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A. CYCLIC CHANGES IN VAGINA AND BREAST

1. VAGINA

Vaginal cytology was evaluated weekly over 12 months in 20 adult female cynomolgus monkeys (Macaca fascicularis). After sacrifice of the animal in histology of the ovaries, uterus and vagina were studied in different phase of the menstrual cycle. The cytological examination of the vagina smears showed that the superficial cells increased in number towards the middle of the cycle and the number of intermediate cells declined gradually. Parabasal cells were observed mainly at the beginning of the cycle; they disappeared towards the middle of the menstrual cycle. During the early follicular phase, the cells were moderately separated from each other, and during the second of the half proliferative or follicular phase, the superficial cells appeared clumped together. Leucocytes were usually absent except for at the beginning of the cycle and in the last few days of the last secretory or luteal phase. The maturation index of the vagina smear can be considered as a tool for distinguishing the different phases of the menstrual cycle. The microscopic examination of the genital organs showed that during proliferative or follicular phase of the cycle, which correspond to the development of the ovarian follicles, the uterus showed growth of the endometrial glands stroma and endothelial cell proliferation with capillary sprouts .Shortly after ovulation and parallel to the formation of the corpora lutea, the endometrium enters the secretory or luteal phase, which is characterized by coiling of endometrial glands, glandular secretion and the differentiation of the spiral artery. The most striking changes in the vagina, is the marked basal cell proliferation and thickening of the stratum granulosum during the follicular phase of the menstrual cycle. The histological changes observed in the vagina demonstrated a good correlation with the observation on cytological examination of the smears. The present study demonstrated that the process of angiogenesis in the uterus during the different phases of the menstrual cycle is a multiple phenomenon involving proliferation, maturation and differentiation

2. BREAST

The volumes and spin-lattice (T1) relaxation times of breast tissues and parenchymal water content were measured non-invasively by magnetic resonance imaging (MRI)in eight healthy women during four to eight consecutive menstrual cycles. Total breast volume, and parenchymal volume, T1 relaxation time and water content were lowest between days 6 and 15. Between days 16 and 28, parenchymal volume, T1 relaxation time and water content rose sharply by 38·9%, 15·1% and 24·5%, respectively, and peaked after day 25. Within 5 days of the onset of menses, parenchymal volume fell sharply by 30·3%, while water content declined by 17·5%. Rising parenchymal volume in the second half of the menstrual cycle is not solely due to increased tissue water.

B. MENSTRUAL CYCLE

Menstruation is the process in a woman of discharging (through the vagina) blood and other materials from the lining of the uterus at about one monthly interval from puberty until menopause (ceasing of regular menstrual cycles), except during pregnancy. It is also known as

having a period. This discharging process last about 3-5days.

Besides the bleeding, other signs and symptoms of menstruation may include headache, acne, bloating, and pains in the lower abdomen, tiredness, mood changes, food cravings, breast soreness and diarrhea.

The menstrual cycle is the hormonal driven cycle; Day 1 is the first day of period (bleeding) while Day 14 is the approximate day for ovulation and if the egg is not fertilized, hormone levels eventually drop and at about Day 25; the egg begins to dissolve and the cycle begins with the period at about Day 30. Menstruation begins Day 1and normally ends days 3-5 of the menstrual cycle.

Days 1-5

The first day of menstrual bleeding is considered Day 1 of the cycle. Period can last anywhere from 3 to 8 days but day 5 is average. Bleeding is usually heaviest on the first 2 days.

Days 6-14

Once the bleeding stops, the uterine lining (also called the endometrium) begins to prepare for the possibility of a pregnancy. The uterine lining becomes thicker and enriched in blood and nutrients.

Day 14-25

Somewhere around day 14, an egg is released from one of the ovaries and begins its journey down the fallopian tubes to the uterus. If sperm are present in the fallopian tubes at this time, fertilization can occur. In this case the fertilized egg will travel to the uterus and attempt to implant in the uterine wall

Days 25-28

If the egg was not fertilization or implantation does not occur, hormonal changes signal the uterus to prepare to shed its lining, and the egg breaks down and shed along with the lining

The cycle begins again at day 1 menstrual bleeding

Day 1-14 (Follicular phase)

This phase of the menstrual cycle occurs from approximately day 1-14. Day 1 is the first day of bright red bleeding, and the end of this phase is marked by ovulation. While menstrual bleeding does happen in the early part of this phase, the ovaries are simultaneously preparing to ovulate again. The pituitary gland (located at the base of the brain) releases a hormone called FSH-follicle stimulating hormone. This hormone causes several follicles to rise on the surface of the ovary.

Day 14 (Ovulatory phase)

The release of the mature egg happens on day 14 as a result of surge in LH (Luteinizing hormone) and FSH (Follicle stimulating phase) over the previous day. After the release, the egg enters the fallopian tubes where the fertilization may occur, if sperm are present. If the egg is not fertilized, it disintegrates after about 24 hours. Once the egg is released, the follicle seals over and this is called corpus luteum

Day 14-28 (Luteal phase)

After the release of the egg, the levels of FSH and LH decrease. The corpus luteum produces

progesterone. If fertilization has occurred, the corpus luteum continues to produce progesterone which prevents the endometrial lining from being shed. If fertilization does not occur, the corpus luteum disintegrates, which cause progesterone levels to drop and signals the endometrial lining to begin shedding.

During this cycle, hormones make the lining of the uterus become thicker, getting ready in case of pregnancy. Hormones also cause an egg to be released from an ovary which is known as **ovulation**. The lining of the uterus falls away and, along with some blood, flows out through the vagina. Periods can be light or heavy, and the blood can range from bright red to dark brown

A cycle is counted from the first day of 1 period to the first day of the next period. The average menstrual cycle is 28 days long. Cycles can range anywhere from 21 to 35 days in adults and from 21 to 45 days in young teens. The rise and fall of levels of hormones during the month control the menstrual cycle.