Name: Albert Ugochukwu Emmanuel
Matric No: 18/MHS01/063 Dept: MBBS

Embryology Assignment

1. Ovulation is the hormone-stimulated process by which the oocyte is released from the ovary. Ovulation normally occurs midway through the menstrual cycle, that is, around the 14th day of a typical 28 day cycle. In human beings, usually only one oocyte is liberated during each cycle, but sometimes either no oocyte or two or more stimultaneous oocytes may be expelled. Just before ovulation the oocyte completes the first meiotic division, which it began and arrested in prophase during fetal life. The chromosomes are equally divided into 2 daughter cells, but one of these cells retains almost all of the cytoplasm. That cell is now the secondary oocyte and the other becomes the first polar body. After expulsion of the first polar, the nucleus of the oocyte begins the 2nd meiotic division but arrests at metaphase and never completes meiosis unless fertilization occurs.

2.	Meiosis I	Meiosis II
-1	Reduces the chromosome number in the daughter cell	Equalizes the chromosome number of both parents and daughter cells.
-2	Homologous chromosomes are present at the beginning	Individual chromosomes are present at the beginning
-3.	Individual chromosomes are present in the daughter nuclei	Sister chromosomes are present in the daughter nuclei
-4	Chromosomal cross-over occurs during prophase I	No chromosomal cross-over occurs during prophase II
-5.	A complex division and takes more time	Less simple and takes lesser time.
-6.	Preceeded by interphase.	No interphase takes place.
-7	Meiosis I is a heterotypic division	Meiosis II is a homotypic division.

3. - Upon contact with cells of the corona radiata, sperm cells undergo the acrosomal reaction in which hyaluronidase is released by exocytosis at multiple locations around the sperm head.
- Specific proteins on the sperm surface bind the receptors ZP3 and ZP4, activating the protease acrosin on the acrosomal membrane to degrade the zona pellucida locally.
- The first sperm cell penetrating the zona pellucida fuses with the oocyte plasmalemma and triggers Ca^{2+} release from vesicles, which induces exocytosis of proteases from the cortical granules. This cortical reaction quickly spreads like a wave across the entire surface of the oocyte, with the proteases converting the zona pellucida to the impenetrable perivitelline barrier that constitutes a permanent block to polyspermy.
- The nucleus of the secondary oocyte immediately completes meiosis II, producing a second polar body and the female pronucleus of the haploid ovum. The haploid nucleus of the single penetrating sperm head undergoes decondensation, becoming the male pronucleus. Fusion of the two pronuclei yields the new diploid cell, the zygote.

4.	Monozygotic Twins	Dizygotic Twins
-1	They are developed by the splitting of a Pertilized embryo into two	They are developed by two soparate simultaneous fertilization events.
-2	Cause is not known	Caused either by IVF, certain fertility drugs or hereditary predisposition.
-3	Genetic codes are nearly identical	Genetic codes are the same as any other sibling.
-4	Blood types are the same	Blood types are different.
-5	Gender is the same	Gender is different
-6	Appearence extremely similar but may be affected by environmental factors.	Appearence is similar as any other sibling.