

Ovulation

Theriogenology



Is the process by which the mature oocyte is released from the Graafian follicle. The number of ovulated eggs varies between species. The exact timing of ovulation is difficult to establish since the continuous observation of the ovaries would be required. Ovulation occurs at the average value 8–12 hours after the end of estrus.

■ **Types of Ovulation**

■ **1. Spontaneous ovulation**

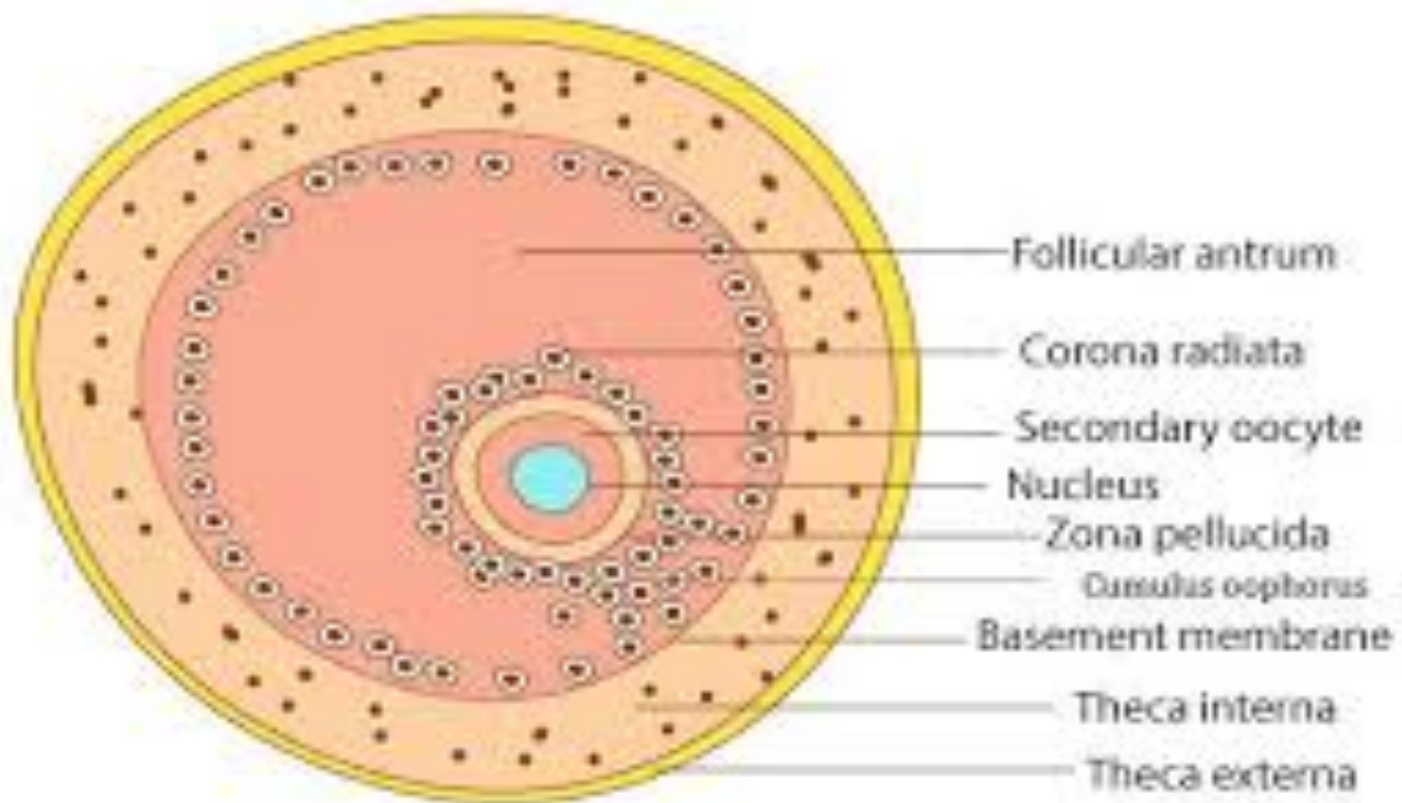
■ **Is the ovulatory process in which the matured follicles secrete ovarian steroids to generate an LH surge leading to ovulation (independent of copulation). Species in which the females are spontaneous ovulators include rats, mice, sow, ewe, cow, mare, monkey, and woman.**



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- **2. Induced ovulation**
 - **Is the process in which ovulation is induced by genital stimulation during coitus rather than the increased pre-ovulatory LH surge. Ovulation stimulator might be seminal plasma, sperms, physical mating even pheromones.**

Species in which the females are spontaneous ovulators include cat, rabbit, ferret, and she-camel





