Reproduction

TALENT & OLYMPIAD

Introduction

We know that every living organism have a certain life span and it dies after sometime. So new organisms have to be produced in place of the dead organisms. Thus, the production of new organisms from preexisting organisms of the same species is known as **reproduction**. The reproduction ensures the continuity of life on earth. It gives rise to more organisms with same basic characteristics as their parents. Organisms look similar, because their body designs are similar. If the designs are to be similar, the blue prints for these designs should be similar. Thus, the reproduction at its most basic level will involve making copies of the blueprints of body designs. The **DNA** in the cell nucleus is the information source for making proteins. If the information is changed, different proteins will be made which eventually lead to altered body designs. Therefore, a basic events in reproduction is the creation of a **DNA** copy.

Cells use the chemical reactions to build copies of their **DNA**. They create two copies of the DNA in a reproducing cell which need to be separated from each other. However, keeping one copy of **DNA** in the original cell and simply pushing the other one out would not work, because the copy pushed out would not have any organized cellular structure for maintaining life processes. Therefore, DNA copying is accompanied by the creation of an additional cellular apparatus. The DNA copies separate, each with its own cellular apparatus, effectively, a cell divides to give rise to two cells.

Types of Reproductions

There are two modes of reproduction in living organisms such as **asexual** and sexual reproduction. In case of asexual reproduction, only one organism is involved. Whereas in sexual reproduction both the organism, **male and female** are involved. In asexual reproduction, no sex cell are involved. For example, **binary fission in amoeba, budding in Hydra** and many more. Whereas in sexual reproductions, the sex cell of one parent fuses with the sex cell of the other parent to form a new cell called 'zygote'. The zygote grows and develops to form a new organism.

Asexual Reproduction

In a sexual reproduction, certain body cells of the parent organism undergo repeated miotic cell divisions to form two new organisms of the same kind. There are different methods of asexual reproduction, which are explain as below:

Binary Fission

In this methods single organism divides to form two new organisms. For example, the organisms like **amoeba, paramecium, bacteria reproduce by this method**.

1. Parent cell

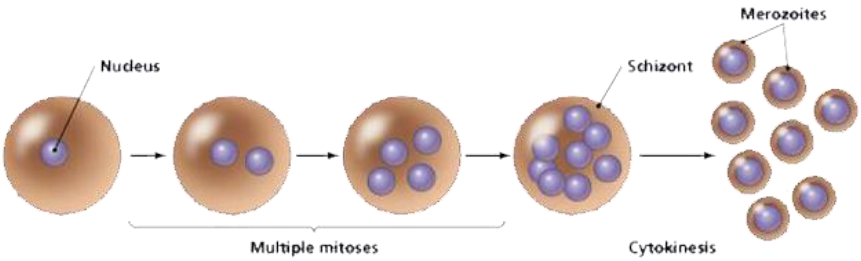
2. Nucleus divides

3. Cytoplasm divides

4. Two daughter cells

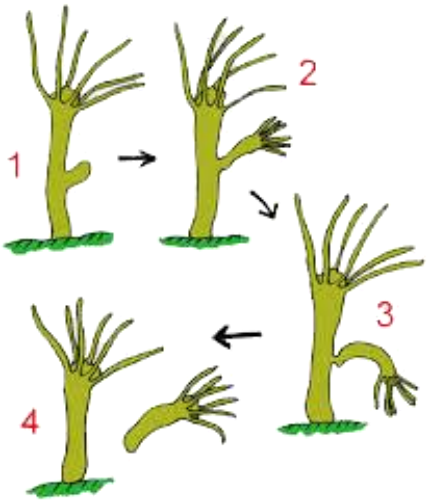
Multiple Fission

In this method, the parent organism splits to form many new organism at the same time. For example, plasmodium reproduce by this method.



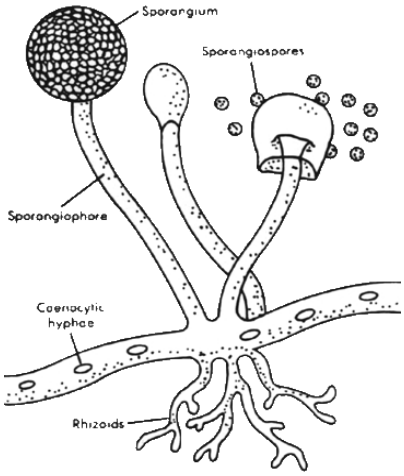
Budding

In this method, a small part of the body of the parent organism grows out as a 'bud', which get detached after sometime and developed as a new organism. The organism like **Hydra and yeast** reproduce by this method.



