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Level; 200

Embryology Assignment Answer:

1. Ovulation is the release of mature secondary oocyte from the ovarian follicle. Another name for Graafian follicle is mature secondary follicle , Due to an abrupt increase in production of LH,

- I. Primary oocyte to complete meiosis I
- II. The follicle to enter the pre ovulatory mature vesicular stage

For ovulation to occur, Meiosis I must be completed

For the matured secondary oocyte to be released, there must be an Abrupt increase in LH

For the oocyte to be released, 2 events occurs which are caused by LH surge;

- I. It increases collagenase activity, resulting in digestion of collagen fibers surrounding the follicle.
- II. Prostaglandin levels also increase in response to the LH surge and cause local muscular contractions in the ovarian wall.

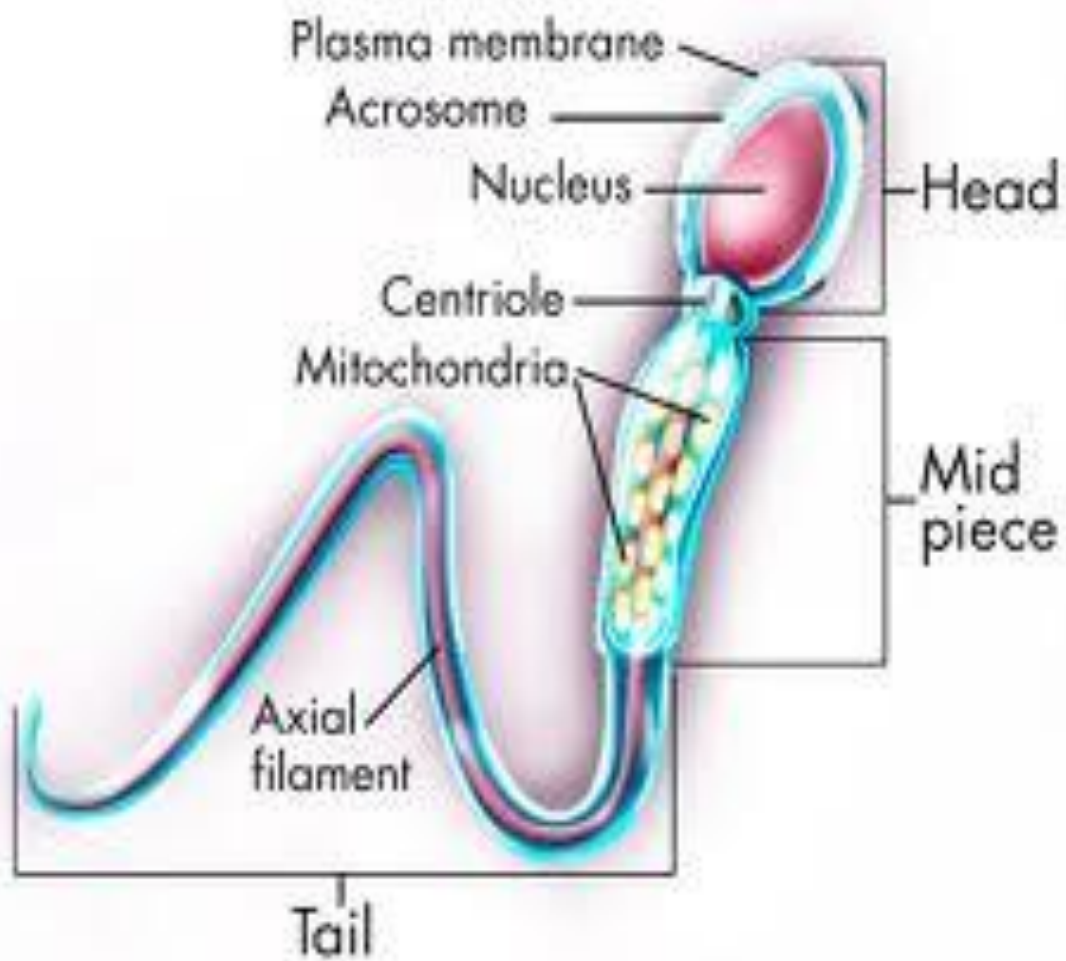
Cells of cumulus oophorus float out with the secondar oocyte during ovulation to form follicular cells of corona radiata

