop

The correct combinations are



All

2) Only i & iv

3) Only i & iii

4) Only i & ii

HUMAN REPRODUCTIVE SYSTEM

84. Read the following

- i) Oxytocin acts on uterine muscles & cause stronger uterine contractions.
- ii) The stimulatory reflex between uterine contraction & oxytocin secretion continues resulting in stronger uterine contractions.
- iii) Parturition occurs through birth canal.

The correct combinations are

- 1) i & ii only
- 3) i & iii only

- 2) ii & iii only



- .) all

HUMAN REPRODUCTIVE SYSTEM

85. Match the following

List - A

- A) Zona pellucida
- B) Trophoblast
- C) Embryoblast
- D) Blastocyst

List - B

- I) Trophoectoderm
- II) After morula stage
- III) Acrosome
- IV) Embryo proper

A B C D

- 1)  III I IV II
2) III IV I II
3) II IV III I
4) I II III IV

HUMAN REPRODUCTIVE SYSTEM

86. Match the following

List - A

- A) Decidua
- B) D. Basalis
- C) D. capsularis
- D) D. Parietalis

List - B

- I) Between embryo uterine cavity
- II) Between embryo placenta
- III) Place of placenta formation
- IV) Rest of the decidua
- V) Uterine endometrium

HUMAN REPRODUCTIVE SYSTEM

A B C D

1) V I II IV

2) I II IV III

3) V III I IV

4) I IV II V



HUMAN REPRODUCTIVE SYSTEM

87. Match the following

List - A

A) Yolksac

B) Hypoblast

C) Delamination

D) Epiblast

List - B

I) Separation of two cell layers

II) Outer layer of embryonic disc

III) Umbilical vesicle

IV) Extra embryonic endoderm

- | | A | B | C | D |
|----|-----|-----|----|----|
| 1) | II | III | I | IV |
| 2) | III | IV | I | II |
| 3) | I | II | IV | II |
| 4) | III | II | IV | I |



HUMAN REPRODUCTIVE SYSTEM

88. Match the following

List - A

- A) Epimere
- B) Hypomere
- C) Mesomere
- D) Dermatome

List - B

- I) Urinogential organs
- II) Connective tissue
- III) Placenta
- IV) Somites
- V) Coelom formation

HUMAN REPRODUCTIVE SYSTEM

A B C D

1) I II IV III

2) II IV V III

3) IV I II III

4) IV V I II



HUMAN REPRODUCTIVE SYSTEM

89. Match the following

List - A

- A) Relaxin
- B) hCG
- C) Inner cell mass
- D) Umbilical cord

List - B

- I) Ovary
- II) Placenta
- III) Stem cells
- IV) Between embryo placenta

A B C D

- 1) II III I IV
- 2) I II III IV
- 3) II III I IV
- 4) IV I II III



HUMAN REPRODUCTIVE SYSTEM

90. Match the following

List - A

- A) Heart of foetus
- B) By the end of 2nd month
- C) By the end of 12 weeks
- D) During 5th month of pregnancy

List - B

- I) External genital organ
- II) Hair on head
- III) After a month
- IV) Limbs & digits

- | | A | B | C | D |
|----|-----|-----|-----|----|
| 1) | III | IV | I | II |
| 2) | III | I | II | IV |
| 3) | II | I | III | IV |
| 4) | I | III | IV | II |



HUMAN REPRODUCTIVE SYSTEM

91. Match the following

List - A

- A) Separation of eyelids
- B) Parturition
- C) Lactation
- D) Ist trimester

List - B

- I) Milk production by end of pregnancy
- II) 12 weeks
- III) By the end of IInd trimester
- IV) By the end of 9 months

	A	B	C	D
--	---	---	---	---

1)	III	II	IV	II
----	-----	----	----	----

2)	II	III	IV	I
----	----	-----	----	---

3)	III	IV	I	II
----	-----	----	---	----

4)	IV	II	I	III
----	----	----	---	-----



HUMAN REPRODUCTIVE SYSTEM

92. Read the following & arrange them in sequence of their development

- a) Primitive pit b) Primary nodes
- c) Primary folds d) Primary streak
- e) Primitive streak

