D II Hons/ ZOOLOGY

Paper IV

Group-A

Lecture-25

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REPRODUCTIVE CYCLE IN VERTEBRATES

Introduction :-

The cycle of physiological changes that begins with Conception and extends through gestation and parturation. Sexual reproduction in most spp. is regulated by regular endocrine changes, or cycles in females. Those cycles begin postnatally, function for variable Times and Can then decreases or cease permanently. There are several species-specific female hormonal cycles which can regulate reproduction. In mammals they are of following types:-

(I) Estrous cycle

(II) Menstrual cycle.

(I) Estrous cycle :- This is found in the females of Non-primate species vertebrates. For Example - rats, mice horses, pigs all have this form of reproductive cycle. There are also a variety of different estrous forms:

(a) Polyestrous Animals :- Estrous cycle through out the year Ex - cattle, pigs, mouse, rat etc.

(b) Seasonally Polyestrous Animals :- Animals they have multiple oestrous cycles only during certain Periods of the year Ex - horses sheep, goats deer etc.

(c) Monoestrous Animals :- Animals that have one oestrous cycle/year Ex - Dogs, wolves, foxes & bear.

(2) Menstrual cycle :- The reproductive cycle in the female primates e.g. monkeys, apes and human being is called menstrual cycle. It is a regular cyclic hormonal change which coordinate changes in the ovary and internal tract. The first menstruation begins at puberty and is called menarche. In human females, menstruation is repeated at an average interval of about 28/29 days and the cycle of events starting from one menstruation till the next one is called the menstrual cycle. one ovum is released (ovulation) during the middle of each menstrual cycle. The major event of menstrual cycle starts with the menstrual phase when the menstrual flow occurs and it lasts for 3-5 days. The menstrual flow results due to breakdown of endometrial lining of the uterus and its blood vessels which form liquid that comes out through vagina.

Menstruation only occurs when ovum is not fertilized. Lack of menstruation may be indication of pregnancy. However, it may also be caused due to some other causes like stress, poor health etc.

Menstrual cycle includes four phases :-

(a) Menstruation
(b) Follicular phase
(c) ~~over~~ ovulation
(d) Luteal phase.

(1) Menstruation :- It is the elimination of the thickened lining of the uterus (endometrium) from the body. Menstrual fluid contains blood cells, lining of uterus & mucus. The average length of period is between 3-5 or 6 days.

(2) Follicular Phase :- The follicular phase starts on the first day of menstruation and ends with ovulation. These changes in the ovary & uterus are induced by changes in the levels of pituitary and ovarian hormone (FSH). The hormones stimulates the ovary to produce around 5-20 follicles (tiny nodules or cysts) which bead on the surface.

Each follicles contains an immature egg. Usually only one follicle will mature into an egg while the others die. This can occur around day 10 of a 28 day cycle. During this phase, the primary follicle grow to become fully mature graffian follicle and simultaneous the endometrium of uterus regenerates through proliferation.

The secretion of gonadotropins (LH & FSH) increases gradually during the follicular phase and stimulates follicular development as well as secretion of estrogens by growing follicles.

(3) Ovulation :- ovulation is the release of a mature egg from the surface of ovary. This usually occurs midday cycle around two weeks or so before menstruation starts. The Gonadotropin releasing hormone (GnRH) prompts pituitary gland to produce LH & FSH during follicular phase. Within two days ovulation is triggered by the high level of LH. The egg is released into the fallopian tube and towards the uterus by waves of hair like projections. The life span of a typical egg is only around 24 hrs. Unless it meets a sperm during this time, it will die. The ovulation phase is followed by luteal Phase.

