Cell

- Types of cell
  - Prokaryotic cell
    - small, simple, unicellular
    - no Nucleus, circular DNA, lack membrane
    - e.g. - bacteria, cynobacria, mycoplasma
  - Eukaryotic cell
    - large, complex, unicellular & multicellular
    - Nucleus & Membrane present, linear DNA
    - e.g. - Plant, Animal
- Definition
  - Building blocks of life
  - Fundamental unit of life
  - Structural or functional basis of life
- Discovery
  - 1st by Robert Hooke (1665)
    - in cork ((Dead Cell)
    - Father of cytology
  - by Antonie van Leeuwenhoek (1674) — in pond water (Living Cell)
  - by Robert Brown (1831) — Nucleus
  - by Fredrick Mischer (1869) — Molecule discovery of DNA
  - Watson & Crick (1953) — Double-helical structure of DNA
  - by Camillo Golgi — Golgi bodies
- Cell Division
  - phases
    - G1 - Growth
    - S - DNA synthesis
    - G2 - Gorwth & preparation for mitosis
    - M - Mitosis
  - Types:
    - Mitosis
      - occurs in Somatic cells
      - Nucleus divides once
      - diploid (2), 2 daughter cells
    - Meiosis
      - occurs in Germ Cells
      - Nucleus divides twice
      - haploid (1), 4 daughter cells
- Parts of Cell
  - Cell membrane
    - Thin, elastic, flexible, Living
    - provide definite shape & holds content
    - Selectively permeable
    - Proteins+lipids (composition)
  - Cell wall
    - Provides determines shape, strength & turgidity
    - Freely permeable, Non-living
    - Plants - made up of Cellulose
    - Bacterial - made up of Peptidoglycan
    - Fungi - made up of Chitin
  - Nucleus
    - Largest cell structure
    - "Brain of the cell"
    - Components
      - Nuclear envelope
        - Composed of membranes & Covers Nucleus
        - Separates nucleus from cytoplasm
      - Nucleoplasm
        - Liquid ground substance of nuclear envelope
        - Types
          - Nucleolus
            - one or more in number
            - forms protein forming centres-Ribosomes
          - Chromatin material
            - Entangled mass of thread like structures
            - Chromosome
              - Thread like structures visible during cell division
              - Components:
                - DNA — Consists of genes
                - Proteins
              - 23 Pairs
                - 22 pairs (autosomal)
                - 1 pair (sex pair - XX & XY)
  - Cytoplasm
    - Parts between plasma membrane & nuclear envelope
    - Cell organelles present in it
    - Cytos: Aqueous ground substance
- Cell organelles
  - Mitochondria
    - Powerhouse of the cell
    - ATP (Adenosine Triphosphate) Energy currency
    - Two-membranes
      - Outer: Porous
      - Inner: ATP synthesis
    - Has its own DNA & Ribosomes
  - Lysosomes — Suicidal bag of the cell
  - Golgi bodies
    - Cis face - towards nucleus
    - Trans face - towards plasma membrane
    - Functions
      - Stores, modification of package
      - Forms lysosomes
  - Endoplasmic Reticulum
    - Rough ER: makes proteins, ribosomes present
    - Smooth ER: synthesis of fats and lipids, ribosomes absent
  - Vacuoles
    - in plants
      - Large, distinct, Permanent
      - Provide turgidity & rigidity
    - in animals
      - Small, temporary
      - stores glucose, glycogen, protein
  - Plastids
    - Only in plant cell
    - Has its own DNA & Ribosomes
    - Types
      - stores chlorophyll pigment — Chloroplasts
      - stores colour pigment — Chromoplasts
      - Stores starch, oil and protein granules — Leucoplasts

Plant Tissue

Meristematic tissue

- Present in growing reason
- Vocuoles absent
- Intercellular space absent
- active cell
- dence Cytoplasm
- perform cell division

Type

- Apical tissue
  - Present at shoot & root apex
  - Increase length of root & stem
- Intercalary tissue
  - Present at the base of leaves/internodes
  - Increase length of leaves & internodes
- Lateral tissue
  - Present beneath the bark
  - Increase girth of root or stem

Permanent tissue

- Cell wall in thin/thick
- large central vacuoles
- by the process of differentiation Meristematic convert in Permanent

Simple tissue

- Parenchyma
  - Food storage tissue
  - Aerenchyma — contain intercellular airy spaces which helps to float
  - Chlorenchyma — contains chlorophyll
- Collenchyma
  - in leaf stalks & stem of dicots
  - Living, Irregularly thickened at corners, little intercellular space
  - Provides mechanical strength & flexibility
  - Allows bending of parts
- Sclerenchyma
  - in Outer parts
  - Dead cells
  - Provides toughness to the tissue
- Protective tissue
  - Epidermis
    - Outermost layer of plant parts
    - Plants of dry habitats have thicker epidermis
    - Cutin is waxy materials & Layer of cutin is called cuticle
    - Cuticle prevents water loss, Injury & Fungi infection
    - Epidermal cells of roots form long hair like structures which increase absorption surface area
  - Cork
    - in mature roots and shoots
    - Protection to mature roots and shoots
    - Dead, Intercellular spaces absent, Walls have suberin

Complex tissue

- Xylem
  - one-way conduction
  - Conducts water & minerals
  - Types
    - Xylem parenchyma - food storage
    - Tracheids
    - Vessels
    - Xylem fibres/sclerenchyma

    (Tracheids, Vessels, Xylem parenchyma — Living)
- Phloem
  - two-way conduction
  - Conducts food
  - Types
    - Sieve tubes
    - Companion cells
    - Phloem parenchyma - food storage
    - Phloem fibers/Sclerenchyma - rigidity & support

Animal Tissue

Epithelial
- Covering/protective tissues of animal body
- Squamous
  - Simple
    - extremely thin, flat, Irregularly shaped
    - Single layer of cells
    - Forms delicate lining
    - eg: mouth and oesophagus
  - Stratified
    - Cells are arranged in layers
    - Prevent wear and tear
    - eg: Skin
- Cuboidal
  - Cube like structure
  - eg: Sweat glands, Salivary glands, Thyroid glands, Lining of Kidney tubules
- Columnar
  - Pillar like structure
  - Lining of intestine, stomach, gallbladder
- Ciliated
  - have Cilia (hair like projections on surface) which facilitates movement
  - Movement of mucus, urine, egg etc

