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DEPARTMENT: MEDICINE AND SURGRY

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COURSE TITLE: INTGRATED CORE BASIC SCIENCES- ANATOMY, BIOCHEMISTRY AND PHYSIOLOGY.

COURSE CODE: ICBS

ASSIGNMENT TITLE: EMBRYOLOGY

1. Discuss Ovulation

Ovulation is the release of an oocyte from the ovarian follicle. In a few days before ovulation, under the influence of **FSH** and **LH** the secondary follicle grows rapidly to a diameter of about 22mm to become mature vesicular/mature secondary or graafian follicle. Coincident with final development of the vesicular follicle, there is an abrupt increase in LH that causes; 1) The primary oocyte to complete meiosis I 2) and the follicle to enter preovulatory mature vesicular stage. Meiosis II is also initiated, but the secondary oocyte is arrested in metaphase approximately 3 hours before ovulation. In the meantime, the surface of the ovary begins to bulge badly locally, and at the apex, an avascular spot, the stigma appears. For the oocyte to be released, 2 events occur which are caused by LH surge: 1) it increases collagenase activity resulting in digestion of collagen fibers (connective tissue) surrounding the follicle. 2) prostaglandin levels also increase in response of the LH surge and causes local muscular contractions in the ovarian wall. Those contractions exclude the oocyte, which together with its surrounding follicular (granulosa) cells from the region of the cumulus oophorus. This causes ovulation in which oocyte floats out of the ovary. Some of the cumulus oophorus cells then rearrange themselves around the zona pellucida to form the corona radiate. Ovulation occurs at the middle (at the 14th day) of the menstrual cycle.

1. Differentiate between Meiosis I and Meiosis II

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| MEIOSIS I | MEIOSIS II |
| 1. It starts as diploid and ends as haploid.
 |  It starts as haploid and ends as diploid. |
| 1. It is a reductive division.
 |  It is an equational division. |
| 1. Homologous chromosome pairs separate.
 |  Sister chromatids separate. |
| 1. Crossing over occurs in meiosis I.
 |  Crossing over does not occur in meiosis II |
| 1. It ends with 2 daughter cells.
 |  Ends with 4 daughter cells. |
| 1. Sister chromatids in prophase have convergent arms.
 |  Sister chromatids in prophase has divergent arms. |
| 1. It is a complicated division process.
 |  It is a simple division process. |

1. Discuss the stages involved in fertilization

There are three stages involved in fertilization. There are;

* Preparation of the sperm- Ejaculated sperm are not ready to fertilize an egg when they enter the vagina. In response to the dilution of semen in the vagina, they undergo several changes, which are collectively known as capacitation. The intracellular Ca++ levels increase, the spermatic motility is activated and tails change beat frequency and sperm cells surface antigens are lost, the loss of these proteins renders the sperm more receptive to binding to the egg.
* Sperm-egg binding- there are three barriers which the sperm has to penetrate before fusing with the ovum. They are; 1) corona radiate, 2) zona pellucida and 3) vitelline membrane. There are four processes are involved in the penetration of the barrier. They are; 1) acrosome reaction, 2) disintegration of barriers, 3) calcium wave in oocyte cytoplasm and 4) nuclear fusion.
* Effects/results of fertilization- The result of fertilization are; the completion of second meiotic division of female gamete (secondary oocyte), restoration of diploid number (46) of chromosomes, determination of chromosomal sex of the future individual to be born, initiation of cleavage (mitotic) division of zygote, determination of polarity and bilateral symmetry of embryo and genetic diversity.
1. Differentiate between monozygotic twins and dizygotic twins.

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| Monozygotic twins | Dizygotic twins |
| 1. Mono zygotic twins are formed by one sperm and one egg.
 |  Dizygotic twins are formed by two different sperm and two different eggs. |
| 1. The reason monozygotic twins form is largely unknown
 |  A number of known reasons exit for dizygotic twinning. |
| 1. There is no hereditary trait that makes monozygotic twins more likely.
 |  Dizygotic twins can be caused by a gene that predisposes women to hyperovulate, or release two or more eggs at one time. |
| 1. Type of placenta depends on the time of splitting of embryo.
 |  Presence of chorionic tissue between 2 amniotic sac. |