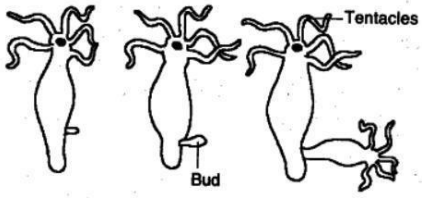
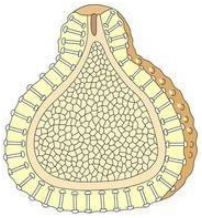
Chapter – 6: Reproduction in Animals

- Reproduction basic characteristic – living beings
- All organisms – simplest bacteria to complex humans – reproduce
- Reproduction – different methods –
    - Asexual –
        - Unicellular organisms, lower level animals – starfish, worms, etc
    - Sexual –
        - Multicellular organisms – dogs, cows, humans, etc

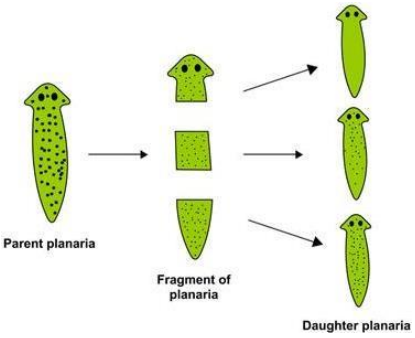
Asexual Reproduction in Animals

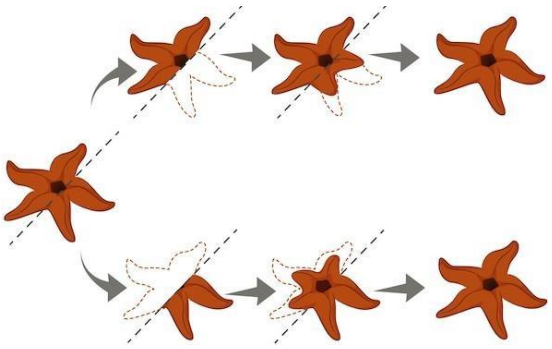
- Single parent – produce offspring (new baby)
- Simplest form – without sex organs
- Bacterial cell – divides into daughter cells
- Also followed by plants – rose, potato, money plant, etc
- Amoeba – also use this method – produce 2 daughter cells
- Some common methods –
    - Budding –
        - Small bulb-like projection – bud – formed on parent body
        - After maturing (growing up) – bud detaches – grows into new individual
        - Hydra, yeast – use this method





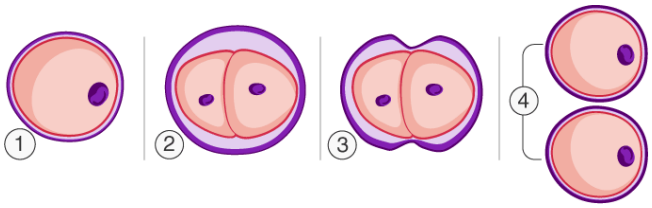
    - Gemmules (internal buds) –
        - This parent – produce specialized mass – develop into offspring
        - Sponges – use this method
    - Fragmentation –
        - Body of parent – breaks into different pieces
        - Each piece – grows into offspring
        - Planaria, spirogyra – use this method





    - Regeneration –
        - Piece of parent's body – detached – grows into new offspring
        - Starfish, lizard – show regeneration
    - Binary fission –

- Simplest form – single cell organism – amoeba, bacteria – use this
- Fully mature cell – splits into 2 cells
- This division – starts with division of nucleus – then division of cell
- 2 new cells (daughter cells) formed – hence, binary fission

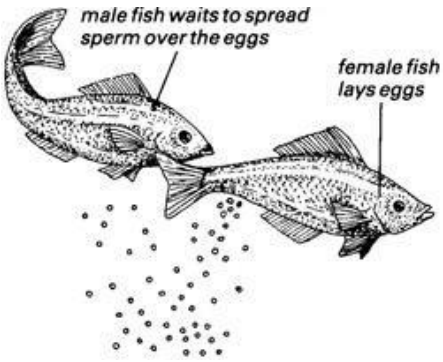


Characteristics of asexual reproduction

- Offspring from single parent only – no variations
- New baby – exactly identical to parent