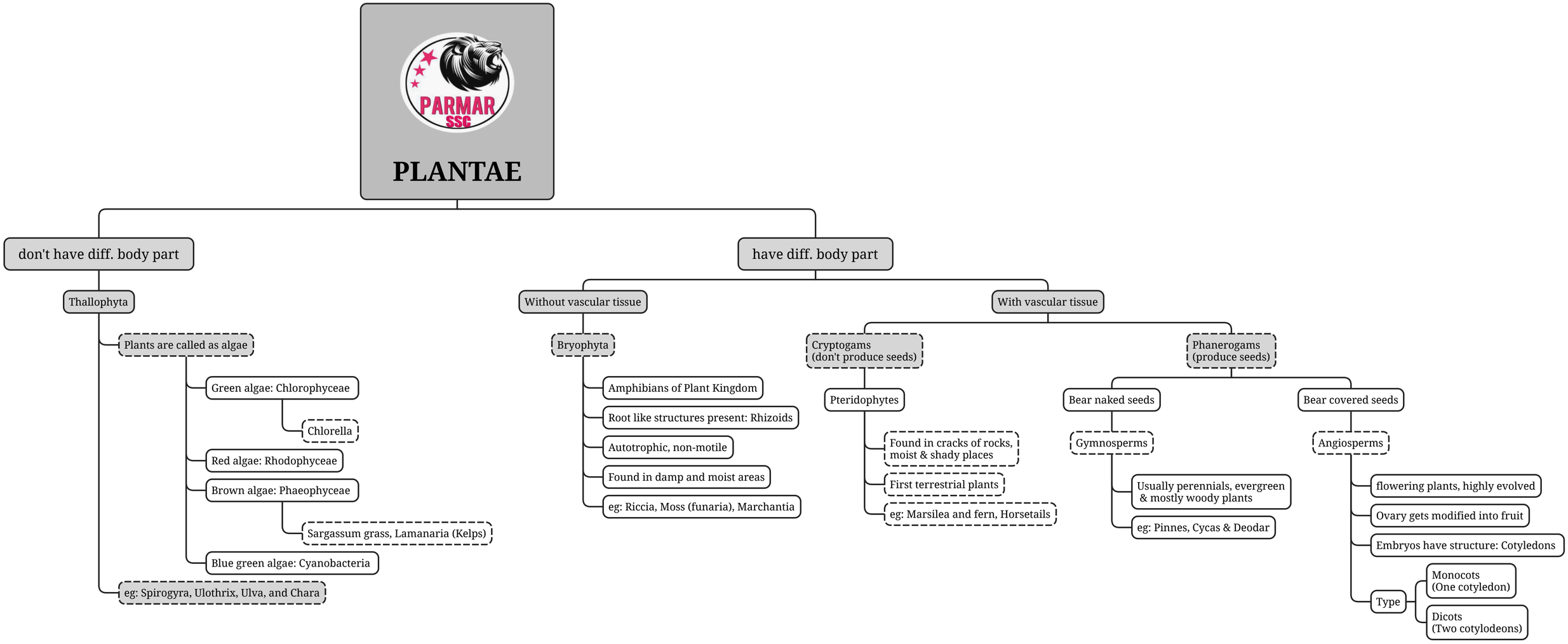
Connective
- Areolar
  - Loose
    - Cells + loose gel like matrix
    - Around blood vessels & nerves, in bone marrow & space inside organs
    - Connects skin + muscles, Supports internal organs, Helps in repair of tissues
  - Dense
    - Tendons
      - Connects muscles to bones
      - Great strength & Limited flexibility
    - Ligaments
      - Connects bones to bones
      - Considerable strength
- Adipose
  - rounded/oval & contain large fat droplets
  - Below the skin
  - Prevents mechanical shocks, Act as insulation
- Skeletal
  - Cartilage
    - flexible, Widely spaced out
    - present in Ear pinna, nose tip, trachea, larynx
  - Bones
    - Very strong, Non flexible, Hard and rigid
    - Supports the body & Provides shape
    - Protects vital body organs like brain, lungs, etc.
- Fluid
  - Blood
    - Liquid
      - Plasma
        - 92% water & 8% harmones, protines etc
        - yellow fluid
      - Solid
        - RBC
          - Red due to hemoglobin (Fe)
          - transports oxygen
          - Graveyard of RBC: Spleen
          - Biconcave / disc shaped
          - known as erythrocytes
          - Life span: 120 days
        - Platelets
          - Helps in blood clotting
          - known as thrombocytes
          - Life span: 7-10 days
        - WBC
          - Prevent from infection
          - formed in bone marrow
          - Types
            - Monocytes, Lymphocytes, Neutrophils, Basophils & Eosinophils
          - known as leukocytes
          - Life span: 12 days
  - Lymph
    - Colourless fluid
    - RBCs & Blood proteins are absent

Nervous
- Found in brain, spinal cord, nerves
- Fundamental unit: Neuron
- Sense stimuli: Touch, Smell, Taste, Hearing & Sight

Muscular
- Are elongated & large sized
- Contraction & relaxation
- Skeletal
  - Unbranched, multinucleated & Striations
  - Fast, Easily fatigue & Voluntary
  - present in Biceps, bone
- Smooth/Visceral
  - Unbranched, Uninucleated & Non-striations
  - Slow, Do not fatigue & Involuntary
  - present in soft interior organs: lung, liver, abdomen, intestines
- Cardiac
  - Branched, uninucleated & Striations
  - Do not fatigue & Involuntary
  - Help to pump & distribute blood