1) e-f-c-a-b



2) d-e-c-a-b

3) c-b-e-a-d

4) a-c-b-d-e

HUMAN REPRODUCTIVE SYSTEM

93. Read the following & arrange them in sequence

- a) Organogenesis
- b) Bilaminar embryo
- c) Implantation
- d) Trilaminar embryo
- e) Gastrulation



1) c-b-e-d-a

2) c-e-b-d-a

3) a-b-d-e-c

4) e-b-d-a-c

HUMAN REPRODUCTIVE SYSTEM

94. Read the following events & arrange them in a sequence

a) Neural plate

b) Neural groove

c) Neural folds

d) Neural tube

1) a-d-b-c

2) c-d-a-b

3) a-b-c-d

4) c-b-d-a



HUMAN REPRODUCTIVE SYSTEM

95. Assertion (A): Inner cell mass of embryo develops into embryo proper.

Reason (R): The outer layer of cells become trophoectoderm.

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

HUMAN REPRODUCTIVE SYSTEM

96. Assertion (A) : Blastocoel is a primary body cavity.

Reason (R) : First formed cavity occurs during blastocyst stage.



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

HUMAN REPRODUCTIVE SYSTEM

97. Assertion (A) : At the end of pregnancy, the decidua is shed off.

Reason (R) : Uterine myometrium develops into decidua.

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

HUMAN REPRODUCTIVE SYSTEM

98. Assertion (A) : Ingression occurs during endoderm formation.

Reason (R) : Hypoblast cells are occupied by epiblast cell.



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

HUMAN REPRODUCTIVE SYSTEM

99. Assertion (A) : Yolk sac has no nutritive role.

Reason (R) : Yolk is absent in yolk sac of mammals.



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

HUMAN REPRODUCTIVE SYSTEM

100. Assertion (A) : Intra embryonic coelom forms pericardial, pleural cavities.

Reason (R) : Intra embryonic coelom is forms between parietal & visceral layers.

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

HUMAN REPRODUCTIVE SYSTEM

101. Assertion (A) : Placenta is called Discoidal.

Reason (R) : Villi of placenta are restricted to dorsal surface of blastodisc.

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

HUMAN REPRODUCTIVE SYSTEM

102. Assertion (A) : Placenta is haemochorionic.

Reason (R) : Maternal blood comes into direct contact with the foetal chorion.



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

HUMAN REPRODUCTIVE SYSTEM

103. Assertion (A) : Placenta is called deciduate placenta.

Reason (R) : Placenta is cast off during parturition with loss of tissue & blood.

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

HUMAN REPRODUCTIVE SYSTEM

104. Assertion (A) : Placenta is connected to embryo through umbilical cord.

Reason (R) : Umbilical cord help in transport of substances.

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

HUMAN REPRODUCTIVE SYSTEM

105. Assertion (A) : Levels of estrogens, progesterons etc. increases during pregnancy.

Reason (R) : Increased levels of above hormones help in maintenance of pregnancy.

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

HUMAN REPRODUCTIVE SYSTEM

106. Assertion (A) : Intrauterine period is gestation.

Reason (R) : Gestation period is 9 months in human beings.

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

HUMAN REPRODUCTIVE SYSTEM

107. Assertion (A) : Stem cells are present in inner cell mass of a blastocyst.

Reason (R) : Stem cells exhibit self –renewal and cellular potency.

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

HUMAN REPRODUCTIVE SYSTEM

108. Assertion (A) : Oxytocin helps in parturition.

Reason (R) : Oxytocin is secreted by maternal pituitary.

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

HUMAN REPRODUCTIVE SYSTEM

109. Assertion (A) : The initial milk produced after parturition is called colostrum.

Reason (R) : Colostrum consists of several antigens to develop resistance for new born babies.