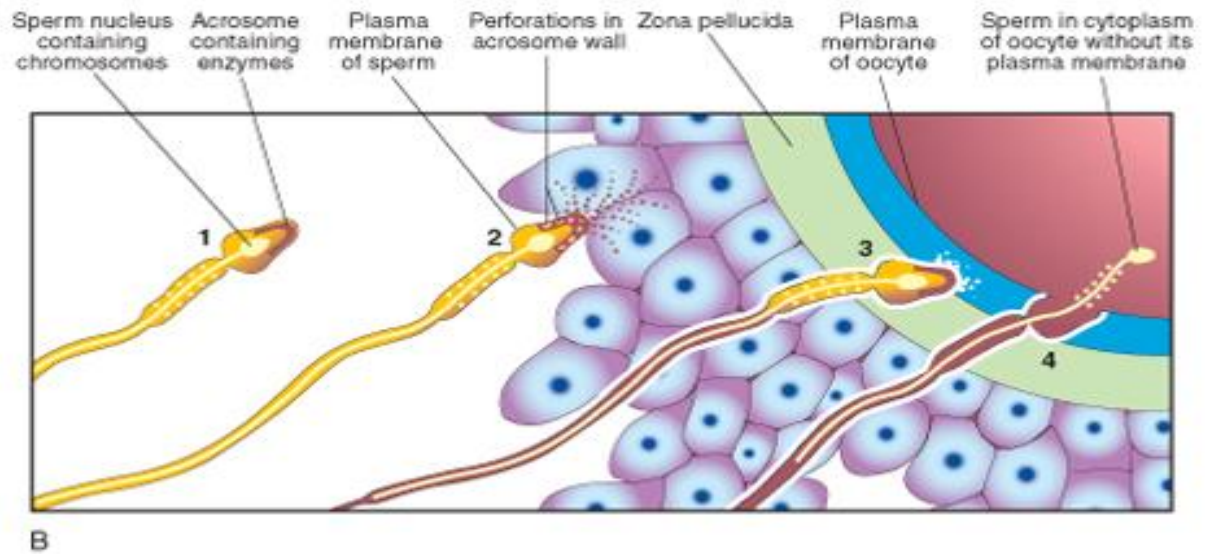
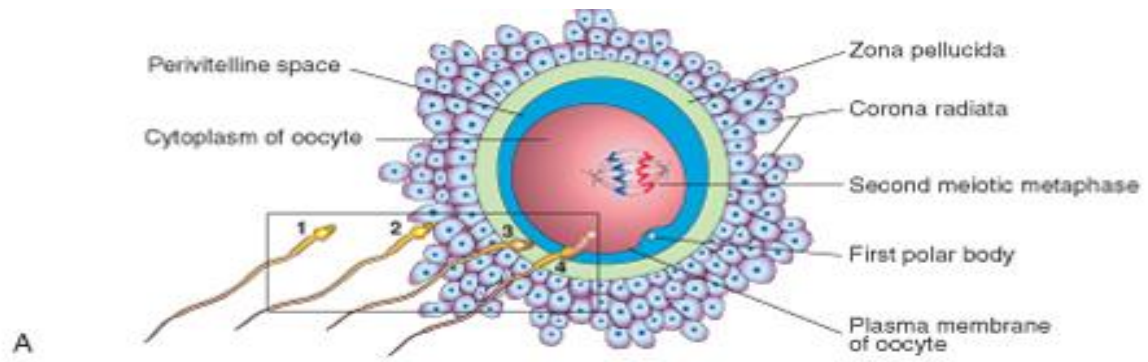
Follicular cells of corona radiata are derivatives of Cumulus Oophorus, Meiosis II is not completed until fertilization occurs in the middle of the ovarian cycle which coincides with menstrual cycle, ovulation occurs.

