PHS 212

1) Briefly discuss the cyclic changes in any two of the following:

1. Cervix
2. Vagina
3. Breasts

The vagina:

## What is a vagina?

The vagina is the tube between the vulva and the [cervix](https://helloclue.com/articles/cycle-a-z/how-to-find-feel-your-cervix). This tube is the connection between your uterus and the outside world. The vagina is what babies exit through during birth, and what menstrual blood exits through during your period. The vagina is also used for insertion, such as with a penis, fingers, female condoms, sex toys, tampons, or [menstrual cups](https://helloclue.com/articles/culture/menstrual-cup-101-theyre-easier-than-you-think).

The vagina can also act as a route to other parts of the body. During penis-vagina sex, ejaculate is deposited in the vagina, allowing sperm to enter the uterus through the cervix. The walls of the vagina can also be used as an administrative route for medications and contraceptives, such as intervaginal hormone creams, the hormonal vaginal contraceptive ring, or vaginal suppository medications.

## Anatomy of the vagina

It may seem strange that an organ capable of passing an entire baby through it is also capable of holding a small tampon in place for hours. How does that tampon stay in there? If the vagina is just a tube, shouldn’t the tampon fall out?

The vagina is much more than just a tube. When it is in a relaxed state (not aroused), the walls of the vagina are collapsed against each other, flattened by the pressure of the surrounding organs and tissues within the pelvis. During this state, a cross-section of the vaginal canal (the vaginal lumen) can resemble an [“H” or a “W” shape](https://www.ncbi.nlm.nih.gov/pubmed/15136106), as the walls flatten against themselves . From the sides, the vagina offers movable support and pressure, which allow your tampon to stay in place .

The walls of the vagina are covered by many folds called rugae . The walls and folds of the vagina have many purposes, providing both a barrier and access route between the cervix and the outside world. All of these folds allow the vagina to be stretched and expand like an accordion when pressure is applied to the sides (like when a baby’s head is passing through).

The walls of the vagina are composed of different layers of tissue. The surface layers of the vaginal wall are made of mucosal tissue—similar to the tissue that lines your mouth, nose, and digestive tract. Underneath the mucosal tissue are layers of smooth muscle tissue, collagen, and elastin fibers, which give the vagina both structure and ability to stretch .

[Fluids](https://helloclue.com/articles/cycle-a-z/getting-wet-cervical-fluid-vs-arousal-fluid-vs-discharge) are released through the walls of the vagina to keep the area moist, and during times of sexual arousal, to increase lubrication. The vagina is also capable of absorbing some substances—such as medications, hormonal creams, or contraceptives—into the body .

## How the vagina changes with age

The vagina can change a lot throughout a person's life . An average adult vagina is slightly curved, and can range between 7 to 12 cm in length but every body is different, and there’s no such thing as a too small or too large vagina.

The vagina is strongly influenced by hormonal changes throughout the body. During the reproductive years after [menarche](https://helloclue.com/articles/life-stages/when-does-menstruation-begin) (the first menstrual period) and before [menopause](https://helloclue.com/articles/life-stages/8-reasons-to-talk-openly-about-menopause), more layers of tissue are present lining the vagina, due to stimulation from higher estrogen levels in the body .

The vagina is also influenced by changing hormone levels during [pregnancy](https://helloclue.com/articles/life-stages/most-common-symptoms-early-pregnancy). Increased blood flow is directed to the pelvis, causing a deeper color change to the vulva and vagina . Throughout a pregnancy, the connective tissue of the vaginal walls progressively relaxes, in preparation for the delivery of a baby. After delivery, the vagina and vaginal opening temporarily widen, but 6-12 weeks post-delivery, the vagina returns to its pre-pregnancy size.

As people age, the walls of the vagina of the vagina become more relaxed, and the diameter of the vagina becomes wider . When it comes to sexual satisfaction, vaginal size does not affect sexual function . The perception of [vaginal tightness](https://helloclue.com/articles/cycle-a-z/vaginal-tightness-tips-myths-what-you-need-to-know-about-pelvic-floor) during sex is primarily related to the pelvic floor muscles, which are present around the base of the vagina and not actually how wide the vaginal canal is.

