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Rana Sakthi Durga
Puducherry

Bio-Zoology

Unit-1

Chapter: 1 Reproduction in organisms

Textbook questions and answers:

1. In which type of parthenogenesis are only male produced **Arrhenotoky.**
2. The mode of reproduction in bacteria by **Conjugation.**
3. In which mode of reproduction variation are seen **Sexual.**

Assertion and reasoning questions:

4. In each of the following questions there are two statements. One is assertion (A) and other is reasoning (R). Mark the correct answer as
   A. If both A and R are true and R is correct explanation for A
   B. If both A and R are true but R is not the correct explanation for A
   C. If A is true but R is false
   D. If both A and R are false.

I) Assertion: In bee society, all the members are diploid except drones.

Reason: Drones are produced by parthenogenesis.

Answer: A) If both A and R are true and R is not correct explanation for A.

II) Assertion: Offspring's produced by asexual reproduction are genetically identical to the parent.

Reason: Asexual reproduction involves only mitosis and no meiosis.

Answer: A) If both A and R are true and R is not correct explanation for A.

5. **Name an organism where cell division is itself a mode of reproduction.**

Unicellular organisms like Amoeba, Bacteria, Paramecium and Vorticella.

6. **Name the phenomenon where the female gamete directly develops into a new organism with an avian example.**

   Turkey bird reproduces by parthenogenesis as the female egg develops into fully developed organ without fertilization.

7. **What is parthenogenesis? Give two examples from animals.**

   Parthenogenesis is a form of asexual reproduction in which an unfertilized egg develops into a new individual. **Example:** Honey bee, Wasps and Gall fly.

8. **Which type of reproduction is effective Asexual or Sexual and why?**

   Sexual reproduction is more effective than an asexual reproduction. In a sexual reproduction the offspring will have the chances of having genes of both the parents whereas is an asexual reproduction. The offspring will genetically be identical to only one of the parent. Sexual reproduction is better mode of reproduction as it produces variations which are necessary for evolution and there are better chances for survival. Whereas in asexual mode of reproduction no variation.

9. **The unicellular organisms which reproduce by binary fission are considered immortal. Justify.**

   Actually single celled organisms are considered to be biologically immortal. This is because they don't die as they grow old. They usually undergo mitosis (Asexual reproduction) to produce in which the organism itself gets divided into two (cell division).

10. **Why is the offspring formed by asexual reproduction referred as a clone ?**

    The offspring formed by asexual reproduction referred to as clone because the offspring morphologically and genetically similar to each other and parent. In asexual reproduction, the mixing of genetic material does not occur, as the offspring is produced by mitotic or amitotic cell division hence they are called clone.

11. **Give reasons for the following:**

    a) Some organisms like honey bees are called parthenogenetic animals.

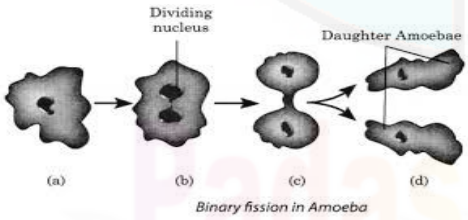
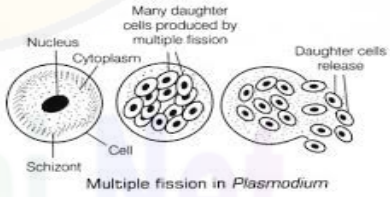
Some animals like honey bees are called parthenogenetic animals. The organisms produced without fertilization of the egg are called parthenogenetic organisms. The male honey bees are forms from unfertilized eggs.

b) A male honey bee has 16 chromosomes where as its female has 32 chromosomes.

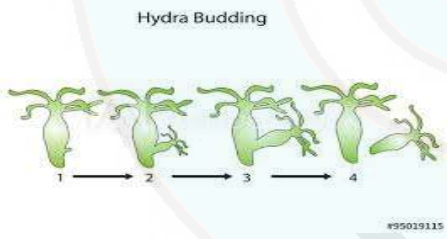
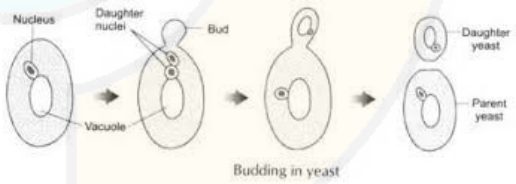
If is because of Haploid which is a sex determination system in which males develop from unfertilized eggs and are haploid and females develop from fertilized eggs and diploid.