Diversity in living organism

- Prokaryotes
  - Monera
    - Can be autotrophic/heterotrophic
    - Cell wall maybe present/absent
    - eg: Archaebacteria, Eubacteria, Cynobacteria (Blue-green algae)
- Eukaryotes
  - Unicellular
    - Protista
      - Locomotion through appendages
      - Cell wall is absent except Euglena
      - can be Autotrophic/Heterotrophic
      - eg: Unicellular algae, diatoms, protozoa
      - PHYLUM PROTOZOA
        - mostly aquatic, solitary or colonial
        - free living/parasitic/symbiotic
        - Paramecium — Cilia - hair-like structure, Helps in movement
        - Euglena — Flagellum - tail-like structure, Helps in movement
        - Amoeba — Pseudopod - false feet, Helps in movement
  - Multicellular
    - Cell wall present
      - Fungi
        - Multicellular except yeast
        - Cell wall is made up of complex sugar chitin
        - Lichen - Blue green algae + fungi — in symbiotic relationship (benefit from each other)
        - Penicillin — Used in medicine
          - Alexander Fleming discovered Penicillin
        - Yeast — Used in bakery
        - Heterotrophic
        - Saprophytic: Decaying organic material as food
        - Parasitic: Dependent on protoplasm of a host organism for food
      - Plantae
    - Cell wall absent
      - Animalia


PARMAR SSC
PLANTAE
don't have diff. body part
Thallophyta
Plants are called as algae
Green algae: Chlorophyceae
Chlorella
Red algae: Rhodophyceae
Brown algae: Phaeophyceae
Sargassum grass, Lamanaria (Kelps)
Blue green algae: Cyanobacteria
eg: Spirogyra, Ulothrix, Ulva, and Chara
have diff. body part
Without vascular tissue
Bryophyta
Amphibians of Plant Kingdom
Root like structures present: Rhizoids
Autotrophic, non-motile
Found in damp and moist areas
eg: Riccia, Moss (funaria), Marchantia
With vascular tissue
Cryptogams (don't produce seeds)
Pteridophytes
Found in cracks of rocks, moist & shady places
First terrestrial plants
eg: Marsilea and fern, Horsetails
Phanerogams (produce seeds)
Bear naked seeds
Gymnosperms
Usually perennials, evergreen & mostly woody plants
eg: Pinnes, Cycas & Deodar
Bear covered seeds
Angiosperms
flowering plants, highly evolved
Ovary gets modified into fruit
Embryos have structure: Cotyledons
Type
Monocots (One cotyledon)
Dicots (Two cotylodeons)

ANIMALIA

Chordata

- Organ system organisation
- Bilateral symmetry
- Triploblastic & coelomate
- Notochord: rod like structure
- Paired gills slits in pharynx
- Closed blood vascular system

Protochordata

- Do not have proper notochord
- Nerve cord is present
- eg: Herdmania, Amphioxus, Balanogesus

Vertebrates

Cyclostomata

- jawless vertebrates
- eg: Petromyzon/Myxine, hog fishes, lamprey

Pieces

- fishes
- 2 Chambered heart
- eg: Dog fish, Shark, tuna

Amphibians

- mucous glands in skin for respiration
- 3 chambered heart
- eg: Frogs, toads, salamader

Reptiles

- 3 chambered heart
- Exception: Crocodile (4 chambered heart)
- Cold blooded animals
- eg: snake, turtle, lizard, crocodile

Aves

- warm blooded animals
- 4 chambered heart
- lay eggs

Mammalian

- warm blooded organism
- 4 chambered heart
- mammary glands
- Exception: Mammals but lay eggs
- eg: Platypus & echidnas
- eg: Human, Whale, Dolphins

Arthropoda

- Largest phylum in animal kingdom
- Organ system organisation
- Bilateral symmetry
- Triploblastic & coelomate
- jointed legs
- Segmented body into head, thorax/cahals thorax, abdomen
- Open circulatory system
- Exoskeleton is made of chitin
- Unisexual
- eg: Spider, Crab, Crayfish, Silverfish

Echinodermata

- Organ system organisation
- Radial symmetry
- Triploblastic & coelomate
- Spiny skinned organism
- Star shaped, spherical, elongated
- No segmentation
- eg: Star fish, Brittle Stars, Sea urchins

Porifera

- Cellular level organization
- Diploblastic & Acoelomate
- have pores so it called sponges
- Non-mobile, aquatic
- Endoskeleton is present
- eg: Scyon, Euplectella, Spongilla

Cnidaria/ Coelenterata

- Tissue level organisation
- Radial symmetry
- Diploblastic & Acoelomate
- Aquatic
- Exoskeleton made of calcium carbonate
- Anus is absent
- eg: Jelly fish, Coral and hydra

Platyhelminthes

- Organ level organisation
- Bilateral symmetry
- Triploblastic & Acoelomate
- Anus is absent
- dorsoventrally flattened body (like ribbon)
- parasitic or free living
- Hermaphrodite (Male+Female part present)
- eg: Planareia, Liverfluke, Tape worm

Nematodes/ Aschelmithes

- Organ system organisation
- Bilateral symmetry
- Triploblastic & Pseudocoelom
- Body is cylindrical
- eg: Elephantiasis (filarial worms) & Worms in intestines (roundworms/pinworms)
- Sexes are separate

Annelida

- Organ system organisation
- Bilateral symmetry
- Triploblastic & coelomate
- Body segmetation is present
- Locomotory organs paired, lateral appendages - Parapodia (Nereis)
- eg: Earthworms, Leech

Mollusca

- 2nd largest phylum
- Organ system organisation
- Bilateral symmetry
- Triploblastic & coelomate
- Body is soft
- Exoskeleton is hard (snails)
- Open circulatory system
- eg: Octopus, Pila, Unio, Snail

BRAIN

Plant Movement

- Nastic Movement
  - Not growth related
  - eg: movement by touch: Thigmonastic Movement (touch me not plant)
- Tropic Movement
  - Growth related
  - Phototropic
    - in response to light
    - Positive movement: Shoots
    - Negative movement: Roots
  - Hydrotropism
    - in response to water
    - Positive movement: Roots
    - Negative movement: Shoots
  - Chemotropism
    - in response to chemical stimuli
    - eg: Growth of pollen tube towards the ovule
  - Geotropism
    - in response to Gravity
    - Positive movement: Roots
    - Negative movement: Shoots

