Education Services Ltd

EB Education Revision Guide

How to work with The Menstrual Cycle

...helping everybody achieve Even Better

Stages of the Menstrual Cycle

What happens?

- STAGE 1

Menstruation begins on day 1. The lining of the uterus breaks down and is released.

- STAGE 2

The lining of the uterus builds back up again from day 4 to day 14. It becomes a thick, spongy layer, full of blood vessels ready for implantation of a fertilised egg.

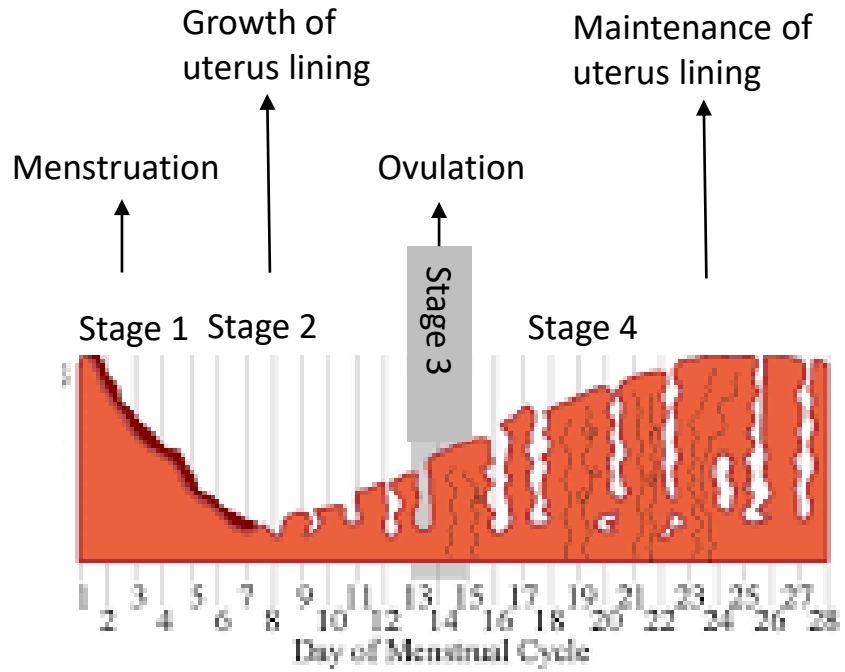
- STAGE 3

An egg is released from the ovary (**ovulation**) on day 14.

- STAGE 4

The uterus lining is maintained for around 14 days (till day 28). The egg travels down the oviduct towards the uterus. If it is not fertilised, the lining starts to break down.

Diagram



Education Services Ltd

Hormones

How is the menstrual cycle controlled?

- **FSH** (Follicle-stimulating hormone)

a) This is released by the **pituitary gland.**

b) Stimulates a follicle (an egg and the cells surrounding it) to mature in one of the ovaries.

c) Stimulates the production of oestrogen.

- **Oestrogen**

a) This is released by the ovaries.

b) It causes the uterus lining to thicken and grow.

c) It stimulates the production of LH.

d) It inhibits the production of FSH.

How is it adapted?

- **LH** (Lutenising hormone)

a) This is released by the pituitary gland.

b) Stimulates ovulation on day 14. The follicle ruptures and the egg is released.

c) Stimulates the remains of the follicle to develop into a structure called the **corpus luteum**.

- **Progesterone**

a) This is released by the corpus luteum in the ovaries.

