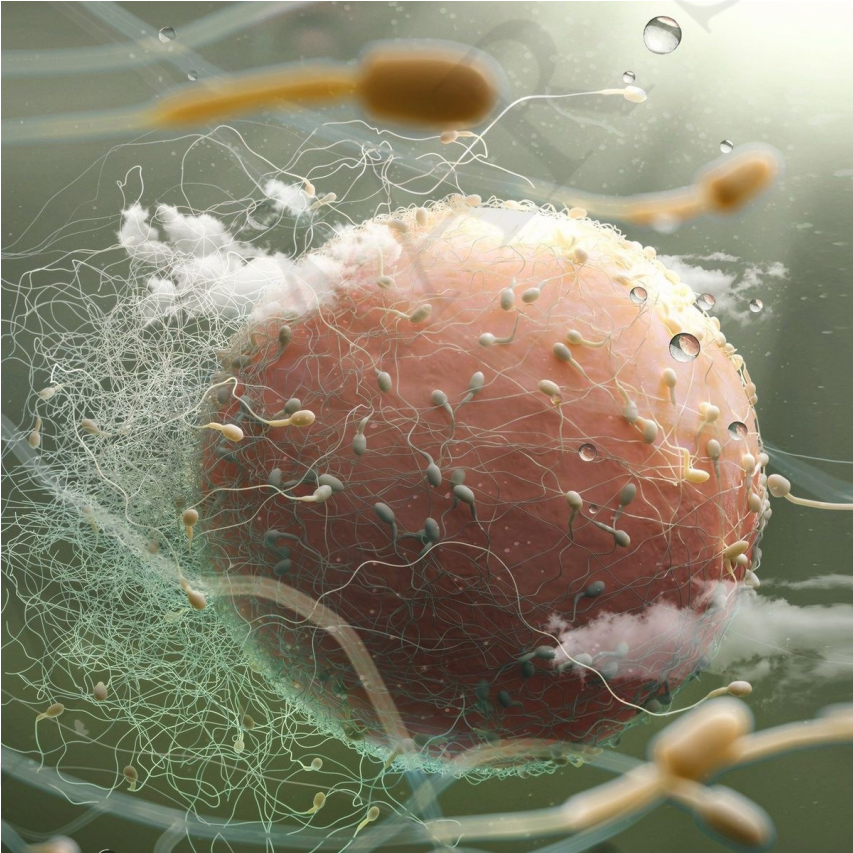
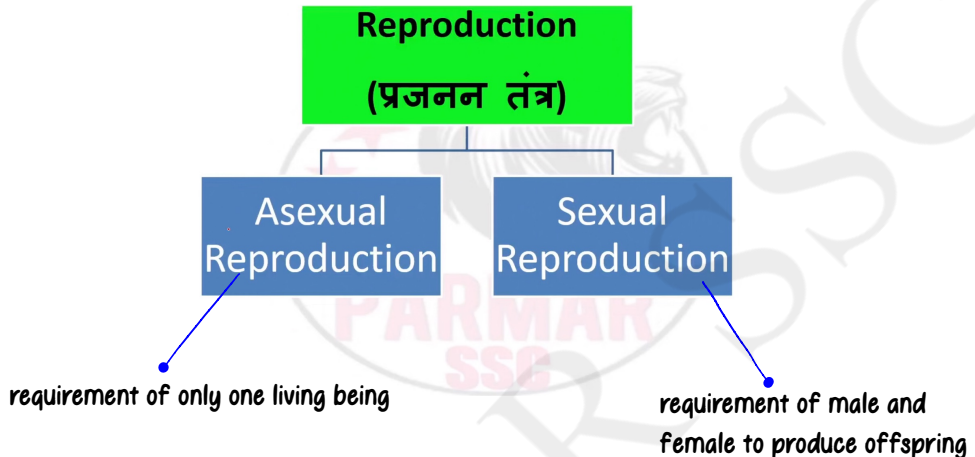


