

Reproduction How Life Continues

Chapter Out Line

- ✧ Reproduction
- ✧ Asexual Reproduction
- ✧ Sexual Reproduction in Flowering Plants
- ✧ Reproduction in Humans
- ✧ Menstrual Cycle

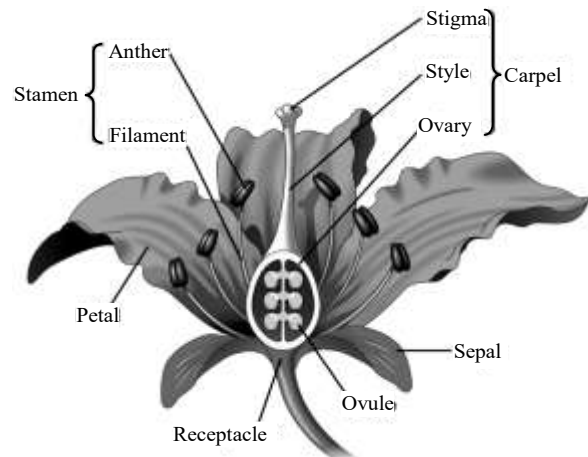


Figure : Flower, Reproductive part of the flower

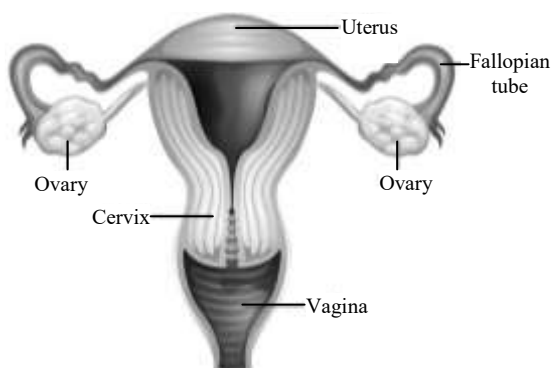


Figure : Female reproductive system

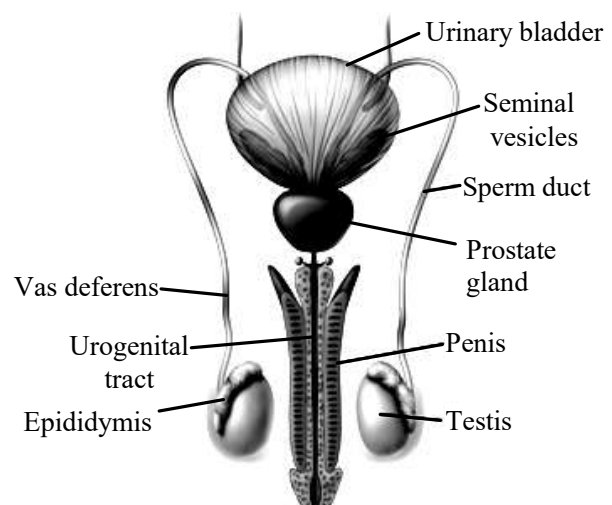


Figure : Male reproductive system

INTRODUCTION

The ability of the living organisms to produce new living beings similar to themselves is called **reproduction**.

In reproduction lot of energy goes waste to produce new individual but it is essential for the survival of a species or for the continuity of life on the earth, because the older individuals of each species undergo senescence and die.

Reproduction at its basic level (cellular reproduction) is involved in making similar or dissimilar body designs through the genetic material (DNA) present in the chromosomes of its nucleus. DNA is the source of information for making proteins. Any change in the information leads to production of different proteins, which ultimately lead to altered body designs.

Basic event in reproduction is production of DNA copies in a reproducing cell. The process is called DNA replication. When the cell divides into two, each new cell gets a copy of each DNA or chromosome along with the whole cellular apparatus.

Complete accuracy in DNA copying leads to two exactly identical cells but any error in duplication can lead to dissimilar cells or variations.

Variations: Variations are differences in structure, physiology and other traits found in individuals of species. Usually the DNA copying which is an essential feature of the reproduction remains constant generations after generations. This helps the offspring's to adopt the particular kind of area in the ecosystem. Both niche and the population of the organism's inhabitant in them are in perfect harmony, so they continue to survive as long as both remain unchanged. Thus the stability of population of species in a particular niche is maintained by the process of reproduction.

However there are chances that niche can change due to reasons beyond the control of the organisms. The changes may be in the form of increased temperature on earth, varying water levels, meteorite hit, or any other ecological disturbance/ balance. Under such conditions any alteration in the particular kind of niche is surely going to hit the consistent population. The population of species may be wiped out due to sudden alteration of niche. However, a few individuals of the population of a species may survive the changed niche which has undergone variation in their features due to variation in DNA copying mechanism. For Example, if a population of bacteria is growing in temperate water and has developed an environmental harmony. Suppose the temperature of water is somehow increased due to global warming then the bacteria definitely die. However, only those will survive which have developed resistance to heat. Variation is thus useful for the survival of species over time.

◆ Importance of reproduction

Reproduction is done for the maintenance of continuity of species.

In other words we can say it provides immortality to organisms of species by replacing the individual with new offspring.

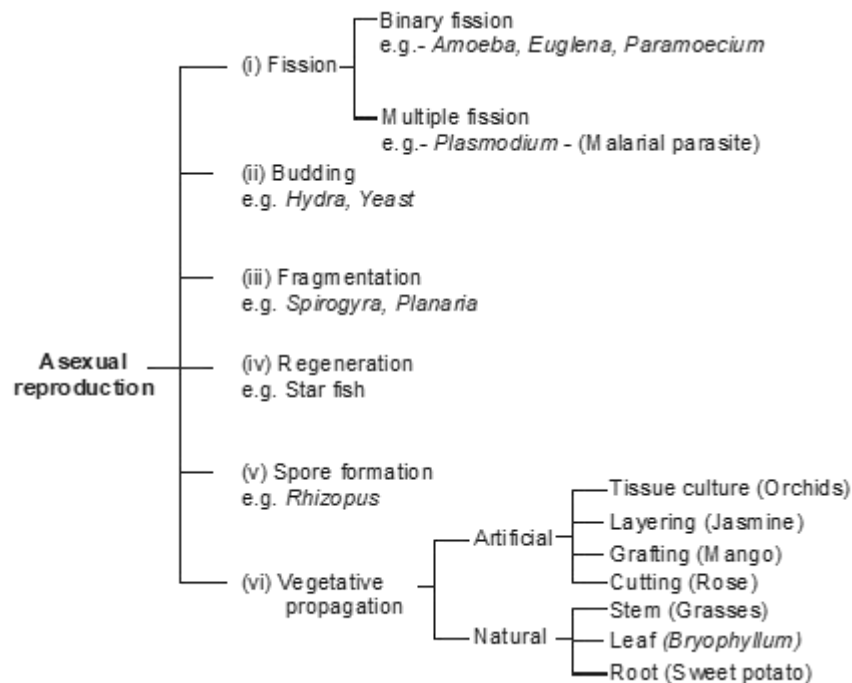
- By reproduction new variation are added as you can see the members of a family having variation in color, shape, size, intelligence, body capacity etc., some are better suitable than other which are selected by nature and others are died and removed.