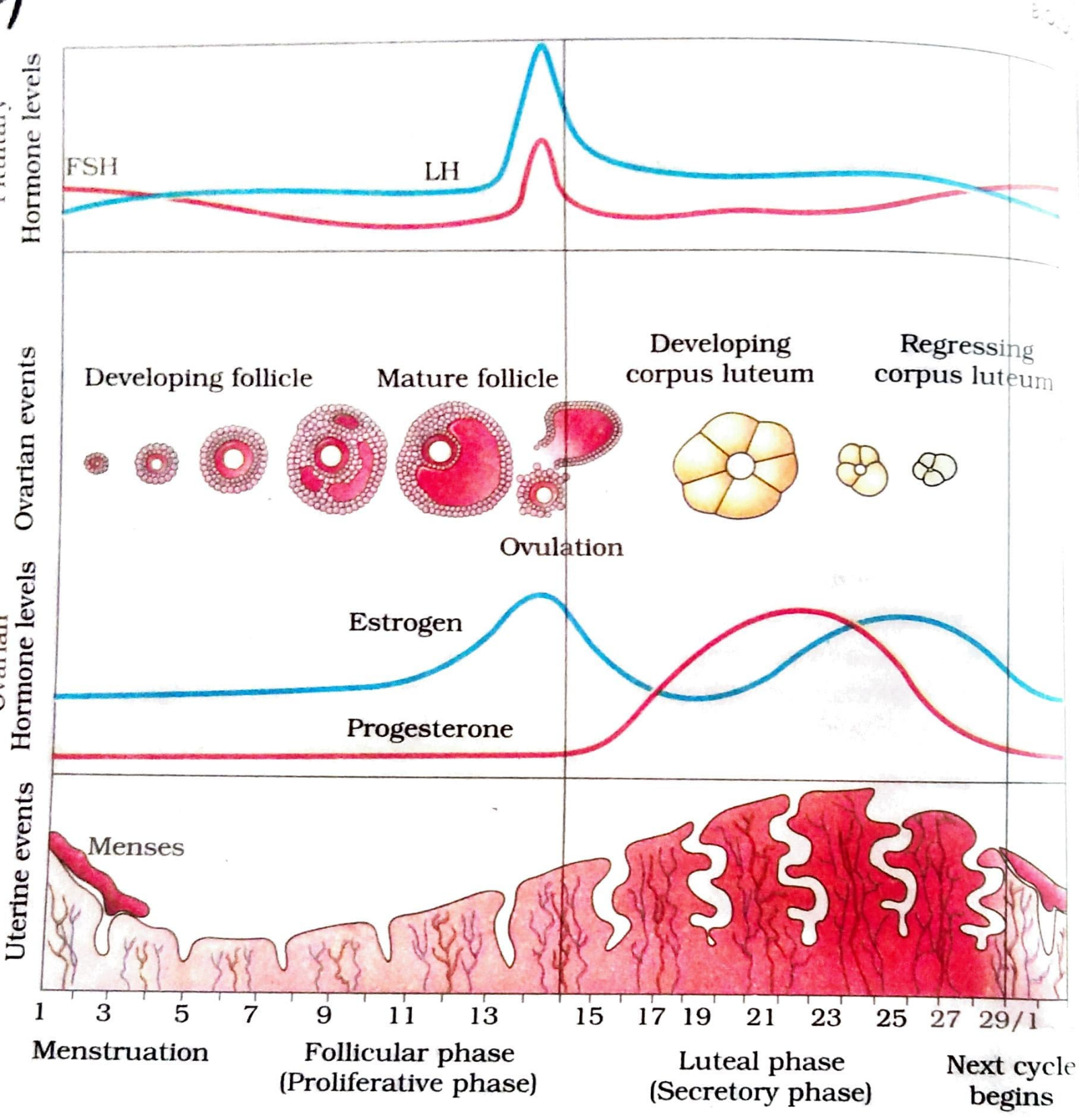

Figure 3.9 Diagrammatic presenation of various events during a menstrual cycle

④ Luteal Phase :- During ovulation, the egg bursts from its follicle, but the ruptured follicle stays on the surface of the ovary. For the next two weeks or so the follicles transforms into a structure called Corpus luteum. This structure starts releasing Progesterone along with small amount of estrogens. This combination of hormones maintains the thickened lining of the uterus waiting for a fertilized egg to implant.

If a fertilized egg implants in the lining of the uterus, it produces the hormone that are necessary to maintain the corpus luteum. This include human chorionic gonadotropins (HCG). The corpus luteum keeps producing the raised levels of progesterone that are needed to maintain the thick lining of uterus.

If pregnancy does not occur the corpus luteum wither and dies, usually around 22 day in a 28 day cycle. The drop in progesterone level causes the lining of the uterus to fall away. This is known as Menstruation. The cycle then repeats.

Cyclic menstruation is an indicator of normal reproductive phase & extends between menarch and menopause. In human beings menstrual cycle ceases around 50 years of age that is termed as Menopause.

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