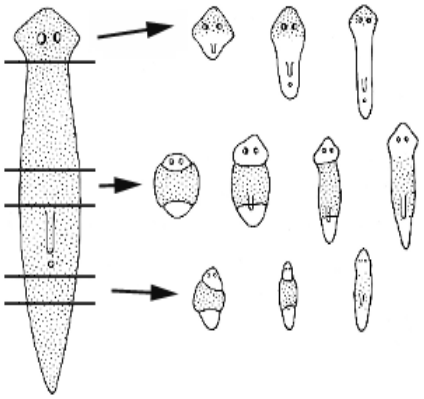
Spore Formation

In this method parent organism produces hundreds of microscopic reproductive units called 'spores'. When the spore case of the plant burst, then the spores spread into air. With the favorable condition, these spores germinates to develop into the new plants.



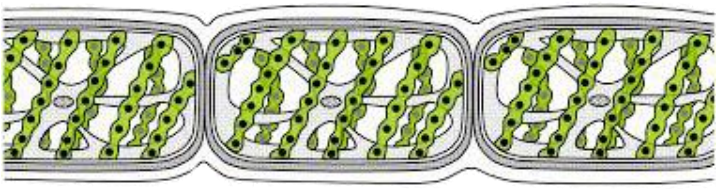
Regeneration

In this method, some small part of the body of the organism is cut and separated. This part grows to form whole new organisms. For example, planaria reproduce by this method. This method of reproduction is not possible for the complex multicellular organism. It can be used to reproduce only those organisms which have relatively simple body design, consisting of only few specialized cells.



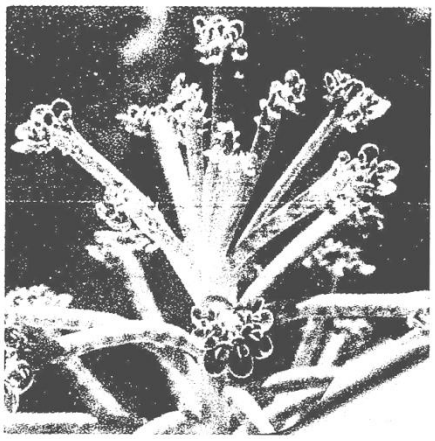
Fragmentation

In this methods the body of simple multicellular organism breaks up into several pieces. On maturing, each pieces develops into complete new individual organisms. For example, **Spirogyra and sea anemones** reproduces by this methods.

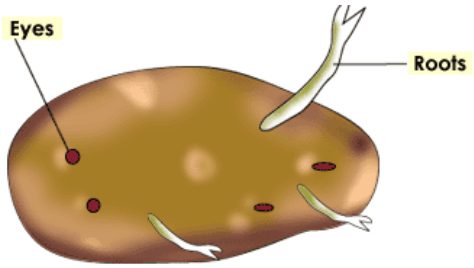


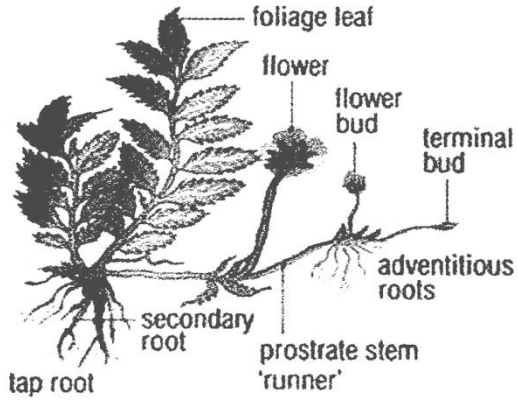
Vegetative Propagation

In this method, new plants are grown from the parts of the plants. Either of the **stem, roots, leaves etc**. develops roots on favorable conditions, and grows into a new plants. For example, **Bryophyllum plants** can reproduce by a piece of its stem or its leaves. The leaves of the bryophyllum when falls on the ground have special types of buds, which produces new roots and develops into new plants.