12**. Differentiate between the following:**

a) Binary fission in amoeba and multiple fission in plasmodium.

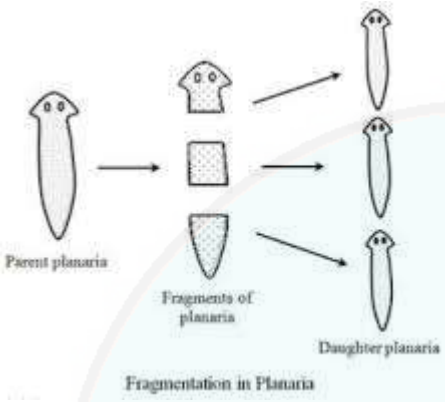
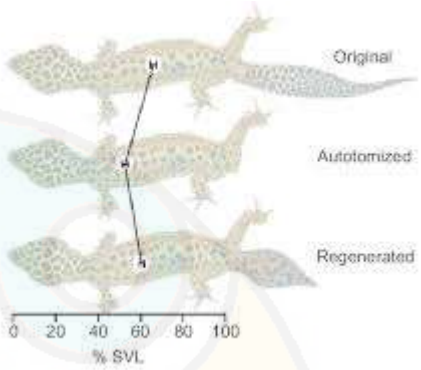
S.No	Binary fission in amoeba	Multiple fission in plasmodium
1	Forms two daughter individuals.	Forms many daughter individuals.
2	Nucleus and cytoplasm divided only once	Nucleus and cytoplasm divided repeatedly
3	Takes place in favorable conditions.	Take place in favorable as well as unfavorable conditions.
4	**Example**: Amoeba reproduces by binary fission.  *Binary fission in Amoeba*	**Example:** Plasmodium reproduce through multiple fission.  Multiple fission in *Plasmodium*

b) Budding in yeast and budding in Hydra.

Sl.NO	Budding in Hydra	Budding in Yeast
1	Hydra is a multicellular organism	Yeast is unicellular and it itself is divided into one larger cell and a smaller daughter cell.
2	Budding starts on the parent organism and then offspring gets detached from the parent surviving as an independent organisms	Budding here is similar to mitosis except that cytokinesis is unequal resulting in a unicellular bud
3	Multiple mitotic divisions are required for the formation of a bud	When a yeast cell becomes mature then only it divides to form the mother cell and daughter cell
4	Uses regenerative cells for reproduction 	If the size is not achieved mother cell will spend the cell cycle 

c) Regeneration in lizard and planaria.

Sl.NO	Regeneration in lizard	Regeneration in planaria
1	Organisms that are fragmented result in each fragment into an individual organism	Regeneration occur when an organisms a lost limb or any other part of the body
2	A new individual emerges from each fragment.	No new organisms are formed
3	Only a few organisms can fragment	All organism exhibit the ability to

	and from new individuals	regenerate to some degree
4	This type of regeneration is observed in organism such as Flatworms and Sponges.  Fragmentation in Planaria	Example of regeneration include regrowing a lost limb, such as the tail of a lizard. 

13. How is juvenile phase different from reproductive phase?

Juvenile phase	**Reproductive phase**
This vegetative phase is the period of growth between the birth of the individual up to reproductive maturity.	The organisms reproduce and their offsprings reach maturity period.
	On the basis of time,breeders animals are of two types.
	i)Seasonal breeders (Frogs,Lizards,Most birds)
	ii)Continuous breeders (Honey bees,poultry,rabbit)

14. What is the difference between syngamy and fertilization?

SL.NO	**Syngamy**	**Fertilization**
1	Syngamy is a type of sexual	Fertilization is the fusion of male and female and

	reproduction in which the fusion of two haploid gametes takes place to produce a diploid zygote.	female haploid gametes to form a diploid zygote.
2	Different kinds of syngamy are prevalent in animals such as autogamy in which the male and female gametes are produced by the same cell or same organisms.	The fertilization is of two types depending on the place where fertilization takes place, the external fertilization and the internal fertilization.

