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Subject – Biology

Class-12

Topic – chapter 31

Gametogenesis in Human

1. Quee / Ans :->

1. How are the eggs (yolk) in placental mammals?
Allecithal

2. Which apex portion comes in contact with ovum at the time of fertilization?
Acrosome

3. Which of the cell organelle are helping in the formation of middle piece of sperm?
Mitochondria and Centrosome.

4. What are the cells called formed as the result of second meiotic division in spermatogenesis?
Spermatid.

5. In which bar body is found?
In the nucleus of cells of woman.

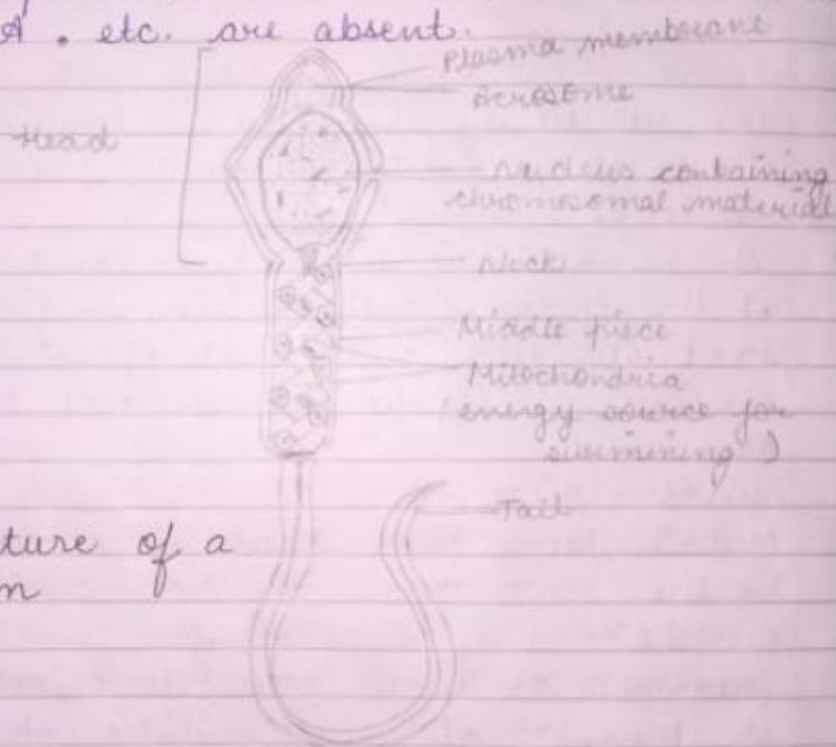
6. Why the sperms are produced in more quantity comparing with eggs?
The number of sperms produced is more than the no. of eggs because it ensures the fertilization of ovum. Sperms are

differentiate into spermatozoa, are very fundamental.

- The nucleus of the spermatid by dehydration of nuclear sap contracts & all the chromosomes situated in it contract together and arrange in comparatively lesser space.
- This is necessary to decrease the weight of the motile sperm. Not only this, all the necessary materials are removed from the nucleus as RNA etc. Only DNA, the hereditary material remains here.
- The shape of nucleus also gets changed, it becomes long and narrow from spherical to swim easily in water.
- The shape of the head of sperm which depends on the shape of nucleus, is various in different animals. For example, in human and bull, it is oval and flat laterally, in rats and frogs dagger-shaped and spiral shaped in birds.
- The acrosome of the sperm is made by the differentiation of golgi bodies. The golgi body of spermatid is made of many cycles of arranged membranes which surround many vacuoles in the center.
- At the time of differentiation, which is one called or more vacuole increases in size and with it develops a micriod, dense body with the vacuole, which is called para-acrosomal particle. If there develops more

part of the tail, in which in addition to 9+2 structure, cytoplasm and a thick filament is also there.

- In a sperm, stored food, ribosomes, endoplasmic reticulum, nucleolus and RNA, etc. are absent.



Structure of a Sperm

2. Describe briefly three phases of gametogenesis.

In gonads formation of gametes by primordial sex cells is known as gametogenesis.

Formation of gametogenesis.

- a) Multiplication phase:
 - undifferentiated primordial reproductive cells, by continuous mitosis gives rise

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motile and they have to compete with one another for their existence. In the end only one sperm fuses with the egg.

7. Write the names of hormones found on the surface of the egg.
LH and FSH

8. Describe the formation of A growth phase in oogenesis;

Necessary nutritive materials are synthesized and deposited in this important phase.

The oogonium phase increase unexpectedly in size, which is called primary oocyte. In mammals the growth of the oocyte is by follicle cells. In egg laying, yolk is synthesized in liver which is transferred in the oocyte through mother's blood. Growth phase can be divided into two periods previtellogenesis and vitellogenesis. In previtellogenesis the volume of nucleus & cytoplasm increases. In this, lampbrush chromosome is formed and cytoplasm grows for its qualitative and quantitative growth. In vitellogenesis period, ovum is organized with cytoplasm, glucogen, carbohydrates, fats, proteins i.e. Yolk is synthesized and deposited. The