Animals Hormones

- Thyroxine
  - Released by thyroid gland (largest endocrine gland)
  - Located in neck region
  - deficiency of Iodine cause Goitre in it
- Growth Hormone
  - secreted by pituitary gland (Master Gland)
  - known as Somatotropin
  - less amount leads to dwarfism
  - surplus amount leads to Acromegaly
- Adrenal Gland
  - regulates blood pressure, heart beat
  - located above kidneys
  - Fight or Flight hormone
  - Deficiency causes - Addison's disease
- Insulin & Glucagon
  - Secreted by Pancreas
  - regulates sugar levels
- Sex Hormones
  - male — Testosterone
  - female — Estrogen/Progesterone
- Melatonin
  - Regulate sleep
  - Released by Pineal Gland (pea-sized gland)
  - located in brain

Nervous System

- Central Nervous System
  - Brain
  - Spinal Cord
- Peripheral Nervous System
  - Nerves

Nerves

- Neuron
  - Longest cell in our body
  - basic unit of nervous system
  - Glial cells
- Synapse
  - Gap between nerve

Brain

- Fore Brain
  - Cerebrum — Memory
  - Thalamus — Pain and Sensation
  - Hypothalamus — Regulates body temperature Hunger, thrust & Sleet
- Mid Brain
  - Controls involuntary actions such as change in pupil size & reflex movements
  - vision, hearing
- Hind Brain
  - Cerebellum — Controls posture and balance
  - Pons — Connects Brain and Spinal Cord
  - Medulla Oblongata — Controls Automatic Nervous System (ANS) - Respiration/heartbeat/Digestion

Plant Hormones

- Auxin
  - Growth hormone
  - involved in phototropism (response towards light)
- Gibbrelin
  - Growth hormone
  - Responsible for germination/flowering
- Cytokinins — Promote cell division
- Abscisic Acid
  - It inhibits growth
  - stress hormone
- Ethylene
  - Gaseous hormone
  - helps in fruit ripening

REPRODUCTION

SEXUAL

- involves two parents
- in PLANT
  - Reproductive organ in plants: Flower
  - Male part called STAMEN
    - supports anther — Filament
    - produces pollen — Anther
  - Female part called PISTIL
    - sticky bulb that catches pollen — Stigma
    - passageway for grain — Style
    - holds the eggs awaiting fertilisation. Becomes the fruit — Ovary
  - pollen grains reach stigma through — Pollination
    - Anemophily - Wind
    - Hydrophily - Water
    - Antemophily - Insect
  - 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 guard
- in HUMANS
  - Male sex cells — produce form Testicle — Sperm
  - Female sex cells — produce form Overy — Ovum
  - Menarche - Ovaries start to mature & produce eggs (age 11-12 yrs)
  - Menopause -natural decline in producing eggs (age 40-50yrs)
  - Gametogenesis > Insemination > Fertilisation > Zygote > Implantation > Gestation
  - Cervical cancer - by Human Papilloma Virus (HPV)
  - IVF (In vitro fertilisation) — fertility treatment where eggs are combined with the sperm outside the body in a lab
  - Methods of Sterilisation
    - surgically blocking fallopian tube — Tubectomy
    - surgically blocking Vas deferens — Vasectomy
  - Parthenogenesis — asexual reproduction in which of embryo occurred directly from egg without fertilis
    - eg: Honey bees, lizard

ASEXUAL

- involves a single parent
- BINARY FISSION
  - divides into two offsprings
  - Only for unicellular organisms
  - eg: Amoeba, Bcteria, Paramecium, Leishmania
- MULTIPLE FISSION
  - divides into many offsprings
  - Only for unicellular organisms
  - eg: Plasmodium (Malarial parasite)
- FRAGMENTATION
  - Breaks into half which is not fully develop & become a new one
  - only for simple multicellular organisms
  - eg: spirogyra & sea anemone
- BUDDING
  - Develops buds to be new one
  - only for simple multicellular organisms
  - eg: hydra & yeast
- REGENERATION
  - repairs or regenerates the missing part of body
  - only for simple multicellular organisms
  - eg: planaria, hydra & rhizopus
- SPORE FORMATION
  - Bob and stick like structures that releases spores
  - only for simple multicellular organisms
  - eg: Rhizopus
- VEGETATIVE PROPAGATION
  - grow from a fragment or cutting of parent plants
  - CUTTING
    - stem or leaf is cut and planted into soi
    - eg: rose plant, money plant, sugarcane plant, banana plant
  - LAYERING
    - stem of the plant is bent to the ground and covered with soil
    - eg: Lemon, strawberry
  - GRAFTING
    - cutting from some other plant attached to the stem of a plant
    - eg: Rose plant
- TISSUE CULTURE
  - Scientific artificial vegetative propagation
  - eg: Snake plant

DIGESTIVE SYSTEM

PARMAR SSC

Mouth
- known as Buccal Cavity
- Saliva Gland releases Salivary Amylase
- enzyme breaks complex carbohydrates to simple carbohydrates