Many other plants like **money plant, potato tuber, guava, onion, banana etc**. reproduce by this method.





Commonly Asked QUESTIONS

The male or female sex cell is called:

(a) Sperm (b) Gametes
(c) Zygote (d) Eggs
(e) None of these

Answer: (b)

Which one of the following reproduce by spore formation?

(a) Hydra (b) Plasmodium
(c) Rhizopus (d) Tuber (e) None of these

Answer: (c)

A sexual reproduction through budding takes place in:

(a) Amoeba (b) Rhizopus
(c) Yeast (d) Hydra (e) None of these

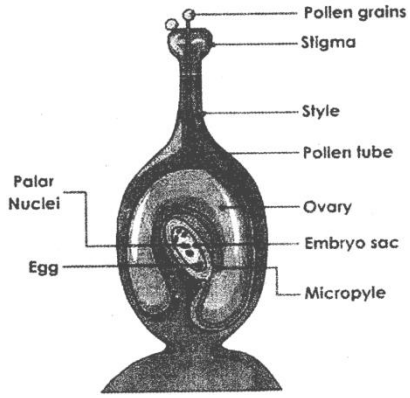
Answer: (d)

Sexual Reproduction

In this mode of reproduction both male and female are involved. The female egg cell fuse with the male egg cell to form zygote, which then develops into the new individual. These egg cells are also called gametes. When the male and female gametes fuses with each other, it forms **zygote**, which starts growing into new individual.

Flowering Plants

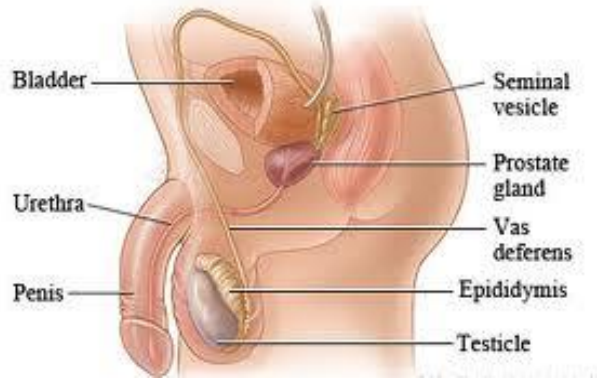
Flowering plants are the dominant plant form on land and they reproduce by sexual and asexual means. Often their most distinguishing feature is their reproductive organs/ commonly called flowers. The anther produces male gametophytes, the sperm is produced in pollen grains, which is attached to the stigma on top of a carpel, in which the female gametophytes are located. After the pollen tube grows through the carpel's style, the sex cell nuclei from the pollen grain migrate into the ovule to fertilize the egg cell and endosperm nuclei within the female gametophyte, in a process termed **double fertilization**. The resulting zygote develops into an embryo, while the triploid endosperm i.e. one sperm cell plus two female cells and female tissues of the ovule give rise to the surrounding tissues in the developing seed. The ovary, which produced the female gametophyte, grows into a fruit, which surrounds the seed. Plants may either self-pollinate or cross-pollinate. No flowering plants like ferns, moss and liverworts use other means of sexual reproduction.



Sexual Reproduction in Animals

Male

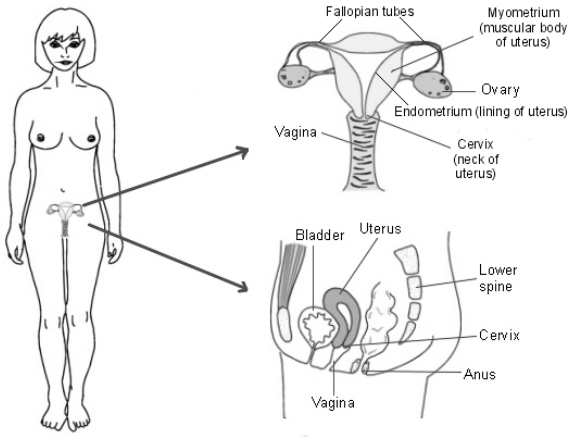
The male reproductive system contains two main divisions: **the penis**, and **the testicles**, where the sperm are produced. In humans, both of these organs are outside the abdominal cavity, but they can be primarily housed within the abdomen in other animals, for instance, in dogs, the penis is internal except when mating. Having the testicles outside the abdomen best facilitates temperature regulation of the sperm, which require specific temperatures to survive. Sperm are the smaller of the two gametes and are generally very short- lived, requiring males to produce them continuously from the time of sexual maturity until death. Prior to ejaculation the produced sperm are stored in the epididymis. The sperm cells are motile and they swim using tail-like flagella to propel themselves towards the ovum. The sperm follows temperature gradients and chemical gradients to locate the ovum.