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

HUMAN REPRODUCTIVE SYSTEM



UNIT-VA

HUMAN

REPRODUCTIVE

SYSTEM

HUMAN REPRODUCTIVE SYSTEM

EXERCISE III

HUMAN REPRODUCTIVE SYSTEM

MCQs

1. Which of the following is not associated with womb?



- 1) Outer thin membranous perimetrium
- 2) Middle thick layer of striped muscle of myometrium
- 3) Middle thick layer of smooth muscle myometrium
- 4) Inner glandular layer endometrium

HUMAN REPRODUCTIVE SYSTEM

2. The ‘Clitoris’ is located in urethral opening at the

- 1) Lower junction of the two labia minora
- 2) Upper junction of the two labia majora
- 3) Lower junction of the two labia majora
- 4)  Upper junction of the two labia minora

HUMAN REPRODUCTIVE SYSTEM

3. Each mammary gland consists of

-  1) Glandular tissue & fat
- 2) Fat & milk secreted by gastric gland
- 3) Only glandular tissue
- 4) Only fat

HUMAN REPRODUCTIVE SYSTEM

4. Which of the following indicates the correct flow of milk until the milk is sucked out?

- 1) Alveoli of mammary lobes-cavities of alveoli-mammary tubules-mammary duct-mammary ampulla-lactiferous duct
- 2) Alveoli of mammary lobes-mammary tubules-cavities of alveoli-mammary duct-mammary ampulla-lactiferous duct
- 3) Mammary ampulla-alveoli of mammary lobes-mammary tubules-lactiferous duct
- 4) Mammary ampulla-mammary duct-mammary tubules-alveoli of mammary glands-cavities of alveoli-lactiferous duct

HUMAN REPRODUCTIVE SYSTEM

5. The site of spermatogenesis in humans

- 1) Spermiducal funnels
- 2) Seminal vesicle
- 3) Epididymis
- 4)  Seminiferous tubules

HUMAN REPRODUCTIVE SYSTEM

6. To produce 100 spermatozoa

- 1) 50 primary spermatocytes are required
- 2) 100 secondary spermatocytes are required
- 3) 25 secondary spermatocytes are required
- 4)  100 spermatocytes are required

HUMAN REPRODUCTIVE SYSTEM

7. The first stage with haploid set of chromosomes can be seen in the following during spermatogenesis
- 1) Primary spermatocyte
 - 2) Spermatid
 -  3) Secondary spermatocyte
 - 4) Spermatozoa

HUMAN REPRODUCTIVE SYSTEM

8. Oogenesis is different from spermatogenesis in the following aspect
- 1) A reproduction division
 - 2) Haploid gametes are formed
 -  3) The process initiated during the embryonic stage
 - 4) A non reduction division

HUMAN REPRODUCTIVE SYSTEM

9. Find out the correct statement

- 1) Primary follicle is with oogonia
-  Primary follicle is with primary oocyte
- 3) Secondary follicle is with secondary oocyte
- 4) Tertiary follicle is with primary oocyte without antrum

HUMAN REPRODUCTIVE SYSTEM

10. Ovulation occurs during

- 1) Beginning of each menstrual cycle
- 2) End of each menstrual cycle
- 3) Middle of first menstrual cycle only
- 4) Middle of each menstrual cycle



HUMAN REPRODUCTIVE SYSTEM

11. For maintenance of the endometrium of womb the hormone that is secreted from corpus luteum
- 1) Estrogen
 - 2) Inhibin
 - 3) GnRH
 - 4) Progesterone

HUMAN REPRODUCTIVE SYSTEM

12. Parturition is induced by a complex



- 1) Neuro endocrine mechanism
- 2) Physico-chemical phenomenon
- 3) Neuro physical mechanism
- 4) Only physical phenomenon

HUMAN REPRODUCTIVE SYSTEM

13. ‘Spermatic cord’ joins the

1) Testis with ventral abdominal wall

 2) Testis with dorsal abdominal wall

3) Scrotal sacs with ventral abdominal wall

4) Scrotal sacs with dorsal abdominal wall

HUMAN REPRODUCTIVE SYSTEM

14. ‘Cryptorchidism’ is .