TYPES OF REPRODUCTION

◆ Asexual Reproduction

Asexual reproduction is the process of formation of new individuals from specialised or un specialised parts of a single parent without the formation and fusion of gametes. Because of the formation of new individuals from a parent, asexual reproduction is called uniparental. Single organism commonly multiply through asexual reproduction.

◆ **Mode of asexual reproduction :**



◆ **Fission (L. fissus-cleft)**

It is a mode of asexual reproduction in which a parent undergoes division to form two or more individuals. Fission is of two types, binary fission and multiple fission.

(i) Binary Fission :

- It means 'splitting into two'. In binary fission, the nucleus or nuclear matter elongates and then divides into two. It is followed by cleavage of cytoplasm in between the two daughter nuclei to form two daughter individuals.
- This process is done in two steps :
(i) Karyokinesis : Division of nucleus
(ii) Cytokinesis : Division of cytoplasm
- Binary fission occur in many Bacteria and Protozoa like Amoeba, Paramecium and Leishmania. In Amoeba fission can take place in any plane.
In Leishmania (which causes kala-azar), binary fission occurs in a definite orientation i.e. longitudinal binary fission.

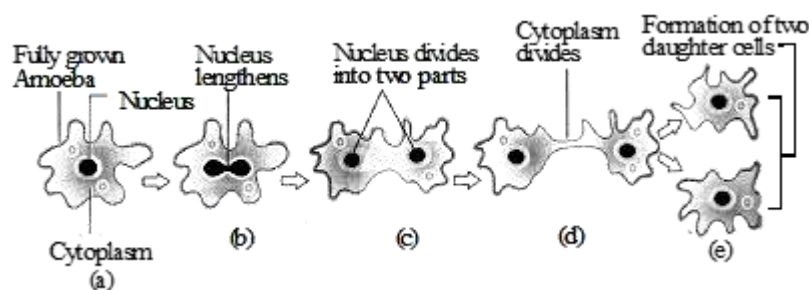
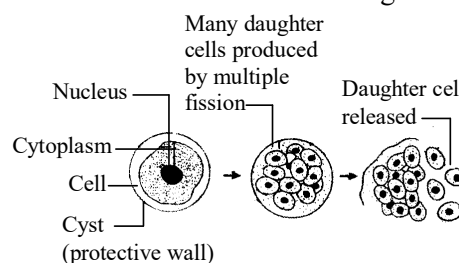


Fig. Binary fission in Amoeba

(ii) Multiple Fission :

- In multiple fission, many individuals are formed from a single individual.



Multiple Fission in Plasmodium

- The nucleus of cell divides repeatedly, producing many nuclei.
- Each nucleus is surrounded by a small amount of cytoplasm & many daughter cells are produced within the cyst.
- The cyst breaks up under favourable conditions & small off springs are liberated.
- In plant, multiple fission is seen in many algae & in animals, a common example of multiple fission is that of the malarial parasite (*Plasmodium*) and Amoeba in unfavourable conditions.

◆ **Budding :**

- In this process a small projection is formed at parent body which is called “bud”. Formation of bud is called “budding”.
- The nucleus of the parent divides and one of the daughter nuclei passes into the bud.
- The bud detaches itself from the parent body & becomes a new individual after growing to full size.

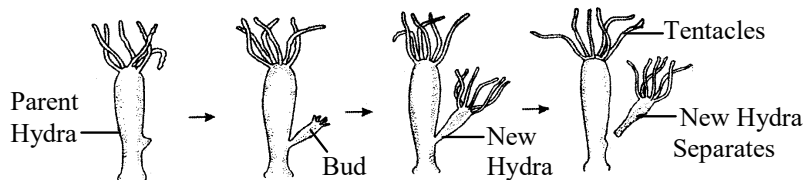
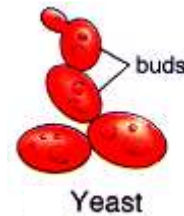


Fig. Budding in Hydra



- Budding takes place in yeast, hydra and sponges.

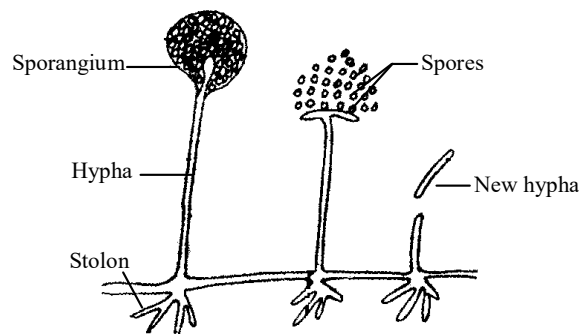
– **Boost your knowledge**

- ☛ Parental identity is not lost in budding.
- ☛ Chain budding occurs in Yeast.

◆ **Spore Formation :**

In spore formation, the parent body produces hundreds of tiny spores which can then produce new individuals. During the growth of a fungus like, Rhizopus, tiny round blob like structure called sporangium develops at the top of the hyphae.

The spores are covered by thick walls that protect them until they come into contact with another moist surface and can begin to grow.



