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Ovulation is the release of eggs from the ovaries. In women, this event occurs when the ovarian follicles rupture and release the secondary oocyte ovarian cells. After ovulation, during the luteal phase, the egg will be available to be fertilized by sperm. In addition, the uterine lining (endometrium) is thickened to be able to receive a fertilized egg. If no conception occurs, the uterine lining as well as blood will be shed during menstruation.

Differences between meiosis I and meiosis II

1. Meiosis I, homologous chromosomes separate, while in meiosis II, sister chromatids separate.

2. Meiosis II produces 4 haploid daughter cells, whereas Meiosis I produces 2 diploid daughter cells.

3. Genetic recombination (crossing over) only occurs in meiosis I

4. Meiosis I is for homologous recombination and separate chromosome in 2 cells resulting in only 1 chromosome of each type, while meiosis II forms haploid gametes by separating sister chromatids

C.

Fertilization is the fusion of haploid gametes, egg and sperm, to form the diploid zygote. Note though there can be subtle differences in the fertilization process which occurs naturally within the body or through reproductive technologies outside the body, the overall product in both cases is a diploid zygote. In fertilization research, after humans the mouse is the most studied species followed by domestic and farm animals. The process of fertilization involves components of, and signaling between, both sperm (spermatozoa) and egg (oocyte).

During fertilization, the sperm and egg unite in one of the fallopian tubes to form a zygote. Then the zygote travels down the fallopian tube, where it becomes a morula. Once it reaches the uterus, the morula becomes a blastocyst. The blastocyst then burrows into the uterine wall — a process called implantation.

The stages of fertilization can be divided into four processes: 1) sperm preparation, 2) sperm-egg recognition and binding, 3) sperm-egg fusion and 4) fusionof sperm and egg pronuclei and activation of the zygote.

The Four Steps of Fertilization:

Step I. Preparation of the Sperm.Ejaculated sperm are not ready to fertilize an egg when they enter the vagina. In response to the dilutionof semen in the vagina, they undergo several changes, which are collectively known as capacitation.

1.Intracellular Ca++ levels increase.

2.Spermatic motility is activated and tails change beat frequency.

3.Sperm cell surface antigens are lost. The loss of these proteins renders the sperm more receptive tobinding to the egg.

Step II. Sperm-Egg Binding

Because of the availability of gametes, the process of

sperm-egg binding was first studied and understood in

invertebrates (Fig. 1-8). In sea urchins, the sperm head

binds directly to the egg outer surface and this triggers the

acrosome reaction.

(Figs.1-9 and 1-10). The acrosomal contents are

released and there is a balanced Na+ influx and H+

efflux, causing an increase in pH. The increased pH

triggers the dissociation of the profilactin complex

(actin and profilin) and the released actin monomers

polymerize to form a filament called the acrosomal

process. This acrosomal process penetrates the egg

coatings to allow fusion of the sperm and egg plasma

membranes. In sea urchins then, the sperm literally

skewers the egg.

In humans the process of sperm-egg binding is not so

simple. The complicating factor is the thick zona

pellucida, which keeps sperm from binding close to the

egg plasma membrane.

Sperm receptor on egg.

D.

1. Monozygotic twins are developed by them splitting of a fertilized embryo, while dizygotic twins are developed by separate fertilizations of two different eggs by two different sperms.

2. Monozygotic twins are always the same gender while in the dizygotic twins the genders are most often different.

3. The genetic codes for monozygotic twins are the same while the dizygotic twins are genetically varied as and two siblings.

4. Monozygotic twins are identical in physical appearance and are called identical twins or maternal twins while dizygotic twins are not identical in their physical appearances and they are called non-identical twins or fraternal twins.