Modes of Reproduction

Introduction to Reproduction

Reproduction is essential for the continuation of species. It ensures that similar kinds of individuals are produced generation after generation. Animals reproduce in different ways, and their young ones may have specific names, such as baby for humans, kitten for cats, puppy for dogs, caterpillar for butterflies, chick for hens, calf for cows, and tadpole for frogs.

Types of Reproduction

There are two main modes of reproduction in animals:

- Sexual reproduction
- Asexual reproduction

Sexual Reproduction

Overview of Sexual Reproduction

Sexual reproduction involves the fusion of male and female gametes to form a zygote, which develops into a new individual. Both male and female animals have specialized reproductive organs that produce gametes.

Male Reproductive Organs

The male reproductive system includes a pair of testes, sperm ducts, and a penis. The testes produce male gametes called sperms. Each sperm is a single cell with a head, middle piece, and tail. The head contains the nucleus with genetic material and an acrosome with enzymes to penetrate the egg. The middle piece contains mitochondria that provide energy, and the tail helps the sperm swim towards the egg.

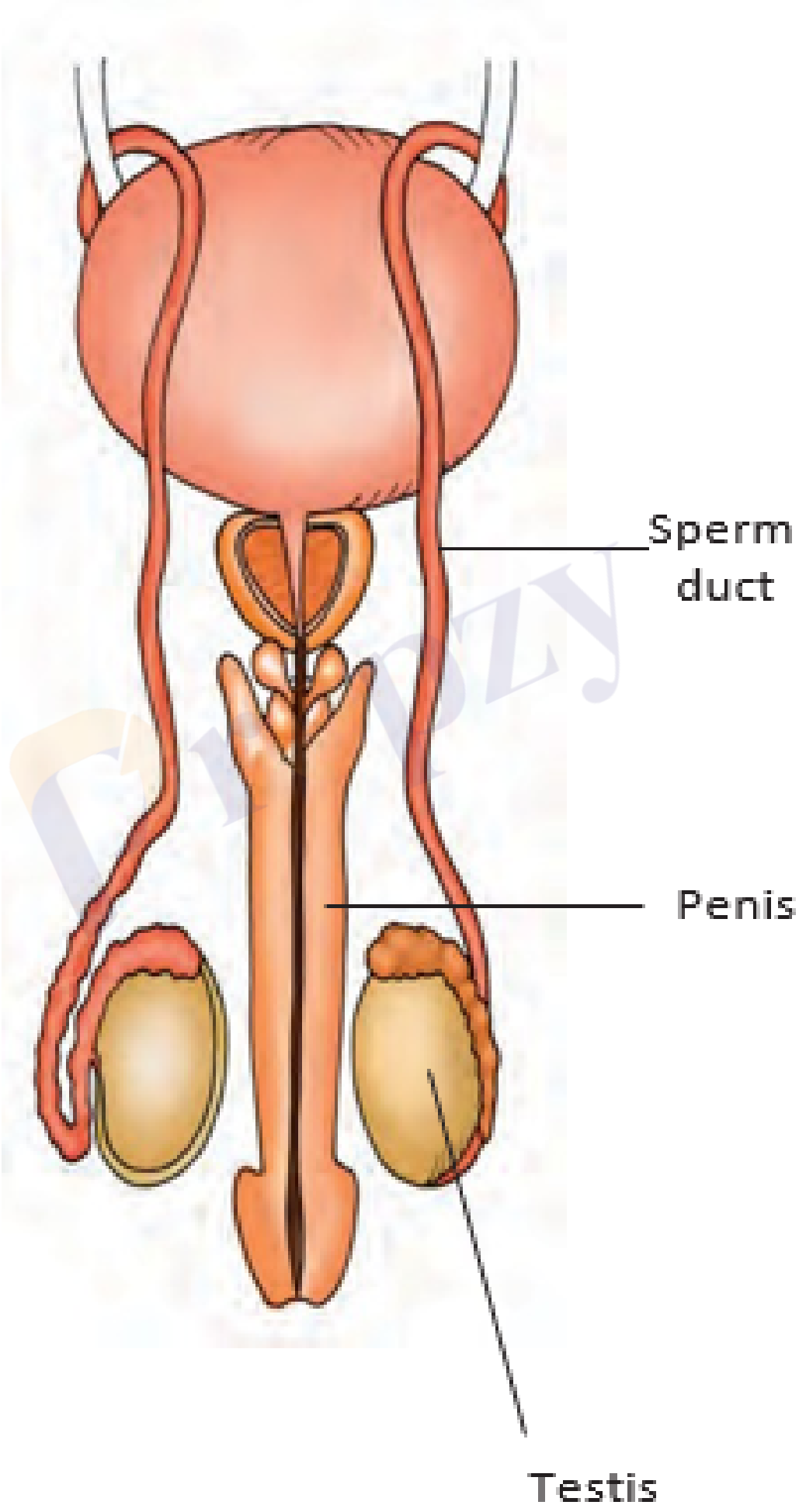


Fig. 6.1: Male reproductive organs in humans

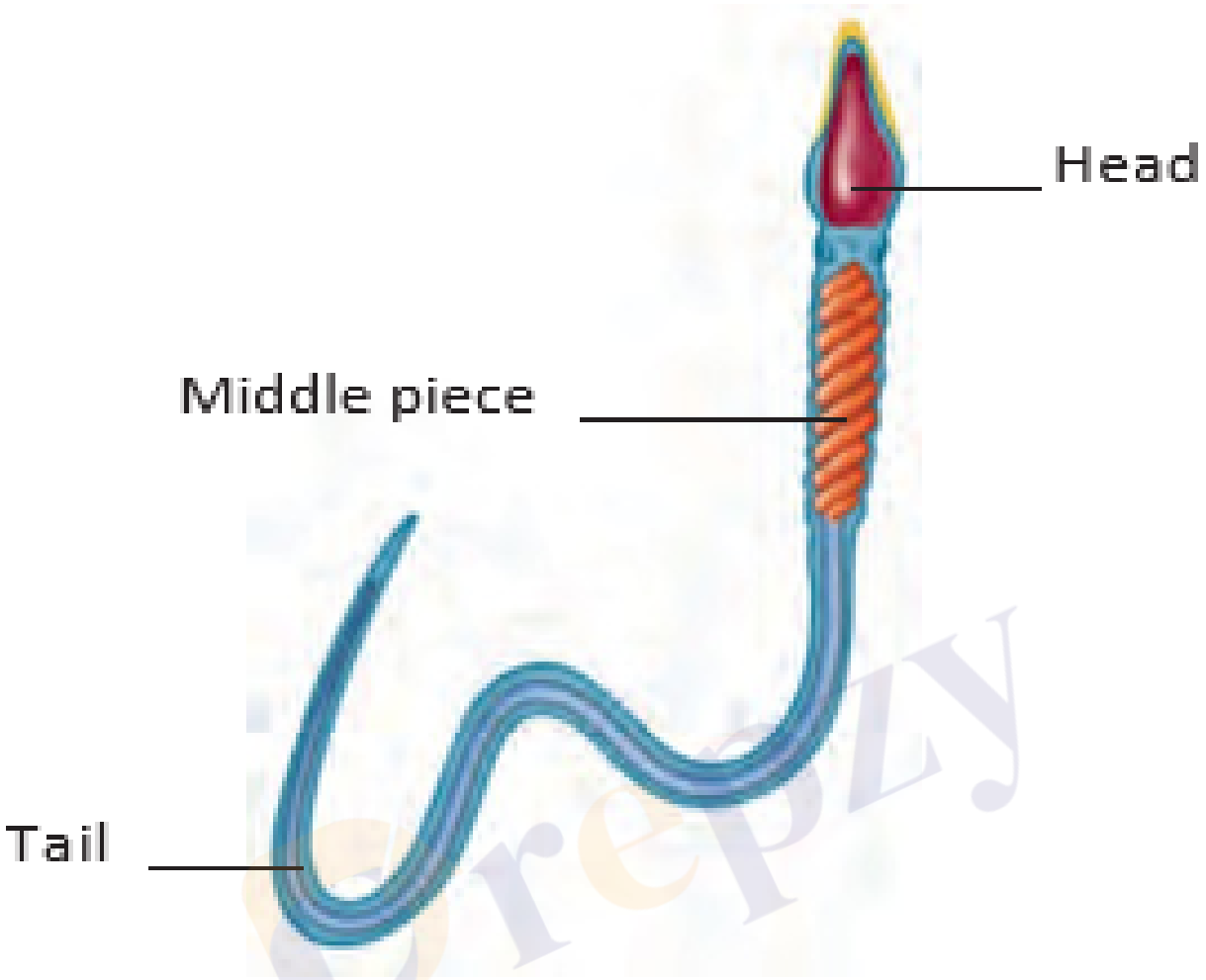


Fig. 6.2 : Human sperm

Female Reproductive Organs

The female reproductive system consists of ovaries, oviducts (fallopian tubes), and the uterus. The ovaries produce female gametes called ova (eggs). Each month, a mature egg is released into the oviduct. Fertilization usually occurs in the oviduct. The uterus is where the fertilized egg develops into a baby. The egg is also a single cell containing genetic material in the nucleus.