1) Failure of development of testes

 2) Failure of descending testes into scrotal sacs

3) Failure of development of scrotum

4) Failure of production of sperms

HUMAN REPRODUCTIVE SYSTEM

15. Androgen binding protein of sertoli cells involved in

- 1) Concentrate testosterone
- 2) Stimulate the secretion of 'inhibin' 2
- 3) Increases the secretion of FSH
- 4) Both 1 & 2



HUMAN REPRODUCTIVE SYSTEM

16. Vasa efferentia ends in and vasa differentia starts from the following regions of epididymis respectively

- 
- 1) Caput epididymis & Cauda epididymis
 - 2) Caput epididymis & Carpus epididymis
 - 3) Cauda epididymis & Caput epididymis
 - 4) Cauda Epididymis & Carpus epididymis

HUMAN REPRODUCTIVE SYSTEM

17. Identify the correct sequence of phases of menstrual cycle

1) Ovulatory – follicular – menstrual – luteal

 2) Menstrual – follicular – ovulatory – luteal

3) Menstrual – luteal – ovulatory – follicular

4) Luteal – menstrual – ovulatory – follicular

HUMAN REPRODUCTIVE SYSTEM

18. High concentration of estrogen inhibits secretion of

- 1) FSH
- 2) GnRH
- 3) LH
- 4) Both 1 & 2



HUMAN REPRODUCTIVE SYSTEM

19. The inner most foetal membrane around the embryo immediately

-  1) Amnion
- 2) Allantois
- 3) Chorion
- 4) Yolk sac

HUMAN REPRODUCTIVE SYSTEM

20. A : Penis of male is homologous to clitoris of human female

R : Both are highly sensitive and both are supported by corpora cavernosa

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

HUMAN REPRODUCTIVE SYSTEM

21. A :During ovulation, the oocyte release one polar body

R : When oocyte is in fallopian tube, it is in second in females



a) A and R are true and R is the correct explanation of A

b) A and R are true and R is not the correct explanation of A

c) A is true, R is false

d) A is false, R is true

HUMAN REPRODUCTIVE SYSTEM

22. A : If the fertilization takes place, the ovulation is prevented in females

R : Corpus luteum secretes progesterone throughout the gestation period



a) A and R are true and R is the correct explanation of A

b) A and R are true and R is not the correct explanation of A

c) A is true, R is false

d) A is false, R is true

HUMAN REPRODUCTIVE SYSTEM

23. A : Placenta in humans is called chorion- allantoic

R : Both chorion and allantoics participate in its formation

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

HUMAN REPRODUCTIVE SYSTEM

24. The graafian follicle contains the following structures

- A. Corona radiata
- B. Discus proligerus
- C. Zona pellucida
- D. Membrana granulosa
- E. Antrum

Arrange the above from outside to inside

1) D - E - B - C - A

2) E - D - B - A - C

3) D - E - B - A - C

4) D - C - B - E - A



HUMAN REPRODUCTIVE SYSTEM

25. A : Capacitation is the physiological maturation of sperm after which it is able to fertilize ovum

R : Capacitation occurs in the female genital tract



1) A and R are true and R is the correct explanation of A

2) A and R are true and R is not the correct explanation of A

3) A is true, R is false

4) A is false, R is true

HUMAN REPRODUCTIVE SYSTEM

- 26. A : Decidua is the umbilical cord, maternal tissue and foetal tissue expelled after the birth of the body**
R : Foetal blood and maternal blood in human placenta are separated by only blood capillaries.
- 1) A and R are true and R is the correct explanation of A
- 2) A and R are true and R is not the correct explanation of A
- 3) A is true, R is false
- 4) A is false, R is true

HUMAN REPRODUCTIVE SYSTEM

27. A : Parturition in human being is controlled by the signals originate from fully formed foetus & placenta; oxytocin & relaxin hormones.

R : Parturition is controlled by a complex neuroendocrine mechanism.