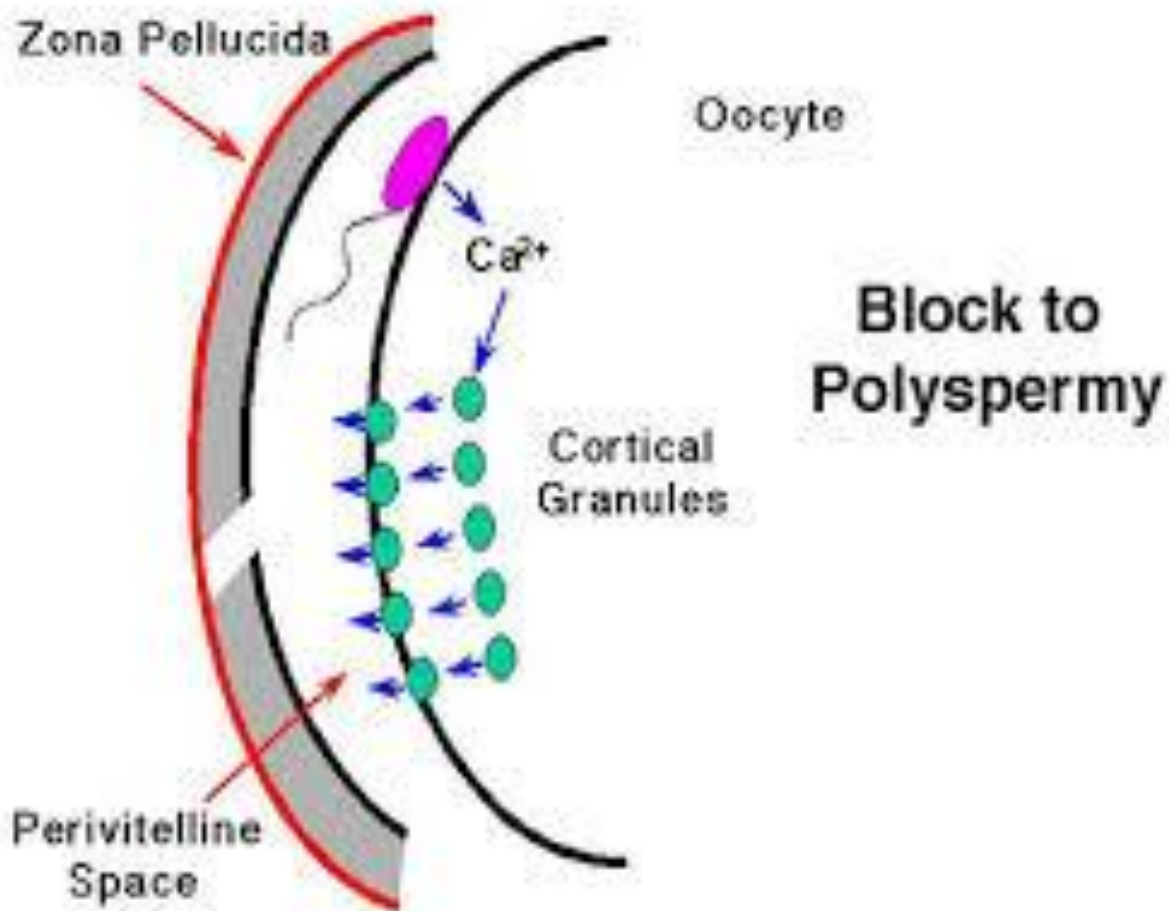
2.

S/N	Meiosis 1	Meiosis 2
1.	There is presence of synapsis (pairing of 46 homologous duplicated chromosomes)	There is no presence of synapsis
2.	Crossing over occurs (exchange of large segments of DNA)	Crossing over does not occur
3.	There is alignment of 46 homologous duplicated chromosomes at the metaphase plate	There is alignment of 23 duplicated chromosomes at the metaphase plate
4.	There is disjunction/separation of 46 homologous duplicated chromosomes from each other, centromeres do not split	There is disjunction/separation of 23 duplicated chromosomes to form 23 single chromosomes, centromeres split.
5.	During cell division there is formation of two secondary gametocytes (23 duplicated chromosomes, 2N)	During cell division there is formation of four gametes (23 single chromosomes, 1N)

