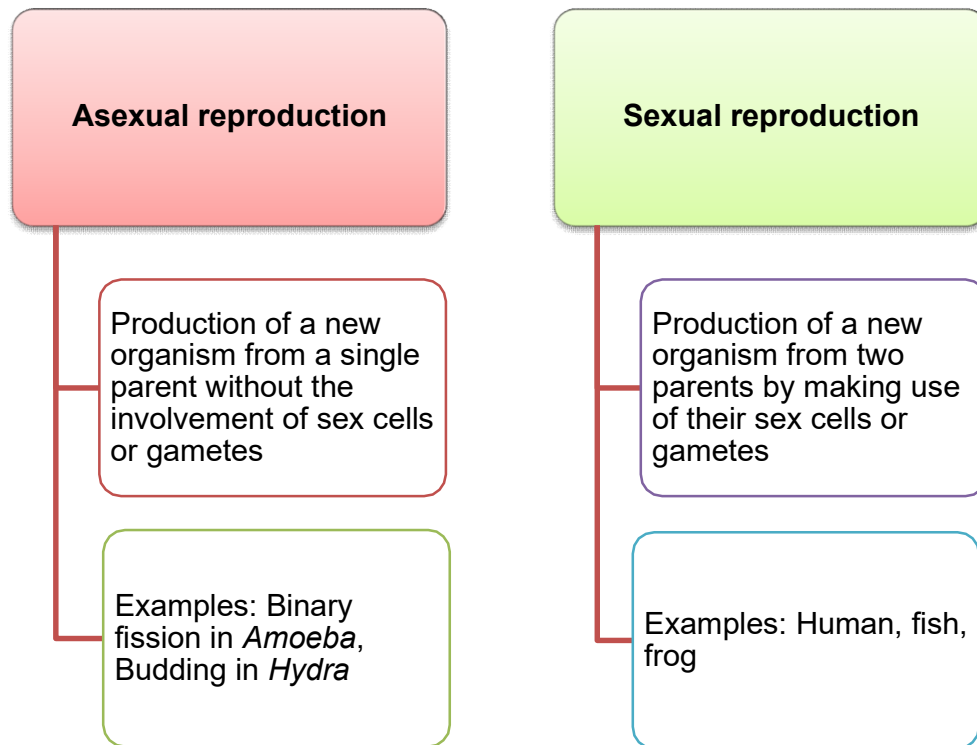
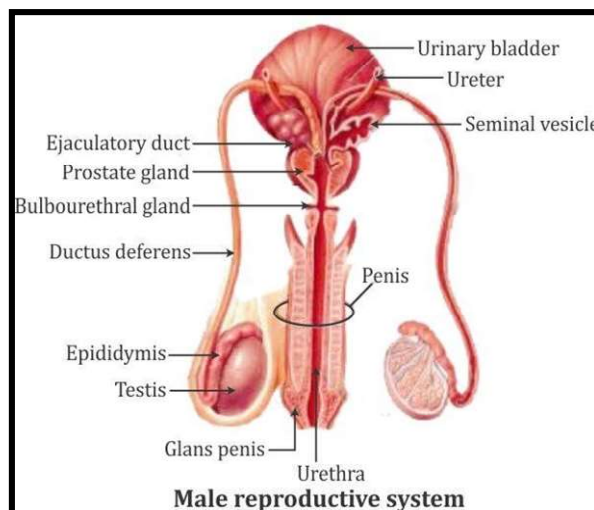


## Reproduction in Animals



## Sexual Reproduction

### Sexual Reproduction in Humans Male Reproductive System



ORGANS	DESCRIPTION
<b>Testes (Testicles)</b>	<ul style="list-style-type: none"> <li>A pair of testes is located below the abdomen in the scrotal sac or scrotum.</li> <li>Testes produce the male gametes or sperms.</li> <li>Sperms can withstand low temperature.</li> <li>To maintain the temperature at 2-3°C lower than the body temperature, the scrotum is located outside the body cavity.</li> </ul>
<b>Epididymis</b>	<ul style="list-style-type: none"> <li>Tubes present in testes join to form the epididymis.</li> <li>The epididymis stores sperms temporarily.</li> </ul>
<b>Vas deferens (Sperm duct)</b>	<ul style="list-style-type: none"> <li>Each epididymis continues further as sperm duct or vas deferens.</li> <li>The two sperms ducts from both the sides open at the top of the urethra.</li> </ul>
<b>Seminal vesicles</b>	<ul style="list-style-type: none"> <li>Seminal vesicles are a pair of glands.</li> <li>A seminal vesicle produces a secretion which is responsible for the transportation of sperms.</li> </ul>
<b>Penis</b>	<ul style="list-style-type: none"> <li>The urethra passes through the penis.</li> <li>It carries either urine or semen at a time.</li> </ul>