Rana Sakthi Durga
Puducherry

Bio-Zoology

Unit-1

Chapter: 2 Human Reproduction

Textbook question and answers:

1. The mature sperms are stored in the **Epididymis.**
2. The male sex hormone testosterone is secreted from **Leydig cell.**
3. The glandular accessory organ which produces the largest proportion of semen is **Seminal vesicle.**
4. The male homologue of the female clitoris is **Penis.**
5. The site of embryo implantation is the **Uterus.**
6. The foetal membrane that forms the basis of the umbilical cord is **Allantois.**
7. The most important hormone in intiating and maintaining lactation after birth is **Prolaactin.**
8. Mammalian egg is **Alecithal and non cleidoic.**
9. The process which the sperm undergoes before penetrating the ovum is **Capacitation.**
10. The milk secreted by the mammary glands soon after child birth is called **Colostrum.**
11. Colostrum is rich in **IgA.**
12. The Androgen binding protein (ABP) IS PRODUCED BY **Sertoli cells.**
13. Find the wrongly matched pair
    a) Bleeding phase –fall in oestrogen and progesterone.
    b) Follicular phase-rise in oestrogen.
    c) **Luteal phase-rise in FSH level**
    d) Ovulatory phase-LH surge

    Answer the following type of questions

    Assertion (A) and Reason (R)

    a) A and R are true, ar is the correct explanation of A
    b) A and R are true, R is not the correct explanation of A
    c) A is true, R is false
    d) Both A and R are false
14. **A-** In human male, testes are extra abdominal and lie in scrotal sacs.

R- Scrotum acts as thermoregulator and keeps temperature lower by 2^{o}c for normal sperm production.

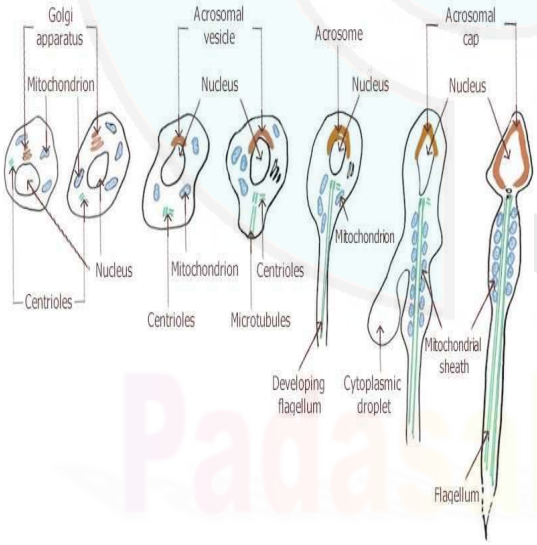
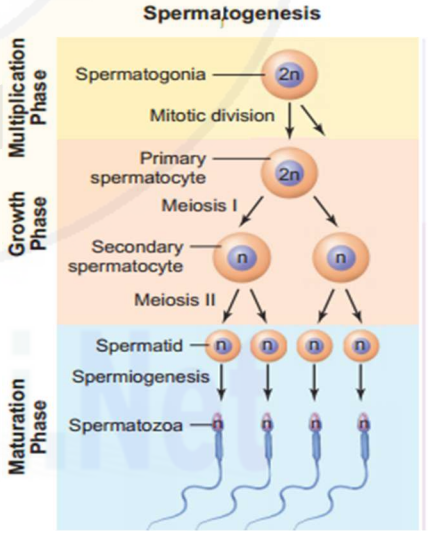
Answer: A) A and R are true, R is the correct explanation of A

S.Durga Lecturer in Zoology, Arumparthapuram, Puducherry. (ranasakthidurga@gmail.com)

15. **A-** Ovulation is the release of ovum from the Graafian follicle.
R- It occurs during the follicular phase the menstrual cycle.
Answer: c) A is true, R is false.

16. **A-** Head of the sperm consists acrosome and mitochondria.
R- Acrosome contains spiral rows mitochondria.
Answer: d) Both A and R are false.