REPRODUCTION





REPRODUCTION

- It is a method by which offsprings are produced by the living beings
- Reproduction is not a necessary instinct for survival of a living being

ASEXUAL REPRODUCTION

- It involves a single parent
- Occurs in simple organisms like **microorganisms, plants**

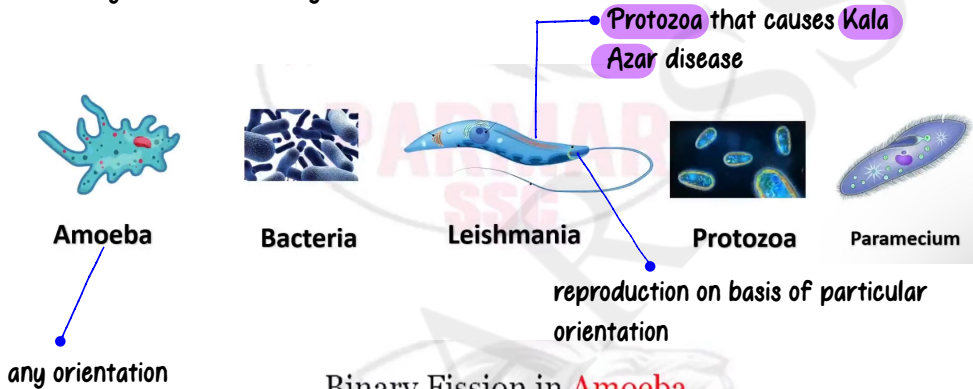
SEXUAL REPRODUCTION

- It involves two parents
 - Mother
 - Father
- eg: in humans, dogs, elephants, birds, fishes, plants

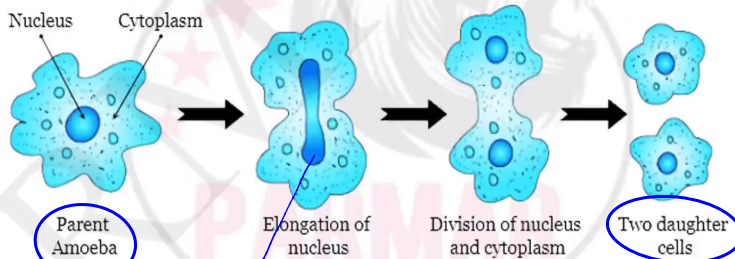
TYPES OF ASEQUAL REPRODUCTION

a) BINARY FISSION

- It is a process of reproduction in which a unicellular organism divides into two organisms
- Only for unicellular organisms



Binary Fission in Amoeba



'Bi: meaning two

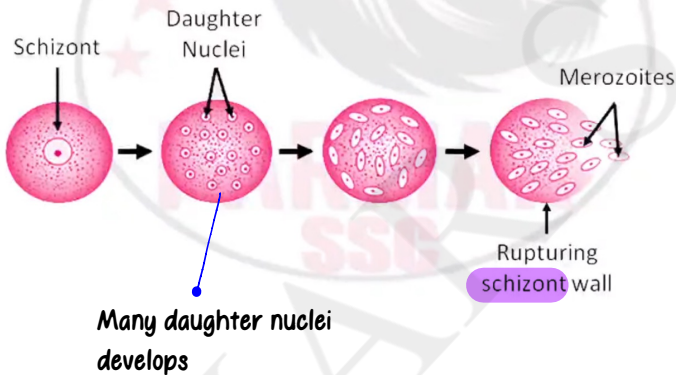
Nucleus inside spreading to divide

b) MULTIPLE FISSION

- It will develop many offsprings
- It happens in unicellular organisms: Malarial Parasite — Plasmodium