Spore Formation in a Fungus (Rhizopus)

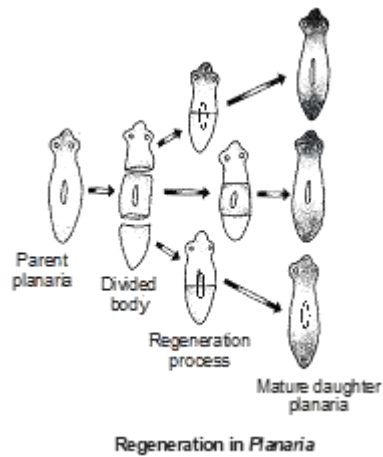
In fungi (mucor, Rhizopus, penicillium) bacteria, ferns or mosses, formation of spores is method of reproduction.

– **Boost your knowledge**

- ☛ Spores are light weight so they are easily carried away by air and water current to new locations and have a tough covering over them which protect them from harsh conditions of environment like dryness and high temperature.

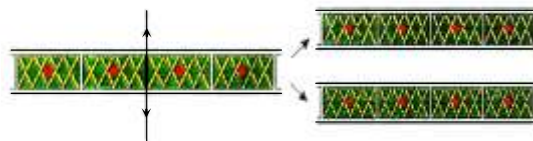
◆ **Regeneration :**

- It is the ability of an organism to replace its lost body parts.
- Regeneration is carried out by specialised cells. These cells proliferate and make large number of cells.
- These changes in organised sequence is called development.
- Hydra and Planaria possess regeneration.



◆ **Fragmentation :**

It is the process of breaking up of the body of an organism into two or more parts called fragments, each of which grows into a new individual. Fragmentation is quite common in algae, fungi, bryophytes and some marine ribbon worms. It is caused by mechanical disturbance, chemicals, death and decay of older parts, emptying of intervening cells, etc. Fragmentation is common method of multiplication in green filamentous alga, *Spirogyra* (figure). Here all the cells are capable of photosynthesis, growth and division. Therefore, each fragment grows into a new filament.



Fragmentation in Spirogyra

◆ **Vegetative Propagation :**

In vegetative propagation, new plants are obtained from the vegetative parts of plants like stems, roots & leaves. It can be achieved naturally or artificially.

It is of two types :

- (1) Natural Vegetative Propagation (2) Artificial Vegetative Propagation

Natural vegetative propagation : Plant reproduce without the help of human being.

- **By leaves :** Leaves of some plants produce adventitious buds with adventitious roots on their margin, which get detached and develop into new plants e.g. *Bryophyllum* , *Kalanchoe*.



Fig. Natural vegetative propagation by leaf (*Bryophyllum*)

- **By stem :** Underground modified stems possess buds that produce aerial shoots annually under favourable conditions when planted in soil. e.g. Potato, Ginger, Onion, Grass.

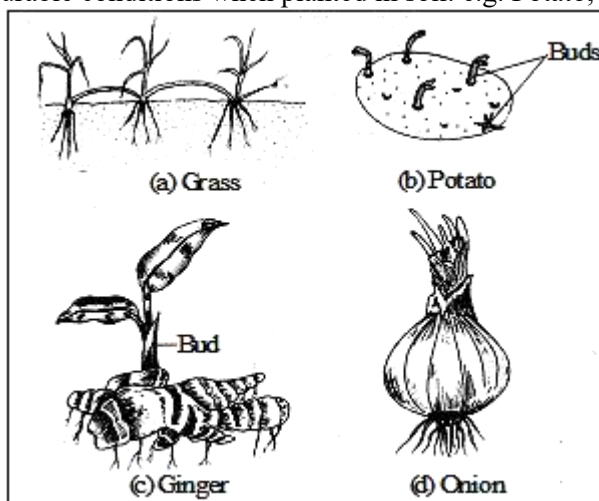


Fig. Natural vegetative propagation by stems

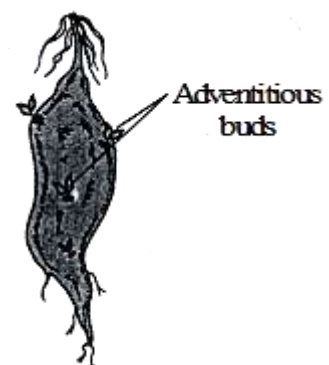


Fig. Natural vegetative propagation by root

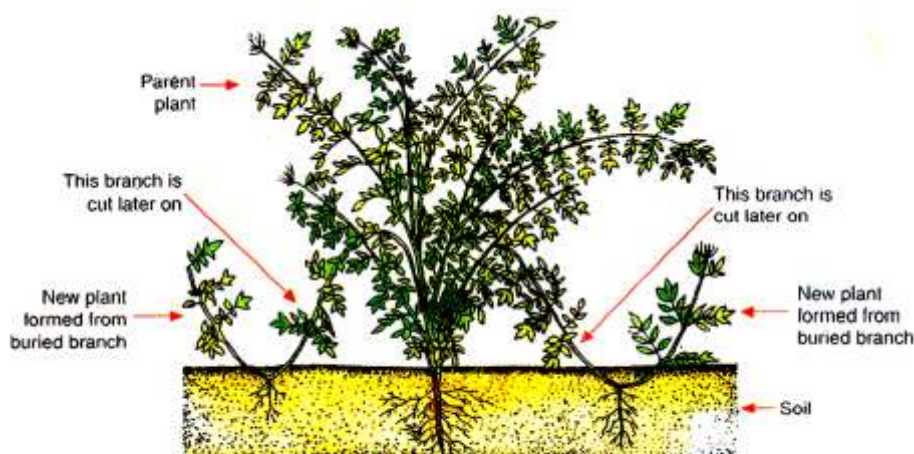
- **By roots** : Modified tuberous roots when planted in soil, the buds present on the roots grow into leafy shoots above ground and adventitious roots at their bases. e.g. Sweet potato, Dahlia.

Artificial vegetative propagation : These methods are man made and developed by plant growers to prepare plants with desirable characters. These are of three types:

- (A) **Cutting** : This is the very common method of vegetative propagation practised by the gardeners. It is the process in which a vegetative portion from plant is taken and is rooted in the soil to form a new plant. e.g. Grapes, Sugarcane etc.
- (B) **Layering** : This is the most common method of propagating herbaceous plants. In this process the development of adventitious roots is induced on a stem before it gets detached from parent plant, e.g., Mango, roses etc.
It is of two types :

(i) **Mound layering** : In this process of layering the lower stem branch of plant is used.

