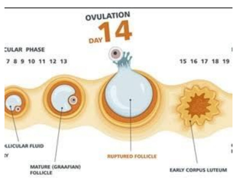
NAME: OZODINIRU CHIBUEZE KINGSLEY
MATRICNO: 18/MHSO1/327
LEVEL: 200
COURSE: EMBRYOLOGY

1) DISCUSS OVULATION

Ovulation is the release of a mature egg from one of the ovaries, which happens every month. A woman is most fertile around the time of ovulation. Generally, ovulation usually occurs halfway through your menstrual cycle, or around day 14 of the average 28-day cycle counting from the first day of one period to the first day of the next. But as with everything pregnancy-related, there's a wide range of normal here since cycles can last anywhere from 23 to 35 days, and even your own cycle and time of ovulation may vary slightly from month to month.

Ovulation lasts between 12 and 24 hours. That's how long the egg released by the ovary is viable.



Ovulation symptoms and signs

Here are the seven main signs of ovulation that you should be on the lookout for:

- Your basal body temperature falls slightly, then rises again.
- Your cervical mucus becomes clearer and thinner with a more slippery consistency similar to that of egg whites.
- Your cervix softens and opens up.
- You may feel a slight twinge of pain or mild cramps in your lower abdomen.
- Your sex drive may increase.
- You may notice some light spotting.
- Your vulva or vagina may appear swollen.

2) DIFFERENTIATE BETWEEN MEIOSIS I AND MEIOSIS II

Differences

MEIOSIS I MEIOSIS II

• Starts as diploid; ends as haploid • Reductive division • Homologous chromosome pairs separate • Crossing over happens • Complicated division process • Long duration • Preceded by S-phase and G-phase • Sister chromatids in prophase have convergent arms • Equatorial plane is centered • Prophase split into 5 sub-phases • Ends with 2 daughter cells	• Starts as haploid; ends as haploid • Equational division • Sister chromatids separate • Crossing over does not happen • Simple division process • Short duration • Preceded only by G-phase • Sister chromatids in prophase have divergent arms • Equatorial plane is rotated 90° • Prophase does not have sub-phases • Ends with 4 daughter cells

3) STAGES INVOLVED IN FERTILIZATION

Fertilization is more a chain of events than a single, isolated phenomenon. Indeed, interruption of any step in the chain will almost certainly cause fertilization failure. The chain begins with a group of changes affecting the sperm, which prepares them for the task ahead.

Successful fertilization requires not only that a sperm and egg fuse, but that not more than one sperm fuses with the egg. Fertilization by more than one sperm - polyspermy - almost inevitably leads to early embryonic death. At the end of the chain are links that have evolved to efficiently prevent polyspermy.

In overview, fertilization can be described as the following steps:

a) Sperm Capacitation
Freshly ejaculated sperm are unable or poorly able to fertilize. Rather, they must first undergo a series of changes known collectively as capacitation. Capacitation is associated with removal of adherent seminal plasma proteins, reorganization of plasma membrane lipids and proteins. It also seems to involve an influx of extracellular calcium, increase in cyclic AMP, and decrease in intracellular pH. The molecular details of capacitation appear to vary somewhat among species.

Capacitation occurs while sperm reside in the female reproductive tract for a period of time, as they normally do during gamete transport. The length of time required varies with species, but usually requires several hours. The sperm of many mammals, including humans, can also be capacitated by incubation in certain fertilization media.

Sperm that have undergone capacitation are said to become hyperactiviated, and among other things, display hyperactivated motility. Most importantly however, capacitation appears to destabilize the sperm's membrane to prepare it for the acrosome reaction, as described below.

b) Sperm-Zona Pellucida Binding
Binding of sperm to the zona pellucida is a receptor-ligand interaction with a high degree of species specificity. The carbohydrate groups on the zona pellucida glycoproteins function as sperm receptors. The sperm molecule that binds this receptor is not known with certainty, and indeed, there may be several proteins that can serve this function.

c) The Acrosome Reaction
Binding of sperm to the zona pellucida is the easy part of fertilization. The sperm then faces the daunting task of penetrating the zona pellucida to get to the oocyte. Evolution's response to this challenge is the acrosome - a huge modified lysosome that is packed with zona-digesting enzymes and located around the anterior part of the sperm's head - just where it is needed.

The acrosome reaction provides the sperm with an enzymatic drill to get through the zona pellucida. The same zona pellucida protein that serves as a sperm receptor also stimulates a series of events that lead to many areas of fusion between the plasma membrane and outer acrosomal membrane. Membrane fusion (actually an exocytosis) and vesiculation expose the acrosomal contents, leading to leakage of acrosomal enzymes from the sperm's head.

As the acrosome reaction progresses and the sperm passes through the zona pellucida, more and more of the plasma membrane and acrosomal contents are lost. By the time the sperm traverses the zona pellucida, the entire anterior surface of its head, down to the inner acrosomal membrane, is denuded. The animation to the right depicts the acrosome reaction, with acrosomal enzymes colored red.

Sperm that lose their acrosomes before encountering the oocyte are unable to bind to the zona pellucida and thereby unable to fertilize. Assessment of acrosomal integrity of ejaculated sperm is commonly used in semen analysis.

d) Penetration of the Zona Pellucida
The constant propulsive force from the sperm's flagellating tail, in combination with acrosomal enzymes, allow the sperm to create a tract through the zona pellucida. These two factors - motility and zona-digesting enzymes- allow the sperm to traverse the zona pellucida. Some investigators believe that sperm motility is0 of overriding imp

4) DIFFEREENCE BETWEEN MONOZYGOTIC AND DIZYGOTIC TWINS

	Dizygotic Twins	Monozygotic Twins
Develop from	Two different eggs fertilized by two different sperm cells	The splitting of the same fertilized egg into two
Genetic code	Like any other sibling; not identical.	Nearly identical
Gender	Usually different	Always the same
Likelihood	Varies by country. About 6 in 1,000 in Japan, up to over 20 per 1,000 in some parts of Africa. Two-thirds of all twins in the world are fraternal.	Uniform around the world; about 3 in 1,000. Only one-third of all twins in the world are identical.
Blood type	May be different	Always the same
Causes	Hereditary predisposition, certain fertility drugs, IVF	Not known
Appearance	As similar as any other sibling	Extremely similar, although may not be exactly identical due to environmental factors
In utero	Develop separate sacs in utero.	May be contained in one sac in utero.
Risk for TTTS (twin-to-twin transfusion syndrome)	Low risk	Higher risk compared with fraternal twins