Sexual Reproduction in Animals

- Requires 2 organisms – 1 male and 1 female
- Common example – human reproduction
- Male, female – special organs – produce gametes – this purpose
- Male gamete – sperm female gamete – ovum (egg)
- Union of these 2 – form zygote – forms into new organism
- This union process – sperm and ovum – fertilization
- 2 types of fertilization –
    - External –
        - Most common – aquatic animals – fish, frogs, etc
        - Eggs – released by females – into water – fertilised by males afterwards
        - Amphibians (live in water and land) – frogs, toads – goes into water – rainy season
        - Male and female – meet each other – female lays eggs (100s)
        - Eggs – covered with jelly-like structure – protection
        - Males – deposit sperms – directly over the eggs
        - Sperm – long tails – helps to swim
        - Fusion of gametes – outside the body – hence, external
        - Such animals – lay 100s of eggs – many eggs – may be eaten by other animals
        - Large number – increases probability of survival
        - After fertilization – embryo grows inside egg – after development – eggs hatch into young ones



    - Internal –
        - Animals – birds, dogs, cows, goats, etc – fertilization – inside female body

- Humans – also show this type of fertilisation

Characteristics of sexual reproduction

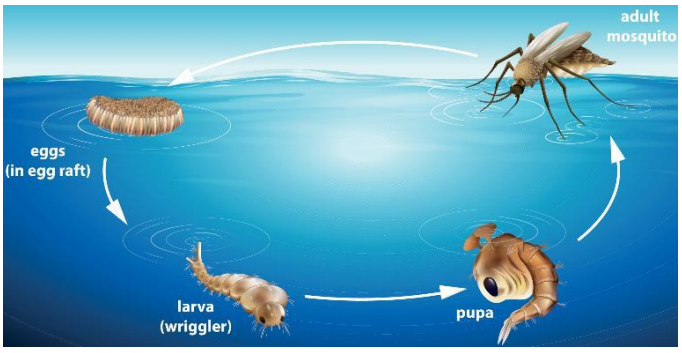
- Zygote – result of fusion – male, female gametes
- Zygote – genes from both – father (male) and mother (female)
- Variations in characters of offspring

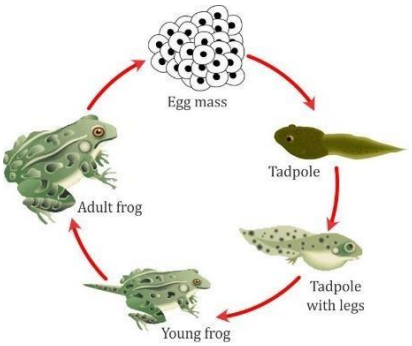
Oviparous and Viviparous Animals

- Oviparous –
  - Egg-laying animals – lizards, frogs, fish, snakes, etc
  - Eggs – hatched by mother (body warmth) – OR – sun's warmth – incubation
  - Birds – also lay eggs
  - Just after fertilization – zygote divide repeatedly
  - Zygote – travel down the oviduct – many protective layers form
  - Once – hard shell developed – bird lays eggs
  - After 3 weeks – embryo develops into young one
  - Young one – completely developed – they break the shell – come out – hatching
- Viviparous –
  - Give birth to young ones – directly
  - Rats, squirrels, buffaloes, humans, etc

Metamorphosis

- Newborns or hatched young ones – grow until they become adults
- Newborn mammals (human baby) – hatched young ones (birds) – similar to their parents – shape, structure
- Some animals – butterflies, silkworms, frogs, etc – not the same
- These young ones – different in shape, structure
- They go through – various stages – life cycle – grow into adult
- Mosquito life cycle – egg → larva → pupa → adult
- Frog life cycle – egg → early tadpole → late tadpole → adult





