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FEMALE REPRODUCTIVE PHYSIOLOGY

Briefly discuss the CYCLIC CHANGES in any two of the following:

- a. Cervix
- b. Vagina
- c. Breast

Explicate any one of the following

1. Menstrual cycle
2. Hormonal regulation of menstrual cycle

1. CYCLIC CHANGES IN CERVIX

During the cyclic change, the mucus membrane of the cervix shows cyclic changes during different phases of menstrual cycle. Which include the proliferative and the secretory phase.

The proliferative phase

In the proliferative phase, the mucus of the cervix becomes thinner and more alkaline due to the influence of the estrogen hormone. It helps in the survival and motility of the spermatozoa.

The secretory phase

In the secretory phase, the mucus membrane of the cervix becomes more thick and adhesive because of the action of progesterone hormone.

The cyclic changes in the surface structure of the cervix; The thirty parous ewes divided into six groups and are sacrificed on day 0, 1, 2, 10, 15 or 16 of the estrous cycle. Observations of the tissues reveals that the cervix is highly convoluted, which results in the formation of numerous folds. Two forms of columnar epithelial cells, a ciliated and non-ciliated cell with the microvilli, line the luminal surface of the cervix in the day 10, luteal-phase ewes. However, on day 15, 2 days before estrus, the non-ciliated cells differentiate into two morphologically distinct types of secretory cells. One type forms when the apex of the non-ciliated cells dilates outwards into the lumen of the cervix. Concurrent with apical enlargement, the microvilli are lost and the limiting cell membrane becomes smooth. The other type of the cell is characterized by only a slight apical swelling. Consequently, remnants of the microvilli along with secretory granules

can be observed on the limiting membrane of the cell. Both cells release a particulate component, which is believed to be a precursor of the mucus.

CYCLIC CHANGE IN VAGINA

Cyclic change in vagina during menstrual cycle also occur at two phases; the proliferative phase and the secretory phase.

Proliferative phase: epithelial cells of vagina are cornified. Estrogen is responsible for this.

Secretory phase: vaginal epithelium proliferates due to the actions of progesterone. It is also infiltrated with leukocytes. These two changes increase the resistance of vagina infection.

2. MENSTRUAL CYCLE

Menstrual cycle is defined as cyclic events that take place in a rhythmic fashion during the reproductive period of a woman's life. Menstrual cycle starts at the age of 12 to 15 years, which marks the onset of puberty. The commencement of menstrual cycle is called **menarche**.

Menstrual cycle ceases at the age of 45 to 50 years. Permanent cessation of menstrual cycle in old age is called **menopause**.

The Hypothalamic pituitary-Gonadal

The hypothalamus anterior pituitary gland and gonads work together to regulate the menstrual cycle. Gonadotropin releasing hormone (GnRH) from the hypothalamus stimulates luteinizing hormone (LH) and follicular stimulating hormone (FSH) release from the anterior pituitary gland. LH and FSH are gonadotropins that act primarily on the ovaries in the female reproductive tract. The menstrual cycle is controlled by feedback systems;

- Moderate oestrogen levels- negative feedback on the HPG axis,
- High oestrogen levels – positive feedback on the HPG axis,
- Oestrogen in the presence progesterone – negative feedback on the HPG axis,
- Inhibin – selectively inhibits FSH at the anterior pituitary.

THE OVARIAN CYCLE

Follicular phase: at the beginning of a new cycle there is little ovarian hormone production and the follicle begins to develop independently of gonadotropins or ovarian steroids. Only one dominant follicle can continue maturity and complete each menstrual cycle, only one follicle can survive and the other follicles form polar bodies.

Ovulation: in response to the LH surge, the follicle ruptures and the mature oocyte is assisted to the fallopian tube by fimbria. Here it remains viable for fertilization for around 24 hrs. The follicle remains luteinized, secreting oestrogen and also progesterone, reverting back to negative feedback on the HPG axis. This, together with inhibin stalls the cycle in anticipation of fertilization.

Luteal phase: The corpus luteum is the tissue in the ovary that forms at the site of a ruptured follicle following ovulation. At the end of the cycle, in the absence of fertilization, the corpus luteum spontaneously regresses after 14 days. If fertilization occurs, the syncytiotrophoblast of the embryo produces HCG, exerting a luteinizing effect, maintaining the corpus luteum. It produces hormone to support pregnancy.

THE UTERINE CYCLE

Proliferative phase; following menses, this phase runs alongside the follicular phase, preparing the reproductive tract for fertilization and implantation. Oestrogen initiates fallopian tube formation, thickening of the endometrium, increased growth and motility of the myometrium etc.

Menses marks the beginning of a new menstrual cycle. It occurs in the absence of fertilization once the corpus luteum has broken down and the internal lining of the uterus is shed. Menstrual bleeding usually last between 22-7 days 10-80ml blood.