FACT



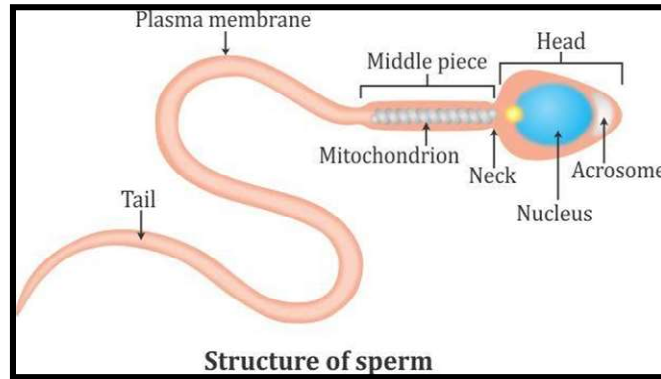
Semen is a milky fluid. It is a mixture of sperms and the secretions of the seminal vesicles, prostate gland and Cowper's gland. About 2-3 ml of semen contains 20,000,000-40,000,000 sperms.

## Structure of Sperm

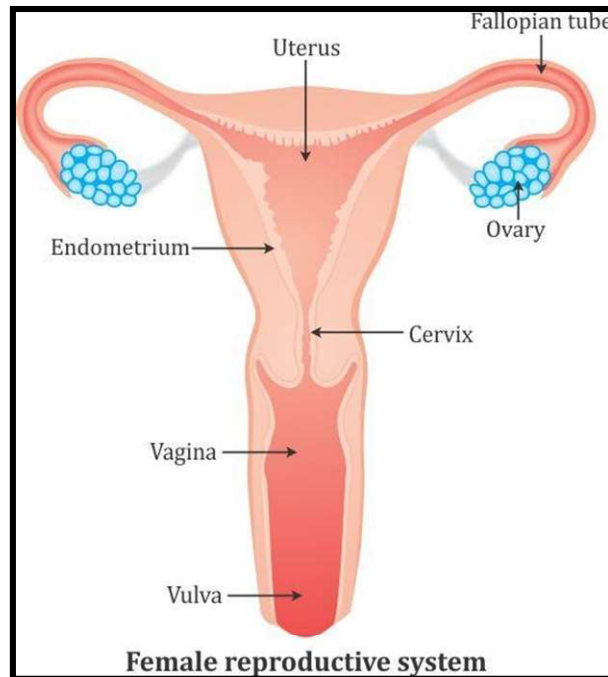
- A sperm cell is composed of four parts- head, middle piece and tail.
- The head carries genetic information. It contains a sac-like structure called acrosome which helps in fertilization.
- The middle part carries spirally coiled mitochondria needed for energy production for the movement of sperm.



- The tail is like a flagellum which helps in movement of sperm in the fluid medium towards the egg cell.



## Female Reproductive System

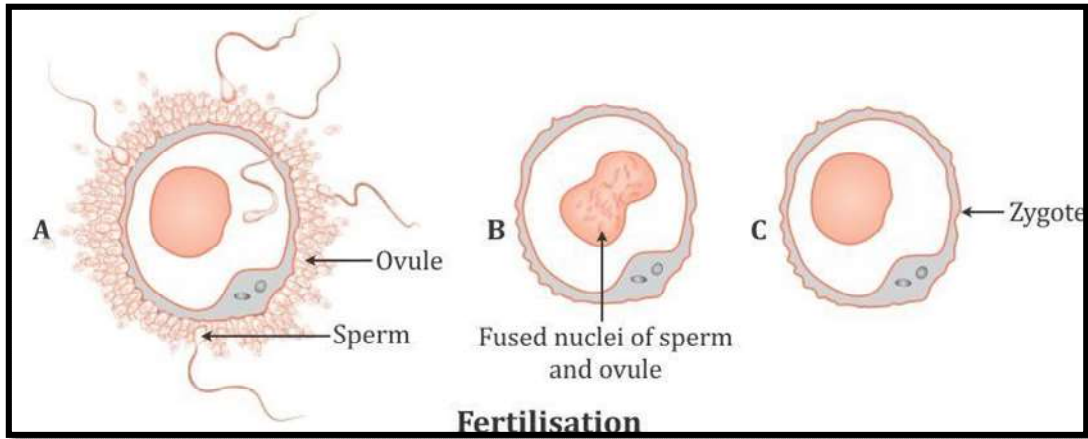


ORGANS	DESCRIPTION
<b>Ovaries</b>	<ul style="list-style-type: none"> <li>Two ovaries are present in the pelvic cavity, one on each side of the uterus.</li> <li>Ovaries produce ova or female gametes.</li> <li>One ovum is released by one ovary every month.</li> </ul>