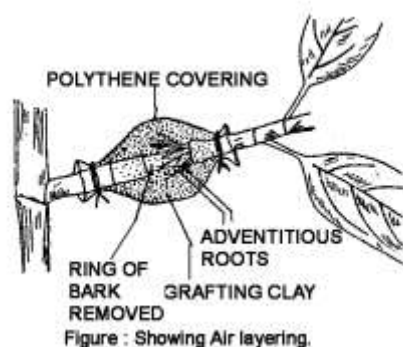
- Leaves are removed from this stem.
- Then it is bent close to the ground, pegged and covered with the moist soil in such a way that its growing tip remains above the soil surface.
- This pegged down branch is called as layer.
- After a few days the covered portion of stem develops roots.
- This stem is then detached from the parent plant and is grown separately into a new individual. e.g. Jasmine



The propagation of jasmine plants (*chameli*) by the layering method.

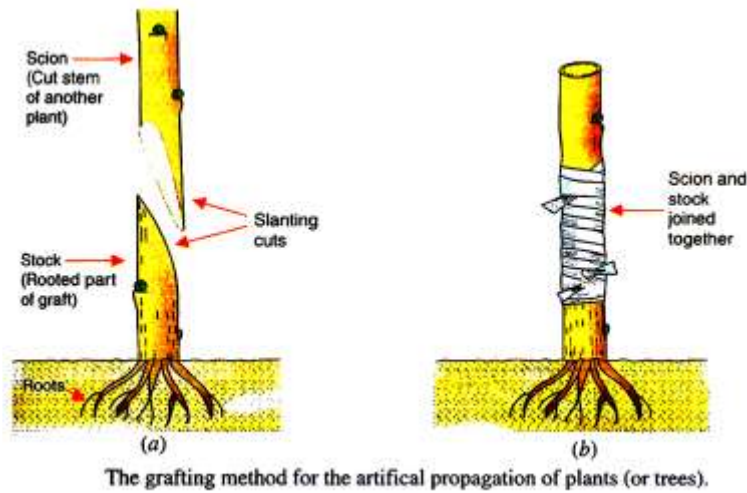
(ii) **Air layering** : It is adopted in those plants where stem cannot be bent to the ground.

- In this process the stem is girdled (i.e. ring of the bark is removed).
- Then it is covered with moist moss or cotton and wrapped with a polythene sheet to preserve the moisture.
- After few weeks adventitious roots develop from the injured part. The branch along with roots is then separated from the parent plant and planted to grow into a new plant. e.g. Orange, Pomegranate etc.



(C) **Grafting** : The process of joining together of two different plants in such a manner that they live as one plants is called as grafting.

- Out of the two plants one is rooted in the soil and is known as the stock.
- The other part consists of a small shoot bearing one or more buds, it is known as scion.
- Their union is carried out in such a way that their cambium must overlap each other. e.g. Mango, roses etc.



◆ **Significance of vegetative propagation**

- (A) It is used to propagate a plant in which viable seeds are not formed or very few seeds are produced. e.g. Orange, pineapple, banana etc.
- (B) Vegetative propagation helps us to introduce plants in new areas where the seed germination fails to produce mature plant due to change in environmental factors and the soil.
- (C) Vegetative propagation is a more rapid, easier and cheaper method of multiplication of plants.
- (D) By this method a good quality of a race or variety can be preserved.
- (E) Most of the ornamental plants are propagated through vegetative propagation. e.g. Rose, Tulip etc.
- (F) Disease free and genetically identical plants are produced.

– **Boost your knowledge**

- ☛ Grafting is not possible in monocot plants. Cambium activity is essential for the union of stock and scion.
- ☛ **Tissue Culture or Micro propagation** : It has now become possible due to recent techniques to produce a large number of plantlets from a small piece of tissue taken from the shoot tip or other suitable plant parts. This method of propagation is called as tissue culture or micro propagation. It involves the process of tissue culture. e.g., Orchids, ornamental plants etc.

Advantages of asexual reproduction

1. It is only method of reproduction in most unicellular organisms.
2. The parental properties are preserved.
3. It is rapid method as it does not require any sexual maturation, production of gametes, transfer of gamete and their fusion.

SEXUAL REPRODUCTION

It is a type of reproduction in which two different sex cells (gametes) take part.

The gametes often come from two different individuals called male and female, so they bring some variations in the next generations.

All sexually reproducing and most of asexually reproducing organisms have two sets of chromosomes called homologous chromosomes. In such set one set of chromosomes come from each parent. Thus when two such sex cells (gametes) fuses they restore the number of chromosomes to the fixed number of chromosomes of that species.

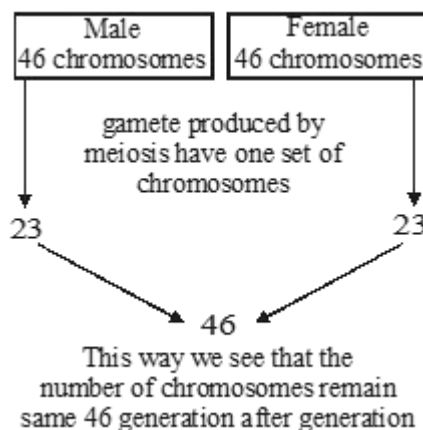


Fig. Sexual reproduction with meiosis

Male gamete is often smaller than female gamete since it does not store any food in it while egg is large in size and stores enough of food in it, also male gametes are motile i.e. they move with the help of their tail, while the ova does not have a tail and it often remains fixed in female body. i.e. does not move.

Sexual reproduction involves following steps -

- Formation of gametes (by meiotic cell division).
- Fusion of gametes (Formation of zygote)
- Development of zygote to new individual.