After menopause, when [estrogen](https://helloclue.com/articles/cycle-a-z/estrogen-101) is lower, the walls of the vagina become thinner and frailer, which can cause symptoms of [vaginal dryness](https://helloclue.com/articles/cycle-a-z/vaginal-dryness-why-it-happens-what-you-can-do-about-it) and decreased vaginal secretions . This may result in discomfort during sex and increase the chances of vaginal irritation or infection .

## How the vagina changes during the menstrual cycle

The vagina also changes in response to hormonal fluctuations of the menstrual cycle. Around mid-cycle, when estrogen is highest, vaginal tissue becomes thicker and fuller.

The cervix, at the top of the vagina, moves and changes shape throughout the cycle. Before and after the fertile window, the cervix is low and can be felt in the vagina, with a firm texture, and the hole in the center of the cervix is closed. During the fertile window, the hole in the cervix opens to facilitate the entrance of sperm into the uterus; the cervix rises higher in the vagina, and is softer when touched.

## How the vagina changes during sex

The vagina can also undergo more rapid changes, such as during sexual activity. When a person with a vagina is sexually aroused, increased blood flow is directed towards the genitals, causing the vaginal tissue to become engorged with blood, and additional lubrication to be produced. This fluid is called [arousal fluid](https://helloclue.com/articles/cycle-a-z/getting-wet-cervical-fluid-vs-arousal-fluid-vs-discharge).

During sexual excitement, the vagina expands by lengthening and widening in shape. This is called vaginal tenting and ballooning. This shape change happens as the uterus and cervix are drawn higher into the pelvis, which creates more space and moves the cervix farther away from any semen that is ejaculated into the vagina. This allows time for the semen to mix with female genital fluids, stimulating the sperm to undergo the physical changes necessary for fertilizing an egg .

The breast:

The **breast** is one of two prominences located on the upper [ventral](https://en.wikipedia.org/wiki/Ventral) region of the [torso](https://en.wikipedia.org/wiki/Torso) of [primates](https://en.wikipedia.org/wiki/Primate). In females, it serves as the [mammary gland](https://en.wikipedia.org/wiki/Mammary_gland), which produces and secretes milk to feed [infants](https://en.wikipedia.org/wiki/Infant). Both females and males develop breasts from the same [embryological](https://en.wikipedia.org/wiki/Embryology) tissues. At [puberty](https://en.wikipedia.org/wiki/Puberty), [estrogens](https://en.wikipedia.org/wiki/Estrogen), in conjunction with [growth hormone](https://en.wikipedia.org/wiki/Growth_hormone), cause [breast development](https://en.wikipedia.org/wiki/Breast_development) in female humans and to a much lesser extent in other primates. Breast development in other primate females generally only occurs with pregnancy.

[Subcutaneous fat](https://en.wikipedia.org/wiki/Subcutaneous_fat) covers and envelops a network of [ducts](https://en.wikipedia.org/wiki/Lactiferous_duct) that converge on the [nipple](https://en.wikipedia.org/wiki/Nipple), and these [tissues](https://en.wikipedia.org/wiki/Tissue_%28biology%29) give the breast its size and shape. At the ends of the ducts are [lobules](https://en.wikipedia.org/wiki/Mammary_lobule), or clusters of [alveoli](https://en.wikipedia.org/wiki/Mammary_alveolus), where milk is produced and stored in response to [hormonal signals](https://en.wikipedia.org/wiki/Hormone). During pregnancy, the breast responds to a complex interaction of hormones, including [estrogens](https://en.wikipedia.org/wiki/Estrogen), [progesterone](https://en.wikipedia.org/wiki/Progesterone), and [prolactin](https://en.wikipedia.org/wiki/Prolactin), that mediate the completion of its development, namely [lobuloalveolar](https://en.wikipedia.org/wiki/Lobuloalveolar) maturation, in preparation of [lactation](https://en.wikipedia.org/wiki/Lactation) and [breastfeeding](https://en.wikipedia.org/wiki/Breastfeeding).