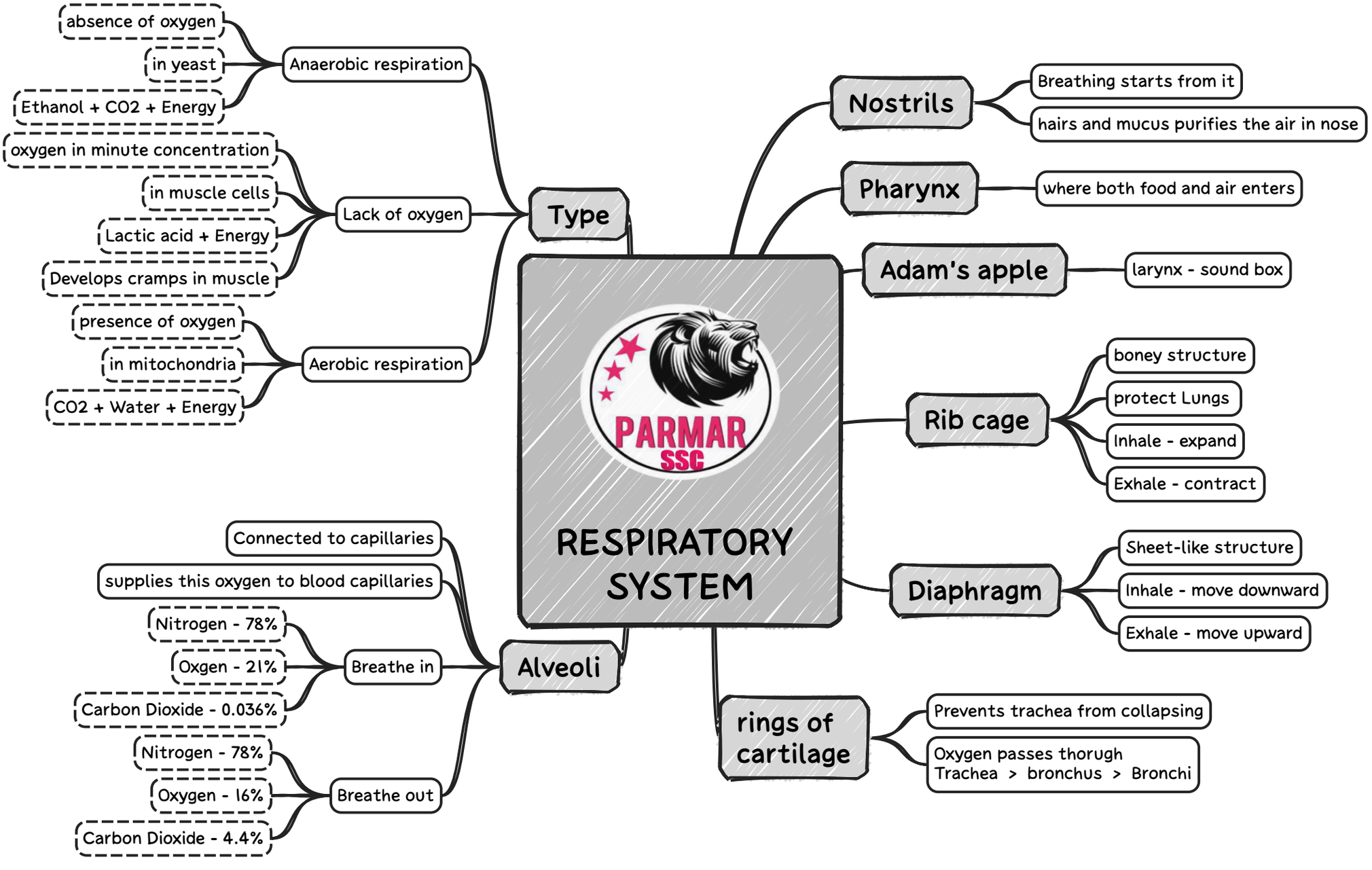
Oesophagus
- Food pipe
- food directly goes to stomach

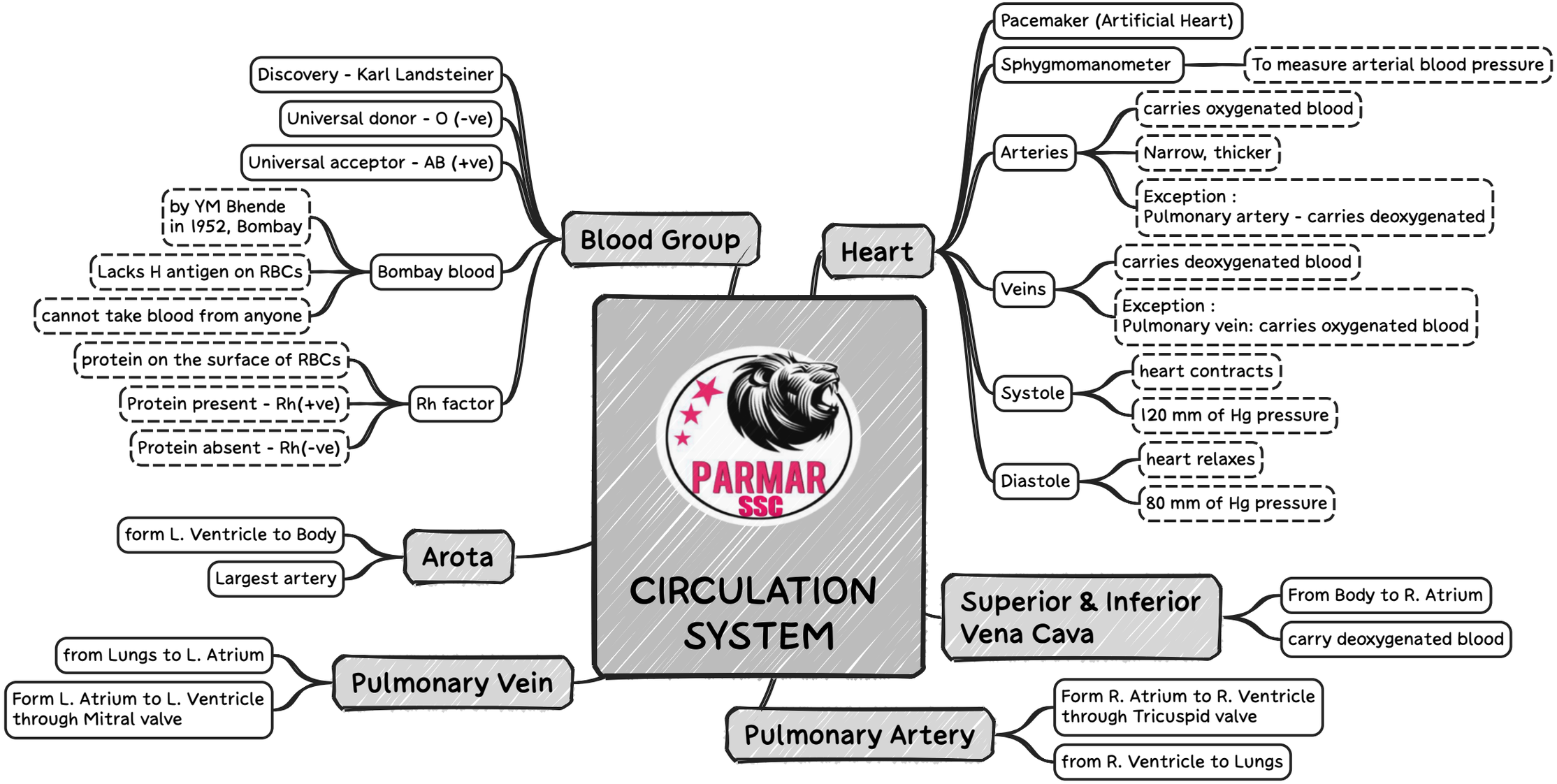
Stomach
- HCl
  - known as Gastric juice
  - kills harmful bacteria
  - make acidic medium
- Pepsin
  - works in acidic medium
  - breaks protein into Amino acids
- Mucus membrane
  - protects inner delicate lining of stomach from gastric juice

