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EB Education Revision Guide

How to work with The Menstrual Cycle

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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 build 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.

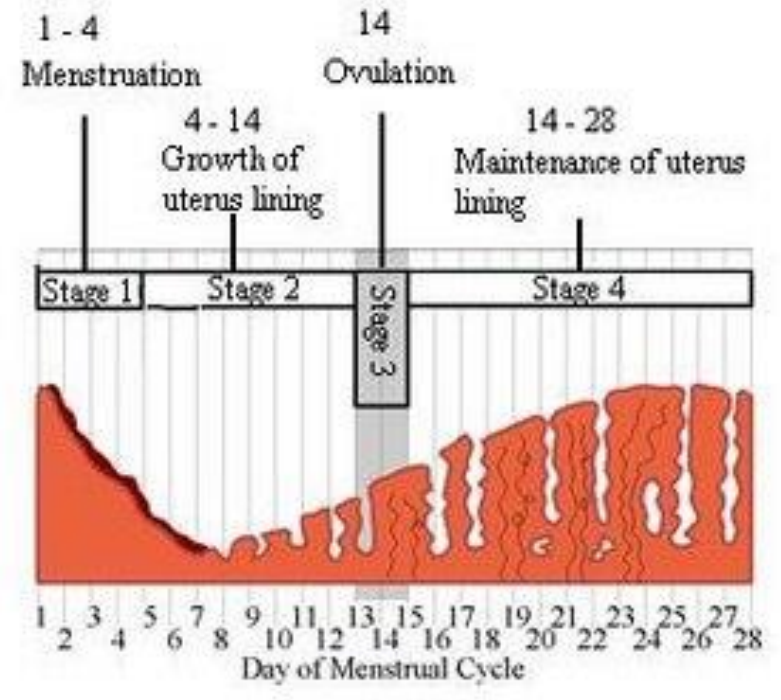
- STAGE 3

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



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.

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.

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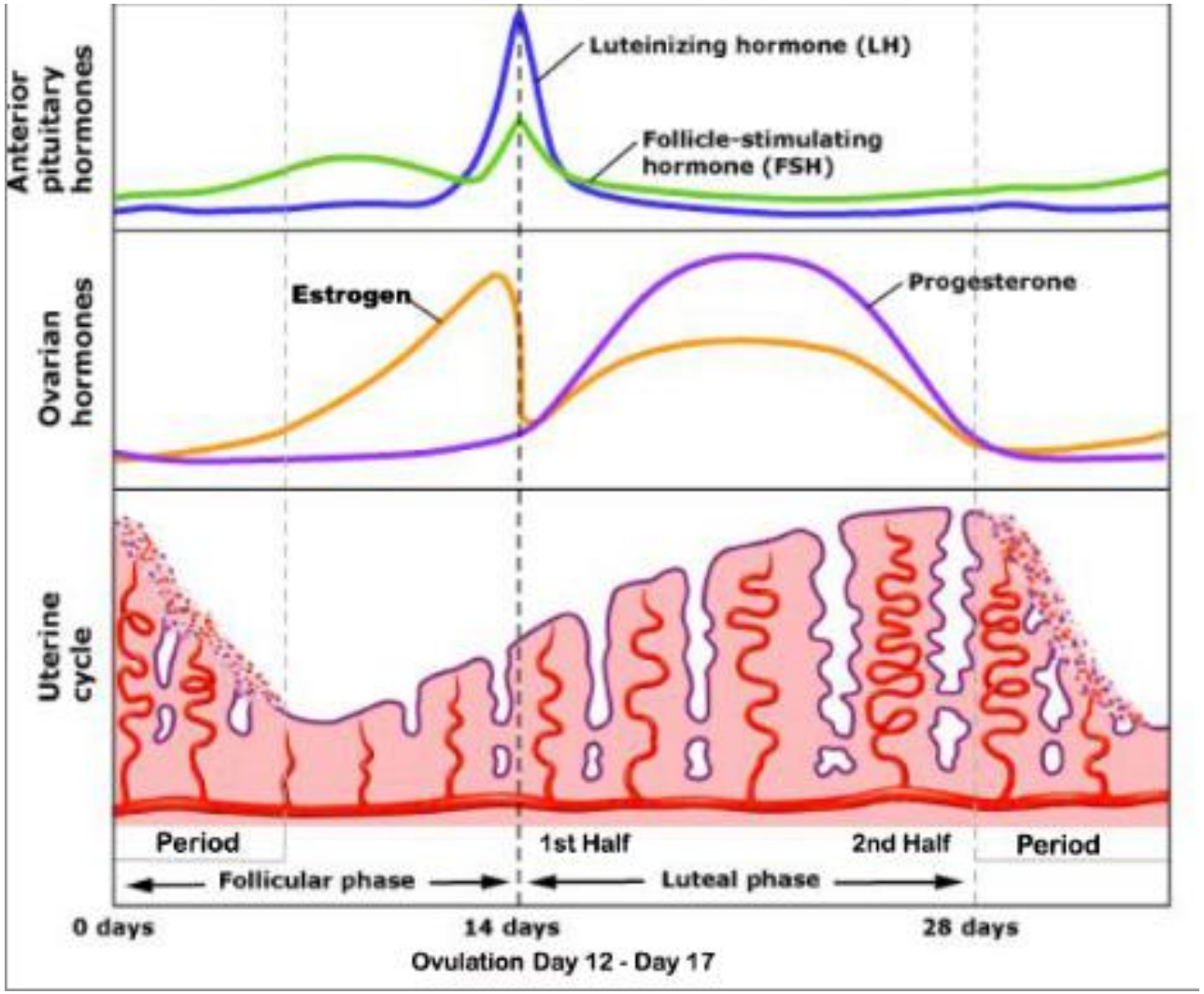
Hormonal Control