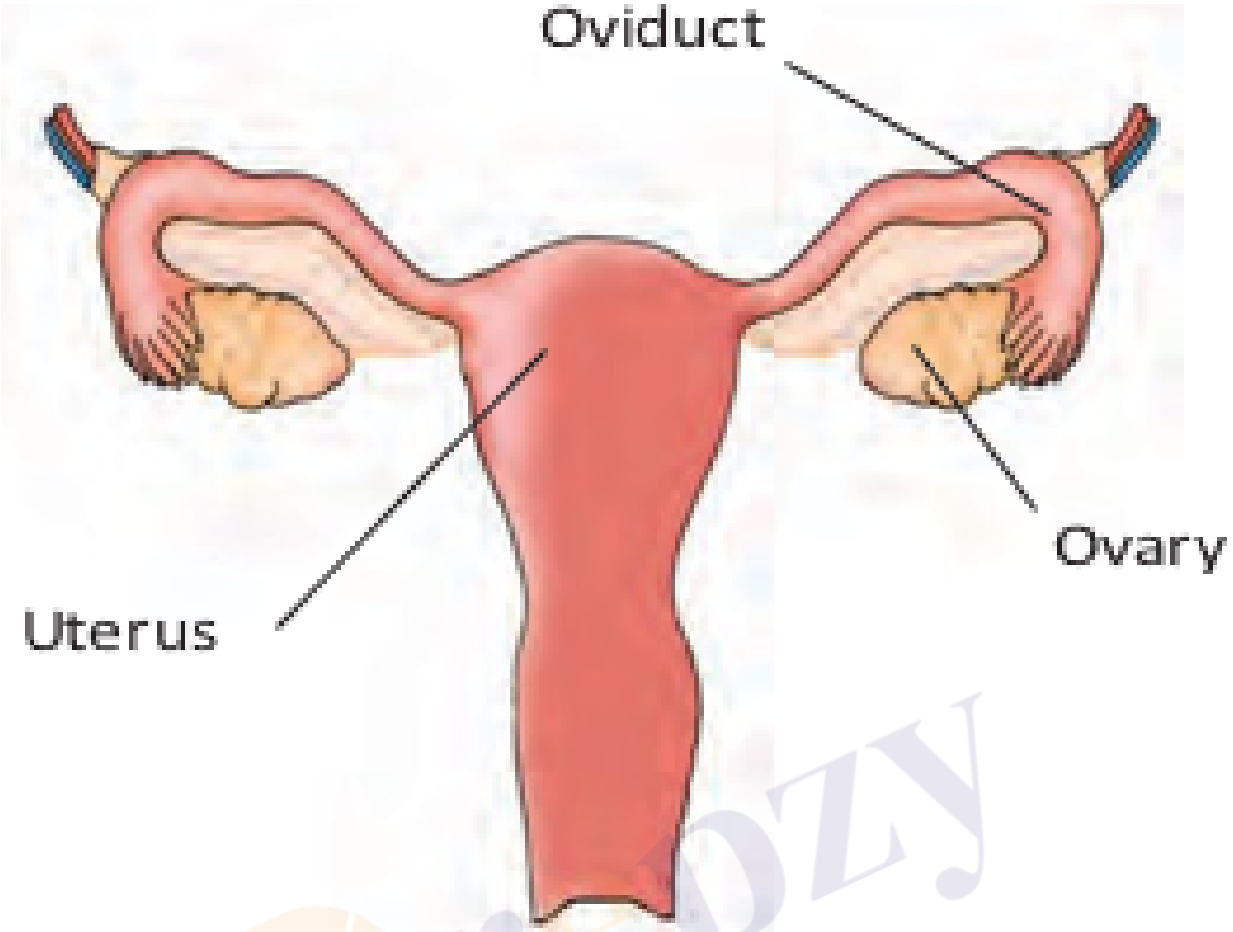


Fig. 6.3 : Female reproductive organs in humans

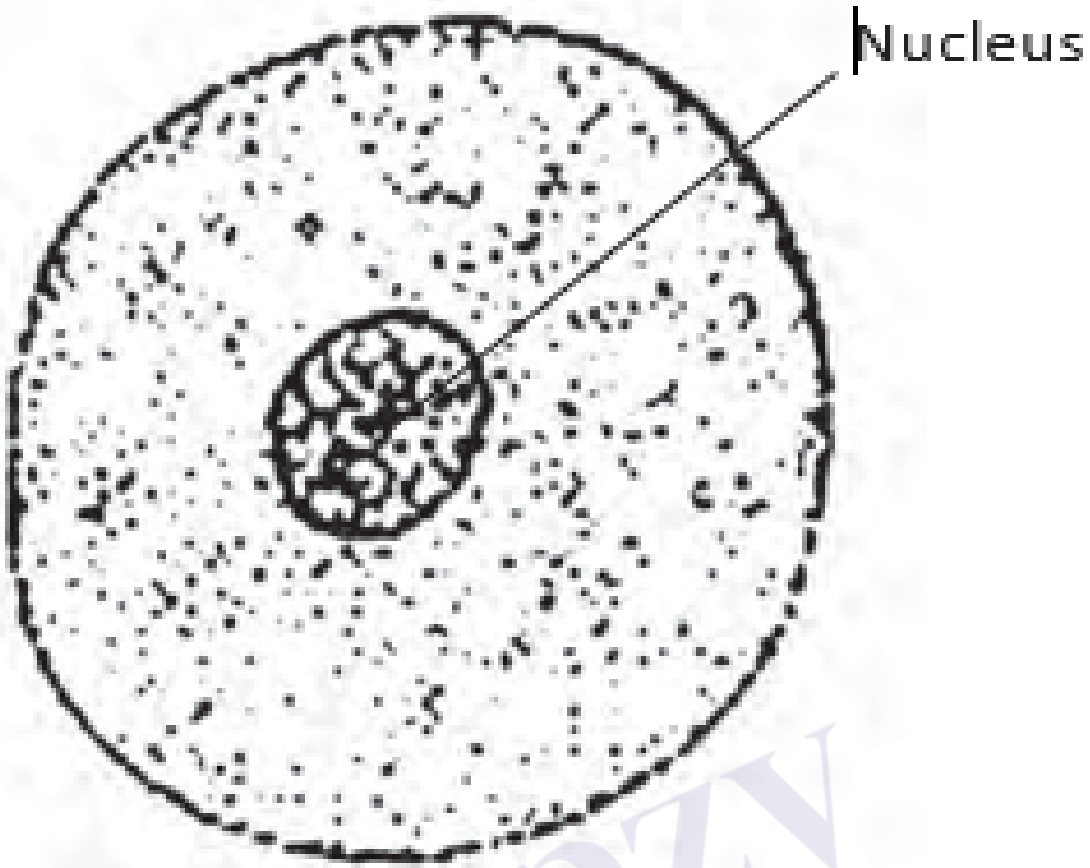


Fig. 6.4 : Human Ovum

Fertilisation

Fertilisation is the fusion of a sperm and an ovum to form a fertilised egg called a zygote. The nuclei of the sperm and egg fuse to form a single nucleus with a full set of chromosomes. Fertilisation can be internal, as in humans, cows, dogs, and hens, or external, as in aquatic animals like frogs and fish.