<b>Oviducts (Fallopian tubes)</b>	<ul style="list-style-type: none"> <li>• There are two oviducts or fallopian tubes present in the female body. Each one is situated close to one ovary of its side.</li> <li>• When the egg is released by the ovary, it passes down to the uterus through the oviduct.</li> </ul>
<b>Uterus (Womb)</b>	<ul style="list-style-type: none"> <li>• Hollow pear-shaped, muscular organ.</li> <li>• The inner lining of the uterus called endometrium protects and nourishes the developing embryo.</li> </ul>
<b>Vagina (Birth Canal)</b>	<ul style="list-style-type: none"> <li>• The uterus opens into the vagina.</li> <li>• The vagina is a muscular narrow tube.</li> </ul>
<b>Vulva</b>	<ul style="list-style-type: none"> <li>• The vagina and urethra both open into the vulva.</li> </ul>



## Fertilization



At the time of intercourse, the semen gets deposited in the female's vagina.

Sperms swim through the uterus and reach the oviduct.

A single sperm fuses with the ovum. The nucleus of the sperm fuses with the nucleus of the egg cell to form a single nucleus.

The sperm combines with the egg in the oviduct and fertilises it to form the zygote. This completes the process of fertilisation.

### Internal Fertilisation

- Takes place inside the female's body.
- Examples: Dogs, cows, humans

### Extrenal Fertilisation

- Fusion of male and female gametes occur outside the body of the female.
- Examples: Amphibians, echinoderms, fish



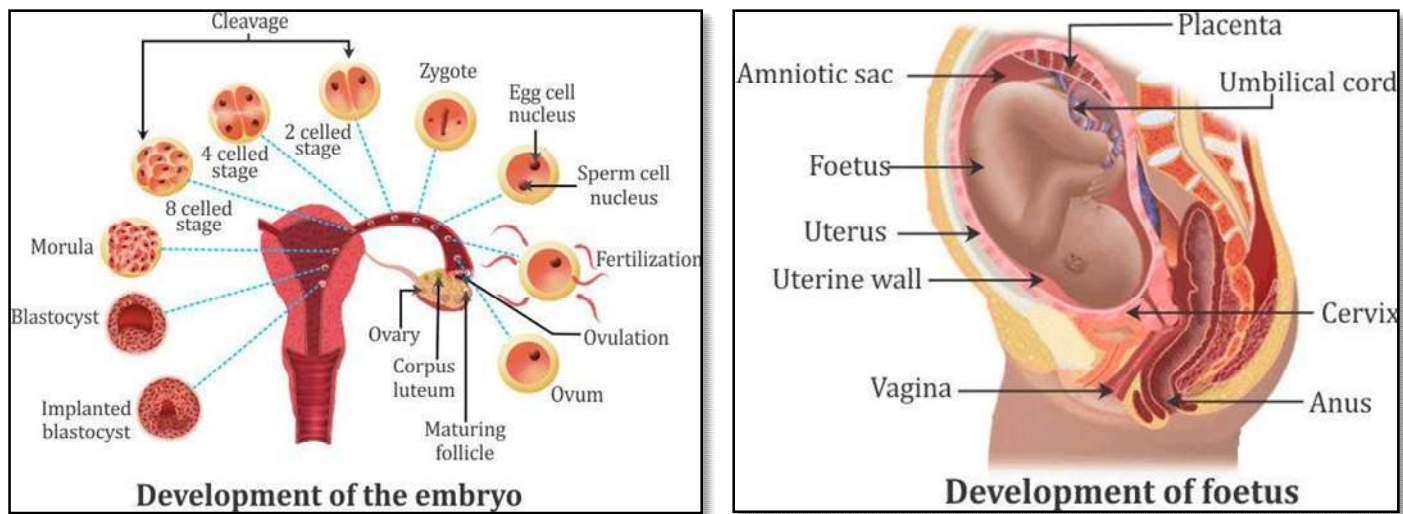
### Test Tube Baby

In case a woman is unable to conceive, doctors collect freshly released egg from her and sperms from her male partner and keep the collected gametes together for some hours.