Differences between asexual and sexual reproduction

S.No.	Asexual reproduction	Sexual reproduction
1	It is always uniparental	It is generally biparental.
2	Gametes are not formed.	Gametes are formed.
3	There is no fertilization.	Fertilization occurs in it.
4	It involves mitotic cell division.	It involves meiotic and mitotic cell division.
5	Daughter individuals are genetically identical to the parent.	Daughter individuals are different from the parent.
6	It does not contribute to the evolution.	It contributes to the evolution by introduction of variation in the offspring.
7	Example : Mostly unicellular organisms	Example : Mostly multicellular organisms

SEXUAL REPRODUCTION IN FLOWERING PLANTS

Sexual reproduction takes place within specialized reproductive organs, called flowers in angiosperms (flowering plants).

Flower is a modified condensed reproductive shoot on which all the floral appendages are inserted.

A typical flower has four whorls arranged on thalamus.

A flower has following parts.

◆ Sepals

Sepals are green outermost leaf-like floral organs which protect the flower in the bud stage. In the mature stage they provide support to other floral organs.

Its whorl is called as calyx.

◆ Petals

Petals are coloured accessory floral organs which lie above the sepals. Petals attract insects to flowers for pollination.

Its whorl is called as corolla.

◆ Stamens

Stamens are the male reproductive organs of the flowers. Its whorl is called as androecium.

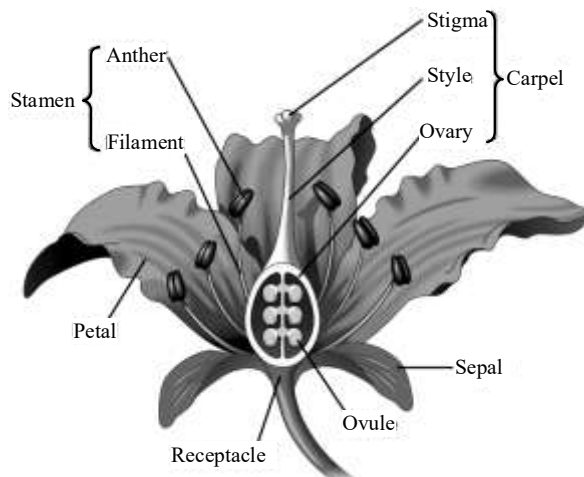
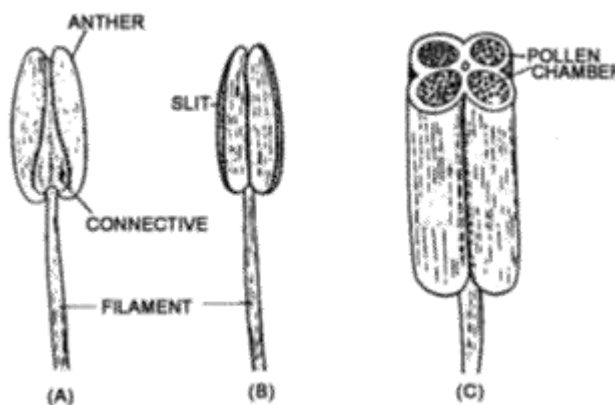


Fig. : Reproductive part of the flower



(A) Ventral view (B) Dorsal view (C) T.S. of anther

A typical stamen is differentiated into three parts, they are filament, connective and anther.

(A) **Filament** : It forms the stalk that bears more or less cylindrical or ovoid anther.

(B) **Connective** : It connects anther to filament.

(C) **Anther** : It is present on the top of filament. Each anther consists of two lobes that is why it is called as bilobed. Each anther lobe has two pollen sacs which contain millions of tiny microscopic pollen grains, called as microspores. The pollen grains are like yellow dusty powder in appearance.

◆ **Carpels**

- Carpels form the central female reproductive organs of the flowers. Its whorl is called Gynoecium.
- It is composed of one or more carpels.
- The freely occurring units of carpel in a flower are called pistils.
- Each pistil usually consists of three distinct parts – ovary, style and stigma.

(A) **Ovary** : It is a basal, swollen part of the pistil. The ovary has one or more chambers called the loculi which is distributed in a special cushion like parenchymatous tissue called the placenta, from which the ovule develops.

(B) **Style** : From the top of the ovary arises a long, elongated structure called as style.

(C) **Stigma** : The terminal end of style is called as stigma. The stigma is normally rough, hairy or sticky to hold pollen grains during pollination process.



Fig. Gynoecium; Female reproductive part of a plant

– **Boost your knowledge**

- Calyx and corolla are referred to as the non-essential or accessory parts of a flower where as androecium and gynoecium are essential parts as these are directly involved in the sexual reproduction .
- When the male and female reproductive parts are present in the same flower, it is called a bisexual flower e.g. Hibiscus, Mustard.
- When the male and female reproductive parts are present in different flowers, they are called unisexual flowers e.g. Papaya, Date palm, Mulberry, Gourd, Water melon.

◆ **Pollination** :

Pollen grains from the anther are transferred by air, water, insects, and other animals, to the stigma of a pistil.

- "The process of transfer of pollen grains from the anther of a flower to the stigma of same or other flower, is called as pollination". On the basis of transfer of pollen grains to the stigma of same or other flower, pollination is of **two types**.

(A) **Self Pollination** :

- The process of transfer of pollen grains from the anther of a flower to the stigma of same flower, is called as "Self-Pollination" or autogamy. e.g. Pea, China rose, Rice, Wheat.
- Self-pollination in bisexual flowers ensures continuity of the race.
- It helps to preserve the parental characters, as the gametes from the same flower are involved.
- (i) **Autogamy** : It is a type of self pollination in which the pollen grains are transferred from the anther to stigma of the same flower e.g. Wheat, rice, pea etc.
- (ii) **Geitonogamy** : It is a type of self pollination in which the pollen grains are transferred from the anthers of one flower to the stigma of another flower borne either on the same plant or a genetically identical plant.

(B) **Cross Pollination** :

- The process of transfer of pollen grain from the anther to the stigma of different plant of the same species, is called as "Cross-pollination" or xenogamy. e.g., mustard, rose.
- Seeds produced by cross pollination have much better germinating capacity.
- Variations are introduced by cross pollination.

Pollinating factors :

(i) Abiotic factors

Wind
Water

Technical Terms

Anemophily
Hydrophily

(ii) Biotic factors

Insects
Birds
Bats
Snails
Animals

Entomophily
Ornithophily
Chiropterophily
Malacophily
Zoophily

◆ **Fertilization in Plants :**

Pollination is followed by fertilization in plants.