Malaria causing protozoa

MULTIPLE FISSION IN PLASMODIUM



c) FRAGMENTATION

- it is used by simple multicellular organisms like spirogyra and sea anemone

green algae

Spirogyra



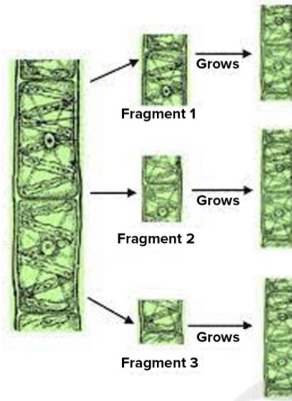
Plant found in water

Sea Anemone



Animal found in water

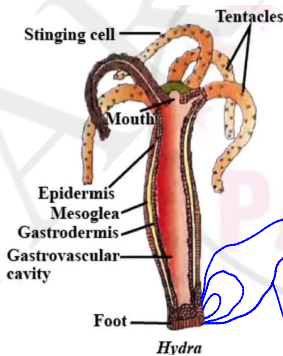
- Red algae mode of reproduction: Fragmentation



Breaks into half, which is not fully developed that later develops into complete spirogyra

d) BUDDING

- It is a process used by simple multicellular organisms like **hydra and yeast**



Develops buds to form complete hydra



Yeast

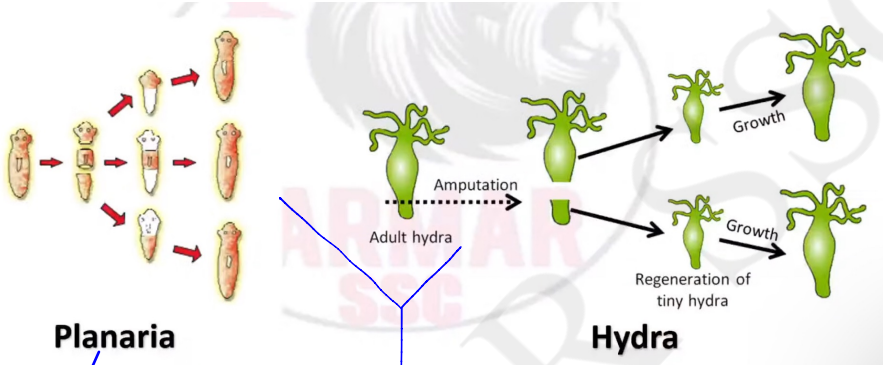
main method of reproduction in hydra is budding

e) REGENERATION

not exactly a method of reproduction

Bread mould

- It occurs in simple multicellular organisms like **planaria and hydra, rhizopus**



Planaria

Phylum: Platyhelminthes
Eg: Tapeworms, flatworms

- They are free living

Hydra

organisms repairs or regenerates the missing part of the body and forms a complete organism again

f) VEGETATIVE PROPAGATION

- It is a type of reproduction where new plants grow from a **fragment or cutting of parent plants**

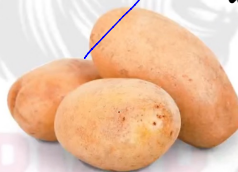
Buds develop that is not completely developed



Money Plant



Rose plant

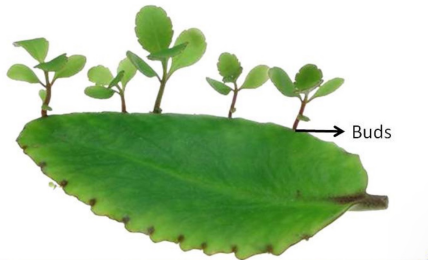


Potato



Bryophyllum

VEGETATIVE PROPAGATION IN BRYOPHYLLUM



eg: in a barren land when it rains, grass grows as stems are present on the ground