If fertilisation occurs, the zygote is developed in-vitro or in the laboratory and then placed in the mother's uterus for further development.

This process is called in-vitro fertilisation and a baby born through this technique is called test tube baby.

### Development of Embryo



The zygote divides repeatedly to make a ball of hundreds of cells called the **embryo**.

The embryo moves down the oviduct into the uterus and gets embedded in the soft and thick lining of the uterus. This is called implantation.

The embryo starts growing into a baby. It gets food and oxygen from the blood vessels in the lining of the uterus through a special tissues called placent.

An unborn baby in the uterus at the stage when all the body parts can be identified is called a **foetus**.

When the development of the foetus into a baby is complete, the fully formed baby comes out of the mother's body through the vagina.



**Menstruation**

If the ovum is not fertilised, then the lining of the uterus breaks down and disintegrates. The ovum, lining of the uterus and some blood is discharged out of the body. This is called menstruation. The bleeding lasts for four days. After menstruation, the ovum is released and the uterus again prepares itself for receiving a fertilised egg cell. If there is no fertilisation, menstruation is repeated.

**Oviparous and Viviparous Animals****• Viviparous animals**

- Animals which give birth directly to their young ones are called viviparous animals.
- The zygote grows in the mother's womb.
- Dogs, cows, humans and other placental mammals are examples of viviparous animals.

**• Oviparous animals**

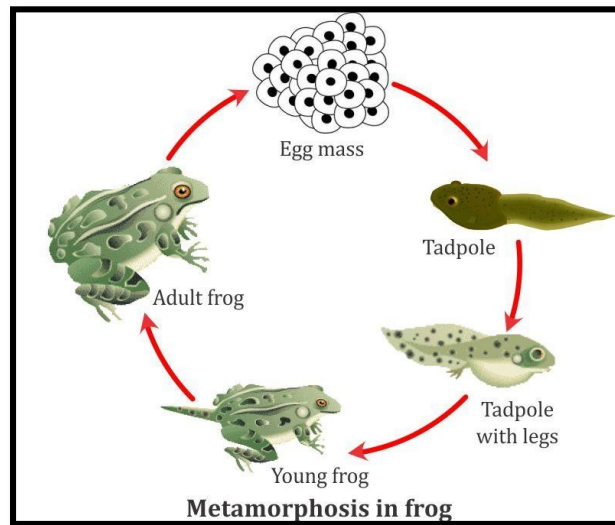
- Animals which lay eggs are called oviparous animals.
- The mothers lay eggs outside their bodies. The eggs are laden with yolk.
- The development of embryo takes place outside the mother's body.
- Frogs, lizards, reptiles, insects such as butterflies and moths, hens, crows and other birds are all oviparous animals.