17. **Mention the differences between spermiogenesis and spermatogenesis.**

SL.NO	Spermiogenesis	Spermatogenesis
1	It is one of the very crucial step in spermatogenesis.	It is the process of production of sperms from immature germ cells in males.
2	There are no changes in the number of cells are only one spermatid develops into a spermatozoa.	Number of cell are increased as each spermatogonium produces four spermatids.
3	No effects on the genetic material of the germ cells. 	The genetic composition primary sperm cells change from diploid to haploid status during spermatogeesis 

18. **At what stage of development are the gametes formed in new born male and female?**
Zygotic stage:
1. The male gamete (sperm)

2. Female gamete (ovum)

Blastocyst stage:

The single celled zygote begins to divide into a solid ball of cells.

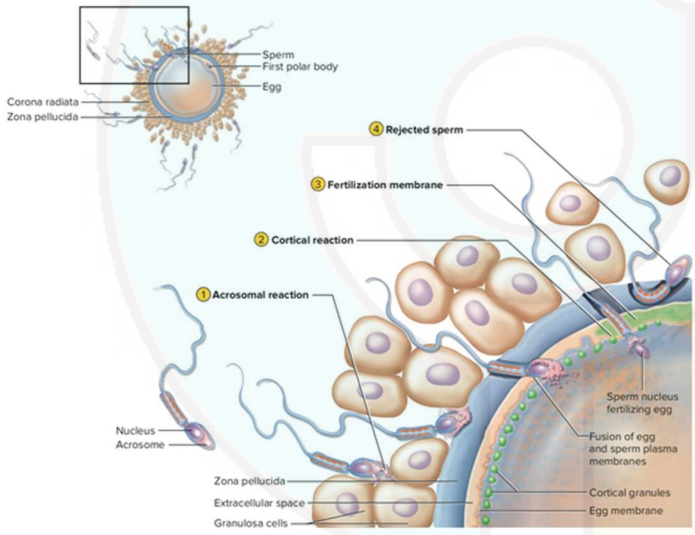
Then it becomes a hollow ball of cells called a blastocyst attaching to the lining of the mothers uterus.

19. **Expand the acronyms.**
    a) **FSH- F**ollicle **S**timulating **H**ormone.
    b) **LH- L**eutinising **H**ormone.
    c) **hCG- h**uman **C**horionic **G**onadotropin.
    d) **hPL- h**uman **P**lacenta **L**actogen.
20. **How is polyspermy avoided in humans?**

When a sperm comes in contact with the zona pellucida layer of the ovum.

It induces changes in the membrane of the ovum to block the entry of additional sperms.

This prevents the polyspermy and ensures that only one sperm can fertilise an ovum.



This picture for only your understanding

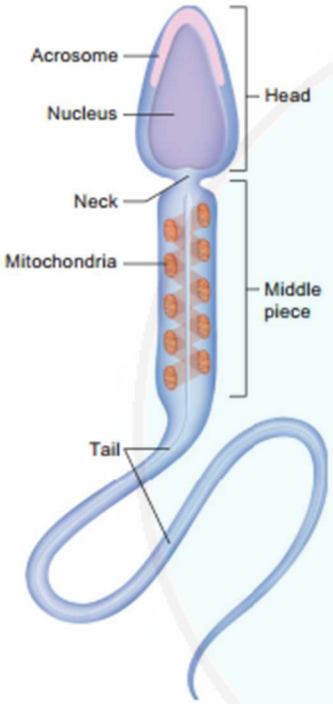
FIGURE 29.1 Fertilization and the Slow Block to Polyspermy.

21. **What is colostrums? Write its signigicance.**
    1. The mammary glands secrete a yellowish fluid called colostrums during the initial few days after parturition.
    2. Colostrum has less lactose then milk and almost no fat.
    3. Colostrum contains more proteins, vitamin- **A** amd minerals.
    4. Colostrum is also rich in **IgA** antibodies.
    5. It is fully sufficient till about 6 months of age and all intants must be breast fed by the mother to ensure the growth of a healthy baby.
22. **Placenta is an endocrine tissue. Justify.**

1)Placenta is connected to the embryo through an umbilical cord which helps in the transport of substance (Nutrirnts, Oxygen) and removing metabolites from the foetus.

2)Placenta acts as an endocrine tissue.and produces several hormones like
human Chorionic Gonadotropin (hCG)
human Placental Lactogen (hPL)
human Chorionic Somatomammotropin (hCS)
Oestrogens and Progesterone.

