

## OESTROUS CYCLE

The oestrous (estrous) cycle is the main reproductive cycle of other species females of non-primate vertebrates, for example rats, mice, horses, pig have this form of reproductive cycle. The estrous cycle or oestrus cycle (derived from Latin oestrus "frenzy", originally from Greek οἶστρος oîstros "gadfly") is the recurring physiological changes that are induced by reproductive hormones in most mammalian therian females. Estrous cycles start after sexual maturity in females and are interrupted by anestrus phases or by pregnancies. Typically, estrous cycles continue until death. Some animals may display bloody vaginal discharge, often mistaken for menstruation.

There are also a variety of different forms:

(a) **Polyestrous Animals** - Estrous cycles throughout the year (cattle, pigs, mice, rats).

(b) **Seasonally Polyestrous Animals** - Animals that have multiple estrous cycles only during certain periods of the year (horses, sheep, goats, deer, cats).

(c) **Monestrous Animals** - Animals that have one estrous cycle per year (dogs, wolves, foxes, and bear).

### Estrous Cycle Stages

The descriptions below refer to the "typical" mammalian cycle (proestrus - estrus - metestrus - diestrus).

i) **Proestrus**: The first stage in the estrous cycle immediately before estrus characterized by development of both the endometrium and ovarian follicles. Proestrus is the period between the regression of the corpus luteum of the previous cycle and estrus. The period proestrus translated the follicular development. Figures 2 and 3 outline the sequence of anatomical and hormonal changes that occur during a typical 21-day cycle in which pregnancy does not occur.

ii) **Estrus**: The second stage in the estrous cycle immediately before metestrus characterized by a receptivity to a male and to mating, often referred to as "heat" or "in heat". Pheromones may also be secreted only at this stage of her cycle. Estrus is the period when high amount of estrogen is presents in the blood. The estrogen produces the behavioral signs of estrus, such as the mounting of other cows, the willingness to stand while mounted by other cow, and general increase of activity.

iii) **Metestrus**: The third stage in the estrous cycle immediately before diestrus characterized by sexual inactivity and the formation of the corpus luteum. Estrus is followed by a 3 to 4 day period referred to as metestrus. During this period the corpus luteum develops under the influence of LH and starts to produce increasing amounts of progesterone.

iv) **Diestrus**: The last stage in the estrous cycle immediately before the next cycle proestrus characterized by a functional corpus luteum and an increase in the blood concentration of progesterone.

v) **Anestrus**: Not a stage in the estrous cycle, but a prolonged period of sexual rest where the reproductive system is quiescent.

### Q. Describe the oestrous cycle with proper illustration.

**Day 0**: The cow is in estrus (standing heat) due to an increased concentration of estrogen for 18 hours (range 12 to 24 hours). As estrogen levels reach a certain threshold level, a surge of LH is released by the pituitary. About 12 hours after the end of standing heat, the mature Graafian follicle ovulates (ruptures) in response to LH released.

**Days 1–2**: The cells that formerly lined the follicle change and become the luteal cells of the corpus luteum. This change in cell form is caused by hormonal action, primarily the action of LH.

**Days 2–5** The corpus luteum grows rapidly in both size and function. At this stage, numerous follicles may be seen on the ovary, but by day 5 they have begun to regress.

**Days 5–16**: The corpus luteum continues to develop and typically reaches its maximum growth and function by day 15 or 16. It secretes the hormone progesterone, which inhibits LH release by the pituitary gland. During this period, the ovaries are relatively inactive except for the functional corpus luteum. No follicles reach maturity and/or ovulate because of high concentrations of progesterone.

**Days 16–18**: Increased follicular growth and accompanying estrogen secretion by the ovary stimulate PGF $2\alpha$  secretion by the uterus, causing rapid regression of the corpus luteum.