18/MHS07/044

PHA 210

Assignment: Discuss lactation and gestation period in a normal female

Answer:

**Lactation** is the maternal physiological response whereby milk is secreted from the mammary glands to feed the infant. The two main hormones involved are prolactin and oxytocin.The delivery of the placenta and the resulting dramatic reduction in progesterone, estrogen, and human placental lactogen levels stimulate milk production. Colostrum is the first milk a breastfed baby receives. It contains higher amounts of white blood cells and antibodies than mature milk and is especially high in immunoglobulin A. This immunoglobulin coats the lining of the baby’s immature intestines, helping to prevent pathogens from invading the baby’s system.

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 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.

**Gestation** is defined as the time between conception and birth. Though we’re focusing on human gestation, this term applies more broadly to all mammals.Gestation period: Fetal development period from the time of conception until birth. For humans, the full gestation period is normally 9 months. A [fetus](https://www.healthline.com/health/pregnancy/embryo-fetus-development) grows and [develops in the womb](https://www.healthline.com/health/pregnancy/when-can-a-fetus-hear) during gestation.

Gestation period

The gestation period is how long a woman is pregnant. Most babies are born between 38 and 42 weeks of gestation.

Babies born before 37 weeks are considered premature. Babies born after 42 weeks are called postmature.

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.

In addition to progesterone and estrogen, human chorionic gonadotropin also spikes in early pregnancy. The levels of this hormone double every two days in the first 10 weeks of pregnancy. Its primary role is to prevent any further menstruation, and to prepare the placenta - the organ that connects the fetus to the uterus. The placenta allows the fetus to be supplied with nutrients and oxygen, as well as providing a route for the removal of toxic waste products.

Pregnancy alters the function of most endocrine glands, partly because the placenta produces hormones and partly because most hormones circulate in protein-bound forms and protein binding increases during pregnancy.

The placenta produces the beta subunit of human chorionic gonadotropin (beta-hCG), a trophic hormone that, like follicle-stimulating and luteinizing hormones, maintains the corpus luteum and thereby prevents ovulation. Levels of estrogen and progesterone increase early during pregnancy because beta-hCG stimulates the ovaries to continuously produce them. After 9 to 10 weeks of pregnancy, the placenta itself produces large amounts of estrogen and progesterone to help maintain the pregnancy.

The placenta produces a hormone (similar to thyroid-stimulating hormone) that stimulates the thyroid, causing hyperplasia, increased vascularity, and moderate enlargement. Estrogen stimulates hepatocytes, causing increased thyroid-binding globulin levels; thus, although total thyroxine levels may increase, levels of free thyroid hormones remain normal. Effects of thyroid hormone tend to increase and may resemble hyperthyroidism, with tachycardia, palpitations, excessive perspiration, and emotional instability. However, true hyperthyroidism occurs in only 0.08% of pregnancies.

The placenta produces corticotropin-releasing hormone (CRH), which stimulates maternal adrenocorticotropic hormone (ACTH) production. Increased ACTH levels increase levels of adrenal hormones, especially aldosterone and cortisol, and thus contribute to edema.

Increased production of corticosteroids and increased placental production of progesterone lead to insulin resistance and an increased need for insulin, as does the stress of pregnancy and possibly the increased level of human placental lactogen. Insulinase, produced by the placenta, may also increase insulin requirements, so that many women with [gestational diabetes](https://www.msdmanuals.com/professional/gynecology-and-obstetrics/pregnancy-complicated-by-disease/diabetes-mellitus-in-pregnancy) develop more overt forms of [diabetes](https://www.msdmanuals.com/professional/endocrine-and-metabolic-disorders/diabetes-mellitus-and-disorders-of-carbohydrate-metabolism/diabetes-mellitus-dm).

The placenta produces melanocyte-stimulating hormone (MSH), which increases skin pigmentation late in pregnancy.

The pituitary gland enlarges by about 135% during pregnancy. The maternal plasma prolactin level increases by 10-fold. Increased prolactin is related to an increase in thyrotropin-releasing hormone production, stimulated by estrogen. The primary function of increased prolactin is to ensure lactation. The level returns to normal postpartum, even in women who breastfeed.