Along with their major function in providing nutrition for infants, female breasts have social and sexual characteristics. Breasts have been featured in notable ancient and modern sculpture, art, and photography. They can figure prominently in the perception of a woman's body and [sexual attractiveness](https://en.wikipedia.org/wiki/Sexual_attraction). A number of [cultures](https://en.wikipedia.org/wiki/Culture) associate breasts with [sexuality](https://en.wikipedia.org/wiki/Sexuality) and tend to regard bare breasts in public as immodest or indecent. Breasts, especially the nipples, are an [erogenous zone](https://en.wikipedia.org/wiki/Erogenous_zone).

## Anatomy

In women, the breasts overlie the [pectoralis major muscles](https://en.wikipedia.org/wiki/Pectoralis_major_muscle) and usually extend from the level of the second rib to the level of the sixth rib in the front of the [human rib cage](https://en.wikipedia.org/wiki/Human_rib_cage); thus, the breasts cover much of the chest area and the chest walls. At the front of the chest, the breast tissue can extend from the [clavicle](https://en.wikipedia.org/wiki/Clavicle) (collarbone) to the middle of the [sternum](https://en.wikipedia.org/wiki/Sternum) (breastbone). At the sides of the chest, the breast tissue can extend into the [axilla](https://en.wikipedia.org/wiki/Axilla) (armpit), and can reach as far to the back as the [latissimus dorsi muscle](https://en.wikipedia.org/wiki/Latissimus_dorsi_muscle), extending from the lower back to the [humerus](https://en.wikipedia.org/wiki/Humerus) bone (the bone of the upper arm). As a [mammary gland](https://en.wikipedia.org/wiki/Mammary_gland), the breast is composed of differing layers of [tissue](https://en.wikipedia.org/wiki/Histology), predominantly two types: [adipose tissue](https://en.wikipedia.org/wiki/Adipose_tissue); and [glandular tissue](https://en.wikipedia.org/wiki/Lactiferous_duct), which affects the lactation functions of the breasts.

[Morphologically](https://en.wikipedia.org/wiki/Morphology_%28biology%29) the breast is tear-shaped.The superficial tissue layer ([superficial fascia](https://en.wikipedia.org/wiki/Superficial_fascia)) is separated from the skin by 0.5–2.5 cm of subcutaneous fat (adipose tissue). The [suspensory Cooper's ligaments](https://en.wikipedia.org/wiki/Cooper%27s_ligaments) are fibrous-tissue prolongations that radiate from the superficial fascia to the skin envelope. The female adult breast contains 14–18 irregular lactiferous lobes that converge at the nipple. The 2.0–4.5 mm milk ducts are immediately surrounded with dense connective tissue that support the glands. Milk exits the breast through the nipple, which is surrounded by a pigmented area of skin called the areola. The size of the areola can vary widely among women. The areola contains modified [sweat glands](https://en.wikipedia.org/wiki/Sebaceous_gland) known as [Montgomery's glands](https://en.wikipedia.org/wiki/Areolar_gland). These glands secrete oily fluid that lubricate and protect the nipple during breastfeeding. Volatile compounds in these secretions may also serve as an olfactory stimulus for the newborn's appetite.[[11]](https://en.wikipedia.org/wiki/Breast#cite_note-11)

The dimensions and weight of the breast vary widely among women. A small-to-medium-sized breast weighs 500 grams (1.1 pounds) or less, and a large breast can weigh approximately 750 to 1,000 grams (1.7 to 2.2 pounds) or more. The tissue composition ratios of the breast also vary among women. Some women's breasts have varying proportions of glandular tissue than of adipose or [connective](https://en.wikipedia.org/wiki/Connective_tissue) tissues. The fat-to-connective-tissue ratio determines the density or firmness of the breast. During a woman's life, her breasts change size, shape, and weight due to hormonal changes during [puberty](https://en.wikipedia.org/wiki/Thelarche), the [menstrual cycle](https://en.wikipedia.org/wiki/Menstruation), pregnancy, breastfeeding, and menopause.

### Changes during the menstrual cycle

During the menstrual cycle, the breasts are enlarged by [premenstrual water retention](https://en.wikipedia.org/wiki/Premenstrual_water_retention) and temporary growth.

### Changes in Pregnancy and breastfeeding

The breasts reach full maturity only when a woman's first pregnancy occurs. Changes to the breasts are among the very first signs of pregnancy. The breasts become larger, the nipple-areola complex becomes larger and darker, the [Montgomery's glands](https://en.wikipedia.org/wiki/Montgomery%27s_glands) enlarge, and veins sometimes become more visible. Breast tenderness during pregnancy is common, especially during the first trimester. By mid-pregnancy, the breast is physiologically capable of lactation and some women can express [colostrum](https://en.wikipedia.org/wiki/Colostrum), a form of breast milk.

