Discuss lactation and gestation period in a normal female

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LACTATION: **Lactation**, secretion and yielding of [milk](https://www.britannica.com/topic/milk) by females after giving birth. The milk is produced by the [mammary glands](https://www.britannica.com/science/mammary-gland), which are contained within the breasts. The breasts, unlike most of the other [organs](https://www.britannica.com/science/organ-biology), continue to increase in size after [childbirth](https://www.britannica.com/science/birth). Although mammary growth begins during [pregnancy](https://www.britannica.com/science/pregnancy) under the influence of ovarian and placental [hormones](https://www.britannica.com/science/hormone), and some milk is formed, [copious](https://www.merriam-webster.com/dictionary/copious) milk secretion sets in only after delivery. Since lactation ensues after a [premature birth](https://www.britannica.com/science/premature-birth), it would appear that milk production is held back during pregnancy. The mechanism by which this inhibitory effect is brought about, or by which lactation is initiated at delivery, has long been the subject of an argument that revolves around the opposing actions of [estrogen](https://www.britannica.com/science/estrogen), [progesterone](https://www.britannica.com/science/progesterone), and [prolactin](https://www.britannica.com/science/prolactin), as studied in laboratory animals, goats, and cattle. During [pregnancy](https://www.britannica.com/science/pregnancy) the combination of [estrogen](https://www.britannica.com/science/estrogen) and progesterone circulating in the [blood](https://www.britannica.com/science/blood-biochemistry) appears to [inhibit](https://www.merriam-webster.com/dictionary/inhibit) milk secretion by blocking the release of [prolactin](https://www.britannica.com/science/prolactin) from the [pituitary gland](https://www.britannica.com/science/pituitary-gland) and by making the [mammary gland](https://www.britannica.com/science/mammary-gland) cells unresponsive to this pituitary hormone. The blockade is removed at the end of pregnancy by the expulsion of the [placenta](https://www.britannica.com/science/placenta-human-and-animal) and the loss of its supply of hormones, as well as by the decline in hormone production by the [ovaries](https://www.britannica.com/science/ovary-animal-and-human), while sufficient estrogen remains in circulation to promote the secretion of prolactin by the pituitary gland and so favour lactation.

For lactation to continue, necessary patterns of [hormone](https://www.britannica.com/science/growth-hormone) secretion must be maintained; disturbances of the [equilibrium](https://www.merriam-webster.com/dictionary/equilibrium) by the experimental removal of the pituitary gland in animals or by comparable diseased conditions in humans quickly arrest milk production. Several pituitary hormones seem to be involved in the formation of milk, so that it is customary to speak of a lactogenic (“milk-producing”) complex of hormones. To some degree, the role of the pituitary hormones [adrenocorticotropin](https://www.britannica.com/science/adrenocorticotropic-hormone), [thyrotropin](https://www.britannica.com/science/thyrotropin), and [growth hormone](https://www.britannica.com/science/growth-hormone) in supporting lactation in women is inferred from the results of studies done on animals and from clinical observations that are in agreement with the results of animal studies. [Adrenal corticoids](https://www.britannica.com/science/adrenal-hormone) also appear to play an essential role in maintaining lactation.

The stimulus of nursing or [suckling](https://www.britannica.com/science/suckling) supports continued lactation. It acts in two ways: it promotes the secretion of prolactin (and possibly other pituitary hormones of value in milk formation), and it triggers the release of yet another hormone from the pituitary gland—[oxytocin](https://www.britannica.com/science/oxytocin), which causes the contraction of special [muscle](https://www.britannica.com/science/muscle) cells around the alveoli in the breast and ensures the expulsion of milk. It is in this way that a baby’s sucking at one breast may cause an increase in milk flow from both, so that milk may drip from the unsuckled nipple. About 30 seconds elapse between the beginning of active suckling and the initiation of milk flow.

The nerve supply to the mammary glands is not of great significance in lactation, for milk production is normal after the experimental severing of nerves to the normal mammary glands in animals or in an udder transplanted to the neck of a goat. Milk ejection, or “the draught,” in women is readily conditioned and can be precipitated by the preparations for nursing. Conversely, embarrassment or fright can inhibit milk ejection by interfering with the release of oxytocin; alcohol, also, is known to block milk ejection in women, again by an action on the [brain](https://www.britannica.com/science/brain). Beyond its action on the mammary glands, oxytocin affects uterine muscle, so that suckling can cause contractions of the [uterus](https://www.britannica.com/science/uterus) and may sometimes result in cramp. Since oxytocin release occurs during [sexual intercourse](https://www.britannica.com/science/sexual-intercourse), milk ejection in lactating women has been observed on such occasions. Disturbance of oxytocin secretion, or of the milk-ejection reflex, stops lactation just as readily as a lack of the hormones necessary for milk production, for the milk in the breast is then not extractable by the infant. Many instances of nursing failure are due to a lack of milk ejection in stressful circumstances; fortunately, treatment with oxytocin, coupled with the reassurance gained from a successful nursing, is ordinarily successful in overcoming the difficulty.