Female

The female reproductive system likewise contains two main divisions: the **vagina** and **uterus**, which act as the receptacle for the sperm, and the ovaries, which produce the female's ova. All of these parts are always internal. The vagina is attached to the uterus through the cervix, while the uterus is attached to the ovaries via the Fallopian tubes. At certain intervals, the ovaries release an ovum, which passes through the fallopian tube into the uterus.

If, in this transit, it meets with sperm, the egg selects sperm with which to merge; this is termed fertilization. The fertilization usually occurs in the oviducts, but can happen in the uterus itself. The zygote then implants itself in the wall of the uterus, where it begins the processes of embryogenesis and morphogenesis. When developed enough to survive outside the womb, the cervix dilates and contractions of the uterus propel the fetus through the birth canal, which is the vagina.



The ova, which are the female sex cells, are much larger than the sperm and are normally formed within the ovaries of the fetus before its birth. They are mostly fixed in location within the ovary until their transit to the uterus, and contain nutrients for the later zygote and embryo. Over a regular interval, in response to hormonal signals, a process of oogenesis matures one ovum which is released and sent down the Fallopian tube. If not fertilized, this egg is released through menstruation in humans and other great apes, and reabsorbed in other mammals in the estrus cycle.

Gestation

Gestation, called pregnancy in humans, is the period of time during which the fetus develops, dividing via mitosis inside the female. During this time, the fetus receives all of its nutrition and oxygenated blood from the female, filtered through the placenta, which is attached to the fetus' abdomen via an umbilical cord. This drain of nutrients can be quite taxing on the female, who is required to ingest slightly higher levels of

calories. In addition, certain vitamins and other nutrients are required in greater quantities than normal, often creating abnormal eating habits. The length of gestation, called the gestation period, varies greatly from species to species; it is 40 weeks in humans, 56-60 in giraffes and 16 days in hamsters.

Birth

Once the fetus is sufficiently developed, chemical signals start the process of birth. This begins with contractions of the uterus and the dilation of the cervix. The fetus then descends to the cervix, where it is pushed out into the vagina, and eventually out of the female. The newborn, which is called an infant in humans, should typically begin respiration on its own shortly after birth. Not long after, the placenta is passed as well. Most mammals eat this, as it is a good source of protein and other vital nutrients needed for caring for the young. The end of the umbilical cord attached to the young's abdomen eventually falls off on its own.

Reproductive Health

Birth control is a term for several techniques and methods used to prevent fertilization or to interrupt pregnancy at various stages. Birth control techniques and methods include **contraception , contragestion and abortion**.

Contraception includes barrier methods, such as condoms or diaphragm, **hormonal contraception**, also known as oral contraception, and **injectable** contraceptives. Contragestives, also known as post-coital birth control, include **intrauterine devices** and what is known as the morning after pill.

The most common methods of hormonal contraception include the combined **oral contraceptive pill and the minipill**. Hormonal emergency contraception can be both **contraceptive and contragestive**.

Sterilization

Surgical sterilization is available in the form of **tubal ligation** for women and **vasectomy** for men. Although sterilization is considered a permanent procedure due to the uncertainty of reversal possibility, it is possible to attempt a tubal reversal to reconnect the Fallopian tubes in females or a vasectomy reversal to reconnect the vasa deferentia in males. The rate of success depends on the type of sterilization that was originally performed and damage done to the tubes as well as the patient's age.

Vasectomy

A vasectomy is a minor surgical procedure for male sterilization and birth control. During the procedure, the vasa deferentia of a man are severed/and then tied in a manner which prevents sperm from entering into the seminal stream. Vasectomy should not be confused with the surgical removal of the testicles.