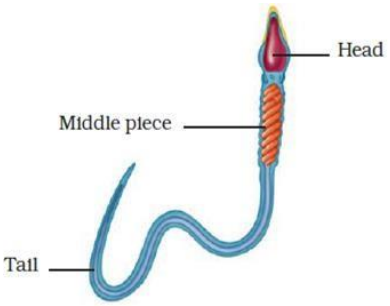
- Both cases – intermediate stages – young ones – very different from adults
- Transformation – young one to adult – drastic (too much) changes - metamorphosis

Reproduction in Humans

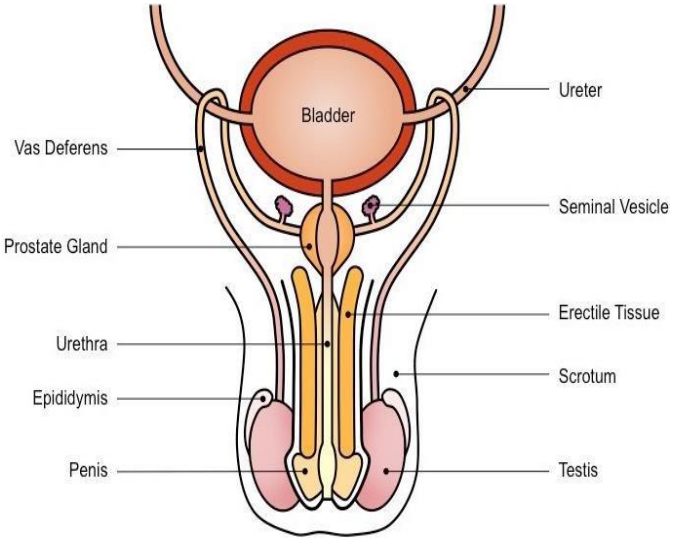
- Humans – reproduce – sexual reproduction – female (mother) – bears (carry) and give birth to child

- Reproductive systems – male, female – very different and specific
- Different steps – discussed below

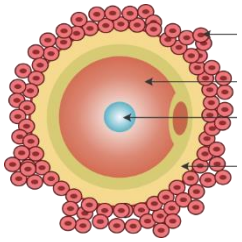
Male reproductive system



- Produce male gametes – sperms
- Sperms – elongated, small-size cells
- Each sperm – single cell – contain all cell components
- Components – head, middle piece, tail – swim with help of tail
- Following organs –
    - Testes –
        - Pair of testes – testis (singular)
        - Located – outside abdominal cavity – small pouches – scrotal sacs
        - Functions –
            - Produce millions of sperms (male gametes)
            - Produce male sex hormone – testosterone
    - Vasa deferentia (sperm ducts) –
        - Sperms – leave testes – pair of narrow ducts – vasa deferentia – deferens (singular)
        - Sperms – move through vas deferens – fluids from male glands – mix with sperm – new fluid – semen
        - These secretions – nourish the sperm – increase mobility (ability to move)
    - Urethra –
        - Vas deferens – open into urethra – narrow duct – coming from urinary bladder
        - Semen – poured into urethra – passed through centre – external male genital organ – penis
    - Penis –
        - Helps – transfer semen into vagina of female
        - Common passage – urine, semen – come out