- 1) A and R are true and R is the correct explanation of A
- 2) A and R are true and R is not the correct explanation of A
- 3) A is true, R is false
- 4) A is false, R is true

HUMAN REPRODUCTIVE SYSTEM

28. Which is correct about human sperm? (CBSE 2010)



- 1) Sperm lysis in acrosome dissolves egg envelop facilitating fertilization
- 2) Acrosome serves as sensory structure leading sperm towards ovum
- 3) Acrosome has no particular function
- 4) Acrosome has conical tip for piercing and penetrating egg for fertilization

HUMAN REPRODUCTIVE SYSTEM

29. Match the columns and find the correct combination

- a) Hypothalamus
- b) Acrosome
- c) Graffian follicle
- d) Leydig cells
- e) Parturition

- 1) Sperm lysis
- 2) Estrogen
- 3) Oxytocin
- 4) GnRH
- 5) Testosterone

(KERALA 2009)

- 1) a-2, b-1, c-4, d-3, e-5
- 2) a-4, b-1, c-2, d-5, e-3
- 3) a-2, b-1, c-5, d-4, e-3
- 4) a-4, b-1, c-2, d-3, e-5
- 5) a-5, b-1, c-3, d-2, e-4



HUMAN REPRODUCTIVE SYSTEM

**30. The release of ovum from Graffian follicles takes place during...day.
(Manipal PMT 2000, AIPMENT Nagapur-2007)**

1) 12th – 14th



2) 14th – 16th

3) Last 2 days of menstrual cycle

4) 8th – 10th

HUMAN REPRODUCTIVE SYSTEM

31. The cells that pass through Hensen's node are the future

- 1) Neuroectodermal cells
-  2) Notochordal mesoderm
- 3) Hypoblast cells
- 4) Endodermal cells

HUMAN REPRODUCTIVE SYSTEM

32. Fertilization was discovered by

(Wardha 2005)

 1) Strasburger

2) Robert Brown

3) Lamarck

4) Darwin

HUMAN REPRODUCTIVE SYSTEM

33. Grey crescent is

(Manipal 2005)

1) Melanin rich area of egg



2) Melanin rich area formed at the region opposite to entry of sperm

3) Yolk rich area of egg

4) Laying of sperms and eggs in Frog

HUMAN REPRODUCTIVE SYSTEM

34. Sertoli cells secrete a hormone

(KCET 2005)

- 1) Gonadotropin
- 2) Testosterone
- 3) Relaxin
- 4) Inhibin

HUMAN REPRODUCTIVE SYSTEM

35. Low level of progesterone and estrogen stimulates the production of
(AMU 2005)

 1) FSH- RH

2) LH

3) GH

4) All

HUMAN REPRODUCTIVE SYSTEM

**36. In human female, ovulation occurs during menstrual cycle...
(CBSE 2004)**



- 1) At the end of proliferative phase**
- 2) In the middle of secretory phase**
- 3) Just before the end of secretory phase**
- 4) In the beginning of proliferative phase**

HUMAN REPRODUCTIVE SYSTEM

37. In spermatogenesis. The phase of maturation involves...

(KCET 2003)

- 1) Growth of spermatogonia into spermatocytes
- 2) Formation of spermatogonia from gonocytes through mitosis
- 3) Formation of spermatids from primary spermatocytes through meiosis
- 4) Formation of oogonia from spermatocytes through meiosis

HUMAN REPRODUCTIVE SYSTEM

38. Menstruation is caused by (MPPMT 2009, ORISSA 2009)

- 1) Increase in FSH level
- 2) Fall in oxytocin level
-  3) Fall in progesterone level
- 4) Increase in oestrogen level

HUMAN REPRODUCTIVE SYSTEM

39. In ectopic pregnancy, foetus grows in

(AMU 2003)

- 1) Vagina
-  2) Fallopian tube
- 3) Uterus
- 4) Body cavity

HUMAN REPRODUCTIVE SYSTEM

40. Onset of menstruation is due to

(DPMT 2003)

-  1) Fall in level of progesterone
- 2) Increase in oestrogen level
- 3) Increase in FSH level
- 4) Decrease in oxytocin level