- After reaching the stigma, the pollen grain develops the pollen tube.
- This pollen tube grows through the style and reaches the ovary where ovules are located. A fully developed typical angiospermic embryo sac consists of seven cells and eight nucleus stage. 3 antipodal cells, 2 synergids, 2 polar nuclei (which fuse to form diploid secondary nucleus) and 1 egg cell.

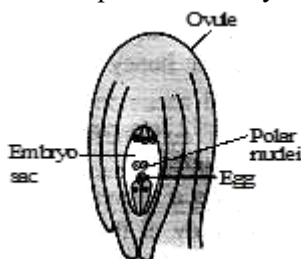


Fig. Female gamete inside the Ovule

- The pollen tube enters the ovule through a small opening called **micropyle**, where it releases two male gametes into the embryo sac.
- One male gamete fuses with the egg contained in the embryo sac of the ovule; and this fusion of male and female gametes is called **syngamy** and its product is the **zygote**.
- The other male gamete fuses with the two polar nuclei and this process is called **triple fusion**, where three nuclei are involved in the fusion process, one male gamete and two polar nuclei.
- The process of **double fertilization** occurs inside each embryo sac, in which two fusions, syngamy and triple fusion take place.

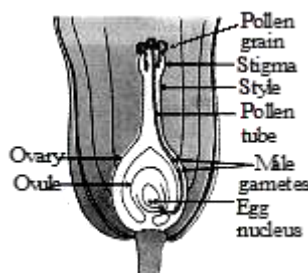


Fig. Process of fertilization

◆ **Post fertilization changes in the flower**

- After fertilization sepals and petals fall and zygote undergoes a series of mitotic divisions to form a multinuclear embryo.
- The endosperm is meant to provide nourishment to the developing embryo.
- At maturity wall of ovules changes into seed coat of which outer one is hard and is known as testa, while inner one is called as tegmen.

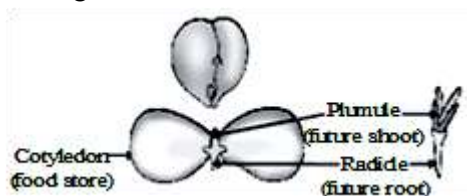


Fig. Structure of seed

- Ovule change into seed and ovary wall change into fruit wall.
- Seed has three parts Cotyledon (Store food), Plumule (future shoot), Radicle (future root).

REPRODUCTION IN HUMANS

Human beings are unisexual and the human reproduction is highly evolved. There is a distinct sexual dimorphism, i.e., males are visibly different from females in physical buildup, external genital organs and accessory (external) sex characters. Thus, the structures associated with reproduction are different in males and females. The structures associated with male reproduction constitute the male reproductive system. Similarly, the structures associated with female reproduction constitute the female reproductive system. The reproductive systems of males and females consist of many organs which are distinguishable into primary and secondary sex organs.

Primary and Secondary Sex Organs : The primary sex organs are gonads, which produce gametes (or sex cells) and secrete sex hormones. The gonads of the male are called testes which produce male gametes-sperms and the male hormone testosterone. The gonads of the female are ovaries which produce female gametes -ova and female hormones estrogen and progesterone.

The secondary sex organs include the genital ducts and glands which help in transportation of gametes and reproductive process. They do not produce gametes or secrete hormones.

Primary and secondary sexual characteristics : Primary sexual characters are those which are present at birth, whereas secondary sexual characters are those that develop at puberty.

Puberty : It is the age of human males and females at which the reproductive organs become functional, gonads start producing gametes and sex hormones. Boys and girls become sexually mature.

- It is attained between the age of 13 to 14 in males and 10 to 12 years in females.
- In males, puberty triggers by the secretion of the hormone(testosterone) from the testes.
- The hormone brings about the growth of secondary sexual characters during puberty and maintains these throughout adult life.
- In females, puberty is triggered by the production of hormone (estrogen) from ovaries.
- This hormone brings the growth and maturation of the reproductive tract and the development of secondary sexual characteristics.
- Puberty changes a girl child into women fit to bear a child.

Secondary sexual characteristics in human males are

- Enlargement of penis and scrotum.
- Broadening of the shoulders and increased muscle development.
- Enlargement of larynx and thickening of vocal cords producing deepening of voice.
- Growth of pubic hair and extra hair on the face, in the armpits and on chest.
- Changes in behavior associated with courtship and mating.
- Increase height.

Secondary sexual characteristics in human female are

- Growth of breasts and external genitalia(vulva).
- Growth of pubic hair and extra hair on armpits.
- Hair on beard and moustache are lacking.
- Broadening of pelvis.
- Initiation of menstruation and ovulation
- Increase in the subcutaneous fat, particularly in thighs, shoulder, buttocks and face
- Voice become shrill.



Male Reproductive System

The human male reproductive system consists of the following organs :

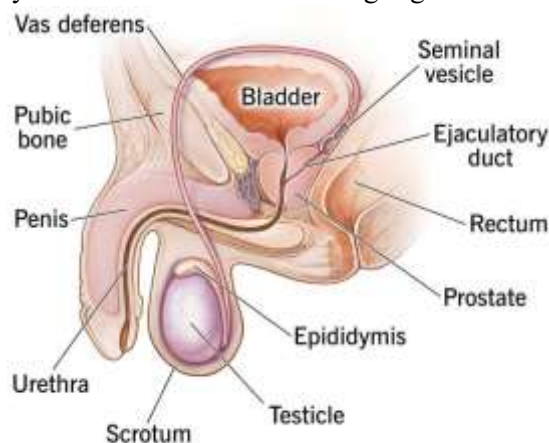


Fig. Male Reproductive System

- **Scrotum :** The scrotum is a pouch of skin that enclose the testes. These arise from the lower abdominal wall and act as a thermoregulator, maintaining the testes at a temperature 2°C lower than that of the body which is required for maturation of sperms.