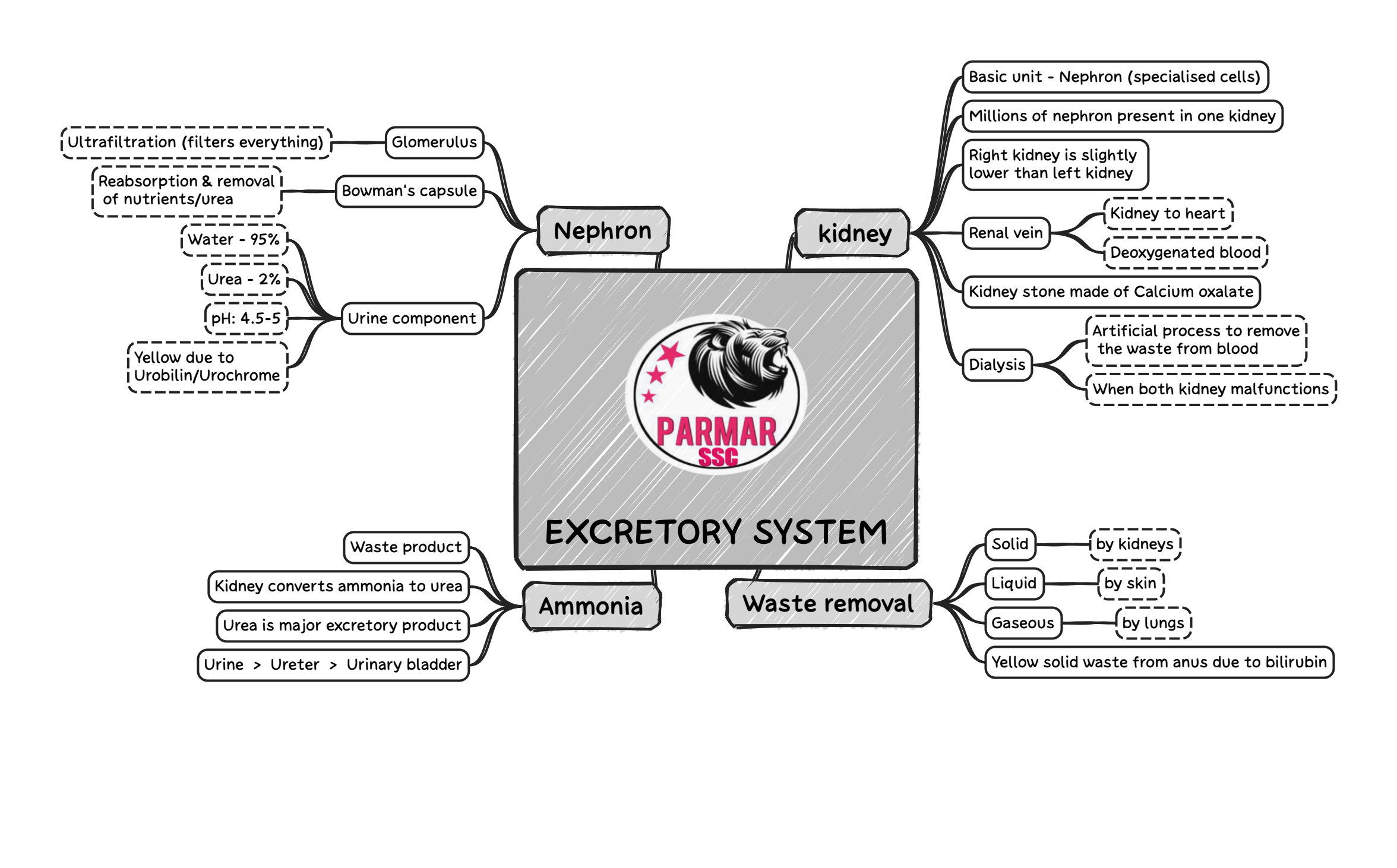
Liver
- largest gland
- dark red brown in colour
- Position - right of abdomen side
- Kupffer cells
  - star shaped phagocytic cells
  - involved in breakdown of RBCs
- Hepatocytes
  - major parenchymal cells
  - responsible for various cellular functions
- not a part of Alimentary Canal

Small intestine
- Sphincter muscle
  - allows food to pass from stomach to small intestine
- 7-8 m long
- 3 parts - Duodenum, Jejunum & Ileum
- Major part of digestion occur here
- Bile juice
  - secreted by liver
  - basic/alkaline medium
  - large Fat globules into Smaller one
- Pancreatic juice
  - secreted by Pancreas
  - amylase
    - breaks carbs
  - lipase
    - fats into fatty acid
  - trypsin
    - Works in basic medium
    - proteins into amino acid
- Villi
  - e finger-like projections
  - help in increase of surface area for food absorption

Large intestine
- 1.5 m long
- Absorb water from food
- Rectum
  - store the waste material
  - further releases through Anus


RESPIRATORY SYSTEM
PARMAR SSC
Type
Anaerobic respiration
absence of oxygen
in yeast
Ethanol + CO2 + Energy
Lack of oxygen
oxygen in minute concentration
in muscle cells
Lactic acid + Energy
Develops cramps in muscle
Aerobic respiration
presence of oxygen
in mitochondria
CO2 + Water + Energy
Alveoli
Connected to capillaries
supplies this oxygen to blood capillaries
Breathe in
Nitrogen - 78%
Oxgen - 21%
Carbon Dioxide - 0.036%
Breathe out
Nitrogen - 78%
Oxygen - 16%
Carbon Dioxide - 4.4%
Nostrils
Breathing starts from it
hairs and mucus purifies the air in nose
Pharynx
where both food and air enters
Adam's apple
larynx - sound box
Rib cage
boney structure
protect Lungs
Inhale - expand
Exhale - contract
Diaphragm
Sheet-like structure
Inhale - move downward
Exhale - move upward
rings of cartilage
Prevents trachea from collapsing
Oxygen passes thorugh
Trachea > bronchus > Bronchi


