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# Describe the Cyclic Change in Virginia

Vagina is a short tubular organ. It is lined by mucus membrane, which is formed by stratified epithelial cells.



Vaginal cytology was evaluated weekly over 12 months in 20 adult female Cynomolgus monkeys (Macaca fascicularis). After sacrifice of the animals the histology of the ovaries, uterus and vagina were studied in different phases of the menstrual cycle. The cytological examination of the vaginal 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 half of the 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 late secretory or luteal phase. The maturation index of the vaginal smears 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 the proliferative or follicular phase of the cycle, which corresponds to the development of the ovarian follicles, the uterus showed growth of 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.



**Diagram of the Uterus and part of the vagina.**

# Describe the Cyclic Change in breast



Breast development is a vital part of a woman’s reproduction. Breast development happens in certain stages during a woman's life: first before birth, again at puberty, and later during the childbearing years. Changes also happen to the breasts during the menstrual cycle and when a woman reaches menopause.

**When does breast development begin?**

Breasts begin to form while the unborn baby is still growing in the mother’s uterus. This starts with a thickening in the chest area called the mammary ridge or milk line. By the time a baby girl is born, nipples and the beginnings of the milk-duct system have formed.

Breast changes continue to happen over a woman’s life. The first thing to develop are lobes, or small subdivisions of breast tissue. Mammary glands develop next and consist of 15 to 24 lobes. Mammary glands are influenced by hormones activated in puberty. Shrinkage (involution) of the milk ducts is the final major change that happens in the breast tissue. The mammary glands slowly start to shrink. This often starts around age 35.

**Cross section of breast.**

As a girl approaches her teen years, the first visible signs of breast development begin. When the ovaries start to produce and release (secrete) estrogen, fat in the connective tissue starts to collect. This causes the breasts to enlarge. The duct system also starts to grow. Often these breast changes happen at the same that pubic hair and armpit hair appear.

Once ovulation and menstruation begin, the maturing of the breasts begins with the formation of secretory glands at the end of the milk ducts. The breasts and duct system continue to grow and mature, with the development of many glands and lobules. The rate at which breasts grow is different for each young woman.

Female breast developmental stages Description

Stage 1 Preteen. Only the tip of the nipple is raised.

Stage 2 Buds appear, and breast and nipple are raised. The dark area of skin around the nipple (the areola) gets larger.

Stage 3 Breasts are slightly larger, with glandular breast tissue present.

Stage 4 The areola and nipple become raised and form a second mound above the rest of the breast.

Stage 5 Mature adult breast. The breast becomes rounded and only the nipple is raised.

Each month, women go through changes in the hormones that make up the normal menstrual cycle. The hormone estrogen is produced by the ovaries in the first half of the menstrual cycle. It stimulates the growth of milk ducts in the breasts. The increasing level of estrogen leads to ovulation halfway through the cycle. Next, the hormone progesterone takes over in the second half of the cycle. It stimulates the formation of the milk glands. These hormones are believed to be responsible for the cyclical changes that many women feel in their breasts just before menstruation. These include swelling, pain, and soreness.

During menstruation, many women also have changes in breast texture. Their breasts may feel very lumpy. This is because the glands in the breast are enlarging to get ready for a possible pregnancy. If pregnancy does not happen, the breasts go back to normal size. Once menstruation starts, the cycle begins again.

Many healthcare providers believe the breasts are not fully mature until a woman has given birth and made milk. Breast changes are one of the earliest signs of pregnancy. This is a result of the hormone progesterone. In addition, the dark areas of skin around the nipples (the areolas) begin to swell. This is followed by the rapid swelling of the breasts themselves. Most pregnant women feel soreness down the sides of the breasts, and nipple tingling or soreness. This is because of the growth of the milk duct system and the formation of many more lobules.

By the fifth or sixth month of pregnancy, the breasts are fully capable of producing milk. As in puberty, estrogen controls the growth of the ducts, and progesterone controls the growth of the glandular buds. Many other hormones also play vital roles in milk production. These include folliclestimulating hormone (FSH), luteinizing hormone (LH), prolactin, oxytocin, and human placental lactogen (HPL).

Other physical changes happen as well. These include the blood vessels in the breast becoming more visible and the areola getting larger and darker. All of these changes are in preparation for breastfeeding the baby after birth.

By the time a woman reaches her late 40s and early 50s, perimenopause is starting or is well underway. At this time, the levels of estrogen and progesterone begin to change. Estrogen levels dramatically decrease. This leads to many of the symptoms commonly linked to menopause. Without estrogen, the breast’s connective tissue becomes dehydrated and is no longer elastic. The breast tissue, which was prepared to make milk, shrinks and loses shape. This leads to the "saggy" breasts associated with women of this age.