- **Testes** : They are the primary sex organs. A pair of testes are located outside the abdominal cavity in scrotum. They produce the germ cells or sperms. They also secrete male sex hormone testosterone into the blood that brings about development of secondary sexual characters in boys at time of puberty.
- **Vasa efferentia** : Testis is connected to epididymis through a fine tubule called as vasa efferentia. They help in conduction of sperms.
- **Epididymis** : It is a coiled tube-like structure firmly attached to the testis and serves as the storehouse of sperms. Inside the epididymis, sperms become mature and develops motility.
- **Vas deferens** : The sperms are carried by a long tube called vas deferens or sperm duct into organs called seminal vesicles, where the sperms get nourished and stored.
- **Ejaculatory duct**: enters prostate gland and joins urethra to form common urino-genital duct.
- **Urethra** : It is about 20 cm long tube that arises from the urinary bladder to carry urine. It runs through the penis and opens to the outside through male genital pore. The contents of two seminal vesicles, i.e., sperms from vas deferens also join the urethra. Thus urethra carries urine from the bladder, as well as sperms from the vas deferens through the penis.
- **Accessory glands**
 - (1) Prostate gland - These secrete Calcium, enzymes, hormones, citric acid.
 - (2) Seminal vesicles - This secretes fructose.
 - (3) Cowper's gland/ Bulbourethral gland-This secretes an alkaline fluid which lubricates the penis at the time of copulation.
- **Penis** is a male copulatory organ at the tip of which urinogenital duct opens. It also passes urine. Semen is sperm + secretion of accessory glands. Semen has chemicals for nourishment of sperms neutralizing the acidity of urethra and vagina, stimulating their movement in female tract.

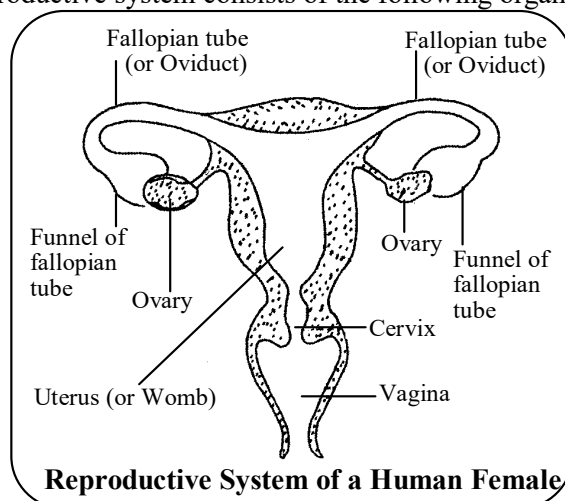
– **Boost your knowledge**

- ☛ **Spermatogenesis** : This process of formation of sperm from spermatogonia is called as spermatogenesis.
- ☛ **Sperm** : The sperms are tiny bodies that consist of mainly genetic material and a long tail that helps them to move towards the female germ-cell (ovum).



Female Reproductive System :

The human female reproductive system consists of the following organs :



- **Ovaries** : These are a pair of small and oval-shaped organs, located in the abdominal cavity near the kidney. Ovaries are the female primary reproductive organs which perform dual functions of production of female gamete or ovum and the secretion of female sex hormones, estrogen and progesterone.
- **Fallopian Tube or Oviduct** : These are a pair of long convoluted tubes that carry ovum or eggs from the ovary to the uterus. The fallopian tube has a funnel-shaped opening near the ovary. It is about 10 cm long muscular tube that provides the appropriate environment for its fertilization.
- **Uterus or womb** - is a hollow, pear-shaped organ within which the embryo develops. Its upper portion is broader, while its lower portion is narrower, called **cervix** that connects uterus to the vagina. Its inner lining is called endometrium, middle is myometrium & outermost is perimetrium.
- **Vagina** - The cervix opens into the vagina which is a large, elastic, muscular tube also called "birth canal" or canal for menstrual flow. Vagina receives sperms from the male and also serves as the passage through which the fully developed fetus is born.

◆ Fertilization in humans

- It includes release of ovum from the ovary, where it remains viable for 12 – 24 hours.
- Only one sperm is required for fertilization of the ovum.
- The head of the sperm penetrates ovum.
- This process is facilitated by acrosome and proteolytic enzymes.
- After penetration only head enter inside the ovum.
- Here the pronuclei of sperm and ovum fuse to form a new resultant nucleus each contributing 23 chromosomes, so that the resultant structure have 46 chromosomes.
- Fusion of male & female gametes is called as fertilization.
- Zygote starts developing in fallopian tube and forms embryo, this later on moves to uterus.
- It gets attached to uterine walls and the whole process is called as implantation.
- The mother's body is designed to undertake the development of the child. Hence the uterus prepares itself every month to receive and nurture growing embryo. The lining thickens and is richly supplied with blood to nourish the growing embryo.
- The embryo gets nutrition from the mother's blood with the help of a special tissue called placenta. Placenta is a fully formed reddish brown disc embedded in the uterine wall, that serves to bring the fetal and maternal blood close enough to permit the exchange of materials between the two. It contains villi. On the mother's side are blood spaces, which surround the villi. This provides a large surface area for glucose and oxygen to pass from the mother to the embryo.
- The developing embryo will also generate waste substances which can be removed by transferring them into the mother's blood through the placenta.
- The time period for which a developing fetus remains inside the mother's womb is called as gestation period. It extends for about 9 months or 40 weeks or 280 days.