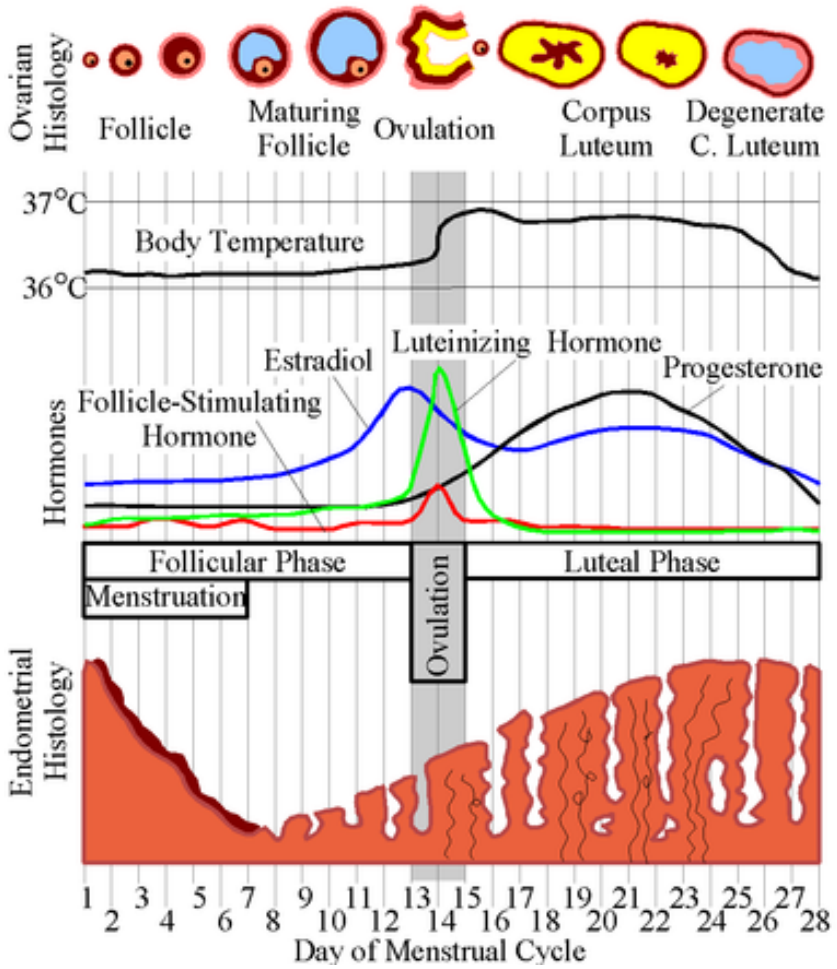
b) It maintains the uterus lining.

c) It inhibits the production of LH and FSH

d) When the corpus luteum breaks down, and progesterone levels fall, the uterus lining will break down and FSH levels will increase.

Education Services Ltd

Hormonal Control



Note: Estradiol in the diagram is the American version of Oestrogen.

If a fertilised egg implants in the uterus, then the level of progesterone will stay high to maintain the lining of the uterus during pregnancy.

Controlling fertility

Treating Infertility

Hormones can be used to help treat someone who struggles to reproduce naturally.

- IVF (“in vitro fertilisation”)

FSH and LH are given to the woman to stimulate egg production (more than one egg is collected)

Eggs are collected from the woman’s ovaries and fertilised in a lab using sperm. These are grown into embryos.

One or two of the embryos are then transferred into the woman’s uterus.

- Clomifene Therapy

Women can become infertile because they don’t ovulate or don’t ovulate regularly.

A drug called Clomifene can be given.

Clomifene causes more FSH and LH to be released by the body. FSH and LH will stimulate egg maturation and ovulation.

Sexual intercourse can take place during this time period (when the woman is ovulating), to increase the chances of becoming pregnant.

Controlling fertility

Contraceptives

Hormones can also be used to prevent pregnancy.

- Oestrogen prevents the release of eggs if taken every day, by inhibiting the production of FSH. After a period of time egg development stops.
- Progesterone works in different ways: one way is by stimulating the production of thick cervical mucus which prevents sperm travelling through the cervix and reaching an egg. It also inhibits FSH and LH production.

<u>Hormonal Control</u>

Combined pill: Contains oestrogen and progesterone. It can be taken as a pill (oral contraceptive) or as a patch which is worn on the skin.

Mini-pill: Contains progesterone only.

Contraceptive injection: Contains progesterone only.