HUMAN REPRODUCTIVE SYSTEM

**40. Polar bodies formed during the formation of oocytes are
(MGIMS, Wardha 2001, Manipal PMT2003)**



- 1) Smaller cells formed due to unequal meiosis**
- 2) Structures which bud off during oogenesis**
- 3) Structure formed during spermatogenesis**
- 4) Daughter cells formed after mitosis**

HUMAN REPRODUCTIVE SYSTEM

42. Which is the correct sequence in Spermatogenesis?

(MPPMT 1989, CBSE 2009)

- 1) Spermatogonia → Spermatids → Secondary spermatocytes → primary spermatocytes → sperms
- 2) Spermatogonia → Spermatids → primary spermatocytes → Secondary spermatocytes → sperms
- 3) primary spermatocytes → Secondary spermatocytes → Spermatids → Spermatogonia → sperms
- 4) Spermatogonia → primary spermatocytes → Secondary spermatocytes → Spermatids → sperms

HUMAN REPRODUCTIVE SYSTEM

43. 100 spermatozoa and 100 mature ova are formed by ...

(MPPMT 1991, 2000)

- 1) 50 secondary spermatocytes and 50 secondary oocytes
- 2) 25 secondary spermatocytes and 25 secondary oocytes
- 3) 25 primary spermatocytes and 25 primary oocytes
- 4) 25 primary spermatocytes and 100 primary oocytes



HUMAN REPRODUCTIVE SYSTEM

44. Function of prostate gland is to

(Wardha 2005)

1) Storage of semen



2) Provide motility to sperms

3) Formation of semen

4) Release of hormones

HUMAN REPRODUCTIVE SYSTEM

45. Identify the correct passage of spermatozoa in male human reproductive system (TS EAM 2015)

A) Vas deferens

B) Epididymis

C) Urethra

D) Vasa efferentia

E) Ejaculatory duct

F) Seminiferous tubules

1) B → D → F → C → A → E

2) B → C → C → F → A → D

3) F → D → B → D → E → C

4) F → B → A → D → E → C



HUMAN REPRODUCTIVE SYSTEM

46. Match the following

(AP EAM 2015)

List - I

- a) Syphilis
- b) Genital warts
- c) Hepatitis
- d) Gonorrhea

List - II

- I) Human papilloma virus
- II) HBV
- III) Treponema pallidum
- IV) HSV (Herpes simple virus)
- V) Neisseria

HUMAN REPRODUCTIVE SYSTEM

A B C D

1) (ii) (iii) (i) (iv)

2) (iv) (ii) (iii) (i)

3) (iii) (ii) (iv) (i)

4) (iv) (i) (iii) (ii)



HUMAN REPRODUCTIVE SYSTEM

47. Study the following and identify the correct combinations

**Extra embryonic
membrane**

A) Amnion

B) Allantois

C) Yolk sac

D) Chorion

formed by

Somatopleure

Splanchnopleure

Mid gut

Outer wall of amniotic folds

(AP EAM 2015)
function

Protection

Placenta formation

Nutrition

Excretion

1) A, B

2) B, D

3) A, C

4) B, C

HUMAN REPRODUCTIVE SYSTEM

48. Identify the complete and correct sequence in the passage of spermatozoa. (AP EAM 2015)

- 1) Seminiferous tubules → Rete testis → Vasa efferentia → Vas deferens → epididymis → Ejaculatory
- 2) Seminiferous tubules → Rete testis → Vasa efferentia → epididymis → Vas deferens → Ejaculatory
- 3) Seminiferous tubules → Rete testis → Vasa efferentia → epididymis → Urethra → Vagina of female
- 4) Seminiferous tubules → Rete testis → Vasa efferentia → epididymis → Ejaculatory duct → Vagina of female

HUMAN REPRODUCTIVE SYSTEM

49. Match the following

List - I

A) Leydig cells

B) Sertoli cells

C) Rete testis

D) Corpus luteum

List - II

I) Carry sperms from seminiferous tubules to vasa efferentia

II) Nourish sperms

III) Secretion of testosterone

IV) Secretion of progesterone

HUMAN REPRODUCTIVE SYSTEM

The correct match

- | | A | B | C | D |
|----|-----|-----|---|----|
| 1) | II | III | V | IV |
| ✓ | III | II | I | IV |
| 3) | III | II | V | IV |
| 4) | II | III | I | V |