TYPES

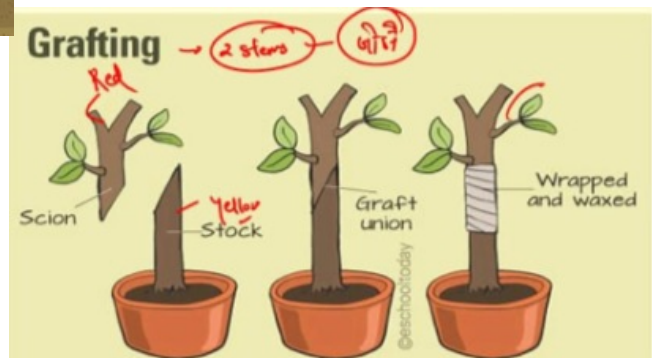
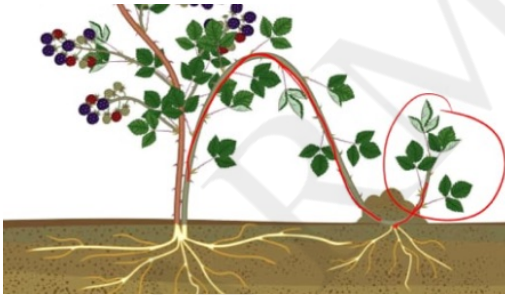
i) **CUTTING**: a part of plant (stem or leaf) is cut and planted into soil
eg: rose plant, money plant, sugarcane plant, banana plant

ii) **LAYERING**: the stem of the plant is bent to the ground and covered with soil
eg: Lemon, strawberry

iii) **GRAFTING**: cutting from some other plant attached to the stem of a plant and planted to soil
eg: Rose plant

→ Why is vegetative propagation done?

- To save time
- To get varieties of plants of same or different type



g) TISSUE CULTURE

- Scientific artificial vegetative propagation is known as tissue culture
- Tissue from different parts of plant are cultured in chemicals in laboratory to develop into a new plant



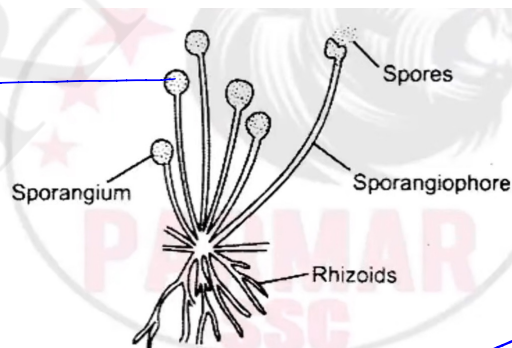
Ornamental Plants

- used in ornamental plants
eg: Snake plant
Cost of selling such plant is very high

h) SPORE FORMATION

- It occurs in simple multicellular organisms like *rhizopus*

Bob and stick like structures that releases spores and these spores further reproduces to rhizopus



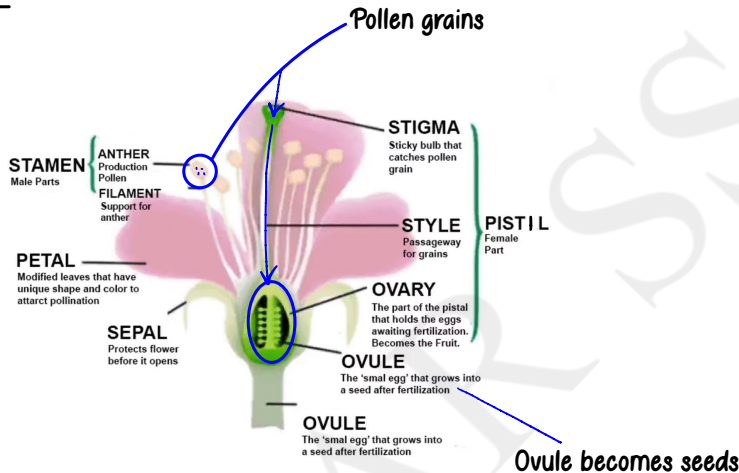
Spore formation in *Rhizopus*

bread mould

- green colour fungus on bread: rhizopus

SEXUAL REPRODUCTION

PLANT



- Reproductive organ in plants: **Flower**

Two types of flower

- Male + female part = **Bisexual/Monoecious**, eg: Hibiscus, sunflower, rose, lily, tulip, tomato, chilli
- Only Male or Female = **Unisexual**, eg: Papaya, cucumber, watermelon, musk melon, bitter gourd

