

The menstrual cycle and fertility control

Revision notes · The stages of the menstrual cycle, the hormones that control it, contraception, and IVF and clomifene.

For Edexcel GCSE Biology 1BI0 and Combined Science 1SC0. **Triple only** is not in Combined Science. **Higher tier** is only on the Higher paper.

The menstrual cycle and fertility control Spec 7.4-7.8

The menstrual cycle Spec 7.4

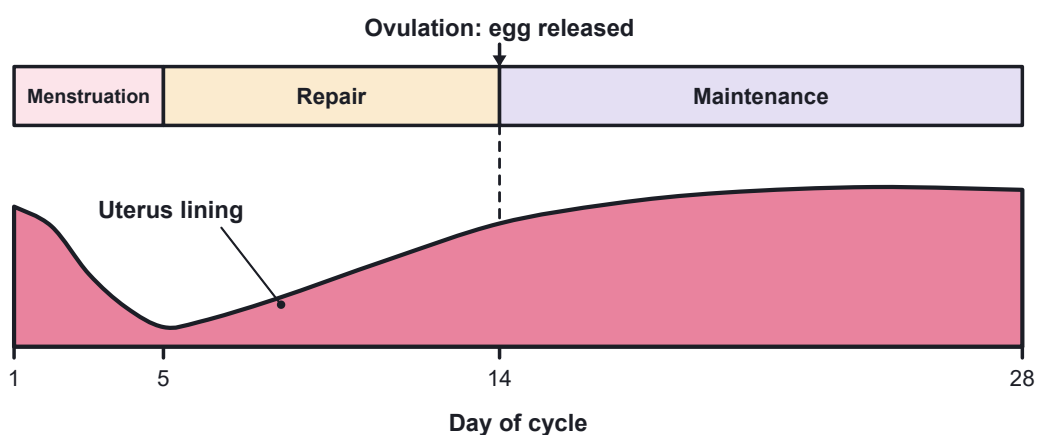
The **menstrual cycle** is a series of changes in a woman that repeats about every 28 days. Each cycle, an egg is released from an ovary and the lining of the uterus is prepared in case the egg is fertilised.

Stages of the menstrual cycle (days are approximate)		
Stage	Days	What happens
Menstruation	1 to 5	The lining of the uterus breaks down and is lost through the vagina with blood
Repair	5 to 14	The uterus lining is repaired and thickens again
Ovulation	Around 14	An egg is released from an ovary
Maintenance	14 to 28	The lining stays thick, ready for a fertilised egg. If there is no pregnancy it breaks down and the cycle starts again

The roles of two hormones

- Oestrogen** is made in the ovaries. It causes the **repair and growth** of the uterus lining.
- Progesterone** is made in the ovaries. It **maintains** the uterus lining.

Maths skill: When you read a hormone graph, say which day the change happens on and whether the level rises, falls or peaks. Use figures from the axes.



The stages of the menstrual cycle and how the thickness of the **uterus lining** changes.

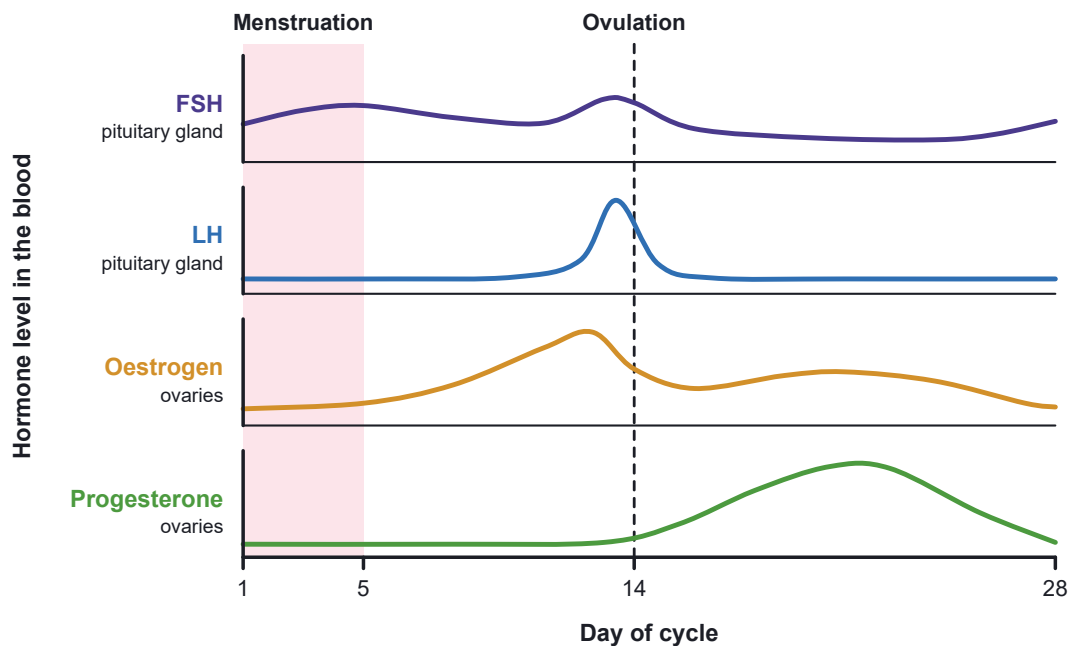
How four hormones control the cycle Spec 7.5 Higher tier

Four hormones interact to control the cycle. **FSH** and **LH** are released by the pituitary gland. **Oestrogen** and **progesterone** are made by the ovaries.