23. **Draw a labeled sketch of a spermatozoan.**



24. **What is inhibin? State its functions.**
Inhibin is one of two hormone secreted by the gonads (by sertoli cells in the male and the granulose cells in the female) and that inhibit (negative feed back mechanism) the production of follicle stimulating hormone (FSH) by the pituitary gland.
25. **Mention the importance of the position of the testes in humans.**
    1. Testes are paired male sex organs lying in the scrotum, which hangs outside the abdominal cavity, because viable sperms cannot be produced at normal body temperature.
    2. The scrotum is placed outside the abdominal cavity to create a temperature 2-3^{o}C lower than the normal internal body temperature.
    3. Thus the testes are placed in the scrotum, Which acts as a thermo regulator for better spermatogenesis

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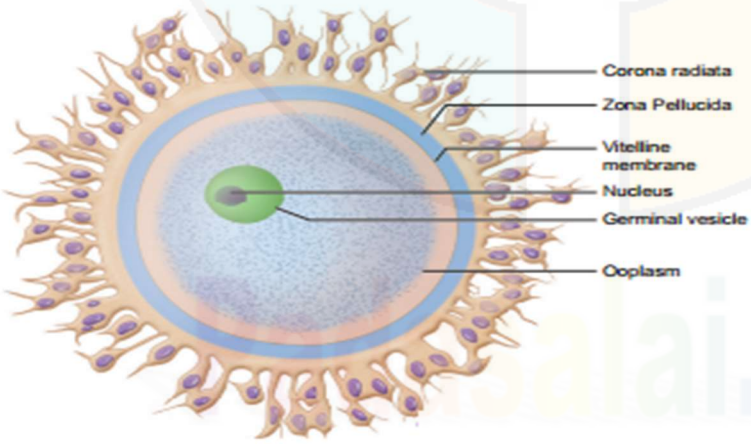
26. **What is the composition of semen?**
    1. Semen contains sperms and the seminal plasma (Secreted from the seminal vesicles, prostate gland and the bulbourethal glands)
    2. The seminal fluid acts as a transport medium, provides nutrients, contains chemicals that protect and activate the sperms and also facilitate their movement.
27. **Name the hormones produced from the placenta during pregnancy.**
    1. **Lactogen (hPL)**
    2. **Oestrogens**
    3. **Progesterone human Chorionic Gonadotropin (hCG)**
    4. **human Chorionic Somatomammotropin (hCS)**
    5. **humanPlacental**
       Which are essential for a normal pregnancy.
    6. **Relaxin**:
       i) Relaxin secreted during the later phase of preganancy
       ii) It help in relaxation of the pelvic ligaments at the time of parturition

28. **Define gametogenesis.**
    1. Gametogenesis is the process where by a haploid cell (n) is formed from a diploid cell (2n) through meiosis and cell differentiation.
    2. Gametogenesis in the male is known as spermatogenesis and produce spermatozoa.
    3. Gametogenesis in the female is known as oogenesis and result in the formation of ovum.
29. **Describe the structure of the human ovum with a neat labeled diagram.**



1. Human ovum is non-cleidoic, alecithal and microscopic in nature.
2. Its cytoplasm called ooplasm contains a largecnucleus called the germinal vesicle.
3. The ovum is surrounded by three coverings namely an inner thin transparent **vitelline** membrane, middle thick **zonapellucida** and outer thick coat of follicular cells called **corona radiate**.
4. The **vitelline** membrane and **zona pellucida** is a narrow perivitelline space.