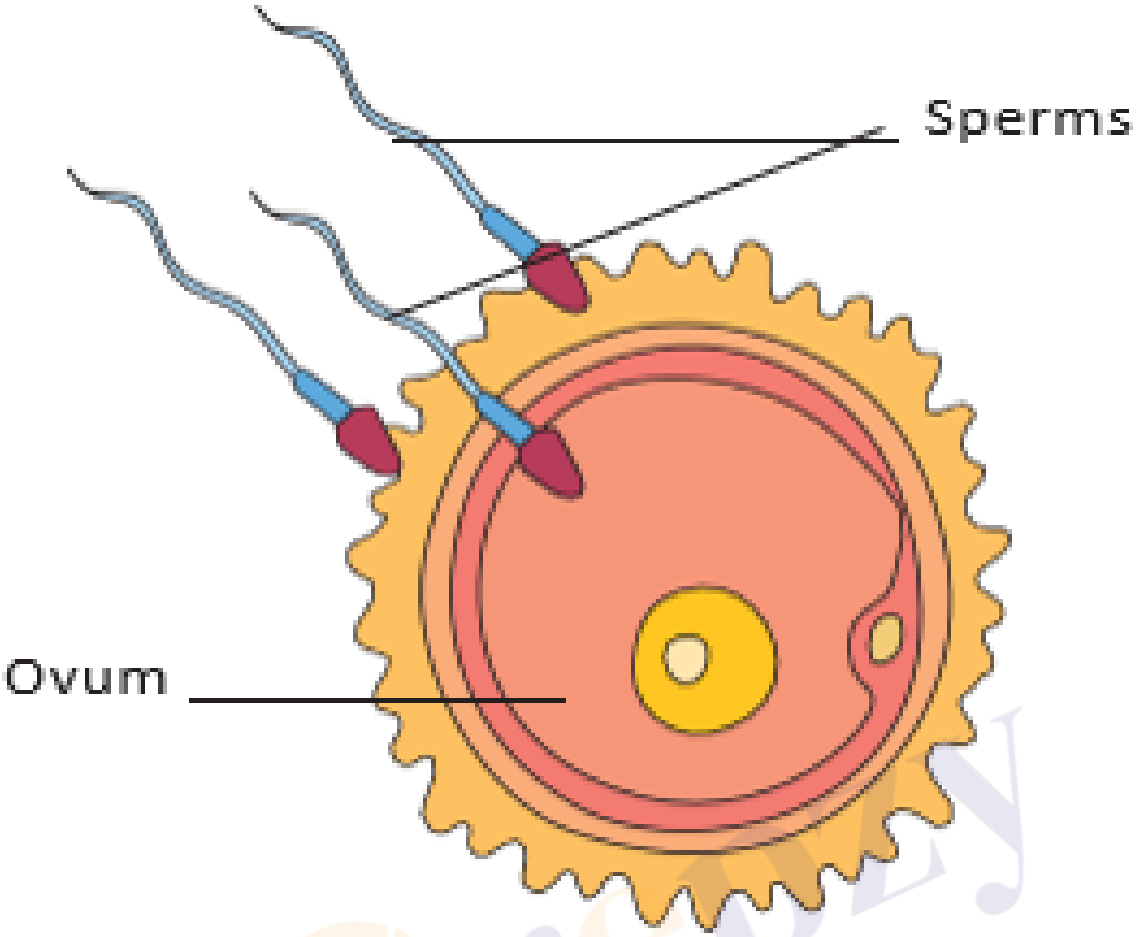


Fig. 6.5 : Fertilisation

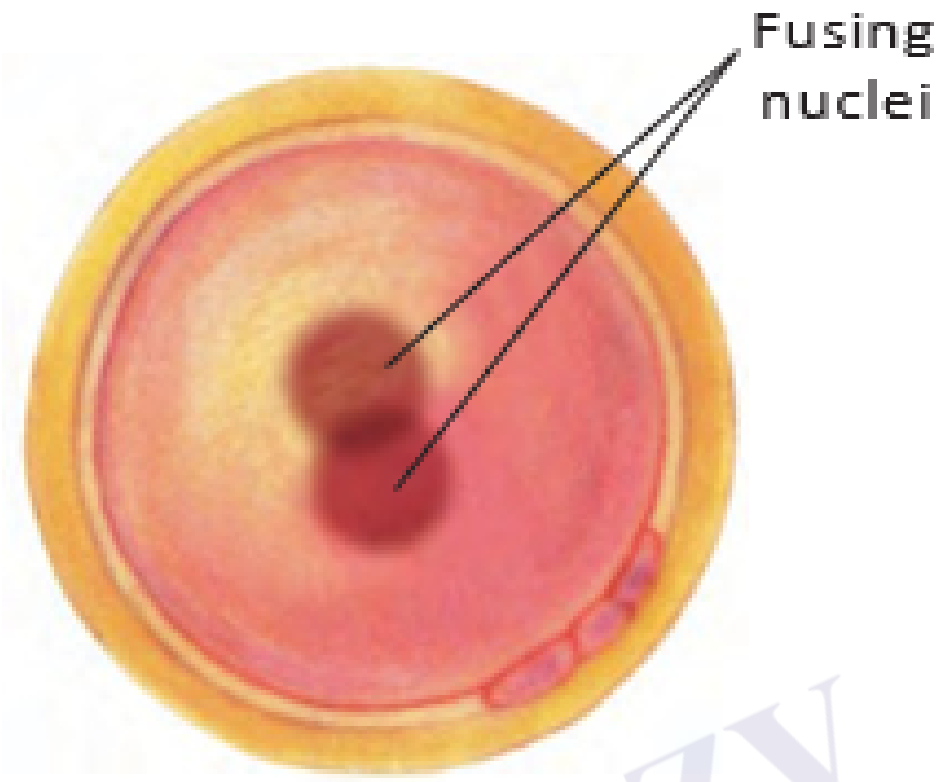


Fig. 6.6 : Zygote

Development of Embryo

After fertilisation, the zygote divides repeatedly to form an embryo. The embryo travels to the uterus and embeds in its wall for further development. The embryo