

Controlling Fertility 2

Q:1 Read the passage about IVF (in-vitro fertilisation) and embryo-splitting.

“IVF is not as successful as we would like it,” says scientist Michael Tucker. “On average, only one in five or one in six of all the embryos that we generate in the IVF lab will develop as far as full-term delivery as a baby.”

“There is a way to perhaps double those odds. A new, identical embryo is split off from the original embryo made in the IVF lab.”

“What we are really doing is creating an identical twin,” says scientist Dr Hilton Kort.

“And that’s what happens in nature every day. Cloning is creating a replica of a person or an animal.”

(a) Explain why the two embryos will develop into identical twins.

(2 marks)

(b) Explain why the embryos are not clones of their parents.

(2 marks)

(c) The scientists want to develop this technique, but are afraid to do so because public opinion might be against the technique.

Suggest an explanation for this.

(1 mark)

Q:2 Hormones are used in contraceptive pills.

(a) Explain how a contraceptive pill works.

(2 marks)

(b) Read the information about the trialling of the first contraceptive pill.

The Pill was developed by a team of scientists led by Gregory Pincus. The team needed to carry out large scale trials on humans.

In the summer of 1955, Pincus visited the island of Puerto Rico. Puerto Rico is one of the most densely populated areas in the world. Officials supported birth control as a form of population control. Pincus knew that if he could demonstrate that the poor, uneducated women of Puerto Rico could use the pill correctly then so could women anywhere in the world.

The scientists selected a pill with a high dose of hormones to ensure that no pregnancies would occur while test subjects were taking the drug. The Pill was found to be 100% effective when taken properly. But 17% of the women in the study complained of side effects. Pincus ignored these side effects.

The women in the trial had been told only that they were taking a drug that prevented pregnancy. They had not been told that the Pill was experimental or that there was a chance of dangerous side effects.

Evaluate the methods used by Pincus in trialling the contraceptive pill.

(5 marks)

Q:3 A woman's fertility can be controlled by using hormones.

(a) Some contraceptive pills contain oestrogen.

Name the gland which produces oestrogen.

(1 mark)

Women are being encouraged to use longer-term methods of contraception to reduce their chances of having an unwanted pregnancy.

The table summarises four long-term methods of contraception.

Method	What it is	How it works	How long does it last?	Chances of getting pregnant	Side effects
Hormone implant	Rod containing slow-release hormone inserted under the skin	Stops ovaries releasing eggs	3 years	Less than 1 in 1000	Acne in some women
Hormone injection	Injection that slowly releases hormone	Stops ovaries releasing eggs	12 weeks	Less than 4 in 1000	Weight gain in some women
IUD	Small plastic and copper coil placed in womb	Stops fertilised eggs developing in womb	5–10 years	Less than 20 in 1000	Heavier or more painful periods in some women
IUS	Plastic device containing slow-release hormone placed in womb	Stops fertilised eggs developing in womb	5 years	Less than 10 in 1000	Irregular periods in some women

(b) Which of the methods in the table is the most reliable?

(1 mark)

(c) What is the advantage of using long-term contraception methods instead of taking a contraceptive pill every day?

(1 mark)

(d) The IUD is the least reliable of the contraceptive methods shown in the table. Use information from the table to suggest a reason for this.

(1 mark)

(e) Some people have ethical objections to the use of an IUD or an IUS. Suggest one reason why people might object to their use.

(1 mark)

(f)(i) Explain how the hormone in the implants prevents the ovary releasing eggs.

(2 marks)

(ii) Hormones can also be used as 'fertility drugs'.

Explain how a fertility drug helps a woman to become pregnant.

(2 marks)

Q:4 Two types of fertility treatment are in-vitro fertilisation (IVF) and in-vitro maturation (IVM).

(a) Describe the role of hormones in IVF treatment.

(3 marks)

(b) Read the passage about fertility treatment.

During normal IVF, a woman undergoes several weeks of hormone injections. The treatment can lead to a condition called ovarian hyperstimulation syndrome resulting in a build-up of fluid in the lungs. Very rarely, it can cause death. The syndrome occurs in about 1 % of standard IVF cycles, but in about 10 % of the IVF cycles of some women. An IVF cycle may cost up to £4300.

In IVM, hormone treatment lasts for less than 7 days. Eggs are then collected from the ovaries while they are still immature. Each egg is then matured in a laboratory for up to 48 hours before being injected with a single sperm.

A few days after fertilisation, the embryos are implanted into the mother's womb. The cost of each IVM cycle is £1700.

An IVM expert says: "In IVM treatment there's a small risk of abnormalities in the sex chromosomes and also of birth deformities and cancer in the babies. These risks are not massive but they are greater than in IVF."

(b) Evaluate the use of IVM rather than IVF in treating infertility.

Remember to give a conclusion to your evaluation.

(4 marks)

Q:5 The InvoCell device below is used in a new IVF (in-vitro fertilisation) treatment. Sperm and eggs are placed in the device which is then placed in the woman's vagina.

The table compares standard IVF treatment with InvoCell IVF treatment.

	Standard IVF treatment	<i>InvoCell</i> IVF treatment
Success rate	29.6 %	19.7 %
Cost	£2500	£900
Laboratory equipment needed	Extra equipment needed	None
Fertility problems that can be treated	100 %	50 %
Hormone treatment needed	Yes	Yes
When the embryos can be seen	Within hours	After 3 days

Using only the information given in the table, answer these questions.

(a) Give two advantages of Invocell IVF treatment compared with standard IVF treatment.

1 _____

2 _____

(2 marks)

(b) Give two disadvantages of Invocell IVF treatment compared with standard IVF treatment.

1 _____

2 _____

(2 marks)

Q:6(a) Hormones are used in some types of contraception.

Complete the sentence.

When used as contraceptives, hormones stop _____ becoming mature.

(1 mark)

(b) There are several ways of using hormones as contraceptives.

These include:

- taking a contraceptive pill each day for 21 days of the menstrual cycle
- using a contraceptive implant.

The contraceptive implant is put under the skin of a woman's arm.

The implant releases contraceptive hormones for three years before the implant needs to be replaced.

(c) (i) Suggest one advantage of using this implant rather than taking contraceptive pills.

(1 mark)

(c) (ii) Suggest one disadvantage of using this implant rather than taking contraceptive pills.

(1 mark)

Q:7 Hormones can be used as contraceptives.

(a) Explain one way in which a hormone can prevent conception (pregnancy).

(2 marks)

(b) Two methods of giving contraceptive hormones to a woman are the vaginal ring and the hormone implant.

Vaginal ring

The vaginal ring is a flexible ring 54 mm in diameter containing hormones.