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 production stop.
- 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).

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Your turn:

1 Infertility can be treated by increasing the chance of ovulation occurring.

Ovulation is controlled by hormones.

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The hormone that stimulates the maturation of follicles in the ovary is

(1)

- ☒ **A** FSH
- ☒ **B** LH
- ☒ **C** oestrogen
- ☒ **D** progesterone

(ii) Infertility treatments, including the use of hormones, can stimulate ovulation.

Explain **one** disadvantage of treating infertility by using hormones to stimulate ovulation.

(2)

.....

.....

.....

.....

.....

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Ovulation during pregnancy is prevented by high levels of

(1)

- ☒ **A** FSH
- ☒ **B** LH
- ☒ **C** insulin
- ☒ **D** progesterone

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Your turn:

(b) Figure 5 shows the level of progesterone for a female during five different stages of the menstrual cycle.

days in the menstrual cycle	progesterone level (nmol/l)
1–9	1.85
10–14	1.48
15–17	14.28
18–23	35.27
24–28	17.11

Figure 5

(i) Describe the changes in progesterone levels during the 28-day cycle.

(2)

(ii) Explain why progesterone levels changed following day 14.

(2)

(iii) Use Figure 5 to explain if the female is pregnant.

(2)

(Total for Question 2 = 9 marks)

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Your turn:

(b) The menstrual cycle is also controlled by hormones including progesterone.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

Progesterone is produced by the

(1)

☒ **A** corpus luteum

☒ **B** glomerulus

☒ **C** hypothalamus

☒ **D** pituitary gland

(ii) Describe the effect of high levels of progesterone on the uterus lining during pregnancy.

(1)

*(b) (iii) Explain how the menstrual cycle is controlled by hormones and negative feedback.

(6)

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Answers:

1 Infertility can be treated by increasing the chance of ovulation occurring.

Ovulation is controlled by hormones.

(a) (i) Complete the sentence by putting a cross (☒) in the box next to your answer.

The hormone that stimulates the maturation of follicles in the ovary is

(1)

- X **A** FSH
- ☐ **B** LH
- ☐ **C** oestrogen
- ☐ **D** progesterone

(ii) Infertility treatments, including the use of hormones, can stimulate ovulation.

Explain **one** disadvantage of treating infertility by using hormones to stimulate ovulation.

(2)

More than one egg fertilised/multiple birth

Increased risk of complications for mother/baby

OR

Woman has side effects

Treatment has to be stopped reducing chance of pregnancy

(iii) Complete the sentence by putting a cross (☒) in the box next to your answer.

Ovulation during pregnancy is prevented by high levels of

(1)

- ☐ **A** FSH
- ☐ **B** LH
- ☐ **C** insulin
- X **D** progesterone

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Answers:

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1–9	1.85
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24–28	17.11

Figure 5

(i) Describe the changes in progesterone levels during the 28-day cycle.

(2)

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

(ii) Explain why progesterone levels changed following day 14.

(2)

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

(iii) Use Figure 5 to explain if the female is pregnant.

(2)

Progesterone falls after day 23 to 17.11 so the uterus lining is not maintained, and the female is not pregnant

(Total for Question 2 = 9 marks)

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Answers:

(b) The menstrual cycle is also controlled by hormones including progesterone.

(i) Complete the sentence by putting a cross (☒) in the box next to your answer.

Progesterone is produced by the

(1)

X ☒ **A** corpus luteum

☒ **B** glomerulus

☒ **C** hypothalamus

☒ **D** pituitary gland

(ii) Describe the effect of high levels of progesterone on the uterus lining during pregnancy.

(1)

Maintain the uterus lining

*(b) (iii) Explain how the menstrual cycle is controlled by hormones and negative feedback.

(6)

FSH stimulates follicles to mature and stimulates the production of oestrogen

Ovaries secrete oestrogen, this builds up the uterus wall, 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

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

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