develops into a foetus, where all body parts become identifiable. The foetus grows inside the uterus until birth.

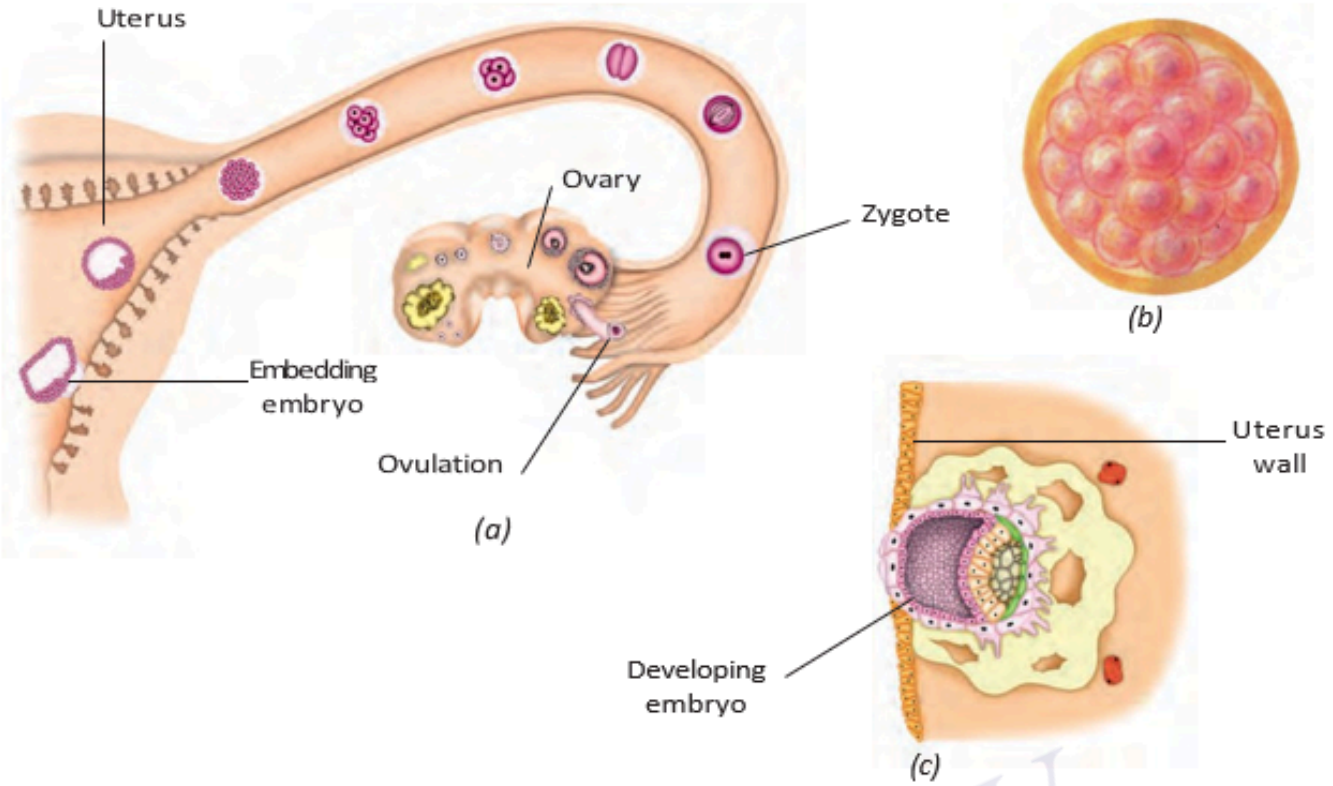


Fig. 6.8 : *(a) Zygote formation and development of an embryo from the zygote; (b) Ball of cells (enlarged); (c) Embedding of the embryo in the uterus (enlarged)*

