Understanding the Menstrual Cycle

The ovary is full of immature egg cells called oocytes.

When a girl is old enough to have her first period (in other words when menarche happens) her ovary contains about 400,000-500,000 oocytes.



Each oocyte is located inside a structure called a follicle.

The follicles in this drawing are drawn in a way that exaggerates the size of the follicles compared to the ovary. During each menstrual cycle about 10-12 follicles enlarge (get bigger).

The follicle that increases in size most quickly will be the one follicle that releases its oocyte in that cycle. The slower follicles will degenerate (shrivel up).



In the remaining drawings of the ovary, we will follow the fate of the one follicle that releases it's oocyte during one menstrual cycle.

At the beginning of the menstrual cycle (when the woman first starts to bleed) the follicle is quite small.



But it gradually gets bigger...



and bigger... (now with the beginning of a small fluid filled space called an antrum)



and bigger...



and bigger...



and bigger...



and bigger... (with a bigger antrum)





and even bigger... (with an even bigger antrum)



and bigger...





and bigger



Until eventually the follicle bursts (ruptures) – and the oocyte is released.

The egg cell is also referred to as the ovum.

Releasing the egg is called ovulation.

The time it takes for the oocyte and follicle to develop to the point of ovulation varies from woman to woman. The timing also varies from cycle to cycle for any particular woman.

Ovulation may occur on the 14th day after bleeding starts (day 14), but in some women ovulation may sometimes occur on day 10, or it may occur on day 17, or it may occur on day 23, or it may occur on day 35, or any one of a wide range of days.



The ruptured follicle quickly turns into a structure called the corpus luteum (Latin for "yellow body"). The corpus luteum will last for about 10-12 days.

If a woman gets pregnant the corpus luteum will last for about 3 months.

The corpus luteum sends hormones (messenger molecules) to the uterus.

These hormones tell the uterus to prepare for and support the existence of a pregnancy.







If pregnancy does not occur, the corpus luteum degenerates into a corpus albicans (Latin for "white body"). The corpus albicans gets smaller and smaller over time.





While the follicles in the ovary are going through changes during the menstrual cycle...

...the uterus goes through it's own cycle of changes as well.

The menstrual cycle is said to have begun (day 1) as soon as a woman begins to bleed with a new period.

The bleeding is the result of the breakdown and shedding of the top layer of the endometrium that lines the inside of the uterus (womb).



After the bleeding stops, the endometrium starts to rebuild itself into a thicker lining once again. The endometrium grows thicker and thicker during the time that the follicles in the ovary are growing bigger and bigger.

The endometrium grows even thicker and has more glands and more blood vessels during the time that the corpus luteum is present in the ovary.



The endometrium decreases in thickness during the time that the corpus luteum starts to degenerate. As the corpus luteum degenerates the endometrium breaks up and the upper layer of the endometrium is shed once more.

When the woman notices bleeding has begun again, she is on day one of her next cycle.





In order for a woman to be able to get pregnant the ovary and the uterus must coordinate their activities. A fertilized egg becomes an embryo that travels down the fallopian tubes to the uterus. An endometrium that is shedding when the embryo arrives cannot support a pregnancy.



A thin endometrium cannot support a pregnancy.



An endometrium that is very thick and full of glands and blood vessels can support a pregnancy.



Molecules called hormones are sent from one part of the body to another part of the body to deliver messages that allow the various body parts to respond to each other.

To regulate the menstrual cycle hormones are sent from the hypothalamus and from the anterior pituitary (front portion of the pituitary) to the ovaries.



The anterior pituitary releases the hormone called Follicle Stimulating Hormone (FSH) which stimulates the follicles to grow and develop.



The wall of the follicle makes estrogen. The estrogen causes the endometrium to get thicker. The bigger the follicle - the more estrogen it makes. Estrogen The anterior pituitary sends out a large amount of the hormone called Luteinizing Hormone (LH) just before ovulation.

This LH surge triggers ovulation and causes the ruptured follicle to turn into a corpus luteum.



The corpus luteum makes the hormone progesterone.

Progesterone causes the uterine lining to get very thick and full of glands and blood vessels.



Progesterone



Once the corpus luteum is gone there is no longer enough progesterone or estrogen to support the endometrium. The endometrium sheds and another cycle begins.





The menstrual cycle is divided into three phases:

- 1) The menstrual phase
- 2) The proliferative phase
- 3) The secretory phase

The menstrual phase.

The uterus sheds part of the endometrium. The follicles are small and immature.





The proliferative phase

The follicles mature under the influence of FSH. The maturing follicles produce estrogen and a mature egg. The endometrium grows under the influence of estrogen. The follicle ruptures and releases the ovum.



The secretory phase

The ruptured follicle turns into a corpus luteum under the influence of LH.

The corpus luteum produces progesterone.

Progesterone causes the endometrium to become thick enough to support a pregnancy.



After 10-12 days the corpus luteum disappears and progesterone levels fall drastically. The endometrium is no longer supported.

The endometrium breaks up and bleeding starts.

Another menstrual cycle has begun.

