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**COURSE: EMBRYOLOGY**

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1. **Discuss ovulation**

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

Following a surge of luteinizing hormone (LH), an oocyte (immature egg cell) will be released into the uterine tube, where it will then be available to be fertilized by a male sperm within 12 hours. Ovulation marks the end of the follicular phase of the ovarian cycle and the start of the luteal phase.

1. **Differences between meiosis 1 and meiosis 2**

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| --- | --- | --- |
| **stages** | **Meiosis 1** | **Meiosis 2** |
| At prophase | Presence of synapsis  Presence of crossing over  Presence of chiasma formation | Absence of synapsis  Absence of crossing over  Absence of chiasma formation |
| At metaphase | Alignment of 46 homologous duplicated chromosome | Alignment of 23 homologous duplicated chromosome |
| At anaphase | separate and moves towards the poles and centromer doesn’t split | Separate and moves towards the poles and centromer splits |
| At telophase | At the end of meiosis 1, two daughter cells are formed | at the end of meiosis 2, four daughter cells are formed |

1. **Stages involved in fertilization**
2. **Sperm capacitation**

Freshly ejaculated sperm goes through certain processes collectively known as capacitation. This involves removal of adherent seminal plasma, proteins, reorganization of plasma membrane lipids and proteins. This occurs when sperm reside in the female reproductive tract during gamete transfer after undergoing capacitation, sperm becomes hyperactivated and prepares it for acrosomal reaction.

1. **Sperm-zona pellucid binding**

Binding of the sperm to the zona pellucida, the carbohydrate group on the zona pellucida function as sperm receptors.

1. **The acrosome reaction**

The acrosome reaction provides the sperm with an enzymatic drill to get through the zona pellucida. Plasma membrane and acrosomal membrane fuse lead to the exposure of the acrosomal content from the sperm head.

1. **Penetration of zona pellucida**

The constant propulsive forve from the sperms flagellating tail, in combination with acrosomal enzymes, allows the sperm to create a tract through the zona pellucida.

1. Sperm-oocyte binding

Once a sperm penetrates the zona pellucida, it binds and fuses with the plasma membrane of the oocyte.

1. Egg activation and the cortical reaction

Upon binding with the sperm, the egg undergoes a series of changes that are collectively called egg activation. The cortical reaction refers to a massive exocytosis of cortical granules seen shortly after sperm-oocyte fusion.

1. **Difference between monozygotic twins and dizygotic twins**

Monozygotic twins are produced from the same zygote, that is, a single zygote divides to give rise to two embryos. They are usually identical.

While,  
Dizygotic twins are formed when a female releases two eggs that are fertilized by two different sperms and result in the formation of two zygote and eventually two embryos.