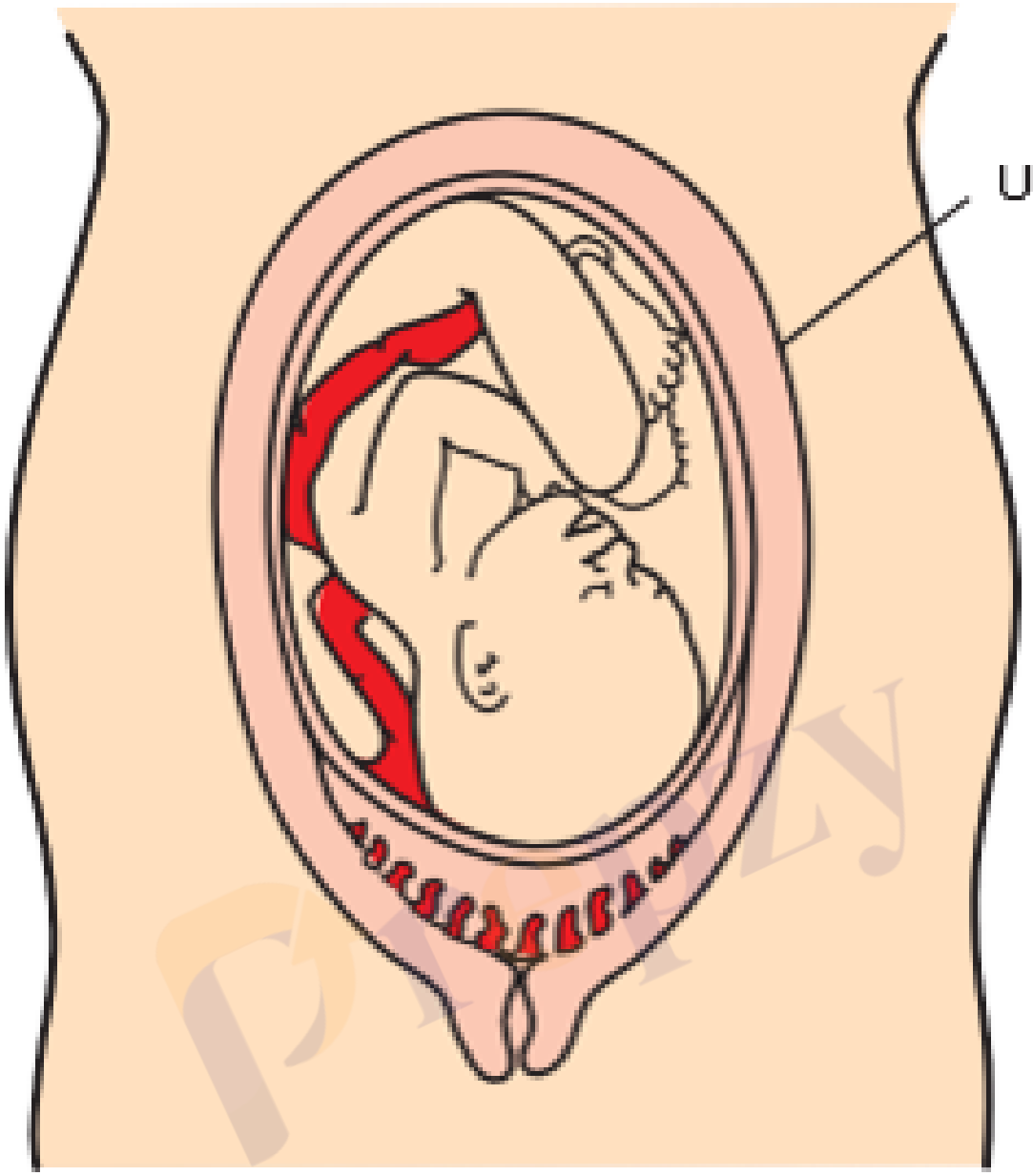


Fig. 6.9 : Foetus in the uterus

Viviparous and Oviparous Animals

Animals that give birth to live young ones are called viviparous, such as humans, cows, and dogs. Animals that lay eggs, which later hatch into young ones, are called oviparous, such as hens, frogs, lizards, and butterflies.

Metamorphosis

Some animals, like frogs, undergo metamorphosis, where the young ones (tadpoles) look very different from adults and transform through distinct stages into adults.

