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1 **CYCLIC CHANGES AT THE:**

1. **Vagina:** 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. Hitschmann and Adler showed that the human uterine mucosa undergoes cyclic morphologic changes, which depend on the ovarian function. Stockard and Papanicolaou, Long, Evans and Allen proved that in rodents not only the uterine mucosa but also the vaginal mucosa and vaginal secretion show cyclic morphologic changes determined by the ovarian function. Hence it is probable to assume that the human vagina is also under the influence of the ovarian hormones. Dierks1 in 1927 showed that during the menstrual cycle definite proliferative and destructive changes occur in the human vaginal epithelium. In the first days after the beginning of the last menstrual period a division of the vaginal epithelium into three layers is noticeable. This is more strikingly marked during the premenstrual period. Through the early appearance of an intra-epithelial zone of cornification.

Studies in nonhuman primates indicate that changes in the thickness and integrity of the vaginal epithelium affect the transmission rates of HIV-1, but few studies have examined the normal variations that may occur in the vagina of normal macaques as a result of aging or changes in the menstrual cycle. This study was conducted to determine if differences occur in the thickness of the vaginal mucosa with age or menses. Vaginal mucosal thickness was compared in 46 rhesus macaques grouped as juvenile (1-3 years old), mature cycling (3-21 years old), and geriatric (> 21 years old). Epithelia of mature cycling macaques were also compared at different stages of the menstrual cycle. Older females (> 21 years) had the thinnest and least keratinized epithelium of all groups, followed by the youngest females (< 3 years). The vaginal epithelium was also thinner in cycling macaques during menses compared to the follicular stage. In addition, young, geriatric, or cycling macaques during menses had minimal keratinization. We hypothesize that normal physiologic changes in the vaginal epithelium of women occur with age and menses, which may affect a woman's susceptibility to HIV-1 transmission and other sexually transmitted diseases. Also, age and menstrual cycle should be considered when designing vaginal transmission experiments in rhesus macaques.

1. **Breasts:** Ask just about any woman: Breasts can go through changes during a menstrual cycle. They get tender, and even seem to shift a bit in size and shape. Chalk it up to the ebb and flow of hormones such as estrogen and progesterone over the course of your cycle. Breast symptoms are the strongest just before your period starts, and improve either during or right after it.

Every woman is different. But it’s common to have one or more of the following: Swelling, Tenderness, Aches, Soreness, Changes in texture.

Whether the breast tissue undergoes morphologic changes in relation to the menstrual cycle had been a subject of debate. Elegant studies performed in the early 1980s provided conclusive evidence of cyclical changes in the normal breast lobules. These studies were almost entirely based on autopsy material and have not been validated in the clinical setting. In the present study, we examine breast tissues from surgical specimens from 73 premenopausal women and use morphological criteria to characterize the stage of the menstrual cycle. Patients taking oral contraceptives or hormonal therapy were excluded from this study. The following histological parameters were used to assess the menstrual stage: number of cell layers in the acini and presence and degree of vacuolation of the myoepithelial cells, stromal edema, infiltrate, mitosis, and apoptosis. The morphological stage was then correlated with the stage of the cycle, as determined by last menstrual period and the usual menstrual cycle length and in some patients with serum estrogen and progesterone levels. The morphologic stage was concordant with dates in 54 of the 73 patients (74%, *P* =.001). In 31 of these patients, serum levels of estradiol and progesterone at the time of surgery were available for correlation. Twenty-five (80%) of these were phase concordant by morphology and progesterone levels (*P* =.01), and 25 (80%), by dates and progesterone levels (*P* =.007). Women with a high morphologic score were seven times as likely to be in luteal phase as were women with a low score (odds ratio, 7.1; 95% confidence interval). Menstrual phase can be determined by the morphology of the normal lobules present within the surgically excised breast specimens. This will permit retrospective analysis of large archival databases to analyze the effect of timing of surgery in relation to menstrual cycle phase. It will also aid the design of epidemiological studies for breast cancer risk assessment.

2 Each month during the years between puberty and menopause, a woman’s body goes through a number of changes to get it ready for a possible pregnancy. This series of hormone-driven events is called the menstrual cycle. During each menstrual cycle, an egg develops and is released from the [**ovaries**](https://www.healthline.com/human-body-maps/ovary). The lining of the [**uterus**](https://www.healthline.com/human-body-maps/uterus) builds up. If a pregnancy doesn’t happen, the uterine lining sheds during a menstrual period. Then the cycle starts again. A woman’s menstrual cycle is divided into four phases:

* menstrual phase
* follicular phase
* ovulation phase
* luteal phase

The length of each phase can differ from woman to woman, and it can change over time.

**Menstrual phase**

The menstrual phase is the first stage of the menstrual cycle. It’s also when you get your period. This phase starts when an egg from the previous cycle isn’t fertilized. Because pregnancy hasn’t taken place, levels of the hormones estrogen and progesterone drop.

The thickened lining of your uterus, which would support a pregnancy, is no longer needed, so it sheds through your vagina. During your period, you release a combination of blood, mucus, and tissue from your uterus.