Women who are taking hormone therapy may have some of the premenstrual breast symptoms that they had while they were still menstruating, such as soreness and swelling. But if a woman’s breasts were saggy before menopause, this will not change with hormone therapy.

# Menstrual Cycle

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

Menstruation is bleeding from the vagina that happens about once a month, as a normal part of the menstrual cycle. It is also known as having a period. During this cycle, your 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. If you don`t become pregnant, your periods start about two weeks after you ovulate. 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. You might also notice small clots.

**When do girls start their period?**

Girls have their first period during puberty. Most often that is around the age 12 or 13 years old, but girls can start menstruating as young as 9, or as late as

16.

**bleeding**. When you menstruate, your body sheds the lining of the uterus

(womb). Menstrual blood flows from the uterus through the small opening in the cervix and passes out of the body through the vagina. Most menstrual periods last from 3 to 5 days.

How long do periods last?

Menstruation affects every woman, but the experience can differ between women. When periods (menstruations) come regularly, this is called the menstrual cycle. Having regular menstrual cycles is a sign that important parts of your body are working normally. The menstrual cycle provides important body chemicals, called hormones, to keep you healthy. It also prepares your body for pregnancy each month. 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.

2. Hormonal Regulation of Menstrual Cycle

The menstrual cycle is a cycle of events that occurs in the womb (uterus) and ovaries of female mammals. It is associated with the production of eggs and preparing the uterus for the implantation of fertilised eggs.

The menstrual cycle occurs over a period of about 28 days. The changes during the cycle are due to four hormones, progesterone, oestrogen, FSH (follicle stimulating hormone) and LH (luteinising hormone). Progesterone and oestrogen have wide ranging effects on the body but in the context of the menstrual cycle progesterone is mainly involved in maintaining the lining of the uterus and oestrogen is mainly concerned with building up the lining of the uterus. FSH stimulates the production of eggs and LH stimulates the release of the egg. FSH and LH are produced by the pituitary gland in the brain.

There are four stages in the menstrual cycle.

**Stage1.** Days 1-4. Menstruation (bleeding) occurs. The lining of the uterus disintegrates and is shed. This is due to low levels of progesterone.

**Stage2**. Days 4-14. The uterine lining grows back. This is due to high levels of oestrogen.

**Stage3.** Day 14. The egg (called an ovum) is released. This is due to LH.

**Stage4.** Days 14-28. The lining of the uterus is maintained in case the egg becomes fertilised and implanted in the uterus. Maintenance of the lining is due to high levels of progesterone.

The four hormones interact with each other. FSH causes Oestrogen release and oestrogen inhibits FSH. LH stimulates both oestrogen and progesterone production. Before ovulation LH release is stimulated by oestrogen but after ovulation it is inhibited by both oestrogen and progesterone.

In summary, the hormones have the following effects:

Oestrogen: causes growth of the uterine lining. Inhibits FSH. Stimulates release of LH and hence release of the egg. Inhibits LH after ovulation.

Progesterone: maintains the uterine lining. Inhibits LH after ovulation.

LH: Stimulates the release of the egg (called ovulation). Stimulates oestrogen and progesterone production.

FSH: Stimulates egg development and the release of oestrogen.

Birth control tablets contain high levels of progesterone and oestrogen. The oestrogen inhibits FSH production so that eggs cease to develop.

FSH is used to treat infertility because it stimulates the production of eggs.

Learning the menstrual cycle Edit

The menstrual cycle is easy to learn. The best approach is probably to break it down into parts.

Menstrual cycle - stages and changes in uterus

Menstrual cycle - changes in oestrogen and progesterone

# Clinical significance

A female has an average of 450 menses throughout her lifetime; therefore, it is important to understand the menstrual cycle and its physiology because of the various complications, consequences, and distress that it may have for a female patient. A female presenting with primary or secondary amenorrhea will need to undergo clinical testing to diagnose the reason, but reasonable testing from the level of the ovaries to the hypothalamus cannot be performed unless a clinician thoroughly understands the hormone feedback system. Additionally, there may be problems with her menses itself such as premenstrual syndrome, hm dysmenorrhea, or menorrhagia. Without an understanding of the female anatomy and menstrual cycle physiology, a clinician would be unable to obtain a complete history and physical to allow understanding of the underlying cause. Infertility is a prominent issue in our society, and the menstrual cycle is the basis for how a woman’s body prepares for pregnancy, so each patient’s menstrual cycle must be evaluated as a possible area of concern for her infertility. As clinicians, we must understand the menstrual cycle in its entirety to provide relevant clinical care to our female patients.

**References**

**1.Physiology textbook**

**2.Wikipedia**



**Diagram of the human ovary undergoing ovulation.**