Notes :->

1. Describe the structure of human sperm.
A typical mammalian sperm is divided into three parts,
 - a) Head :
 - It is made up of nucleus and acrosome.
 - For hereditary functions, a haploid set of chromosomes is found with protamine protein.
 - The acrosome is situated on the anterior end of the sperm, antifertilizin is found on the head of sperm and inside sperm lysin enzyme as hyaluronidase and cathepsins are found.
 - b) Middle piece :
 - Middle piece joins head by neck.
 - In the neck there are two similar centrioles but different for function. The proximal centriole after fertilization helps in the formation of mitotic spindle. This is situated perpendicular to the long axis.
 - Distal centriole forms the axis.
 - Structure of the axial filament is similar to flagellum i.e. 9+2 type, the distal centriole also works as basal body.
 - c) Tail :
 - Tail is the longest part of a sperm.
 - The end part makes the pointed part of tail while main part forms the major

- to cells, which are called Gametogonia.
- Spermatogonia are diploid cells.
- b) Growth phase
 - After the last division of the multiplication phase, spermatogonia after taking nutrition from the germ cells become two times in size, these are called Primary gametocytes which are diploid.
 - Rest of the spermatogonia remain as additional stock in seminiferous tubules.
 - Growth phase is the longest phase.
- c) Maturation Phase:
 - The primary gametogonia cyte forms two haploid secondary gametocytes by meiosis - first division (reduction division).
 - These secondary gametocytes divide by meiosis II (mitosis or second maturation division).
 - Thus two spermatocyte gamatids are formed from each secondary spermatocyte i.e. four haploid spermatids are formed from one diploid primary gametocyte.
- 3. Describe spermatogenesis with diagrams.
 - Although, the chromosome number in spermatids become haploid, however these have no functional capacity of a male gamete. Differentiation takes place in them to form sperm. This process is known as spermiogenesis or spermateliosis.
 - The changes by which spermatids

than one vacuole and the particles, then in the end these all fuse together and only one vacuole with single particle remains.

- This vacuole with the particle attached with the anterior of nucleus.
- The particle increases in size, this is called acrosomal particle & it forms the head of acrosome.
- The fluid from the vacuole flows out and its anterior half of the nucleus like a bilobed cap.
- This double cover is called cap of sperm.
- The remaining part of the golgi body & most of the cytoplasm of spermatid is left out.
- Acrosomal particle has some enzymes which at the time of fertilization used in dissolving the ovum membrane.

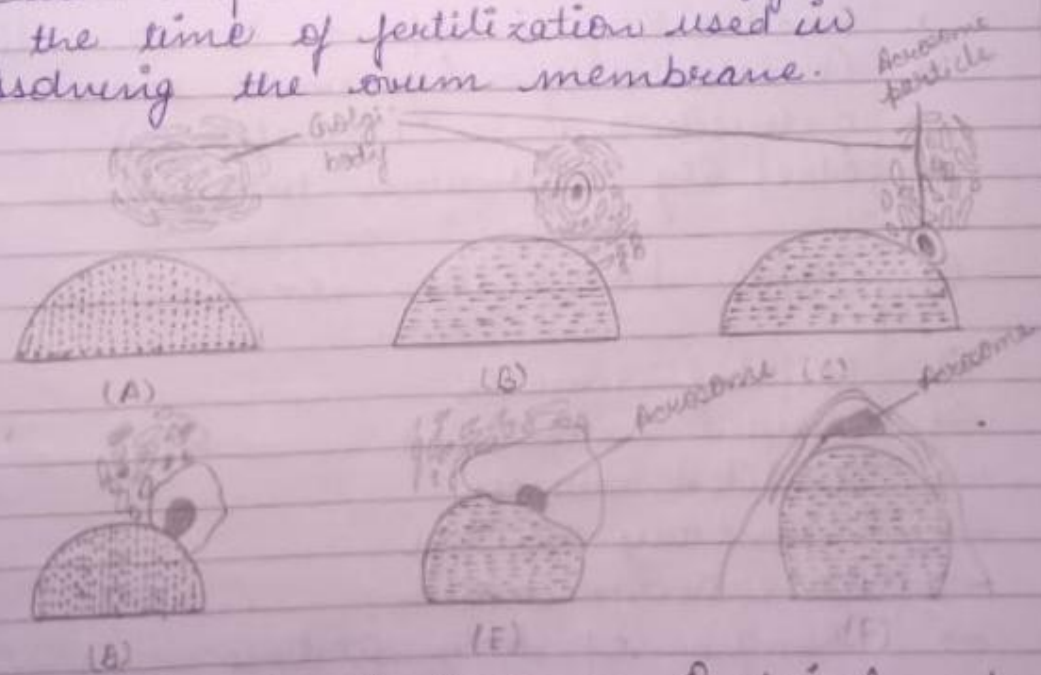


Fig:- Development of Acrosome & apical cap in sperm at the time of Spermeogenesis

10. Differentiate between oogenesis and spermatogenesis

	Spermatogenesis	Oogenesis
1.	Occurs in germinal epithelium of testes	Occurs in germinal epithelium of ovary.
2.	Meiotic divisions are equal	Meiotic divisions are unequal.
3.	At the end of Meiosis - I 4 spermatids are formed.	At the end one ootid & three bodies are formed.
4.	Polar bodies are not formed.	Polar bodies formed
5.	Growth phase is insignificant.	More significant.
6.	Spermatid undergoes spermiogenesis to become functional spermatozoa	No such changes in ootid to ovum.