HUMAN REPRODUCTIVE SYSTEM



UNIT-VA

HUMAN

REPRODUCTIVE

SYSTEM

EXERCISE IV

1. In the menstrual cycle of woman ovulation occurs...

- 1) At the end of the menstrual cycle
-  2) In the middle of the menstrual cycle
- 3) At the beginning of the menstrual cycle
- 4) On 25th day

2. During ovulation....



- 1) Gonadotropins attains peak level
- 2) Estrogen level declines
- 3) Progesterone level rises
- 4) Both estrogen and progesterone attain peak level

3. During luteal phase of menstrual cycle.....

- 1) Corpus luteum persists in the absence of pregnancy
- ✓ 2) Corpus luteum secretes large amount of progesterone
- 3) The mature graffian follicle ruptures
- 4) The endometrium of uterus starts regression

4. During fifth week of development in the embryonic testes, primordial germ cells differentiate into

- 1) Primary spermatocytes
- 2) Spermatogonia
- 3) Secondary spermatocytes
- 4) Spermatozoa



5. Cryptorchidism is the condition in which

- 1 Accessory glands do not develop**
- 2) Formation of testes does not take place**
- 3) Formation of seminal plasma does not take place**
- 4) Testes do not descend into the scrotum**



6. After ovulation the fate of granulosa cells in the follicle is that they...

- 1) degenerate
- 2) develop into corpus spongiosum
- 3) become corpora cavernosa
- 4) become corpus luteum



7. Splanchnopleure gives rise to

- 1) Amnion & Chorion
- 2) Chorion & Allantois
- 3) Amnion & allantois
- 4) Allantois & Yolk sac



8. In humans, at the end of the first meiotic division, the male germ cells differentiate into the

- 1) Spermatids
- 2) Spermatogonia
- 3) Primary spermatocytes
- 4) Secondary spermatocytes



9. The vas deferens receives duct from the seminal vesicle and opens into urethra as

- 1) Epididymis
- 2) Ejaculatory duct
- 3) Efferent ductile
- 4) Ureter

10. Assertion (A) : Vagina forms the birth canal along with the cephalic canal.

Reason (R) : Vagina extends from the cervix to the vestibule.

- 1) Both A & R are true and R explains A**
- 2) Both A & R are true and R doesn't explain A**
- 3) A is true but R is false**
- 4) A is false but R is true**

11. At the time of ovulation the state of female gamete

1) Primary oocyte at prophase I of Meiosis I

 Secondary oocyte at Metaphase II of Meiosis II

3) Secondary oocyte at prophase I of Meiosis I

4) Primary oocyte at the Metaphase II of Meiosis II

12. The double layered fold of peritoneum connecting the ovary with the wall of abdominal cavity is...

- 1) Mesorchium
- 2)  Mesovarium
- 3) Mesometrium
- 4) Mesosalpinx

13. The region in the ovary which appears more granular due to the presence of ovarian follicles is the.....

-  1) Outer most layer of stroma
- 2) Inner most layer of stroma
- 3) Layer outer to germinal epithelium
- 4) Layer outer to tunica albuginea

14. Assertion (A) : The fallopian tubes are involved in the collection of ovum after ovulation

Reason (R): A funnel shapes ‘infundibulum’ with ‘fimbriae’ is present in each oviduct at its hinder end

- 1) Both A & R are true and R explains A
- 2) Both A & R are true and R doesn't explain A
- 3) A is true but R is false
- 4) A is false but R is true



15. Find out the correct match in the following

- 1) Perimetrium – Joins the mesosalpinx with mesometrium
- 2) Myometrium – Consists of voluntary muscles helpful in parturition
-  Endometrium – Undergoes cyclic changes during menstrual cycle
- 4) Mesometrium – thin membrane around uterus

16. Assertion (A): The placenta of humans is called discoidal.

Reason (R): The villi are restricted to the ventral surface of the blastodisc.