Pregnancy causes elevated levels of the hormone [prolactin](https://en.wikipedia.org/wiki/Prolactin), which has a key role in the production of milk. However, milk production is blocked by the hormones [progesterone](https://en.wikipedia.org/wiki/Progesterone) and [estrogen](https://en.wikipedia.org/wiki/Estrogen) until after delivery, when progesterone and estrogen levels plummet.

### Changes in Menopause

At menopause, breast atrophy occurs. The breasts can decrease in size when the levels of circulating estrogen decline. The adipose tissue and milk glands also begin to wither. The breasts can also become enlarged from [adverse side effect](https://en.wikipedia.org/wiki/Adverse_effect)s of [combined oral contraceptive pills](https://en.wikipedia.org/wiki/Combined_oral_contraceptive_pill). The size of the breasts can also increase and decrease in response to [weight](https://en.wikipedia.org/wiki/Body_weight) fluctuations. Physical changes to the breasts are often recorded in the [stretch marks](https://en.wikipedia.org/wiki/Stretch_marks) of the skin envelope; they can serve as historical indicators of the increments and the decrements of the size and volume of a woman's breasts throughout the course of her life.

## Changes when Breastfeeding

The primary function of the breasts, as mammary glands, is the nourishing of an infant with [breast milk](https://en.wikipedia.org/wiki/Breast_milk). Milk is produced in milk-secreting cells in the alveoli. When the breasts are stimulated by the suckling of her baby, the mother's brain secretes [oxytocin](https://en.wikipedia.org/wiki/Oxytocin). High levels of oxytocin trigger the contraction of muscle cells surrounding the alveoli, causing milk to flow along the ducts that connect the alveoli to the nipple.

Full-term newborns have an instinct and a need to suck on a nipple, and breastfed babies nurse for both nutrition and for comfort. Breast milk provides all necessary nutrients for the first six months of life, and then remains an important source of nutrition, alongside solid foods, until at least one or two years of age.

1. explicate any one of the following
2. Menstrual cycle.
3. Hormonal regulation of the menstrual cycle.

Hormonal regulation of the Menstrual cycle:

The menstrual cycle is regulated by a complex hormonal system with positive and negative feedback mechanisms and changes in sensitivity of peripheral tissues. Four concepts appear to be fundamental: -- regular, pulsatile secretion of LHR is necessary to the functioning of the system; -- regulation is to a great extent effected by the pituitary gland in response to changes in ovarian steroid levels; -- changes in ovarian steroid levels are due to regulatory changes in receptivity to pituitary hormones, as well as to variations in enzyme activities; -- at the periphery, changes in hormonal impacts are accompanied by modifications of receptivity to steroid hormones.

#### PIP:The menstrual cycle is the most evident manifestation of an extremely complex phenomenon which concerns not only reproduction, but the general health of the individual. In the light of the most recent clinical acquisitions, the menstrual cycle can be described as follows: 1) regular, pulsatile secretion by the hypothalamus of luteinizing hormone-releasing hormone (LH-RH), which, in turn, liberates follicle stimulating hormone (FSH) and luteinizing hormone (LH); 2) the FSH makes possible the ovarian action of LH, which, in turn, permits the synthesis of estradiol; 3) negative feedback of estradiol and inhibin on the hypophysis cerebri; 4) ovulation is caused by a peak level of LH, but is dependent on progesterone levels; 5) synthesis of progesterone by the corpus luteum; 6) negative biofeedback of progesterone at the hypothalamic level; and 7) at the endometrial level increase in the number of estradiol receptors during the follicular phase and decrease of cytoplasmatic progesterone receptors during the luteal phase. The discovery of the mechanism of the menstrual cycle has helped women with hypothalamic disorders by using a pump releasing LH-RH in a pulsatile fashion.

