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 Answers

1. . Ovulation: This is the release of a secondary oocyte from the ovarian follicleIn a few days before ovulation, under the influence of FSH and LH, the secondary follicle grows rapidly to a diameter of about 25 mm to become mature vesicular/ mature secondary or Graafian follicleCoincident with final development of the vesicular follicle, there is an abrupt increase in LH that causes; the primary oocyte to complete meiosis I and the follicle to enter the 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 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:it increases collagenase activity, resulting in digestion of collagen fibers (connective tissue) surrounding the follicle. Prostaglandin levels also increase in response to the LH surge and cause local muscular contractions in the ovarian wall. Those contractions extrude 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 radiata. Ovulation is triggered by a surge of LH production. Ovulation usually follows the LH peak by 12 to 24 hours.The LH surge, elicited by the high estrogen level in the blood, appears to cause the stigma to balloon out, forming a vesicle.
2. In meiosis 1, homologous chromosomes separate while in meiosis 2 sister chromatids separate.

 Meiosis 2 produces 4 haploid daughter cells whereas meiosis 1 produces 2 daughter cells.

 Genetic recombination(crossing over) only occurs in meiosis 1.

1. . Passage of a sperm through the corona radiata:For sperms to pass through the corona radiata, they must have been capacitated (removal of the glycoprotein coat and seminal plasma proteins from the plasma membrane that overlies the acrosomal region of the spermatozoa). Penetration of the zona pellucida: The zona is a glycoprotein shell surrounding the egg that facilitates and maintains sperm binding and induces the acrosome reactionThe intact acrosome of the sperm binds with a zona glycoprotein (ZP3/ zona protein 3) on the zona pellucidaRelease of acrosomal enzymes (acrosin) allows sperm to penetrate the zona pellucida, thereby coming in contact with the plasma membrane of the oocyteAs soon as the head of a sperm comes in contact with the oocyte surface, the permeability of the zona pellucida changesWhen a sperm comes in contact with the oocyte surface, lysosomal enzymes are released from cortical granules lining the plasma membrane of the oocyte. In turn, these enzymes alter properties of the zona pellucida to :prevent sperm penetration and inactivate binding sites for spermatozoa on the zona pellicida surfaceonly one sperm seems to be able to penetrate the oocyte III. Fusion of plasma membranes of the oocyte and sperm The plasma or cell membranes of the oocyte and sperm fuse and break down at the area of fusionThe 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 of oocyte and formation of female pronucleusPenetration of the oocyte by a sperm activates the oocyte into completing the second meiotic division and forming a mature oocyte and a second polar bodyThe nucleus of the mature ovum/oocyte is now called the female pronucleus. Formation of the male pronucleusWithin the cytoplasm of the oocyte, the nucleus of the sperm enlarges to form the male pronucleus and the tail of the sperm degenerates.The 2 pronuclei fuse into a single diploid aggregation of chromosomes, the ootid becomes a zygoteThe chromosomes in the zygote become arranged on a cleavage spindle in preparation for cleavage of the zygote.
2. Monozygotic twins originate from a single zygote or fertilized egg. ... Most monozygotic twins share one placenta and amniotic sac, this occurs when the original zygote divides about seven to twelve days into pregnancy. Dizygotic twins originate from two zygotes or fertilized eggs. And they are called fraternal twins