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MATRIC NO:18/MHS01/001

COLLEGE:MEDICINE AND HEALTH SCIENCES

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EMBRYOLOGY ASSIGNMENT

Question

- 1 Discuss ovulation
- 2 Differentiate between meiosis 1 and meiosis 2
- 3 Discuss the stages involved in fertilization
- 4 Discuss between monozygotic twins and dizygotic twims

1. Ovulation is the release of secondary oocyte from the ovarian follicle under the influence of follicle stimulating hormones and leutenizing hormone which both help to increase collagenase activity and prostaglandin level. There is an abrupt increase in LH that causes the primary oocyte to complete meiosis I and the follicle to enter the preovulatory stage. Meiosis II is also initiated, but the oocyte is arrested in metaphase approximately 3 hours before ovulation. In the meantime, the sur- face of the ovary begins to bulge locally, and at the apex, an avascular spot, the stigma, appears. The high concentration of LH increases collagenase activity, resulting in digestion of collagen fibers surrounding the follicle.

2. Difference between meiosis 1 and meiosis 2 include:
- A. • meiosis 1 starts as diploid and ends as haploid while meiosis 2 starts as haploid and end as diploid
 - B. • meiosis 1 is a reductive division while meiosis 2 is equal division
 - C. • in meiosis 1 homologous chromosome pair separate while meiosis 2 sister chromatids separate
 - D. • meiosis 1 crossing over occur while meiosis 2 crossing over doesn't occur
 - E. • in meiosis 1 there is chiasma formation while meiosis 2 there is no chiasma formation
 - F. • in meiosis 1 synapses occur while meiosis 2 synapses is absent
 - G. • meiosis 1 is for long duration while meiosis 2 is for short duration
 - H. • meiosis 1 equatorial plane is centered while meiosis 2 equatorial plane is rotated 90 degree
 - I. • meiosis 1 ends with two daughter cells while meiosis 2 ends with four daughter cell

3. Stages involved in fertilization include:

Fertilization occurs in the ampulla by the union of sperm and oocyte and involve six stages.

- a. passage of sperm through the Corona radiata
- b. penetration of sperm through the zona pellucida
- c. fusion of plasma membrane of sperm and oocyte
- d. completion of 2nd meiotic division and formation of female pronucleus
- e. formation of male pronucleus
- f. formation of the zygote

The sperm passes through the Corona radiata by removal of glycolipid materials through a process called capacitation. The acrosome binds itself to the receptor site in the zona pellucida and release a lysosomal enzyme called acrosin to break through the zona pellucida so as to allow passage to the plasma membrane. The plasma membrane contains cortical granules which it releases immediately to the zona pellucida to block the binding site to avoid more sperm from binding. The head and tail of the sperm enters into the cytoplasm but the cell membrane of the sperm remain outside. The sperm nucleus and oocyte nucleus fuses together immediately the sperm enters the oocyte's cytoplasm, the female nucleus change to pronucleus in formation of male pronucleus, the tail degenerate and the nucleus of the sperm enlarge. The female pronucleus and male undergo fusion to give rise to ootid which develop in zygote.

4. Difference between Monozygotic twin (identical) and Dizygotic twin (fraternal) include:

- g. monozygotic twins are genetically identical while dizygotic twins are genetically non identical.
- h. monozygotic twins resemblance is similar while non dizygotic twins resemblance is just like other siblings.
- i. monozygotic twins is formed from single zygote while dizygotic is formed from two different zygote.
- j. monozygotic twins is more common while dizygotic twins is less common
- k. monozygotic twins is diamniotic, monochromatic with single placenta while dizygotic twins have two amnion, two chromium and two placenta
- l. monozygotic twins are seen as conjoined twins while dizygotic twins are seen as not conjoined