The ovarian hormones circulate in the blood and are excreted in modified forms in the [urine](https://www.britannica.com/science/urine). Estimation of the urinary output by chemical methods gives an indication of the blood levels and of the total production of these substances. There are several natural estrogens, and numerous [synthetic](https://www.merriam-webster.com/dictionary/synthetic) modifications of these and of progesterone have been devised; many are active when taken by mouth and are used for treatment of hormonal disorders and as oral [contraceptives](https://www.britannica.com/topic/contraception).

The cyclic events in the ovary that have already been mentioned depend on gonadotropic hormones secreted by the anterior lobe of the pituitary gland; this gland is situated in a small recess at the base of the skull. There are two, and possibly three, gonadotropic hormones: [follicle-stimulating hormone](https://www.britannica.com/science/follicle-stimulating-hormone) (FSH), [luteinizing hormone](https://www.britannica.com/science/luteinizing-hormone) (LH), and, possibly, [luteotropic hormone](https://www.britannica.com/science/prolactin) (LTH).

FSH is secreted in greatest amount in the first half of the menstrual cycle, and LH has its peak of secretion at mid-cycle. It is believed that the sequential action of FSH and LH causes ripening of the follicle and [ovulation](https://www.britannica.com/science/ovulation). In some animals LTH is necessary for maintenance of the [corpus luteum](https://www.britannica.com/science/corpus-luteum), but in women under treatment for infertility ovulation has been successfully induced with FSH and LH alone. Multiple births, as the result of multiple ovulation, have occurred after excessive doses of FSH have been given.

The [pituitary gland](https://www.britannica.com/science/pituitary-gland) stimulates the ovary to produce estrogens and progesterone, but there is a “negative feedback” by which the estrogens [inhibit](https://www.merriam-webster.com/dictionary/inhibit) the output of FSH from the pituitary gland (and probably stimulate the output of LH). In addition, progesterone is believed to inhibit the further output of LH. In this process, in which the pituitary first stimulates the ovary, and the ovary then [inhibits](https://www.merriam-webster.com/dictionary/inhibits) the pituitary, the basic rhythm is under the control of the hypothalamus; nevertheless, ovulation can be [inhibited](https://www.merriam-webster.com/dictionary/inhibited) by [oral contraceptives](https://www.britannica.com/topic/oral-contraceptive), which contain estrogens and progestogens—modifications of progesterone.

The anterior lobe of the pituitary gland is connected by its stalk to the hypothalamic region of the brain. The anterior lobe secretes many important hormones, including those that control the activity of the adrenal and thyroid glands, the [growth hormone](https://www.britannica.com/science/growth-hormone), and the gonadotropic hormones. From the hypothalamus substances are carried in the veins in the pituitary stalk that cause release of hormones from the pituitary, including FSH and LH, but also a factor that inhibits release of LTH. The higher brain centres no doubt affect the hypothalamic function; this explains the temporary disturbances of menstruation that may follow emotional stress.

## Ovulation and the fertile phase

Ovulation occurs at about the midpoint of each normal cycle, and the ovum is probably capable of fertilization for only about two days after this. In the majority of women the time of ovulation is fairly constant. In women with cycles of irregular length the date of ovulation is uncertain; in these women the long menstrual cycles are usually due to prolongation of the proliferative phase; the secretory phase tends to remain normal in length. In some animals, ovulation only follows coitus; this mechanism has been used to explain cases in which human [pregnancy](https://www.britannica.com/science/pregnancy) has apparently followed [coitus](https://www.britannica.com/science/sexual-intercourse) early or late in the menstrual cycle, but there is no definite evidence for such a mechanism in women.

The [rhythm method](https://www.britannica.com/science/rhythm-method) of contraception is based on the fact that ovulation normally occurs at mid-cycle, but the date of ovulation may vary unexpectedly even in women whose menstrual cycles were previously regular.

## The [menarche](https://www.britannica.com/science/menarche)

The first menstruation, or menarche, usually occurs between 11 and 13 years of age, but in a few otherwise normal children menstruation may begin sooner or may be delayed. If the menstrual periods have not started by the age of 16 gynecological investigation is indicated. The menarche is preceded by other signs of estrogenic activity, such as enlargement of the breasts and the uterus and growth of pubic hair. The ovarian response to gonadotropic hormones may be erratic at first, so that irregular or heavy bleeding sometimes occurs, but this irregularity nearly always disappears spontaneously.