CIRCULATION SYSTEM
PARMAR SSC
Blood Group
Discovery - Karl Landsteiner
Universal donor - O (-ve)
Universal acceptor - AB (+ve)
Bombay blood
by YM Bhende in 1952, Bombay
Lacks H antigen on RBCs
cannot take blood from anyone
Rh factor
protein on the surface of RBCs
Protein present - Rh(+ve)
Protein absent - Rh(-ve)
Heart
Pacemaker (Artificial Heart)
Sphygmomanometer
To measure arterial blood pressure
Arteries
carries oxygenated blood
Narrow, thicker
Exception : Pulmonary artery - carries deoxygenated
Veins
carries deoxygenated blood
Exception : Pulmonary vein: carries oxygenated blood
Systole
heart contracts
120 mm of Hg pressure
Diastole
heart relaxes
80 mm of Hg pressure
Arota
form L. Ventricle to Body
Largest artery
Superior & Inferior Vena Cava
From Body to R. Atrium
carry deoxygenated blood
Pulmonary Vein
from Lungs to L. Atrium
Form L. Atrium to L. Ventricle through Mitral valve
Pulmonary Artery
Form R. Atrium to R. Ventricle through Tricuspid valve
from R. Ventricle to Lungs


EXCRETORY SYSTEM
PARMAR SSC
Nephron
Glomerulus
Ultrafiltration (filters everything)
Bowman's capsule
Reabsorption & removal of nutrients/urea
Urine component
Water - 95%
Urea - 2%
pH: 4.5-5
Yellow due to Urobilin/Urochrome
kidney
Basic unit - Nephron (specialised cells)
Millions of nephron present in one kidney
Right kidney is slightly lower than left kidney
Renal vein
Kidney to heart
Deoxygenated blood
Kidney stone made of Calcium oxalate
Dialysis
Artificial process to remove the waste from blood
When both kidney malfunctions
Ammonia
Waste product
Kidney converts ammonia to urea
Urea is major excretory product
Urine > Ureter > Urinary bladder
Waste removal
Solid
by kidneys
Liquid
by skin
Gaseous
by lungs
Yellow solid waste from anus due to bilirubin

DISEASES

Bacteria

- Prokaryotes, Unicellular and living entity
- genetic material is called genophore (bacterial DNA)
- Divides on its own
- Parasitic/Saprophytic
- Antibiotics used to treat
- Plague
  - Death due to plague known as - Black Death
  - 1897-1906 - 12 Million death in India
  - Caused by - Yersinia pestis
- Leprosy
  - Affects skin
  - Also known as Hansen's Disease
  - Caused by: Mycobacterium leprae
- Tetanus
  - Clostridium tetani
- Whooping cough
  - Diphtheria
  - Affects respiratory tract
- Gonorrhoea
  - Affects reproductive organs
- Pneumonia
  - Streptococcus
  - pneumoniae
- Typhoid
  - Salmonella typhi
  - Widal Test
- Anthrax
  - Transferred through animals
- Tuberclosis (TB)
  - Caused by - Mycobacterium tuberculosis
  - Mainly attack lungs
  - Commonly referred as White Plague
  - Vaccine - BCG (Bacillus Calmette-Guerin)
- Cholera
  - Caused by: Vibrio cholera
  - It is a water borne disease
  - Death due to cholera known as - Blue Death
- Syphilis
- Acne
  - Staphylococcus bacteria

Protozoa

- Malaria
  - Protozoa - plasmodium
  - Carrier - female Anopheles mosquito
  - Treatment - Quinine (found in bark of cinchona tree)
  - Detection - VIVAX TEST
  - Malaria Day - 25th April
- Sleeping Sickness
  - Protozoa - Trypanosoma
  - Carrier - Tse Tse flies
- Kala Azar
  - Protozoa - Leishmania
  - Carrier - Sandfly

Fungi

- Baldness
- Athlete's foot
- Ring worm
- Skin disease
  - Scabies
- Asthma

Classification

- Acute disease
  - diseases that last for a short period of time
  - eg: fever, cold, cough
- Chronic diseases
  - diseases that last for a long period of time
  - eg: Diabetes, TB, elephantiasis (filaria)
- COMMUNICABLE
  - diseases that spread from one person to another
  - eg: AIDS, cold, chicken pox, COVID
  - infectious diseases
- NON-COMMUNICABLE
  - diseases that cannot spread from contact
  - non-infectious diseases
  - eg: diabetes, arthritis, glaucoma, polio
- Pandemic
  - Sudden an intention cases across several countries, continents, or the world
- Epidemic
  - Sudden increase in cases spreading through a large population
- Endemic
  - These disease are constantly present in a population or region with relatively low spread

GENETIC DISORDERS

- caused due to gene malfunction (meiosis)
- Down Syndrome
- Thalassemia
- Sickle Cell Anaemia
- Colour blindness

Mendelian Disorders
Change in gene (gene defects)

- Turner's Syndrome
  - X-chromosome is missing, seen only in female
- Albinism
- Angelman Syndrome
- Klienfelter Syndrome
  - Presence of an extra copy of X-chromosome in males

