

5.3.4 Hormones in human reproduction

AQA GCSE Biology (Higher) Question and answer notes

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How to use these notes

These notes cover everything you need to know for this part of the specification. They have been written in question-answer format to make them easier for you to study from.

In order to study successfully, I recommend you do the following for each question and answer:

- Read it carefully and make sure you **understand** it.
- **Memorise** the answer.
- **Practice** applying your understanding to past exam questions.

A good way to memorise information is to use **retrieval practice**. This is when you practise retrieving information from your memory. You could do this by making a flashcard for each question with the question on one side and the answer on the other. Or you could use a flashcard app. Alternatively, use a sheet of paper to cover up the answer so you can only see the question. Try to answer the question and then check how you did.

You should practise retrieving each answer from your memory until you can do it perfectly. Even once you can retrieve the answer perfectly, your ability to retrieve it will probably fade as time passes without practising. Therefore you will need to keep going back to the questions that you have previously mastered and practising them again. However, each time you re-learn the answer, the memory will be stronger and will last longer than the time before.

What is puberty?

Puberty is a process in which the human body undergoes changes that prepare it for reproduction. In most people, puberty begins in childhood and lasts for a few years.

What are secondary sex characteristics?

Secondary sex characteristics are features of the female and male body that develop during puberty.

What are the main female secondary sex characteristics?

The main female secondary sex characteristics are:

- The menstrual cycle begins
- The body has a growth spurt
- Underarm and pubic hair grow
- Breasts develop

What are the main male secondary sex characteristics?

The main male secondary sex characteristics are:

- The testes grow and begin producing sperm
- The body has a growth spurt
- Underarm, pubic and facial hair grow
- The larynx (voice box) gets bigger and the voice breaks (becomes deeper)

What causes secondary sex characteristics to develop?

During puberty, the body releases reproductive hormones into the bloodstream. The main female reproductive hormone is oestrogen and the main male reproductive hormone is testosterone. However, both females and males produce both hormones. These reproductive hormones stimulate the secondary sex characteristics to develop.

What is the menstrual cycle?

The menstrual cycle is a repeating series of changes that take place within the female reproductive system, beginning at puberty and continuing until around the age of 50. Roughly once every 28 days, the menstrual cycle releases an egg cell and prepares the body for fertilisation.

What are the two main parts of the female reproductive system that are involved in the menstrual cycle?

The ovaries and the uterus (womb) are the two main parts of the female reproductive system involved in the menstrual cycle.

What are ovaries?

Ovaries are structures within the female reproductive system that produce egg cells. There are two ovaries - one on each side of the uterus. Each ovary is connected to the uterus by a tube called a fallopian tube.

What happens to the egg cells that are produced in the ovaries?

Roughly once every 28 days, one of the two ovaries releases an egg cell. This process is called ovulation. The egg cell then begins travelling along the fallopian tube towards the uterus. If sperm cells are present (e.g. as a result of having sex), one of the sperm cells may fertilise the egg cell. If the egg cell is not fertilised, it will pass out of the body during menstruation.

What happens to a fertilised egg cell?

When an egg cell and a sperm cell fuse during fertilisation, they form a cell called a zygote. The menstrual cycle stops and pregnancy begins. The zygote develops into an embryo, which then implants into the lining of the uterus. The embryo then develops into a foetus, which then continues to develop until it is born, at which point it becomes a baby.

What is the uterus?

The uterus (also known as the womb) is a structure within the female reproductive system. It is where an embryo develops into a foetus and then continues developing until it is born.

How long does the menstrual cycle last?

The length of the menstrual cycle varies but the average length is around 28 days.

What is menstruation?

Menstruation (also known as a period) is a process which takes place at the beginning of each menstrual cycle. During menstruation, the lining of the uterus breaks down. Blood and other tissue from the broken down uterus lining then passes out of the body through the vagina, along with the unfertilised egg from the previous ovulation.

How long does menstruation typically last?

Menstruation varies in length, but it typically lasts about 5 days.

What happens in the menstrual cycle after menstruation?

After menstruation (on around day 6 of the menstrual cycle), the uterus lining starts to thicken again. On around day 14, ovulation takes place - this is when an egg cell is released from one of the ovaries. The uterus lining then continues to thicken and the egg cell travels through the fallopian tube towards the uterus. If the egg cell is not fertilised, the cycle will begin again with menstruation after about day 28.

What part of the menstrual cycle does oestrogen stimulate?

Oestrogen stimulates the uterus lining to build up.

What part of the menstrual cycle does progesterone stimulate?

Progesterone stimulates the growth of blood vessels within the uterus lining.

What are FSH and LH?

FSH (follicle stimulating hormone) and LH (luteinising hormone) are hormones produced by the pituitary gland which have roles in controlling the menstrual cycle.

What part of the menstrual cycle does FSH stimulate?

FSH stimulates egg cells to mature within the ovaries.

What part of the menstrual cycle does LH stimulate?

LH stimulates ovulation (the release of an egg cell from one of the ovaries).

How do oestrogen, progesterone, FSH and LH interact with each other?

Oestrogen, progesterone, FSH and LH interact in the following ways:

- FSH stimulates the ovaries to produce oestrogen.
- LH stimulates the ovaries to produce progesterone.
- Oestrogen stimulates the pituitary gland to produce less FSH and more LH.

How do oestrogen, progesterone, FSH and LH work together to control the menstrual cycle?

Oestrogen, progesterone, FSH and LH work together to control the menstrual cycle in the following way:

- At the beginning of the menstrual cycle, levels of all four hormones are low.
- Then levels of FSH begin to rise.
- This stimulates egg cells to mature within the ovaries and causes an increase in the level of oestrogen.
- Increasing oestrogen levels stimulate the lining of the uterus to build up and lead to a decrease in the level of FSH and an increase in the level of LH.
- Increased levels of LH stimulate ovulation to take place and lead to an increase in the level of progesterone.
- The increased level of progesterone stimulates the growth of blood vessels within the uterus lining.