1) Both A & R are true and R explains A

2) Both A & R are true and R doesn't explain A

3) A is true but R is false

4) A is false but R is true

17. Assertion (A): Vagina can withstand the mechanical stress and aberration occurring during coitus.

Reason (R): It is lined by non keratinized stratified squamous epithelium.

-  1) Both A & R are true and R explains A
- 2) Both A & R are true and R doesn't explain A
- 3) A is true but R is false
- 4) A is false but R is true

18. Which of the following statements are correct with respect to 'pudendum'

- I) Urethral orifice of the urethra is upper to vaginal orifice of vagina
- II) Labia minora lie outer to labia majora
- III) 'Clitoris' is a sensitive erectile structure supported by corpus callosum
- IV) Mons pubis is a cushion of fatty tissue covered by skin and public hair

1) Only I & II

2) Only II & III

3) Only III & IV

 Only I & IV

19) Uterus is positioned



- 1) Dorsal to the urinary bladder and ventral to the rectum**
- 2) Dorsal to the rectum and ventral to the urinary bladder**
- 3) Ventral to both rectum and the urinary bladder**
- 4) Dorsal to both rectum and urinary bladder**

20) Arrange the following in sequence in the flow of milk from mammary glands

A) Mammary ampulla

B) Lactiferous duct

C) Alveoli

D) Mammary duct

E) Mammary tubules

1) C-D-E-A-B

✓ 2) C-E-D-A-B

3) C-A-B-D-E

4) C-E-A-D-B

HUMAN REPRODUCTIVE SYSTEM

21. Match the following

Set-I

- A) Bartholin glands
- B) Skene's glands
- C) Clitoris
- D) Ampulla
- E) Vestibule

Set-II

- I) Homologous to penis
- II) Homologous to prostate gland
- III) The space between labia minora
- IV) Between infundibulum and isthmus
- V) Homologous to cowper's glands

A	B	C	D	E
---	---	---	---	---

1)	V	III	IV	II	I
----	---	-----	----	----	---

2)	V	I	II	IV	III
----	---	---	----	----	-----

3)	V	II	I	III	IV
----	---	----	---	-----	----

4)	V	II	I	IV	III
----	---	----	---	----	-----



22. The secretions of greater vestibular gland are involved in

- 1) Providing alkalinity
- 2) Providing nutrients to sperms
- 3) Lubricating the vagina
- 4) Stimulating the penis to swell

23. Find out the wrong match

- 1) Mesovarium – Ovaries
- 2) Mesometrium - Uterus
- 3) Mesosalpinx - Oviduct
- 4) Mesothelium - Vagina



24. Primordial follicle consists of

-  1) Primary oocyte + Squamous cell layer
- 2) Primary oocyte + Stratified squamous cell layer
- 3) Primary oocyte + Cuboidal call layer
- 4) Oogonium + Squamous cell layer

25. The homogenous membrane between primary oocyte and granulosa cells is

- 1) Theca interna**
- 2) Theca externa**
- 3) Zona pellucida**
- 4) Membrane granulose**



26. ‘Corona radiata’ is a derivative of

-  1) Inner most layer of granulosa cells
- 2) Outer most layer of granulosa cells
- 3) Tunica albuginea
- 4) Tunica vaginalis

27. Primary follicles are called as secondary follicles with the immediate development / formation of

- 1) Granulosa cells**
- 2) Zona pellucida & Corona radiate**
- 3) Theca externa & Theca interna**
- 4) Secondary oocyte**

28. During oogenesis the first meiotic division

- 1) Takes place inside the primary follicle, oogonium participates
- 2) Leads to the formation of secondary oocyte, inside the secondary follicle
- 3) Leads to the development of secondary follicle, with primary oocyte
- 4) Occurs inside the secondary follicle, secondary oocyte participates

29. First polar body lies in the

- 1) Ooplasm
- 2) Corona radiata
- 3) Perivitelline space
- 4) Zona pellucida

HUMAN REPRODUCTIVE SYSTEM