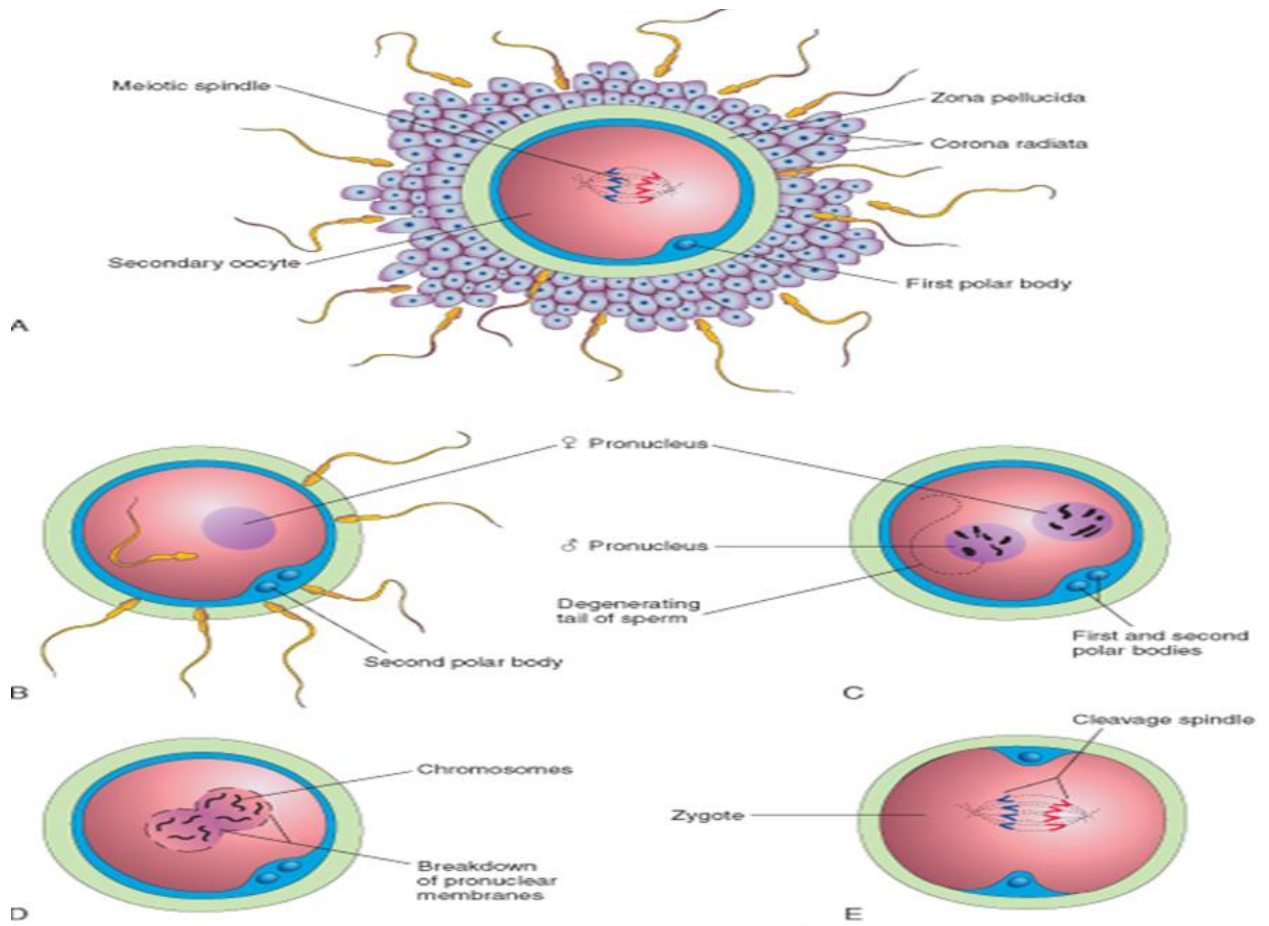
3. Fertilization takes approximately 24 hours, it is the union of the sperm and oocyte. The stages involved during fertilization includes;
- I. Passage through the corona radiata; The cell must be capacitated (removal of glycoprotein and seminal plasma proteins) in order to freely pass through the corona radiata.
 - II. Penetration of the zona pellucida; The sperm is left with the acrosome. The acrosome now binds with the zona pellucida. The enzyme in the acrosome is known as acrosin, a lysosome enzyme is released by the sperm on getting to the zona pellucida which allows the sperm pass. Immediately one sperm passes, the zona pellucida disallows other sperms from passing. After passing zona pellucida the sperm moves forward to the plasma membrane of the oocyte covered by **Cortical Granules** (which sends information to the zona pellucida to prevent more sperms from passing thereby preventing POLYSPERMY)







- III. Fusion of the plasma membrane of the sperm and oocyte; The plasma or cell membranes of the oocyte and sperm fuse and breakdown at the area of fusion. The head and tail of the sperm enter the cytoplasm of the oocyte, but the sperm's plasma membrane remains behind.
- IV. Completion of the second meiotic division and the formation of the female pronucleus; As soon as the sperm (head and tail) enters into the region of the oocyte (cytoplasm), 2nd meiotic division is completed and then the female nucleus becomes the female pronucleus.
- V. Formation of the male pronucleus; The tail would be degenerated, the male nucleus that is left would enlarge to become pronucleus.
- VI. The female pronucleus and male pronucleus fuse to become an ootid which later becomes the zygote. Two haploid pronuclei(ootid)



4.

S/N	Monozygotic Twins	Dizygotic Twins
1.	They are often seen as Conjoined Twins	They are not seen as conjoined twins
2.	They form a single zygote	They form two zygotes
3.	The twins are of the same sex	The twins are of the sex or of different sex
4.	Resemblance is similar	Resemblance is just like any other two siblings
5.	They are mostly diamniotic, mono chorionic, with single placenta	They mostly have two amnions, two chorions, and two placentas
6.	They are genetically identical	They are not genetically identical

7.	The incidence is more common	The incidence is less common
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