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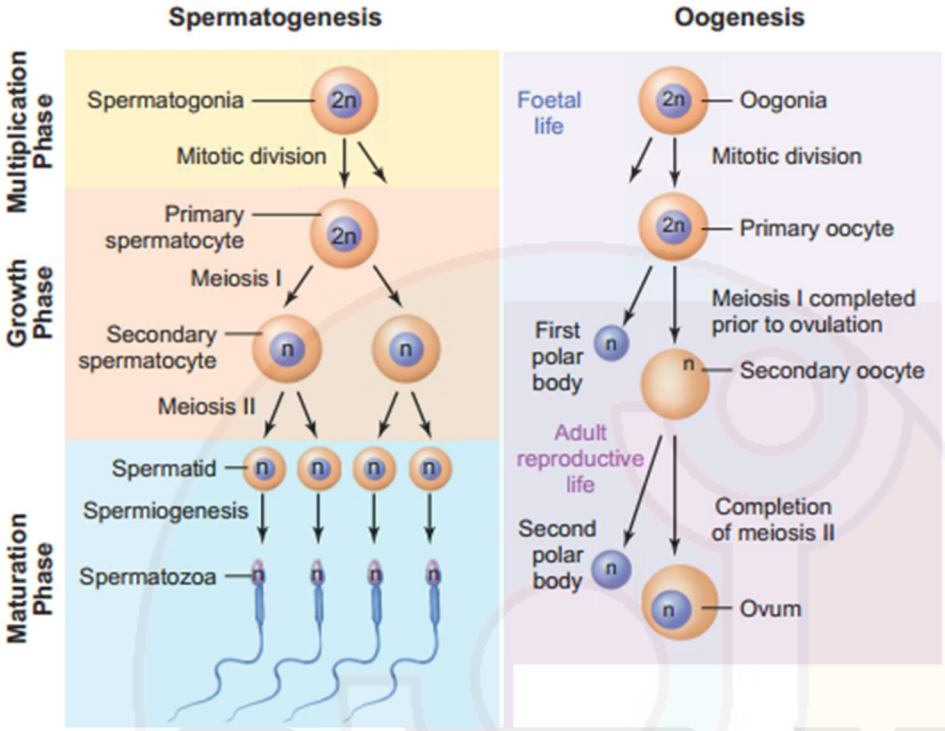
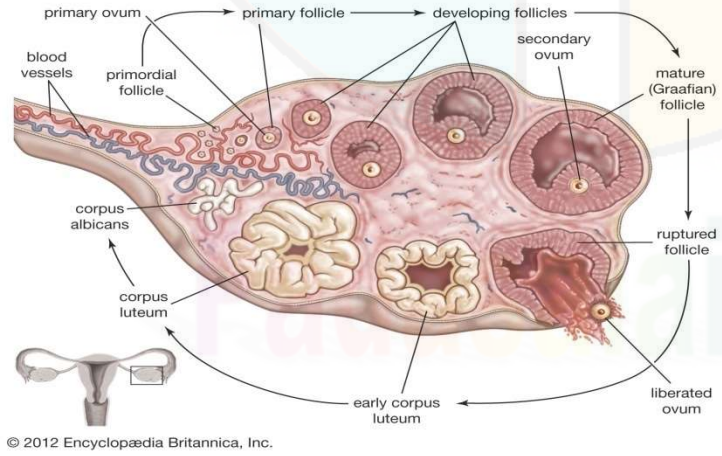
30. **Give a schematic representation of Spermatogenesis and Oogenesis in humans.**



31. **Explain the various phases of the menstrual cycle.**

Menstrual cycle:

The menstrual or ovarian cycle occurs approximately one in every 28/29 days during the reproductive life of the female from menarche (puberty) to menopause except during pregnancy



Menstrual cycle comprises of the following phases:

1. Menstrual phase
2. Follicular or proliferative phase
3. Ovulatory phase

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4. Luteal or secretory phase

1. Menstrual phase:

1. The cycle starts with the menstrual phase when menstrual flow occurs and lasts for **3-5** days.
2. Menstrual flow is due to **the breakdown of endometrial lining of the uterus**, and its blood vessels due to decline in the level of **progesterone** and **oestrogen**.

2. Follicular or proliferative phase:

1. The follicular phase extends from the **5th day** of the cycle until the time of ovulation.
2. During this phase, the **primary follicle in the ovary grows to become a fully mature Graafian follicle** and simultaneously, the **endometrium regenerates** through proliferation.
3. These changes in the ovary and the uterus are induced by the secretion of **gonadotropins** like **FSH** and **LH**, which increase gradually during the follicular phase.
4. It stimulates follicular development and secretion of **oestrogen** by the follicle cells.

3. Ovulatory phase:

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

2. Maximum secretion of **LH** during the middle cycle called **LH surge** induces the rupture of the **Graafian follicle** and the release of the **ovum** (**secondary oocyte**) from the ovary wall into the peritoneal cavity. This process is called as **ovulation**.