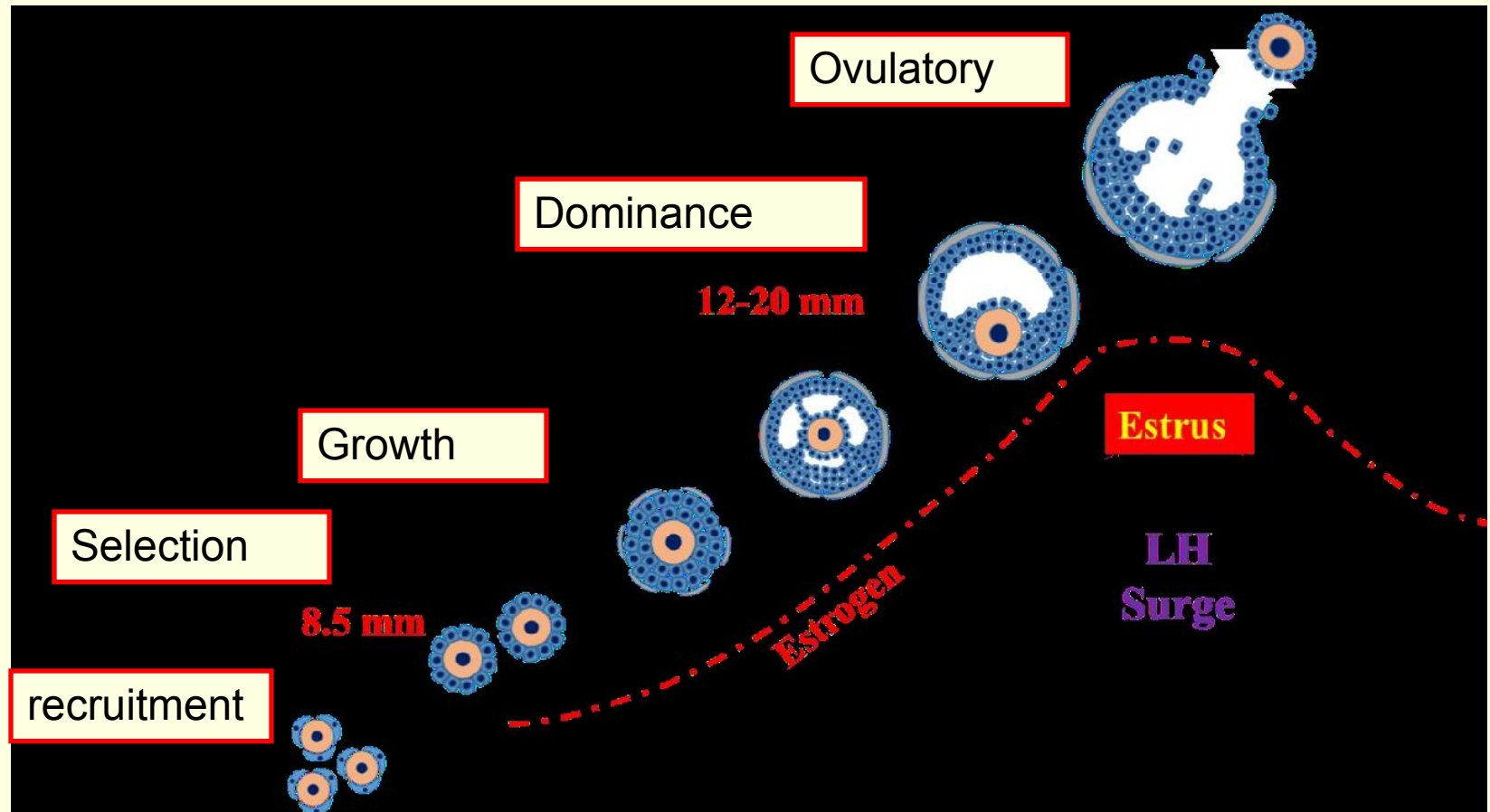
Graafian follicle



- □ **Follicle development occurs as a wave-like pattern, each wave is initiated with follicle recruitment-selection- growth- dominance, and ovulation (or regression). Usually, 2 to 4 follicular waves occur during the estrous cycle in cattle.**



A figure demonstrating follicle development toward ovulation



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- □ **The elevation in circulating concentrations of estradiol during the late follicular phase leads to the preovulatory surge of LH.**
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 - □ **Local regulation of ovulation involves the interaction of LH and intra-follicular factors including steroids, prostaglandins, and peptides derived from endothelial cells, leukocytes, fibroblasts, and steroidogenic cells.**



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- **The LH surge stimulates the process of ovulation by:**
 - **Activating an inflammatory reaction, which weakens and ruptures the follicle wall.**
 - **Initiates luteinization of the granulosa and theca interna cells of the follicle.**