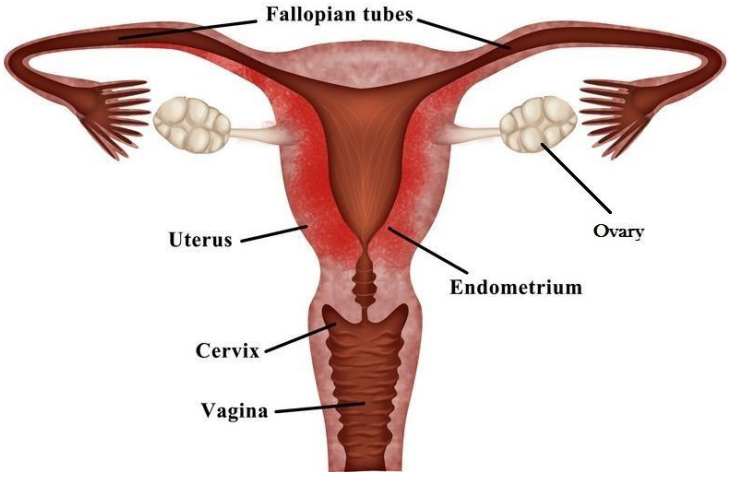


Female reproductive system



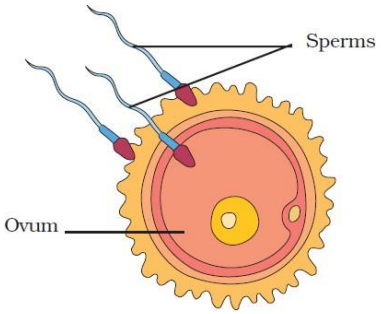
- Produce female gametes – eggs or ova – ovum (singular)
- Following organs –
    - Ovaries –
        - Pair – round-shaped ovaries
        - Located – lower abdominal cavity – female

        - Functions –
            - Produce female gamete – ovum – 1 ovum – released every month – ovum – round in shape – bigger than sperm – stores food – single cell – immobile – cannot move
            - Produce female sex hormones – oestrogen, progesterone
    - Fallopian tubes (oviducts) –
        - Ovum – after released by ovary – passes to oviduct
        - Sperm meet ovum – inside oviduct – fertilization takes place
    - Uterus (womb) –
        - Pear-shaped, thick-walled, muscular organ
        - Zygote – grows into baby – inside womb
        - Lower narrow part of uterus – cervix
    - Vagina –
        - Female genital organ – receives sperm from male



Fertilization

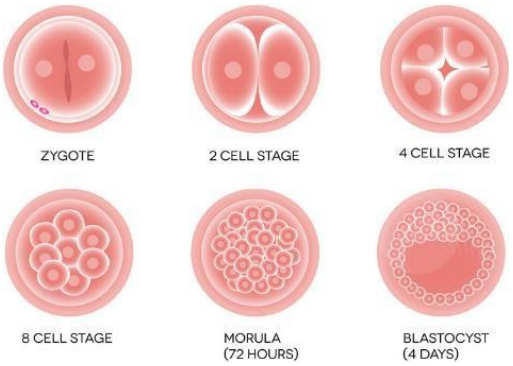
- Inside oviduct of female – sperms meet ovum
- On sperm – may fuse with ovum – form single cell – zygote
- This process – fertilization
- Nucleus of ovum – fuse with – nucleus of sperm – form single nucleus



Development of embryo

- After fertilization – zygote – moves down oviduct – divides repeatedly – form ball of cell
- This structure – embryo – gets embedded into the wall
- This process – implantation – embryo further developed here
- Embryo – slowly develop different body parts – hands, legs, head, eyes, ears etc
- Stage of embryo – all body parts – identified clearly – foetus
- Growing embryo – obtain nourishment (food) – mother's body – through placenta, umbilical cord

- When foetus – developed completely – mother gives birth



Gestation

- Woman – having a baby inside womb – pregnant
- Period – fertilization to birth – gestation period
- This period – 40 weeks (9 months) - humans

Childbirth

- Completion of gestation period – baby delivered
- Natural childbirth (labour) – several hours – may be painful for mother
- Sometimes – complications occur – may need surgical delivery – doctors take out child from womb
- This process – caesarian delivery
- Sometimes – babies born before completion of gestation period – premature babies – need special care

What happens if fertilization does not occur?

- Before fertilization – uterus prepares itself to receive embryo
- Walls – supplied too much – blood vessels
- If ovum – not fertilised by sperm – blood vessels – rupture (break)
- Ovum – expelled (thrown out) from uterus – along with uterine muscles and blood
- This process – known as menstruation