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1. Discuss ovulation?

Ovulation is the release of eggs from the ovaries or the release of an oocyte from the ovarian follicle. In women, this event takes place when the ovarian follicles rupture and release the secondary oocyte ovarian cells. A few days before ovulation, secondary follicle grows rapidly under the influence of FSH (follicle stimulating hormone) and LH (luteinizing hormone) to about 25mm or more to become mature vesicular follicle. Coinciding with the final stage of development there is a sudden increase of luteinizing hormone that causes;

* The primary oocyte to complete meiosis 1
* The follicle to enter the pre ovulatory mature vesicular stage

Meiosis 2 is also initiated but the secondary oocyte is arrested in the metaphase approximately 3 hours before ovulation by cytostatic factor. While the surface of the ovary begins to bulge locally and at the apex an avascular spot the stigma appears. For the oocyte to be released two events occur which are caused by luteinizing hormone surge;

* It increases collagenase activity resulting in digestion of the collagen fibers surrounding the follicle.
* Prostaglandin levels also increase in response to the luteinizing hormone surge and cause local muscular contractions in the ovarian wall.

The contractions push out the oocyte from the cumulus oophorous with its follicular (granulosa) cells;

* This causes ovulation in which oocyte floats out of the ovary.
* Some of the cumulus oophorous cells rearrange themselves around the zona pellucida to form the corona radiata.

Clinical correlates

* During ovulation, some women experience abdominal pain called mittelschmer also known as middle pain because it occurs near the middle of the menstrual cycle.
* Ovulation results in slight bleeding into the peritoneal cavity which results in sudden constant pain in the lower abdomen.
* Mittelschmer may also be used as a symptom of ovulation
* Changes in cervical mucus
* Increase libido/increase urge for sex
* Tenderness of breast
* Swollen vagina

Other symptoms may include;

* Prior to ovulation there is constant basal body peak
* As one gets closer to ovulation, there may be a slight decline but it will be followed by a sharp increase after ovulation.

1. Differentiate between meiosis 1 and meiosis 2

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| Meiosis 1 | Meiosis 2 |
| Meiosis 1 starts at diploid and ends at haploid. | Meiosis 2 starts at haploid and ends at haploid. |
| This is a reductive division | This is a equational division |
| Homologous chromosome pairs separate | Sister chromatids separate |
| Crossing over happens | Crossing over does not happen |
| Complicated division process | Simple division process |
| Long duration | Short duration |
| Preceded by interphase | No interphase takes place |
| Sister chromatids in prophase have convergent arms | Sister chromatids in prophase have divergent arms |
| Prophase split into 5 sub-phases | Prophase does not have sub-phases |
| Ends with 2 daughter cells | Ends with 4 daughter cells |

1. Discuss the stages involved in fertilization.

Fertilization is the process by which the male and female gametes fuse together to form zygote. Fertilization takes place in the ampulla of the uterine tube. Before fertilizing the ovum, the spermatozoa undergo two processes upon arrival in the female genital tract: capacitation and acrosome reaction.

Capacitation

This is the period of conditioning in the female reproductive tract and this lasts for approximately 7 hours. The glycoprotein coat and seminal plasma protein are removed from the plasma membrane that overlies the acrosomal region of the spermatozoa.

Acrosome reaction

This occurs in the immediate environment of the ovum. During this process the following substances are released:

1. Hyaluronidase: needed to assist in penetration of the corona radiata
2. Trypsin like substance: required to digest the zona pellucida
3. Acrosin: also required to help the spermatozoa to penetrate the zona pellucida

The spermatozoa encounters and penetrates these barriers before it reaches the ovum:

(a) The corona radiata

(b) The zona pellucida

(c) The oocyte cell membrane

Immediately the spermatozoon enters the oocyte, the egg reacts in 3 ways:

* Cortical and zona reactions
* Resumption of second meiotic division
* Metabolic activation of the egg

Results of fertilization include: restoration of diploid number of chromosomes, determination of sex and initiation of cleavage.

1. Differentiate between monozygotic and dizygotic twins.

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| Monozygotic twins | Dizygotic twins |
| Developed from a single egg which is fertilized by a single sperm cell | Developed from two eggs which is fertilized by two different sperm cells |
| Two fetuses grow in the same placenta | Two fetuses grow in two different membranes |
| Have almost identical genetic profile | Completely different genetic profile |
| Always of the same sex | May be of the same or opposite sex |
| May have the same physical and mental characteristics | May look alike or different; may behave similarly or differently |
| Also called identical twins | Also called fraternal twins |
| Incidence is common | Incidence is uncommon |
| Mostly diamniotic and monochromic | Mostly have two amnions and two chorions |
| They are often called conjoined twins | They are not seen as conjoined twins |