You may have period symptoms like these: cramps (try these [home remedies](https://www.healthline.com/health/womens-health/menstrual-cramp-remedies)), tender breasts, bloating, mood swings, irritability, headaches, tiredness, low back pain

On [average](http://www.soc.ucsb.edu/sexinfo/article/menstrual-cycle), women are in the menstrual phase of their cycle for 3 to 7 days. [**Some women have longer periods than others.**](https://www.healthline.com/health/how-long-does-your-period-last)

**Follicular phase**

The follicular phase starts on the first day of your period (so there is some overlap with the menstrual phase) and ends when you ovulate. It starts when the hypothalamus sends a signal to your pituitary gland to release [**follicle-stimulating hormone (FSH)**](https://www.healthline.com/health/fsh)**.** This hormone stimulates your ovaries to produce around 5 to 20 small sacs called follicles. Each follicle contains an immature egg. Only the healthiest egg will eventually mature. (On rare occasions, a woman may have two eggs mature.) The rest of the follicles will be reabsorbed into your body.

The maturing follicle sets off a surge in estrogen that thickens the lining of your uterus. This creates a nutrient-rich environment for an embryo to grow.

## [The](https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2834565/) average follicular stage lasts for about 16 days. It can range from 11 to 27 days, depending on your cycle.

## Ovulation phase

Rising estrogen levels during the follicular phase trigger your pituitary gland to release [**luteinizing hormone (LH)**](https://www.healthline.com/health/lh-blood-test). This is what starts the process of [ovulation](https://www.healthline.com/health/womens-health/what-is-ovulation).

Ovulation is when your ovary releases a mature egg. The egg travels down the fallopian tube toward the uterus to be fertilized by sperm.

The ovulation phase is the only time during your menstrual cycle when you can get pregnant. You can tell that you’re ovulating by symptoms like these:

* a slight rise in [**basal body temperature**](https://www.healthline.com/health/pregnancy/basal-body-temperature)
* thicker discharge that has the texture of egg whites

## Ovulation happens at around day 14 if you have a 28-day cycle — right in the middle of your menstrual cycle. It lasts about 24 hours. After a day, the egg will die or dissolve if it isn’t fertilized.

## Luteal phase

After the follicle releases its egg, it changes into the [**corpus luteum**](https://www.healthline.com/health/womens-health/corpus-luteum). This structure releases hormones, mainly progesterone and some estrogen. The rise in hormones keeps your uterine lining thick and ready for a fertilized egg to implant.

If you do get pregnant, your body will produce human chorionic gonadotropin (hCG). This is the hormone [pregnancy tests](https://www.healthline.com/health/hcg-in-urine) detect. It helps maintain the corpus luteum and keeps the uterine lining thick.

If you don’t get pregnant, the corpus luteum will shrink away and be resorbed. This leads to decreased levels of estrogen and progesterone, which causes the onset of your period. The uterine lining will shed during your period.

* During this phase, if you don’t get pregnant, you may experience symptoms of [**premenstrual syndrome (PMS)**](https://www.healthline.com/health/premenstrual-syndrome)**.** These include: bloating, breast swelling, pain, or tenderness, mood changes, headache, weight gain, changes in sexual desire, food cravings, trouble sleeping.

The luteal phase lasts for 11 to 17 days. The average length is 14 days.

Every woman’s menstrual cycle is different. Some women get their period at the same time each month. Others are more [irregular](https://www.healthline.com/symptom/menstrual-irregularity). Some women bleed more [heavily](https://www.healthline.com/health/why-is-my-period-heavy) or for a longer number of days than others.

Your menstrual cycle can also change during certain times of your life. For example, it can get more irregular as you get close to [menopause](https://www.healthline.com/health/menopause).

One way to find out if you’re having any issues with your menstrual cycle is to track your periods. Write down when they start and end. Also record any changes to the amount or number of days you bleed, and whether you have [spotting between periods](https://www.healthline.com/health/vaginal-bleeding-between-periods).

Any of these things can alter your menstrual cycle:

* [**Birth control**](https://www.healthline.com/health/birth-control-pills)**.** The birth control pill may make your periods shorter and lighter. While on some pills, you won’t get a period at all.
* [**Pregnancy**](https://www.healthline.com/health/pregnancy)**.** Your periods should stop during pregnancy. Missed periods are one of the most obvious [first signs](https://www.healthline.com/health/pregnancy/early-symptoms-timeline) that you’re pregnant.
* [**Polycystic ovary syndrome (PCOS)**](https://www.healthline.com/health/polycystic-ovary-disease)**.** This hormonal imbalance prevents an egg from developing normally in the ovaries. PCOS causes irregular menstrual cycles and missed periods.
* [**Uterine fibroids**](https://www.healthline.com/health/uterine-fibroids)**.** These noncancerous growths in your uterus can make your periods longer and heavier than usual.
* [**Eating disorders**](https://www.healthline.com/nutrition/common-eating-disorders)**.** Anorexia, bulimia, and other eating disorders can disrupt your menstrual cycle and make your periods stop.

Here are a few signs of a problem with your menstrual cycle:

* You’ve skipped periods, or your periods have stopped entirely.
* Your periods are irregular.
* You bleed for more than seven days.
* Your periods are less than 21 days or more than 35 days apart.
* You bleed between periods (heavier than spotting).

If you have these or other problems with your menstrual cycle or periods, talk to your healthcare provider.