Suckling can initiate lactation in nonpregnant women. This has been seen most often in women of childbearing age but also has been observed in older persons. A baby who had lost his mother was suckled by his 60-year-old grandmother, who had borne her last child 18 years before. The grandmother produced milk after a few days and continued to nurse the baby until he was a year old and could walk. Rarely, lactation has been reported to set in after operations on the chest; in such instances it is attributed to injury or irritation of the nerves in this region. Such observations argue against the possibility that lactation continues simply as a consequence of emptying the breasts.

Gestation is the period of [development](https://en.wikipedia.org/wiki/Prenatal_development) during the carrying of an [embryo](https://en.wikipedia.org/wiki/Embryo) or [fetus](https://en.wikipedia.org/wiki/Fetus). Human pregnancy can be divided roughly into three trimesters, each approximately three months long. The first trimester is from the last period through the 13th week, the second trimester is 14th–27th week, and the third trimester is 28th–42nd week. Birth normally occurs at a [gestational age](https://en.wikipedia.org/wiki/Gestational_age) of about 40 weeks, though it is common for births to occur from 37 to 42 weeks. From the 9th week of pregnancy (11th week of [gestational age](https://en.wikipedia.org/wiki/Gestational_age)), the embryo is called a fetus.

Various factors can come into play in determining the duration of gestation.

Physiological changes that occur during pregnancy or gestation

Hormonal: The menstrual cycle refers to the normal changes in your ovaries and uterus that make an egg accessible for fertilization and prepare your uterus for pregnancy. It typically occurs once every 28 days. If you are ovulating normally, an egg, or ovum emerges from one or other of your ovaries, leaving behind a structure called the corpus luteum. This structure produces large amounts of progesterone and estrogen, hormones that help prepare your uterus for implantation of a fertilized egg. If the egg is not fertilized, the corpus luteum degenerates, causing progesterone and estrogen levels to drop, and menstruation to begin. If the ovum is fertilized, on the other hand, the corpus luteum remains intact and continues to maintain the hormone levels you need to keep your uterus baby-friendly. Eventually, the placenta develops the ability to secrete the necessary hormones itself, and the corpus luteum typically disappears after 3 to 4 months.

Immune tolerance

 Cardiovascular: During pregnancy, your cardiac output - the amount of blood your heart pumps around your body per minute - increases to meet the needs of the developing fetus, and to provide the volume of blood necessary to fill the uteroplacental circulation.

This is achieved by increasing the stroke volume, which is the amount of blood pumped out of your heart with each heartbeat. Your cardiac output peaks around week 24 of your pregnancy, when it is 30%-40% higher than normal. As the fetus grows, your uterus begins to crowd your aorta, the major artery that carries oxygenated blood to your tissues and organs and vena cava, the major vein that carries deoxygenated blood back to your heart.

Renal: Your kidneys are responsible for filtering waste products from your blood, and regulating blood pressure and electrolytes; During pregnancy, changes in kidney function approximately follow changes in cardiac function - both organs work considerably harder. By around the 20th week, and sometimes as early as the 8th to 10th week of pregnancy, your kidneys are filtering 30% to 50% more blood than before you were pregnant. The effects of this are greater reabsorption of sodium, and increased elimination of sugars (glycosuria), amino acids (aminoaciduria), and creatinine in your urine (creatinine clearance tests are often used by doctors as a measure of how well your kidneys are working). After about the 12th week of pregnancy, progesterone, a smooth muscle relaxant, causes the tubes that transport urine from the kidneys to the bladder, called the ureters, to dilate. As your uterus expands, it may compress the dilated ureters, obstructing the flow of urine to your bladder, and increasing the chances that you get a urinary tract, or kidney infection while you are pregnant. Laying down on your side can help relieve the pressure on your major blood vessels letting your kidneys work more effectively. However, this can make for a lot of urine production and toilet breaks during the night when you are trying to sleep.

Respiratory:  As with your other organs, the growing uterus begins to invade the space normally reserved for your lungs, which restricts their expansion during normal breathing. Once again, progesterone, the multi-talented pregnancy hormone gets to work, triggering your lungs to increase the amount of air inhaled with each breath - the tidal volume - as well as the number of breaths per minute - the respiratory rate.This increases the oxygen supply required to meet the metabolic needs of the fetus, placenta and other organs.

Metabolic: Changes in metabolism during pregnancy alter the distribution of body fat, as well as how you digest and process food.

Body weight: Supporting the growth of a developing fetus takes a lot of energy, so it’s not surprising that more calories are required during pregnancy.

Gastrointestinal: As your uterus grows, it puts pressure on your digestive organs including your colon, gallbladder, liver, and stomach. This can impair their function, and lead to constipation, gallstones, reduced bile transport, as well as a general slowing of the digestive process that is related to lower levels of the hormone gastrin. Gastrin stimulates the secretion of stomach acid, which in turn leads to the production of pepsin, an enzyme that digests proteins in your food - less gastrin leads to slower digestion. In addition to this, elevated progesterone levels during pregnancy slacken the cardiac sphincter, the “door” between your esophagus and stomach, making it open more easily.

Musculoskeletal: Numerous anatomical and physiological changes occur during pregnancy that strain the muscles and skeleton, particularly the pelvis, and which may lead to lower-back pain, leg cramps, and hip pain. One of the hormones responsible for musculoskeletal changes during pregnancy is relaxin, which softens your ligaments and cartilage tissues to help your body accommodate your growing baby.