4. Luteal or secretory phase:

1. During luteal phases, the remaining part of the **Graafian follicle** is transformed into a transitory endocrine gland called corpus luteum.

2. The **corpus luteum secretes large amount of progesterone** which is essential for the maintenance of the endometrium.

3. If Fertilization takes place, it paves way for the implantation of the fertilized ovum.

4. The uterine wall secretes nutritious fluid in the uterus for the foetus. So, this phase is also called as **Secretory phase**.

32. **Explain the role of oxytocin and relaxin in parturition and lactation.**

Role of Oxytocin:

1. Oxytocin brings about the **powerful contraction** of the uerine muscles and leads the to expulsion of the baby through the birth canal.
2. Oxytocin causes the **Let-Down reflex** the actual **ejection of milk from the alveoli** of the mammary glands.

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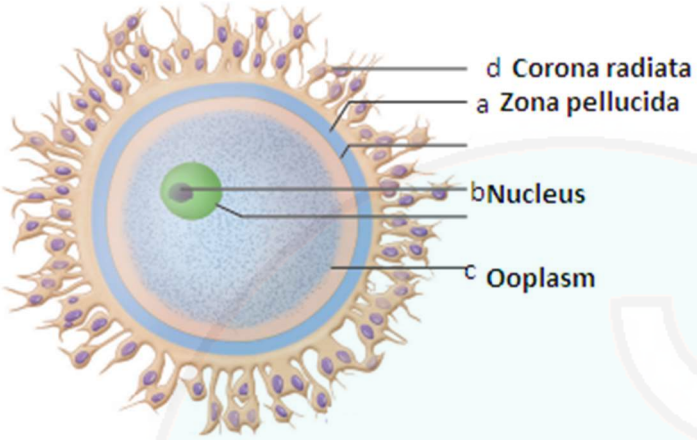
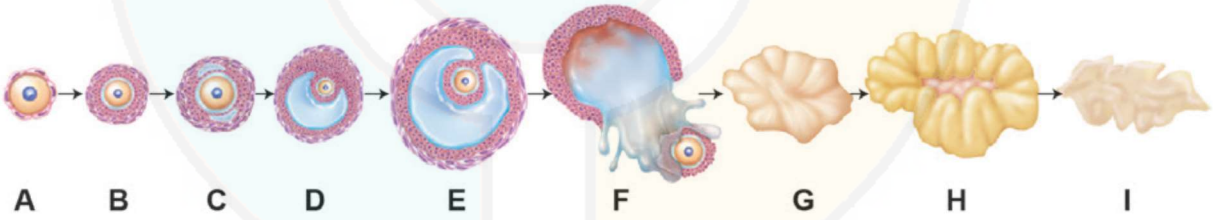
3. During lactation, oxytocin stimulates the recently emptied uterus to contract, helping it to return to **pre- pregnancy size.**

33. **Identify the given image and label its parts marked as a, b, c and d.**



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



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

A-D- The stages of follicular development**.**

E- Single mature follicle

F- Ovulation

G and H- Corpus luteum

I- Corpus albicans.

It represents the maturation state of Oogenesis.

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

Ovarian hormones:

1. Oestrogen
2. Progesterone.

Pituitary hormone:

1. Follicle Stimulating Hormone (FSH)
2. Lutenizing hormone (LH)

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

1. The uterus wall becomes thick and spongy so as to receive the eggs and nourish it.
2. The wall surrounds with extensive network of blood.

d) Write the difference between C and H.

C- Developing stage of follicle.

H- Developed corpus luteum

SL.NO	**C- Developing stage of follicle**	**H- Developing corpus luteum**
1	Primary follicles in the ovary grow to become a mature follicle (Graafian follicle)	A corpus luteum is a mass of cells that forms in an ovary and is responsible for the production of the hormone progesterone during early pregnancy.
2	It extends for about 10-12 days in a 28 day cycle.	Secretion Of homone: It act as a temporary endocrine gland. Secretes large quantities of Progesterone and small quantities of Oestrogens.
3	Changes in follicular phase are due to high level of FSH, LH and Oestrogen.	Maintenance of pregnancy.

S.Durga Lecturer in Zoology, Arumparthapuram, Puducherry. (ranasakthidurga@gmail.com)