Hormones of the menstrual cycle		
Hormone	Made in	What it does
FSH	Pituitary gland	Causes an egg to mature in an ovary. Stimulates the ovaries to produce oestrogen
Oestrogen	Ovaries	Repairs and builds up the uterus lining. Inhibits FSH. Stimulates the release of LH
LH	Pituitary gland	Causes ovulation
Progesterone	Ovaries	Maintains the uterus lining. Inhibits FSH and LH

1. FSH makes an egg mature and stimulates the ovaries to make oestrogen.
2. Oestrogen repairs the uterus lining. When oestrogen is high it inhibits FSH and stimulates the release of LH.
3. LH causes ovulation, around day 14.
4. After ovulation the ovary produces progesterone, which maintains the lining and inhibits FSH and LH, so no more eggs mature.
5. If there is no pregnancy, progesterone falls. The lining is no longer maintained and breaks down. This is menstruation.

Exam tip: Always say what each hormone does to the next one: stimulates or inhibits. Just writing 'oestrogen affects LH' will not score.



Levels of FSH, LH, oestrogen and progesterone. The **LH surge** triggers ovulation around day 14.

Hormonal contraception Spec 7.6

Hormonal contraceptives contain oestrogen, progesterone or both. They can be taken as a pill, or given as a patch, an injection or an implant under the skin.

The hormones keep levels in the body high. This stops the normal changes in hormone levels that cause eggs to mature and be released. The effects on the cycle and on pregnancy are:

- Eggs do not mature, so **ovulation does not happen**. There is no egg to be fertilised.
- Progesterone makes the **mucus at the cervix thicker**, so sperm cannot get through to reach an egg.

Higher tier

The oestrogen in the pill inhibits the release of FSH from the pituitary gland. With FSH kept low, eggs do not mature in the ovaries.

Common mistake: The pill does not kill sperm or stop sperm being made. It works by stopping ovulation and thickening cervical mucus.

Evaluating hormonal and barrier methods Spec 7.7

Barrier methods such as condoms and diaphragms stop sperm reaching an egg. **Hormonal methods** change the menstrual cycle. To evaluate them, give advantages and disadvantages of each.

Comparing methods		
Method	Advantages	Disadvantages
Hormonal (pill, patch, injection, implant)	Very effective when used correctly. Implants and injections last a long time, so there is nothing to remember each day	Do not protect against sexually transmitted infections. Can cause side effects. The pill must be taken at the right time every day
Barrier (condom, diaphragm)	Condoms also protect against sexually transmitted infections. No hormone side effects. Only used when needed	Less effective if not used correctly, for example a condom can split or slip. A diaphragm has to be fitted correctly

Exam tip: An evaluate answer needs both sides and a conclusion. Finish with a judgement, such as which method suits a couple who also want protection from infection.

Assisted reproductive technology Spec 7.8 Higher tier

Assisted Reproductive Technology (ART) helps people who find it hard to have a baby. Hormones are used in two types of treatment.

IVF (in vitro fertilisation)

1. The woman is given FSH and LH. These make several eggs mature in her ovaries.
2. The eggs are collected from the ovaries.
3. The eggs are mixed with sperm in a dish in the laboratory, where they are fertilised.
4. The fertilised eggs develop into embryos.
5. One or two embryos are placed into the woman's uterus.

Clomifene therapy

Clomifene is a drug taken by women who do not ovulate. It stimulates the release of FSH and LH, so eggs mature and ovulation happens.

Exam tip: In IVF the hormones are given to make eggs mature. The fertilisation then happens outside the body. Keep these two ideas separate.

Quick check

- 1 . Which hormone repairs the uterus lining and which maintains it?
- 2 . Around which day does ovulation happen in a 28-day cycle?
- 3 . State one way the contraceptive pill prevents pregnancy.
- 4 . Give one advantage of condoms over the pill.
- 5 . What does clomifene do? (Higher)

Quick check answers

The menstrual cycle and fertility control

1. Oestrogen repairs it. Progesterone maintains it.
2. Around day 14.
3. It stops ovulation, or thickens the mucus at the cervix so sperm cannot get through.
4. They protect against sexually transmitted infections.
5. It stimulates the release of FSH and LH so that ovulation happens.