<u>Barrier Methods</u>

These put a barrier between the sperm and the egg. Examples of these include condoms and diaphragms (these fit over the opening of the uterus).

Education Services Ltd

Your turn:

1. Ovulation is controlled by hormones.
Infertility can be treated by increasing the chance of ovulation.

a) Which hormone stimulates the maturation of follicles in the ovary?

……
……

b) Ovulation can be stimulated during infertility treatment using hormones.

Explain a disadvantage of using hormones to treat infertility.

……
……
……
……
……
.

c) High levels of which of the following hormones prevents ovulation during pregnancy?

A: LH
B: insulin
C: progesterone
D: FSH

Education Services Ltd

Your turn:

2. The table below shows the level of progesterone throughout the different stages of a female's menstrual cycle.

Days in cycle	Progesterone level (nmol/l)
1-9	1.92
10-14	1.46
15-17	13.79
18-23	33.28
24-28	16.14

a) Describe how the levels of progesterone change throughout the cycle.

……
……
……
……
……
.

b) The progesterone levels changed after day 14. Explain why.

……
……
……
……
……

c) Using the information in the table, explain whether the female is pregnant.

……
……
……
……
……

Education Services Ltd

Your turn:

3. Hormones ,including progesterone, control the menstrual cycle.

a) Where is progesterone produced?

……
……

b) Describe the effect that high levels of progesterone have on the uterus lining during pregnancy.

……
……
……
……
……
……

4. Explain, in as much detail as you can, how the menstrual cycle is controlled by negative feedback and hormones.

……
……
……
……
……
……
……
……
……
……
……
……

Answers:

1. Ovulation is controlled by hormones.
Infertility can be treated by increasing the chance of ovulation.

a) Which hormone stimulates the maturation of follicles in the ovary?

FSH

b) Ovulation can be stimulated during infertility treatment using hormones

Explain a disadvantage of using hormones to treat infertility.

More than one egg fertilised/multiple birth, which can lead to increased risk of complications for mother/baby

OR

Woman has side effects, which can cause complications.

Treatment has to then be stopped reducing chance of pregnancy

c) High levels of which of the following hormones prevents ovulation during pregnancy?

A: LH
B: insulin
C: progesterone
D: FSH

Education Services Ltd

Answers:

2. The table below shows the level of progesterone throughout the different stages of a female's menstrual cycle.

Days in cycle	Progesterone level (nmol/l)
1-9	1.92
10-14	1.46
15-17	13.79
18-23	33.28
24-28	16.14

a) Describe how the levels of progesterone change throughout the cycle.

Levels remain low until day 14 when they rise. They continue to rise until day 23 when they drop.

b) The progesterone levels changed after day 14. Explain why.

After ovulation occurs, the corpus luteum releases progesterone, in order to maintain the uterus lining

c) Using the information in the table, explain whether the female is pregnant.

Progesterone falls after day 23 to 16.14 so the uterus lining is not maintained, and the female is not pregnant

Education Services Ltd

Answers:

3. Hormones ,including progesterone, control the menstrual cycle.

a) Where is progesterone produced?

Corpus luteum

b) Describe the effect that high levels of progesterone have on the uterus lining during pregnancy.

It maintains the uterus lining

4. Explain, in as much detail as you can, how the menstrual cycle is controlled by negative feedback and hormones.

FSH stimulates follicles to mature and also stimulates the production of oestrogen.
Ovaries secrete oestrogen, this builds up the uterus lining, inhibits FSH and stimulates LH.
LH triggers ovulation.
After ovulation the corpus luteum produces progesterone which maintains the uterus lining.
Progesterone also inhibits LH and FSH
The corpus luteum breaks down and progesterone levels decrease causing FSH to be released, and the uterus lining breaks down (menstruation)
Low levels of oestrogen and progesterone cause menstruation

Education Services Ltd

For more help and resources, or to work with us as a tutor, please contact us

www.ebeducationservices.co.uk

contact@ebeducationservices.co.uk

0161 442 5270

...helping everybody achieve Even Better