VIRUS

- genetic material encoded in a protein envelope known as Capsid
  - DNA
  - RNA
- behave as Non-living outside
- Become active after getting a host
- cannot be treated with antibiotics
- Hepatitis
  - affects liver
  - Hepatitis A: Transmission through food
  - Hepatitis B: Sexually transmitted through bodily fluids
  - Hepatitis C: Transmitted when in contact with infected blood
  - India's first indigenous Hepatitis-A vaccine: Havisure
- Jaundice
  - mainly affects liver
- Mums
  - affects the parotid salivary glands
- Polio
  - Virus - Poliomyelitis virus
    - Entovirus
  - eradicated from India, as declared in 2023
  - affects the nervous system
  - 1st polio vaccine - by Dr. Jonas Salk
  - Inactivated (killed) polio vaccine (IPV) - by Dr. John Salk
  - Live attenuated (weakened) oral polio vaccine (OPV) - by Dr. Albert Sabin
- Cervical Cancer
  - affects the cervix region in women
  - Virus - Human Papillomavirus
  - Detected through - Smear Test
- Dengue
  - carrier - female Aedes aegypti mosquito
- Acquired Immunodeficiency Syndrome (AIDS)
  - sexually-transmitted diseases
  - virus - HIV (Human Immunodeficiency Virus)
    - Retrovirus
  - death - due to weak immune system
  - method of transmission - sexual contact, blood transfusions, from mother to baby
  - test - ELISA Test (Enzyme-linked Immunosorbent Assay)
  - AIDS DAY - 1st Dec
- Measles
- Influenza
- Swine flu
  - H1N1
- Rabies
- Bird flu
  - H5N1
- Small pox
  - eradicated in 1979
  - last case in Somalia (Africa)

NUTRIENTS

In Plant

- make own food through photosynthesis
- Requires - CO2, Water, Sunlight
  6CO2 + 6H2O ----> C6H12O6 + 6O2
- Presence of - Chlorophyll > Plastic(Chloroplast)
  - in stroma — Dark reaction
  - in grana — Light reaction
- Macronutrients
  - Magnesium
  - sulfur
  - Oxygen
  - Carbon
  - Silicon
  - Calcium
  - Potassium
  - Phosphorus
  - Nitrogen
  - Hydrogen
  - NPK used in Urea
- Micronutrients
  - Sodium
  - Chlorine
  - Molybdenum
  - Copper
  - Iron
  - Cobalt
  - Nickle
  - Boron
  - Zinc
  - Manganese

Minerals

- Deficiency - Bone / Tooth issues — Calcium
- Deficiency - Goitre — Iodine
- Deficiency - Anaemia — Iron

vitamin

- discovered by - Casimir Funk
- Vitamin A
  - Retinol
  - Deficiency - Night Blindness / Xerophthalmia
  - Source - Carrot, mango, apple, papaya
- Vitamin B
  - Vitamin B1 — Thiamine
    - Deficiency - Beri-beri
  - Vitamin B2 — Riboflavin
  - Vitamin B3 — Niacin / Niacinamide
    - Deficiency - Pallagra, 3D
  - Vitamin B5 — Pantothenic acid
  - Vitamin B6 — Pyridoxine / Pyridoxamine / Pyridoxal
  - Vitamin B7/ H — Biotin
  - Vitamin B9/B11 — Folic Acid
  - Vitamin B12 — Cyanocobalamin
    - Deficiency - Pernicias anemia
- Vitamin C
  - Ascorbic Acid
  - Deficiency - Scurvy / Bleeding Gum
  - Source - Lemon, Amla
- Vitamin D
  - Calciferol
  - Deficiency - Rickets / Osteomalacia
  - Source - Sunlight, Fish oil
- Vitamin E
  - Tocopherols
  - Deficiency - Anti-Sterility
  - Source - Sprouts
- Vitamin K
  - Phylloquinone
  - Deficiency - no blood clotting
- type
  - Water Soluble — Vitamin B & Vitamin C
  - Fat Soluble — Vitamin A, Vitamin D, Vitamin E & Vitamin K

Nutrition

- Autotrophic — eg: Green plant, Phytoplantons
- Heterotrophic
  - Saprophytic
    - feed on dead & decaying
    - eg: Fungi, Yeast
  - Parasitic — eg: Cuscuta, Plasmodium, Nematodes
  - Holozoic — eg: Man, Dog, Amoeba

In Animal

- Micronutrients
- Macronutrients

Fats

- High energy storage
- Storage in Adipose tissue
- Saturated
  - Single bond
  - Hard to digest
  - eg: Animal fat, Trans fat
- Unsaturated
  - Double / Triple Bond
  - Easily to digest
  - eg: Vegetable oil, Plant fat
- Bile juice emulsify fat
- Lipase turn fat in Fatty acid

Carbohydrates

- Sugar — Glucose
- provides Energy
- Simple
  - Monosachhride
  - 1 molecule of Sugar
  - eg: Glucose, Fructose, Galactose
- Complex
  - Disachhride
    - 2 molecule of sugar
    - eg: Sucrose, Maltose, Lactose
  - Polyschhride
    - many moleucle of sugar
    - eg: Glycogen, Starch, Cellulose
- Benedict Test — sugar is present or not

Proteins

- fundamental unit - Amino acids
  - Essential
    - need to be consumed
    - eg: Leucine, Histidine, Lysine, Tryptophan
  - Non -essential
    - body synthesises on its own
    - eg: Glutamine, Glycine, Proline, Arginine
- Body building nutrients
- eg:
  - Egg: white part (proteins), yolk: yellow part (fats, vitamins, etc)
  - Soyabean

Genetics

- Father of Genetics - Gregor Johann Mendel
- study in Pea (Piscum Satvium) plant
- Chromosome
  - 22 pair
  - 1 pair
    - called Sex chromosome
    - male - XY
    - Female - XX
    - Trans gender - Chromosomal Abnormality
- Turner's Syndrome
  - X-chromosome is missing
  - In female (X)
- Down's Sundrome
  - X-chromosome is extra
  - In male (XXY)
- Homologous organ
  - seems similar ; different function
  - eg: Human hand, Dog hand, Bird hand
- Analogous organ
  - seems different ; similar function
  - eg: Butterfly wing, Bat wing, Bird wing

Tooth

- Structure
  - Crown
    - Enamel
      - hardest part
      - Calcium Phospate (CaPo4)
    - Dentin
    - Pulp cavity
  - Neck
  - Root
    - Root Canal
    - Cement
- Type
  - Incisors (8) — Biting
  - Canines (4) — Tearing of food
  - Pre-Molars (8) — Chewing / Grinding
  - Morals (12)
    - Wisdom tooth / 3rd molar
    - Chewing / Grinding
- No. of tooth
  - Adult — 32
  - Child
    - 20
    - in child Pre-molars are absent
- Dentine formula
  - Adult — 2123 / 2123
  - Child — 2102 / 2102
- Elephant's tusk is Incisor
- Bird's beak is modified form of teeth