Male part has:

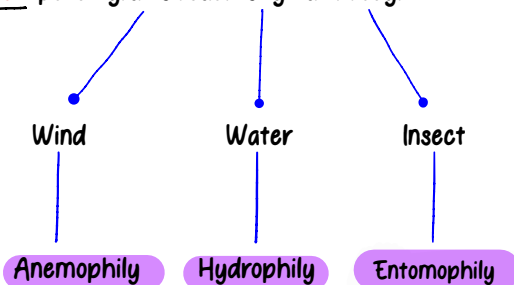
- **Filament**: supports anther
 - **Anther**: produces pollen
- collectively called **STAMEN**

collectively called **PISTIL**

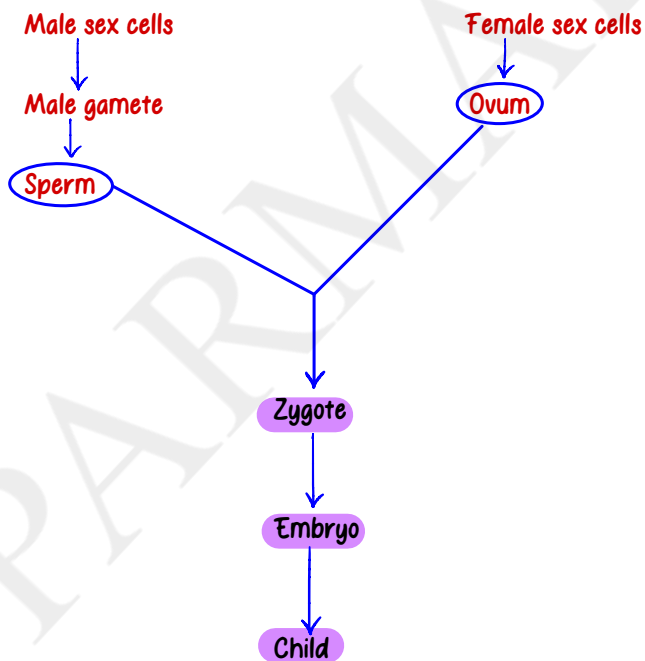
Female part has:

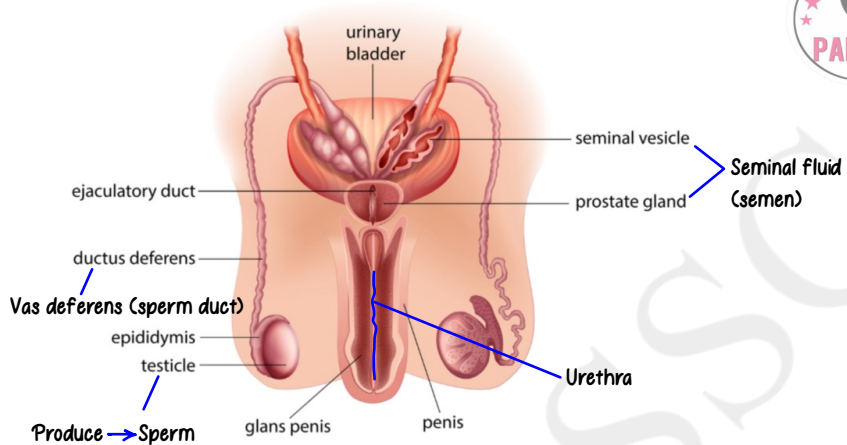
- **Stigma**: sticky bulb that catches pollen
- **Style**: passageway for pollen
- **Ovary**: the part of pistil that holds the eggs awaiting fertilisation. Becomes the fruit