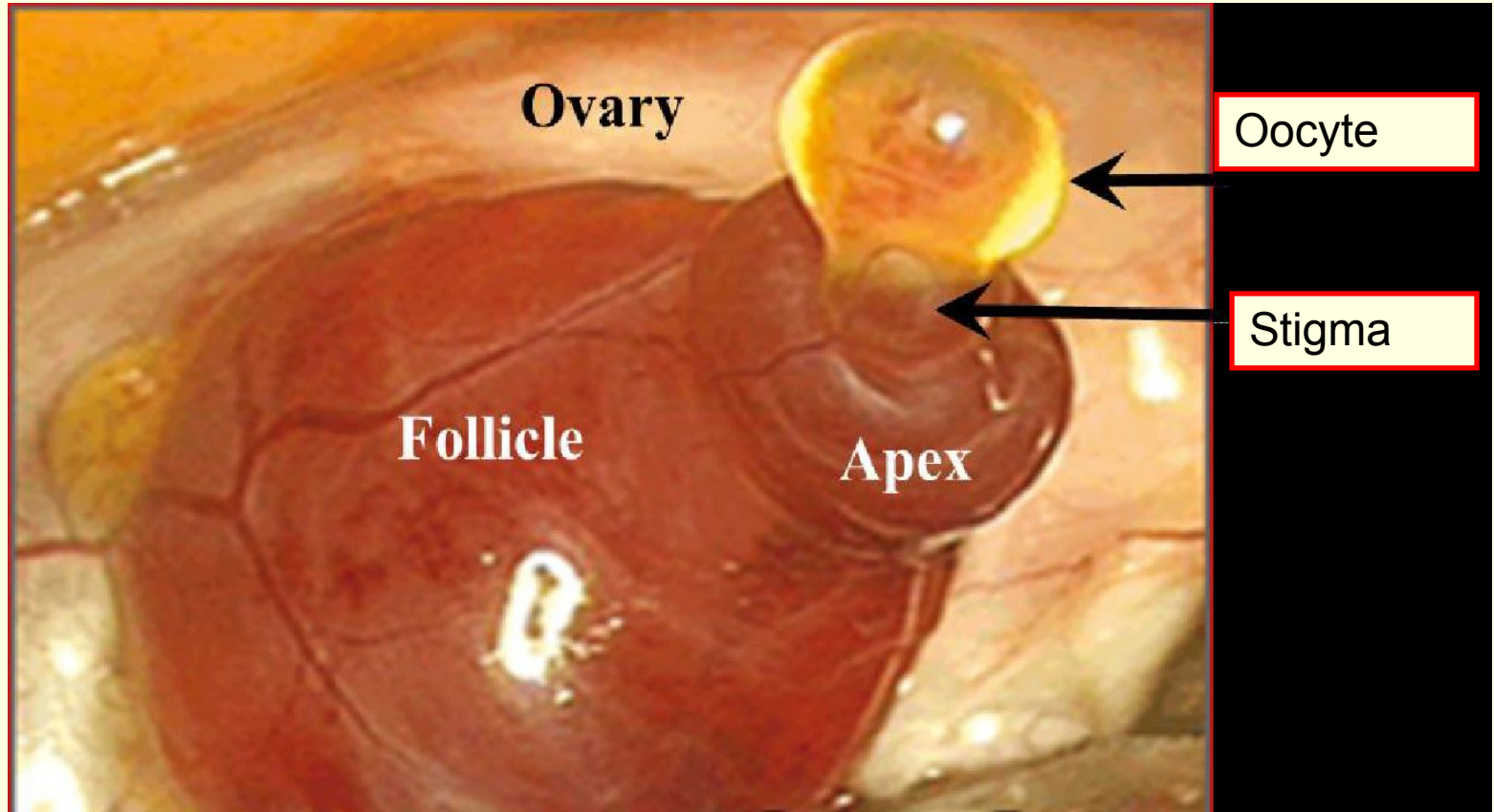


- **An hour before ovulation, the follicle forms an ‘apex’, the point where rupture takes place at the most avascular point called Stigma. After ovulation, there is a rapid collapse of the follicle wall.**
- **Usually, ovulation occurs from 24–32 hours after the beginning of the surge (8-12 hours after end estrus).**
- **At ovulation, the mature antral follicle ruptures, separating its content of the follicular fluid in the abdominal cavity and releasing the unfertilized ovum, still surrounded by cumulus cells.**



- **The ovum is collected by the fimbria of the oviduct and transports down the oviduct by a combination of cilia action and muscular contractions of the oviduct wall.**
- **At this stage, the ovulated follicle forms a temporary structure called corpus hemorrhagicum, which is filled with blood that quickly clots.**





Mechanism of ovulation induced by LH surge