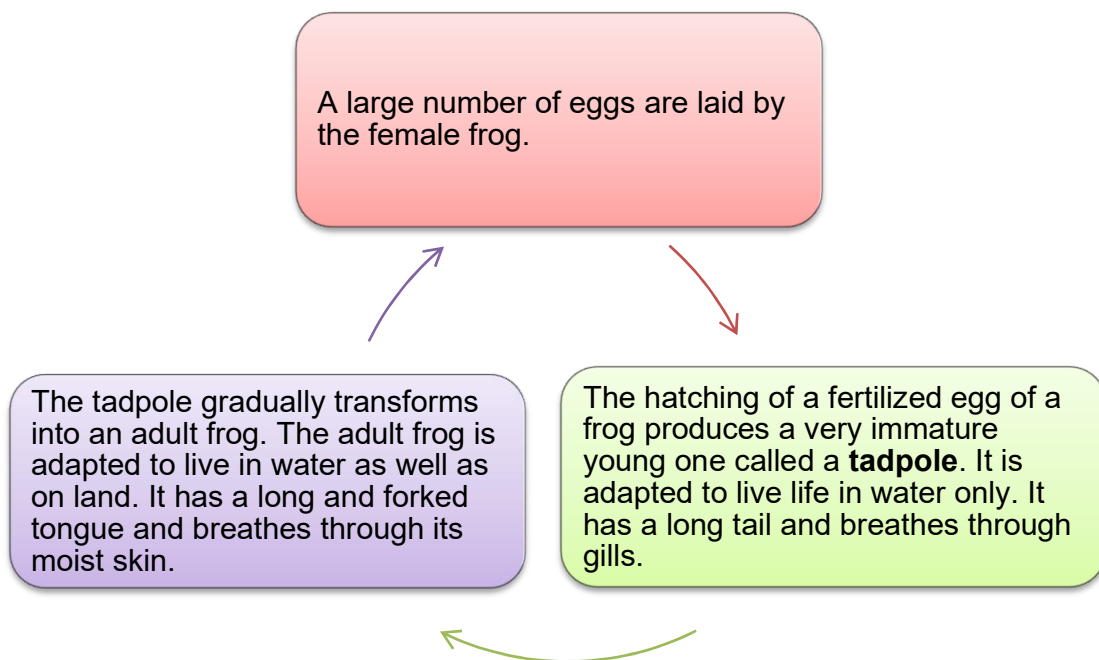
## Metamorphosis

- The morphological, anatomical and physiological changes which occur in a young one when being transformed into an adult is known as **metamorphosis**.

### Metamorphosis in Frog

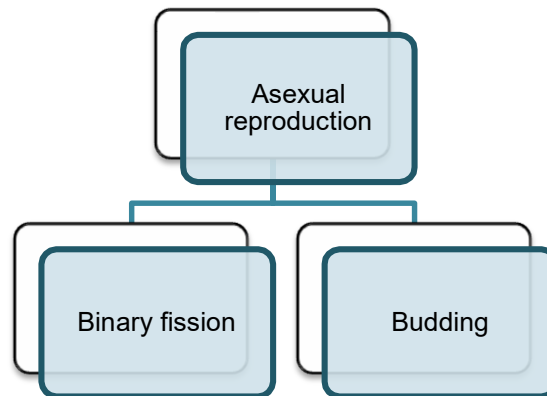


The lifecycle of a frog has three distinct stages- egg, tadpole or larva and adult frog.





## Asexual Reproduction



METHOD	DESCRIPTION
<b>Budding</b> 	<ul style="list-style-type: none"> <li>• A small outgrowth called <b>bud</b> arises on the parent body.</li> <li>• The bud grows and develops a mouth and a ring of tentacles.</li> <li>• The bud breaks off from the parent body and develops into a new individual.</li> <li>• Examples: <i>Hydra</i>, Sponges, Corals</li> </ul>
<b>Binary Fission</b> 	<ul style="list-style-type: none"> <li>• Most common method in unicellular organisms.</li> <li>• Binary fission is the division of the parent cell.</li> <li>• When the organism matures, it grows in size. Its nucleus duplicates. Cytoplasm divides in the middle.</li> <li>• A single parent organism gives rise to two identical daughter organisms.</li> <li>• Examples: <i>Amoeba</i>, <i>Paramecium</i></li> </ul>

## Cloning

- **Cloning** is the process in which an exact copy of a cell, any other living part or an entire organism can be produced.
- In animal cloning, an entire organism is produced from a single cell of the body.

### Dolly, the Clone



The technique of animal cloning was successfully performed for the first time by Ian Wilmut and his colleagues at the Roslin Institute in Edinburgh, Scotland. They created the first cloned sheep Dolly. In the case of Dolly, an entire sheep was cloned from an adult cell rather than an embryo. Dolly was the first mammal to be cloned successfully. Dolly was born on 5th July 1996. A cell was taken from the mammary gland of a female Finn Dorsett sheep. At the same time, an egg was taken from a Scottish blackface ewe and the nucleus was removed from the egg. The nucleus of the mammary gland cell from the Finn Dorsett sheep was next inserted into the egg of the Scottish blackface ewe. The egg, thus, formed was implanted into the Scottish blackface ewe. This egg developed normally and in this way Dolly was born. Though Dolly was born from the Scottish blackface ewe, it was found to be absolutely identical to the Finn Dorsett sheep from which the nucleus was taken. The nucleus from the egg of the Scottish blackface ewe had been removed and so Dolly had no characters of the Scottish blackface ewe. Dolly was now a healthy clone of the Finn Dorsett sheep and produced several offspring of her own by normal sexual means. Dolly died on 14th February 2003 of lung disease.

**Advantages of Cloning**

- Enables us to produce exactly identical copies of animals with favourable characteristics.
- Helps in preserving desirable features of the parent animal for future generations.

**Disadvantages of Cloning**

- Many cloned animals die before birth or die soon after birth.
- Often, cloned animals are born with severe abnormalities.