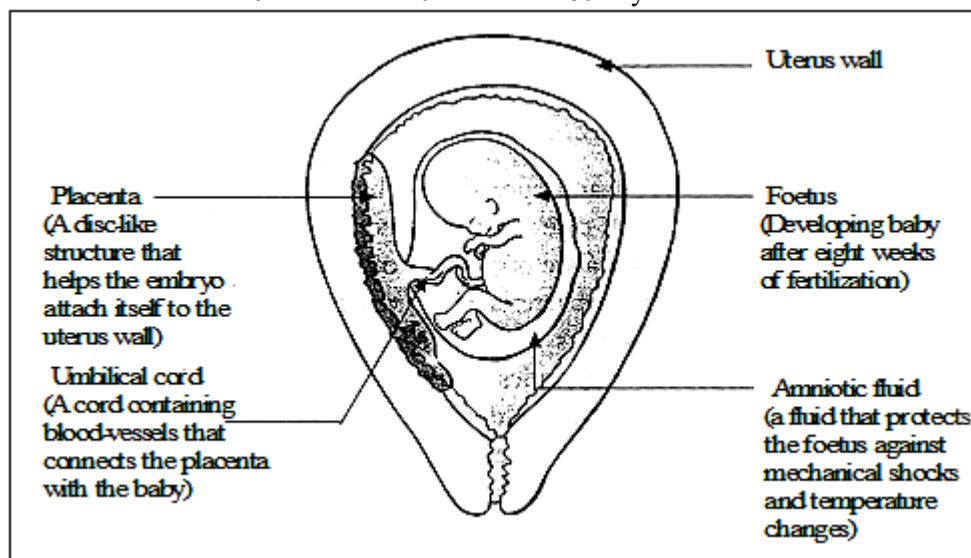


Fig. Baby inside the womb

– Boost your knowledge

- The type of fertilization which occurs inside the body of female is called **internal fertilization** and fertilization which occurs outside the body of female is called **external fertilization**. External fertilization takes place in many invertebrates, fish and amphibians and internal fertilization takes place in all reptiles, birds and mammals.
- **Oogenesis** : Oogenesis is a process of formation of ovum. The ovum is a rounded, non-motile cell.
- **Parturition** is the process of giving birth to young one from the mother's uterus at the end of gestation period.

- If, a sperm is not available at the time of ovulation, then fertilization of ovum (or egg) does not take place. Since the ovum (or egg) does not take place. Since the ovum (or egg) is not fertilized, so the thick and soft uterus lining having lot of blood capillaries in it is not required. Thus, the unfertilized ovum (or egg) dies within a day and the uterus lining also breaks down. The breakdown and removal of the inner, thick and soft lining of the uterus along with its blood vessels in the form of vaginal bleeding is called menstrual flow or menstruation.

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- The first menstruation is called menarche. It stops between age 45–50 years. Stoppage of menstruation permanently is called menopause. Menstrual cycle consists of four phases.

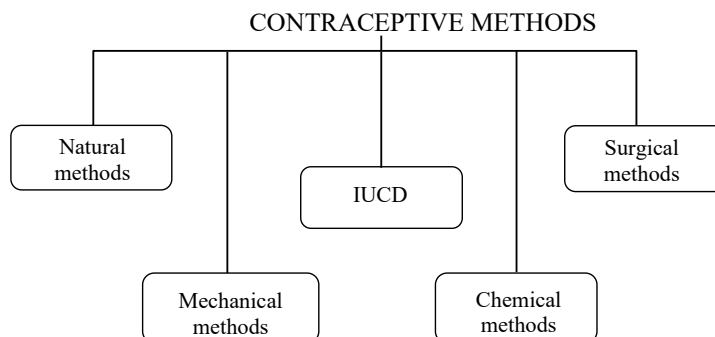
REPRODUCTIVE HEALTH

Reproductive health is the state of physical, mental and social fitness to lead a responsible safe and satisfying reproductive life. Its knowledge provides:

- Awareness to both male and female regarding fertility regulating methods.
- Reduction in the number of children to the limit of enjoying family life as well as rearing the children with better resources as and when they are available.
- Prevention for catching up sexually transmitted disease.
- Manage disorders related to reproductive system by getting them treated at the earliest.

CONTRACEPTION

Prevention of pregnancy is called contraception. The techniques used in preventing the occurrence of pregnancy are called contraceptive devices.



- Natural methods** : These methods include periodic abstinence (avoid copulation during fertile period), coitus interruptus (withdrawal of penis just before ejaculation from vagina)
 - Mechanical Methods of Contraception** :
 - Condom** : It is tubular latex sheath which is worn over the male copulatory organ or penis during sex.
 - Cervical cap or Diaphragm** : Use of diaphragms or cervical caps fitted in vagina of female to check the entry of sperms into the uterus and also helps in avoiding conception.
 - Intra Uterine Contraceptive Devices (IUCD or IUD)** : They are devices made of plastic, metal or a combination of the two which is inserted into uterus to prevent conception generally through excessive secretion of cervical mucus. The most common type is copper-T for preventing implantation. It is functional for 3-5 years.
 - Chemical Methods of Contraception** : Foam tablets, jellies, pastes, creams and spermicides are some common chemicals used by females. It immobilise and kill the sperms. Oral pills are also used to check ovulation. These are mainly hormonal preparations and contain estrogen and progesterone. These prevent development of egg and ovulation by inhibiting secretion of FSH. They are called oral contraceptives (OCs).
 - Surgical Method** : Surgical methods are safe in the long run but they may cause infections and other problems if not done properly. These methods include (i) Vasectomy and (ii) Tubectomy.
 - Vasectomy** : This is a small surgical operation performed in males. It involves removal of a small portion of the sperm duct (or vas deferens) by surgical operation. The two cut ends are then ligated (tied) with threads. This prevents the sperms from coming out.
 - Tubectomy** : This is a surgical operation performed in females. It involves removal of a small portion of the fallopian tubes (or oviducts) by surgical operation. The cut ends are then ligated (tied) with threads. It prevents the egg(ovum) to enter the fallopian tube.

Surgery can also be used for abortion. Abortion is the medical termination of pregnancy (MTP) before the fetus becomes viable. However, this method is widely misused by people who do not want a female child. It is illegal (the prenatal sex determination has been prohibited by law). Moreover, the female-male sex ratio must be maintained to have a health society.
- ◆ **Sexually transmitted diseases (STD)** : These diseases are transmitted through unsafe sexual act. e.g.
- Gonorrhoea caused by *Neisseria gonorrhoea* (bacteria).
 - Syphilis caused by *Treponema pallidum* (bacteria).
 - AIDS (Acquired Immuno deficiency Syndrome) caused by human immuno deficiency virus (HIV)
 - Trichomoniasis caused by "*Trichomonas vaginalis* (a protozoan)"
 - Genital warts caused by *Human papilloma virus*

– Boost your knowledge

- Among the STDs, HIV infection is the most dangerous one. AIDS can spread through sexual contact, use of infected syringes, blood transfusion and from infected mother to baby.