Pollination: pollen grains reach stigma through

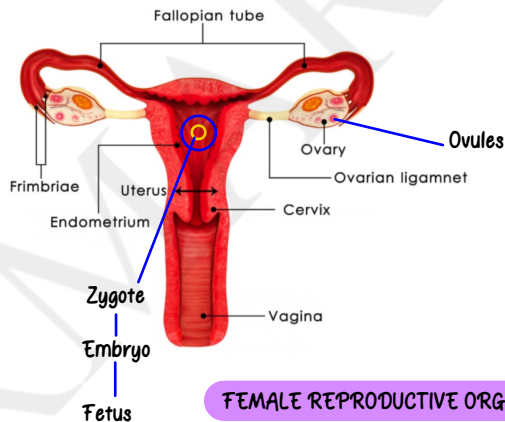


REPRODUCTION IN HUMANS





MALE REPRODUCTIVE ORGAN

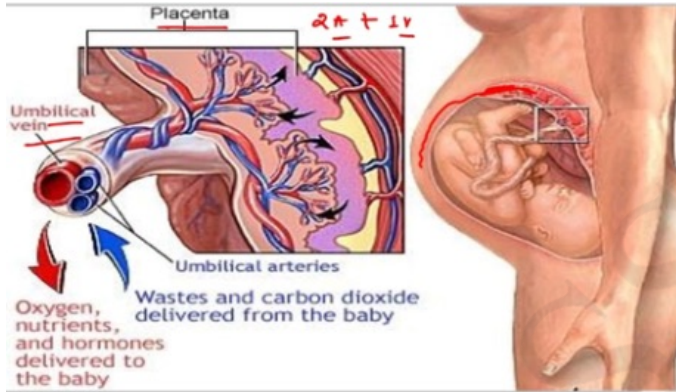


FEMALE REPRODUCTIVE ORGAN

- At the age 11-12 — The ovaries start to mature, the oviducts, uterus, vagina, breast, become pigmented, this is the first sign of **menarche**
- Menopause: natural decline in reproductive hormones in women when she reaches her **40s or 50s**

Gametogenesis → **Insemination** → **Fertilisation** → **Zygote** → **Implantation** → **Gestation**

Cervical cancer is caused by **Human Papilloma Virus (HPV)**



- **Artery:** Deoxygenated blood/waste
 Fetus → Placenta

- **Veins:** Oxygenated blood/nutrition
 Placenta → Fetus

IVF (In vitro fertilisation)

- IVF is a type of fertility treatment where eggs are combined with the sperm outside the body in a lab. The embryos are then inserted into women's vagina through the cervix up to the womb

Methods of Sterilisation

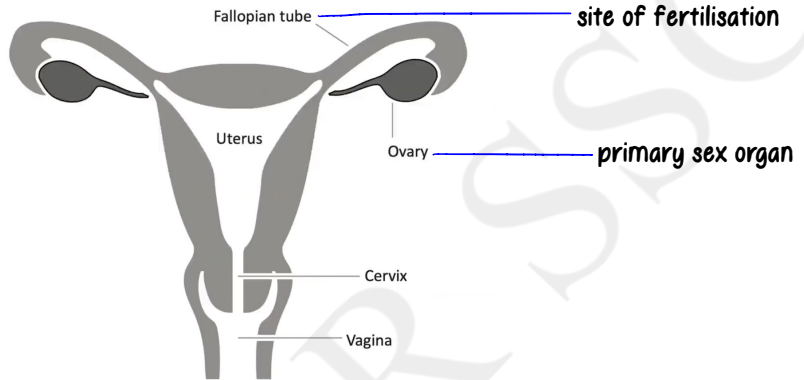
- **Tubectomy:** It is a permanent method of contraception for woman. It involves surgically blocking the fallopian tube so that the egg released by ovary cannot reach the uterus
- **Vasectomy:** It is a permanent method of contraception in male. It involves cutting the supply of sperm to the semen
- **Parthenogenesis:** it is a natural form of asexual reproduction in which growth and development of an embryo occurred directly from an egg without the need of fertilisation