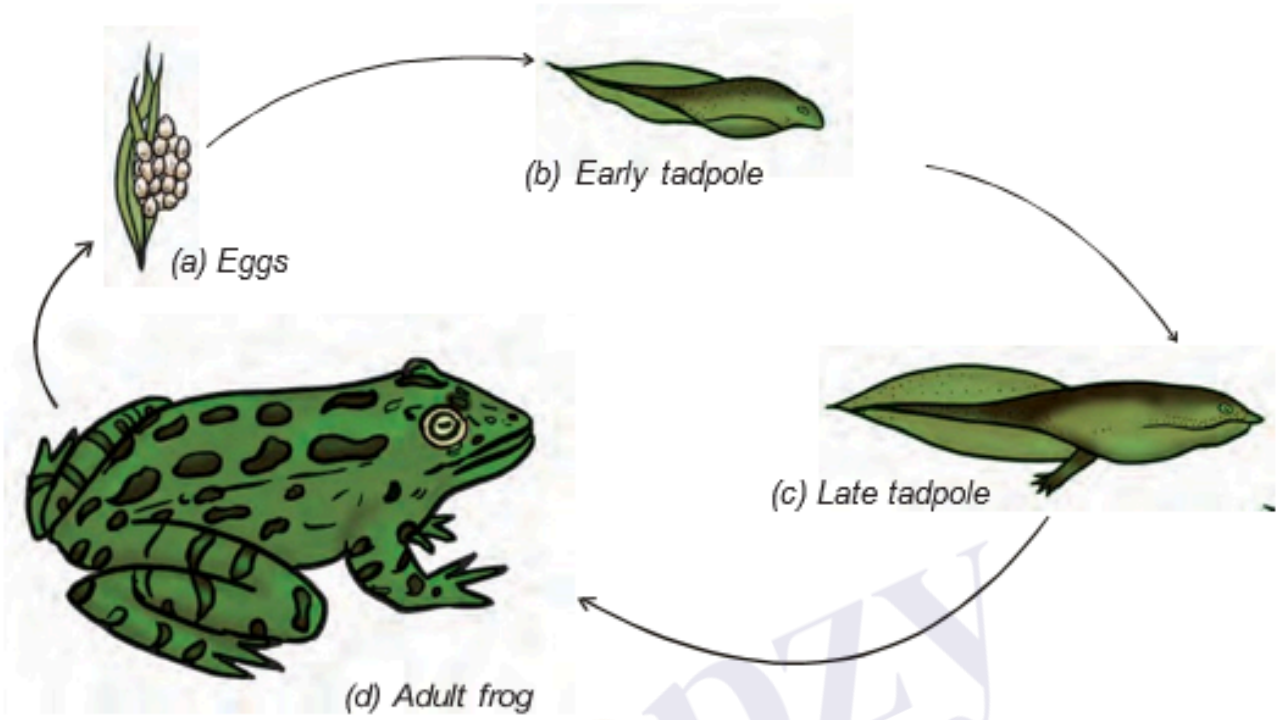


Fig. 6.10 : Life cycle of frog

Asexual Reproduction

Introduction to Asexual Reproduction

Asexual reproduction involves a single parent producing offspring without the fusion of gametes. The offspring are genetically identical to the parent.

Budding in Hydra

Hydra reproduces asexually by budding, where a new individual grows as an outgrowth from the parent and eventually detaches to live independently.

