

Exercise walk-through

16.5

Sex hormones in humans

IGCSE Biology

Human reproductive systems

male

testes make **sperm** ;
sperm ducts → **ure-**
thra → penis

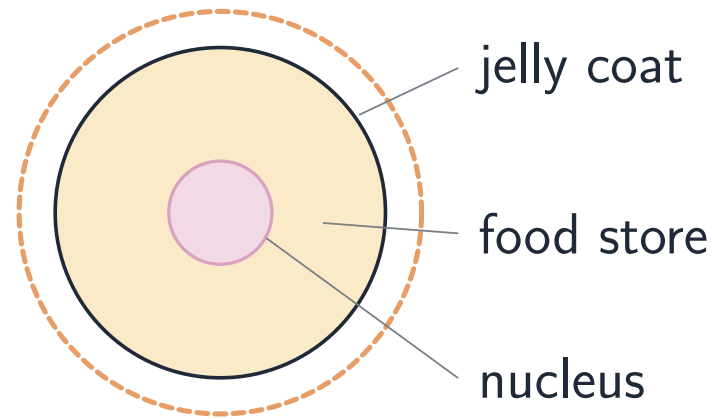
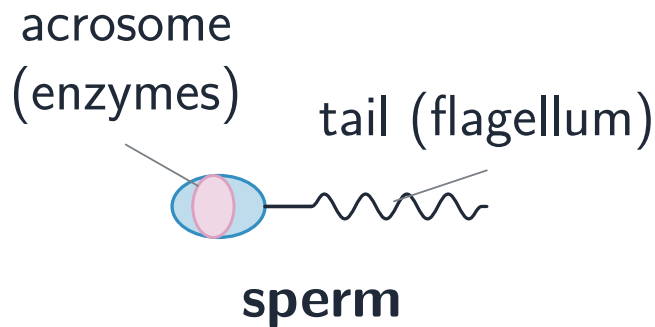
female

ovaries make **eggs** ;
oviduct → **uterus**

Gametes: sperm and egg

- **sperm** – small, many, swims (**flagellum**)
- **egg cell** – large, few (about one a month), stores food

Fertilisation = the two nuclei fusing. Sperm are made in **millions** and eggs in **ones**, which is the difference every comparison question turns on.



Two cells built for opposite jobs

The sperm

Small and mobile: a tail, many **mitochondria** for energy, and **enzymes** in the **acrosome** to break into the egg.

The egg

Large and still: a store of food, and a **jelly coat** that changes after fertilisation to keep other sperm out.

Haploid and diploid

Gamete nuclei are **haploid** – one set of **chromosomes**; the zygote's nucleus is **diploid**, with two.

After fertilisation

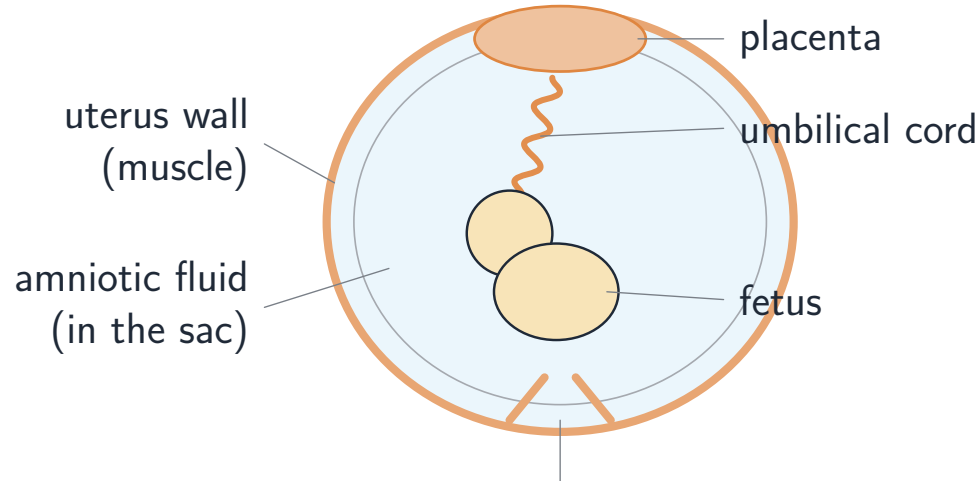
The zygote divides into an **embryo**, a ball of cells that **implants** into the lining of the uterus.

Each adaptation answers a job: the sperm must travel and enter, the egg must feed the embryo and admit only one sperm.

Pregnancy and the fetus

The **fetus** grows in the uterus:

- **placenta** – exchanges food, gases & waste
- **umbilical cord** – joins fetus to placenta
- **amniotic sac** – fluid cushions it



Puberty and the menstrual cycle

At **puberty**, sex hormones bring **secondary sexual characteristics**.

The ~28-day cycle: lining thickens → **ovulation** (day 14)
→ a period if no pregnancy.

A woman has a regular 28-day cycle and her period starts on the 1st. Around which date is she most likely to conceive?

- Day 1 is the day the period starts, not the day it ends.
- Ovulation is about **day 14**, so count 14 days on from the 1st.
- That points to about the **14th**, and the days either side are the most fertile.

Exercises 2.1·2.2

2.1 Name the hormone responsible for female secondary sexual characteristics. [1]

2.2 State on which day of a 28-day cycle ovulation usually occurs. [1]

Exercises 2.1·2.2

2.1 Name the hormone responsible for female secondary sexual characteristics. [1]

2.1

- female secondary sexual characteristics: **oestrogen**
-

2.2 State on which day of a 28-day cycle ovulation usually occurs. [1]

2.2

- ovulation is about **day 14** of a 28-day cycle

Exercise 3.1

3.1 Ovulation is the:

[1]

☐

- A** thickening of the uterus lining
- B** release of an egg from the ovary
- C** breakdown of the lining
- D** fusion of gametes

Exercise 3.1

3.1 Ovulation is the:

[1]

☐

A thickening of the uterus lining

B release of an egg from the ovary

C breakdown of the lining

D fusion of gametes

3.1 B

- ovulation is the **release of an egg from the ovary**
- A is the lining thickening; C is menstruation; D is fertilisation

Exercise 3.2 (a)

3.2 The menstrual cycle prepares the uterus for pregnancy.

(a) Describe what happens to the uterus lining if the egg is not fertilised.

[2]

Exercise 3.2 (a)

3.2 The menstrual cycle prepares the uterus for pregnancy.

(a) Describe what happens to the uterus lining if the egg is not fertilised.

[2]

(a)

- the lining **breaks down**
- and leaves the body as a **period**

Exercise 3.2 (b)

3.2 The menstrual cycle prepares the uterus for pregnancy.

(b) Name the hormone that triggers ovulation.

[1]

Exercise 3.2 (b)

3.2 The menstrual cycle prepares the uterus for pregnancy.

(b) Name the hormone that triggers ovulation.

[1]

(b)

- ovulation is triggered by **LH**