Honey bees, lizard

Meaning

- **Parthe:** Virgin
- **Genesis:** Birth

Female Reproductive System



Seedless fruit

- Development of fruit without fertilisation: **Parthenocarpy**
- Transfer of pollen grains from one anther to stigma of another flower of the same plant is called: **Geitonogamy**
- Productivity of an ecosystem is composed of: net primary productivity and gross primary productivity

total biomass consumed

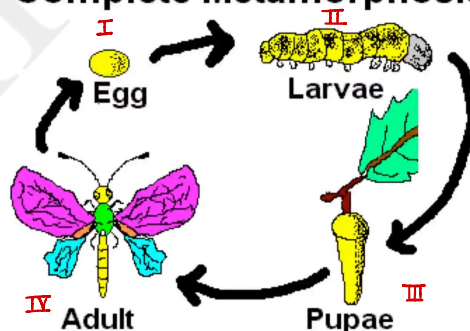
Gross primary productivity - Energy required to make food

- Sequence of parts of female reproductive organ:
 - Stigma
 - Style
 - Ovary
 - Thalamus

- One nucleus of the pollen tube and secondary nucleus of the ovum grows into: Endosperm
- Arteries in umbilical cord: Two
- Ability of a single cell to produce a fertile, adult individual: Totipotency
- Cloning: process of creating exact genetic replica of another cell, tissue or organism
- Mutation: change in DNA or gene
- Female gamete undergoes development to form new organisms without fertilisation in some organism like honey bees, some lizards or birds: Parthenogenesis
- Reproduction in humans is: Internal Fertilisation
- In Vitro fertilisation: joining of women's egg and man's sperm in a laboratory dish (artificial way of fertilisation)
- Metamorphosis: Change in form

Four stages of metamorphosis:

Complete Metamorphosis



- Oviparous: lay eggs
eg: Frog
- Viviparous: directly produce offsprings
eg: humans

Hereditary and Evolution

- First studied by: Gregor Johan Mendel

father of genetics

Pea plant (as it shows varieties)

Scientific name: Pisum sativum

- TT: pure tall
- Tt: tall
- tt: short

Sex Determination

- Male/Female
- Chromosome: 23 pairs (total: 46)

1 pair (sex chromosome) → 22 pairs (autosomal chromosomes)

Male

Female

XY

XX

Sperm + Ova = Zygote

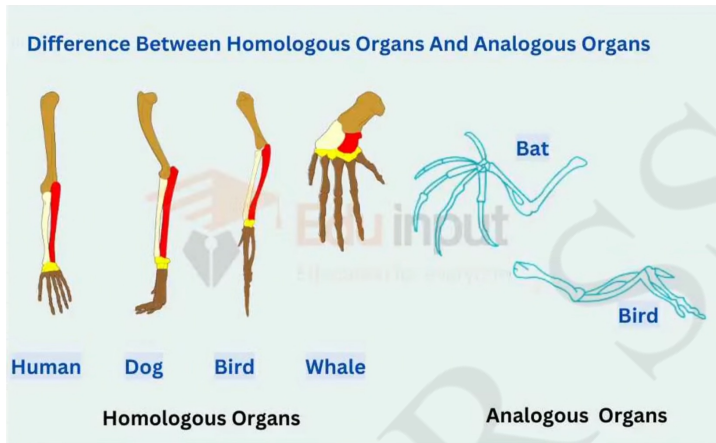
Y

X

- Turner syndrome: Female is missing one X chromosome (not a Mendelian disorder)
- Down syndrome: due to extra chromosome (not a Mendelian disorder)

Male chromosome determines the sex of a foetus

- Homologous organs: look similar but functions are different



- Analogous organs: look different but functions are similar