Sexually Transmitted Disease (STD)

A sexually transmitted disease (STD), also known as a **sexually transmitted infection (STI),** or venereal disease (VD), is an illness that has a significant probability of transmission between humans by means of human sexual behavior, including vaginal intercourse, oral sex, and anal sex. While in the past, these illnesses have mostly been referred to as **STDs** or **VD**, in recent years the term **sexually transmitted infections (STIs)** has been preferred, as it has a broader range of meaning; a person may be infected, and

may potentially infect others, without showing signs of disease. Some **STIs** can also be transmitted via the use of **IV** drug needles after its use by an infected person, as well as through childbirth or breast-feeding. Sexually transmitted infections are as follows:

Bacterial

- Chancroid
- Chlamydia
- Granuloma inguinale
- Gonorrhea
- Syphilis

Fungal

- Candidiasis

Viral

- Micrograph showing the viral cytopathic effect of herpes.
- Viral hepatitis
- Herpes simplex
- HIV (Human Immunodeficiency Virus)
- HPV (Human Papilloma Virus)
- Molluscum contagiosum

Parasites

- Crab louse, colloquially known as "crabs" or "pubic lice"
- Scabies

Protozoal

- Trichomoniasis

Commonly Asked QUESTIONS

The male reproductive organ of flower is called:

(a) Stamen (b) Carpel

(c) Petals (d) Sepals

(e) None of these

Answer: (a)

Which one of the following flower is bisexual?

(a) Rose
(b) Jasmine
(c) Hibiscus
(d) Lotus
(e) None of these

Answer (c)

Which one of the following animals shows external fertilization?

(a) Birds
(b) Toads
(c) Reptiles
(d) Goat
(e) None of these

Answer (b)

Which one of the following is a male sex chromosomes?

(a) XX
(b) YY
(c) XY
(d) All of these
(e) None of these

Answer: (c)

You Must KNOW

- Did you know that the largest cell in the human body is the female egg and the smallest is the male sperm?
- Your teeth start growing 6 months before you are born.
- The color of your eyes depends on the genes you get from your parents, but at birth most babies appear to have blue eyes.

SUMMARY

- The process of production of organisms of its own king is called reproduction.
- There are two methods of reproductions, sexual and asexual.
- Reproduction involves DNA copying.
- The different methods of asexual reproductions are fission, regeneration, vegetative propagation, grafting, budding, fragmentation etc.
- The male reproductive system consists of testis, vas deferens, seminal vesicles, prostate gland, urethra and penis.
- The female reproductive system consists of ovary, fallopian tube, uterus, and vagina.
- Different methods of birth controls are condoms, IUDC, copper-T, oral pills etc.

Self Evaluation TEST

Duration
10 Minutes

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1. How does sponge reproduce?

(a) Fragmentation (b) Regeneration
(c) Fission (d) Grafting
(e) None Of these

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2. How is rose plant reproduced?

(a) Cutting (b) Regeneration
(c) Layering (d) Grafting
(e) None of these

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3. The fusion of male and female gametes leads to the formation of:

(a) Sperm (b) Eggs
(c) Zygote (d) Foetus
(e) None of these

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4. Where does the fertilized eggs get implanted in human beings?

(a) Fallopian Tube (b) Vasdeference
(c) Vagina (d) Uterus
(e) None of these

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5. After how many days ovary releases an egg?

(a) 20 days (b) 25 days
(c) 28 days (d) 15 days
(e) None of these

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6. Which one among the following is the male contraceptive devices?

(a) Condom (b) Copper T
(c) IUCD (d) Oral Pills
(e) None of these

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7. **Name the sexually transmitted diseases among the following.**

(a) TB (b) Cancer
(c) AIDS (d) Ulcer
(e) None of these

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8. **Name the organ through which the developing foetus obtains it food form the mother's.**

(a) Ureters (b) Placenta
(c) Uterus (d) Zygote
(e) None of these

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9. **The outer most whorl which consists of sepals is called:**

(a) Calyx (b) Corolla
(c) Androecium (d) Gynoecium
(e) None of these

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10. **The male reproductive organ which produce sperm is called:**

(a) Vas deferens (b) Scrotum
(c) Testis (d) Ovary
(e) None of these

Answers – Self Evaluation Test																			
1.	A	**2.**	A	**3.**	C	**4.**	D	**5.**	C	**6.**	A	**7.**	C	**8.**	B	**9.**	A	**10.**	C