

The Menstrual Cycle – An Overview



FAQs about the menstrual cycle; what is the menstrual cycle?

The menstrual cycle is the reproductive cycle of the woman during the child-bearing years.

When does the cycle begin and end?

The first day of the menstrual cycle is the first day of the menstrual period and the last day of the menstrual cycle is the day before the next menstrual period. The cycle length varies from 23 to 35 days, the average length is about 28 days.

What is menstruation?

Menstruation is the vaginal bleeding that occurs at the end of an ovulatory cycle when fertilization has not occurred and is due to the drop in hormone levels in the bloodstream. Menstruation marks the beginning of a new cycle, and lasts 3 to 5 days.

What happens during each menstrual cycle?

During each cycle **three** events are occurring:

1. In the **ovary**, the ovum (egg) is maturing and the growing ovarian follicle secretes rising levels of **oestrogen before ovulation**. The corpus luteum in the ovary secretes **progesterone after ovulation**.
2. In the **uterus**, the lining of the uterus (endometrium) is being prepared to accept the fertilised ovum, i.e. the lining of the uterus becomes thicker and more vascular in preparation for a possible pregnancy.
3. In the **cervix** (neck of the womb) the cells lining the cervix produce cervical mucus.

If pregnancy does not occur the cycle ends with menstruation.

What role do the hormones oestrogen and progesterone play during the cycle?:

- Oestrogen and progesterone act on the lining of the womb (endometrium)

to prepare it for a possible pregnancy. ([see page on HPO axis.](#))

- Oestrogen and progesterone stimulate the cells in the cervix to secrete cervical mucus. The presence of fertile-type cervical mucus is essential to achieve pregnancy. (see page on [‘types of cervical mucus’](#))

Hormone levels during the cycle –

see page 9 of [Pictures & Diagrams](#) to view a ‘**Diagram of Changes in Different Organs** during the Menstrual Cycle’

The **levels** of **oestrogen** and **progesterone vary** during the menstrual cycle; at the **beginning** of the cycle both hormones are at a **low** level, their levels increase during the cycle and they are **low** again at the **end** of the cycle. Both hormones prepare the **lining of the womb** for a possible pregnancy. **Before ovulation**, oestrogen causes the endometrium to proliferate, and the cervix to secrete fertile-type mucus. **After ovulation**, progesterone causes the endometrium to become more secretory to nourish the embedding embryo and the cervix to secrete gestogenic mucus to occlude the cervix.

If pregnancy does not occur the levels of these hormones begin to fall about 7 days after ovulation. As progesterone is required to maintain the integrity of the endometrium this drop in progesterone means that the lining of the womb can no longer be maintained and it is shed about 14 days after ovulation. This shedding is called menstruation. If pregnancy does not occur in that cycle menstruation will start about 14 days after ovulation. In other words when menstruation starts the woman knows that ovulation most likely had occurred 14 days previously.

What is ovulation ?

Ovulation means the release of a mature ovum (egg) from the ovary into the fallopian tube ready to be fertilized by the sperm. It occurs once in any cycle, about 14 days before the next period. If two or more ova (eggs) are released in a cycle, all are released within the same 24 hour interval.

What is the life-span of the ovum?

The ovum lives for 24 hours.

What is the life-span of the sperm?

Sperm can survive for up to 5 days in the fertile-type cervical mucus which is present in the vagina during the 6 days or so leading up to ovulation.

Fertilization:

Fertilization is when the nucleus of the sperm and the nucleus of the ovum fuse together to become the first cell of a new human being. Fertilization occurs in the outer end of the fallopian tube. see Fig. 6-17 page 15 in [Pictures & Diagrams](#)

Two questions about ovulation:

1. Can the time of ovulation be pin-pointed in regular cycles ?
2. Can the time of ovulation be pin-pointed when the cycle is irregular ?

Answer: The exact moment of ovulation cannot be pin-pointed by any of the fertility indicators, (BBT, 'cervical mucus' or 'changes in the cervix'), whether the cycle is regular or irregular.

