



Understanding Your Menstrual Cycle

To understand the menstrual cycle, there are some important concepts to grasp. The first is that the purpose of the menstrual cycle is to reproduce. During each cycle, an egg is produced and the body readies itself for a pregnancy. The second is that the cycle lasts approximately 28 days, from day 1 of one cycle to day 1 of the next cycle. Even though we call it our “monthly cycle,” only the month of February has 28 days, so we usually do not start our period on the same day of each month. The third is that “day 1” of each cycle is the first day of your period (the first day you see blood). This is the day that the entire reproductive cycle starts over.

The menstrual cycle involves a close relationship between the pituitary gland, the ovaries, and the uterus. The pituitary gland is located at the base of the brain and makes certain chemical substances that “talk” to the ovaries to tell them when to produce an egg and when to release it. This gland can also “listen” to the ovaries via chemical signals and respond accordingly. The ovaries are small, round-shaped organs located in the pelvis, one on each side of the uterus. The ovaries make chemical substances known as hormones which “talk” to the uterus and tell it when to make a blood lining. The ovaries can also communicate with other parts of the body and with the pituitary gland via these hormonal signals. The uterus is a single organ located in the pelvis near the top of the vagina. The uterus, or “womb”, has a cavity inside of it that fills with a blood layer each month. The purpose of this blood layer is to allow the implantation of a pregnancy. The uterus responds to hormones made by the ovary and is thus under the direction of the ovary.

The menstrual cycle can be thought of as having two phases, the “follicular phase” and the “luteal phase”. The follicular phase is the first two weeks of the cycle and the luteal phase is the last two weeks. Two other events that occur during the cycle are menstruation (the period) and ovulation (the release of an egg from the ovary).

The first day that you see blood marks day one of the new cycle. The first two weeks of the cycle is called the follicular phase because this marks the time in which a follicle develops within the ovary. A follicle is a small, fluid-filled cyst that contains an egg. During this phase, the follicle will increase in size and will provide a nurturing environment for the egg to mature. A woman is born with all of the eggs she is ever going to make, which is about 2 million. The eggs will decrease over the lifespan of a woman, until only about 400 eggs will actually undergo ovulation.

A critical event that signals the start of the follicular phase is the production of follicle stimulating hormone (FSH). The increase in FSH, a chemical substance made by the pituitary gland, “tells” the ovary to start producing a follicle. As the follicle begins to grow, it makes increasing amounts of the hormone “estrogen”, which will signal the pituitary gland that the ovary is working. Clinical Pearl: The first one to two days of the cycle are a time of low estrogen levels, which, in some women, may be the cause of menstrual migraine headaches.

The hormonal environment of the ovary during follicular development must be very exact. The ovary makes many hormones that are involved in the development of the follicle, and they must work together in harmony to produce an egg. If just one hormone is made in excess, this can shut the entire process down. Clinical Pearl: The overproduction of testosterone by the ovary can lead to infertility and irregular cycles, such as in the condition known as polycystic ovarian syndrome.

As the follicle containing the egg undergoes the development process, it becomes an enlarging, fluid-filled cyst. At the time of ovulation, the cyst measures about 2.0 centimeters in size. Thus, the ovary is a “cyst-making” organ. Clinical Pearl: Occasionally, a follicular cyst can continue to grow in size and become symptomatic, with pain and pressure being two common symptoms.

With rare exception, only one follicle will undergo ovulation and release its egg. However, some women may develop and ovulate more than one egg in a particular cycle, which can lead to a

fraternal (non-identical) twin pregnancy. The tendency for a woman to naturally ovulate two eggs seems to be an inherited trait, which explains why fraternal twins “run in the family” while identical twins are a random occurrence.

As a woman approaches the time of ovulation, which is usually 12 to 14 days into the cycle, her estrogen level begins to rise and will “peak.” This estrogen is being produced by the follicle within the ovary. The sharp rise in estrogen levels tells the pituitary gland that the egg is almost ready for ovulation. The pituitary gland responds by making a chemical messenger known as luteinizing hormone (LH). The LH is released in a “surge,” meaning that a large amount is released at once. This surge promotes ovulation of the egg by the follicle. Clinical Pearl: Ovulation detector kits are used to detect the LH surge so that a woman can predict when she will ovulate in order to time sexual intercourse to achieve a pregnancy.

When the estrogen and LH surge during the mid-cycle, a woman may have noticeable physical changes. She may experience some mild cramping as the egg is physically released. She may develop watery vaginal discharge, tender breasts, and an increase in sex drive. The exact timing from the surge to ovulation varies from cycle to cycle and from woman to woman, but, on average, ovulation occurs approximately 36 hours after the LH surge begins. The egg has a window of approximately 24 hours in which it can be fertilized by a sperm. While this may be a narrow range of opportunity to become pregnant, a woman must remember that sperm can live inside of the vagina and uterus for up to 72 hours after sexual intercourse.

The second two weeks of the cycle mark the luteal phase. This is a time when the body readies itself for a possible pregnancy. This phase is so-named because the area of the ovary from which the egg ovulates becomes yellow in color due to the accumulation of a pigment known as lutein. The area of the ovary that was previously a follicle now becomes a “corpus luteum,” which is a cyst-like structure that makes hormones. Clinical Pearl: Just like with the follicle, a corpus luteum cyst can grow to be quite large and symptomatic. The corpus luteum is a very vascular structure (it has a lot of blood flowing to it), so if it ruptures, it can lead to a significant amount of blood loss in the pelvis, sometimes requiring surgery.

The main hormone made by the corpus luteum is progesterone. Progesterone is a “pro-gestational” hormone that instructs the body to get ready for a pregnancy. Progesterone “talks” to many organs. One of which is the uterus, which is instructed to change the composition of

the blood lining to get ready for implantation of a pregnancy. Another is the breast, which is instructed to increase the size of both its glands and surrounding tissue to be ready for a possible pregnancy and lactation in nine months. This explains why the breast is cystic and tender just before the cycle starts. Some women chart their cycles by measuring their basal body temperature and the rise in body temperature after ovulation is associated with the rise in progesterone. How well the corpus luteum functions (i.e. how well it produces an adequate amount of progesterone) depends on the production of a good follicle during the follicular phase. Clinical Pearl: Some infertility patients may have trouble achieving a pregnancy due to an “inadequate luteal phase.” They may be treated by taking progesterone during the second half of the cycle, or they may be treated by improving the follicle made during the follicular phase.

In the normally functioning cycle, the time period from the LH surge to the onset of the period is 14 days. The corpus luteum can only survive for 9-13 days after ovulation, so unless it receives a signal from the uterus that it contains a pregnancy, it will degenerate and eventually disappear. If it does receive a signal that the woman is pregnant, then it will continue to make progesterone and sustain the pregnancy until about the 8th week, at which time the placenta (part of the pregnancy) takes over. Clinical Pearl: Some infertility patients take progesterone during the first 10-12 weeks of pregnancy to help maintain a pregnancy and to decrease the chance of miscarriage.

Once the corpus luteum degenerates, the progesterone levels decrease. This sends a signal to the uterus that the body is not pregnant, so it begins to empty its contents to get ready for the next cycle (thus, the menstrual cycle). The pituitary also notices the drop in progesterone, and once again begins the secretion of FSH. While a normal menstrual cycle (day 1 to day 1) is reported as 28 days, anything between 24 days and 35 days is considered within normal limits. The normal length of the period is 4-6 days, but anything between 2 days and 7 days is considered normal.



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