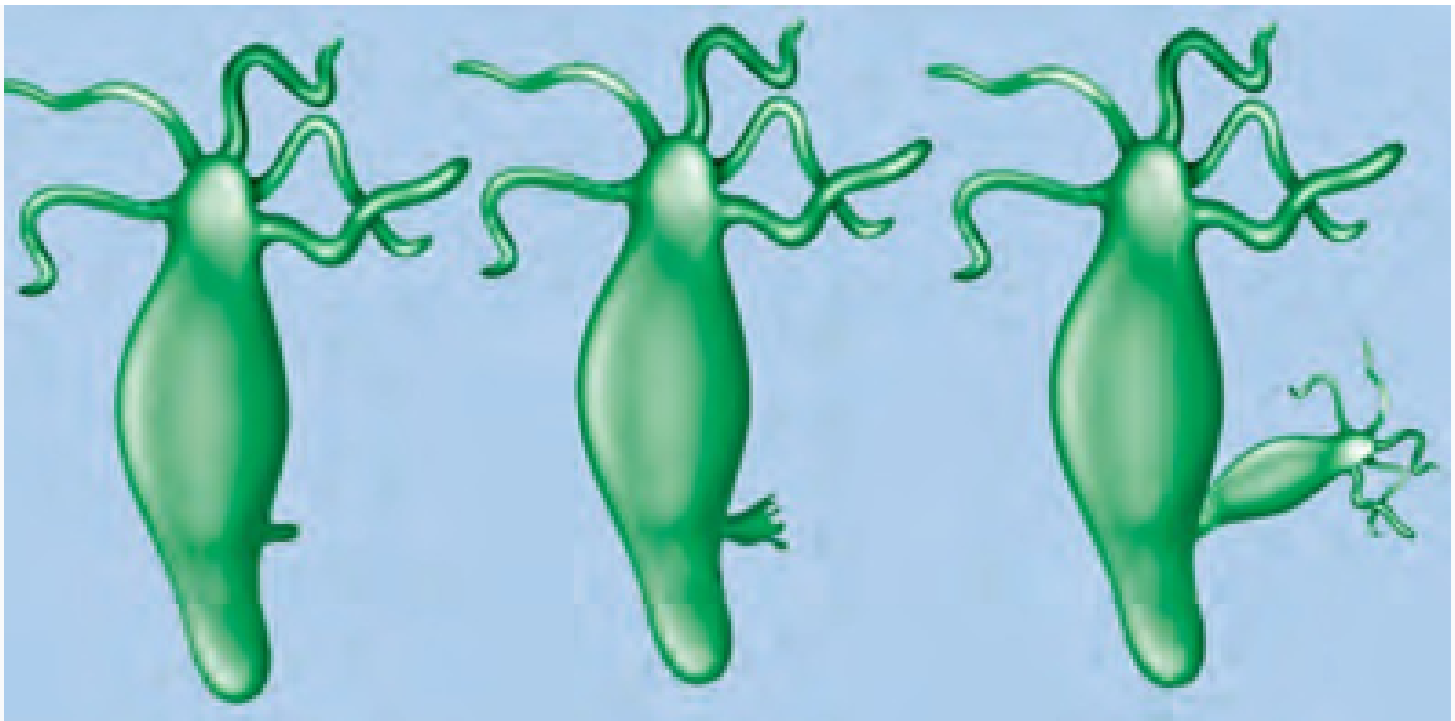
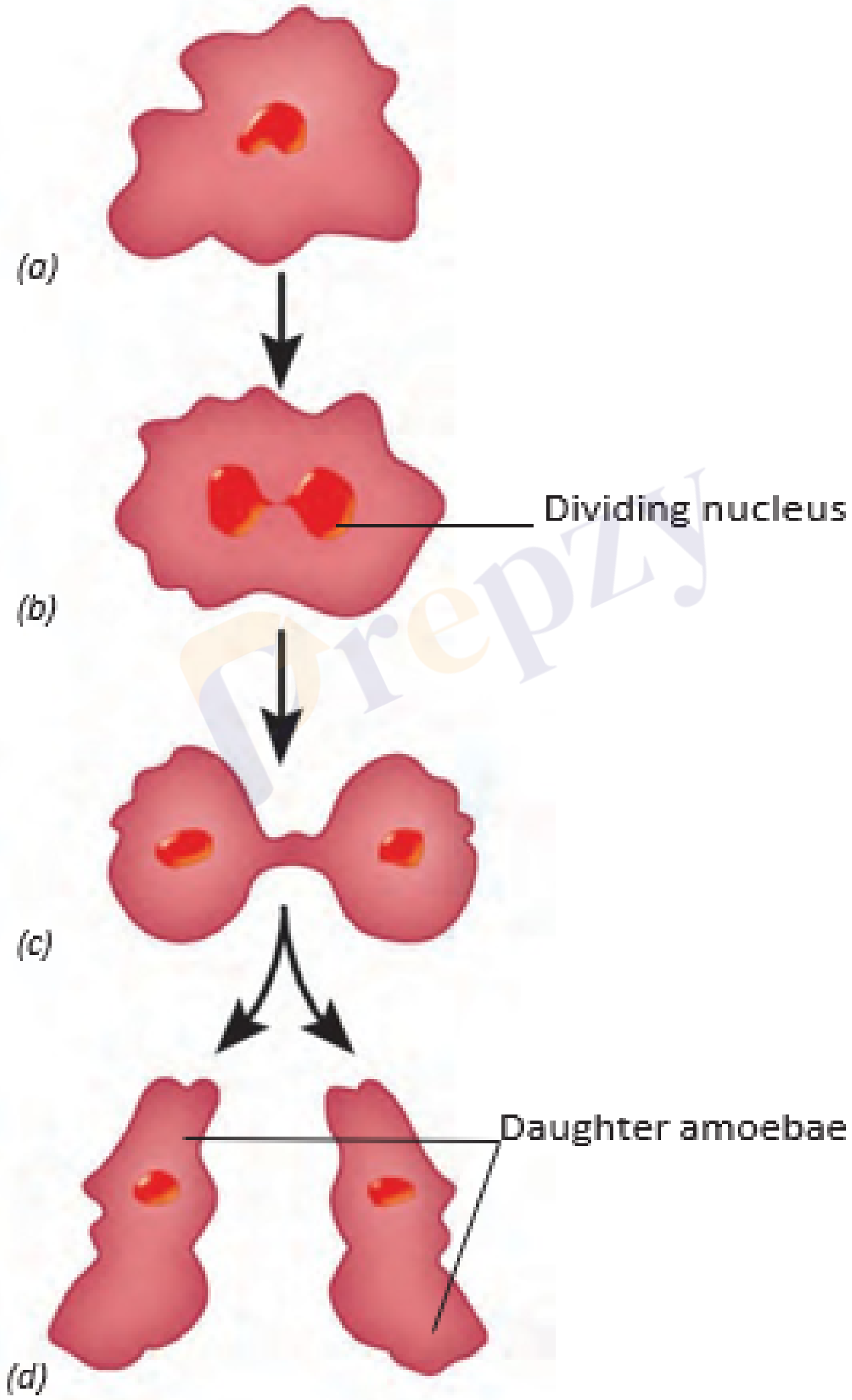


Fig. 6.11 : Budding in Hydra

Binary Fission in Amoeba

Amoeba reproduces by binary fission, where the nucleus divides into two, followed by the division of the cell into two daughter amoebae.


(a)
(b)
Dividing nucleus
(c)
Daughter amoebae
(d)

Cloning

Fig. 6.12 : Binary fission in Amoeba

Cloning is the production of an exact copy of an organism. Dolly, the first mammal cloned from an adult cell, was created by transferring the nucleus of a mammary gland cell into an enucleated egg, which was then implanted into a surrogate mother.

(a) Finn Dorsett sheep *(b) Scottish blackface ewe* *(c) Dolly*

Fig. 6.13