If you cannot pin-point the moment of ovulation, is this not a drawback for those who wish to achieve pregnancy and who may have irregular cycles?

The answer is **NO**. If you do not know the exact moment of ovulation this is not a drawback to achieve pregnancy, as the life-span of sperm in fertile-type mucus is 5 days and fertile-type mucus is present in the vagina at the time around ovulation itself as well as the 6 days or so leading up to ovulation, i.e. the fertile phase of the cycle . This means that whether the woman has regular cycles or irregular cycles, she is still able to **identify the fertile phase** of the cycle by the presence of fertile-type cervical mucus at the vulva, the time when there is an increased probability of achieving pregnancy.

Which of the signs (indicators) of fertility confirm that ovulation has occurred?

The rise in basal body temperature (BBT), i.e. the '**thermal shift**' is the only fertility indicator that **confirms** that ovulation has occurred. The definition of what is a 'thermal shift', is laid down by the by the rules of the symptothermal NFP method used.

What factors can cause irregularity of the menstrual cycle?

The menstrual cycle is regulated by a finely tuned balance of hormones secreted by the ovary and the pituitary gland, and is ultimately under the control of the higher centres of the brain. This delicate mechanism can be disturbed by a number of factors, notably stress, but also by over-doing physical exercise, by dieting and by weight-loss.

What effects has the 'Pill' on the menstrual cycle?

Women taking hormonal contraception (the 'Pill') do not have a normal menstrual cycle and the apparent menstrual period when taking the Pill is just a withdrawal bleed due to a drop in synthetic hormone levels in the blood in the pill-free days. [Effects of Contraceptive Medication on the Cervix and Cervical Mucus](#)

What is Menarche?

The first menstrual period is known as menarche and usually occurs about 13 years of age. The normal age of menarche varies from 10 to 16 years. A study done in Ireland of 2940 girls aged 9 to 17 years showed that the average age of menarche in Ireland in 1986 was 13.5 years, with a standard deviation of

1.3 years.¹ A further study in 2006 found that the mean age of menarche decreased from 13.5 years in 1986 to **12.5 years in 2006** and was lowest in cities and among manual groups.³ The age of menarche has decreased in the 20th century and this could well be due to improved nutrition. In the 19th century girls in the USA reached a weight of 46kg at about 14 years of age which was the year of the menarche. In Belgium in the 19th century girls reached a weight of 46 kg at about 16.5 years and also attained the menarche at that age. According to Griffin et al,² the increase in body fat at adolescence of about 11kg is equivalent to 99,000 calories and the number of calories estimated to maintain a pregnancy is 88,000. Thus one of the main functions of the adolescent growth spurt in females may be the storage of energy to sustain a pregnancy and lactation.

What is Menopause?

When the final menstrual period has occurred the woman has reached menopause, and the end of the child-bearing years has arrived. Menopause occurs within a wide age range between the ages of 42 to 58,³ on average at about age 51 and this is unchanged from ancient times. See pages on menopause on this website.

1. Hoey, H.; The age of Menarche in Irish girls; Ir Med J. Oct. 1986, vol 79, no. 10, p283-285
2. Griffin, James E; Ojeda, Sergio R; Textbook of Endocrine Physiology, 3rd edition, 1996, ch. 9, p187, 188
3. Soules MR, Sherman S, Parrot E et al; Executive summary: Stages of Reproductive Aging Workshop (STRAW). Fertil Steril. 2001; 76: 874.
4. **Brown JB; 'Types of ovarian activity in women and their significance: the continuum (a reinterpretation of early findings)'; Human Reproduction Update; 2011; vol 17; No 2; p141-158 (this is a classic article which gives a greater understanding of the menstrual cycle throughout the reproductive life of the woman).**
5. O'Connell A et al, 'The mean age of menarche of Irish girls in 2006'; Ir Med J. 2009; Mar 102 (3), 76-9.