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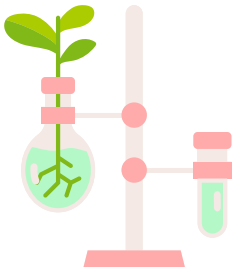
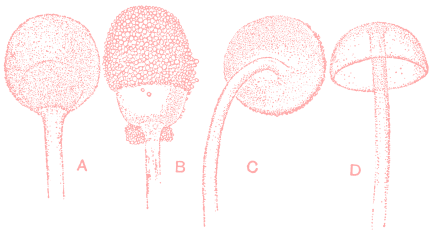
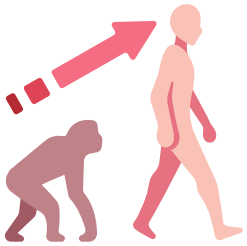
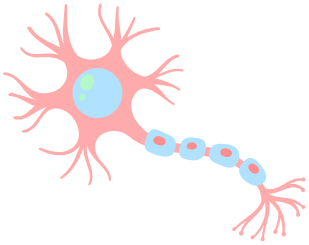
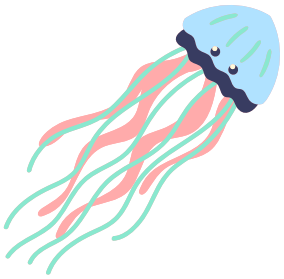
BIOLOGY MDCAT Guidebook 2024



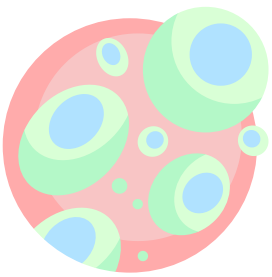








Elevate your MDCAT journey with **PreMed.PK**



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About Author

Hey MDCAT warriors,

This guide was made by your senior **Hira Zahid,** 2nd year MBBS student, whether you're just starting out or looking to level up your game, this course outline is here to empower you! Get ready to tackle the MDCAT exam head-on as we dive into the ins and outs of biology, chemistry, physics, and English... Well break down complex topics, provide practice exercises, and share valuable tips and tricks to boost your confidence and maximize your score. Let's embark on this MDCAT adventure together and rock that exam!"

So first you have to know the books which you have to study and build concepts from as it is the first step for you to take.. Its important to know from where to start and which right resources to use as its gonna help to save your a lot of time and acts as a building block toward your goals.

START

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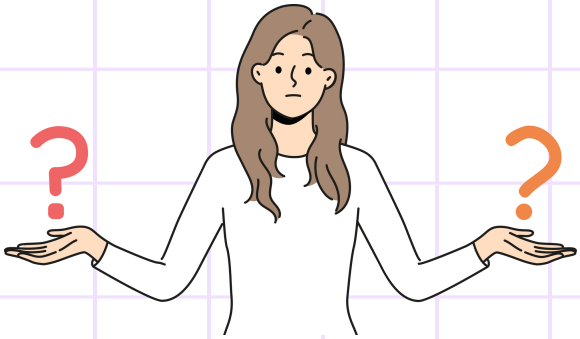
Preferance list for your preparation



1. 1st PREFERENCE
   SINDH TEXT BOOK
2. 2nd PREFERENCE
   FEDERAL TEXT BOOK
3. 3rd PREFERENCE
   PUNJAB TEXT BOOK
4. 4th PREFERENCE
   BALOCHISTAN TEXT BOOK

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NOTE:

First you have to give priority to your own province books learn the content from your books which you have study in your board exams build concepts from it and if you see any objective which is mention in pmdc syllabus and it dosen't exists in your book then go for fedral book if you are sindh student they are written very well and also they are easy to understand and make good concepts.

Federal books are good because they are easy to understand for example evolution chp has more info in federal books and also immunity they are written well in federal & Cardiac cycle as well..

So for sindh students especially there books have been changed from this year so the improver also have to study from the new books which have been published by STB.

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Important Topics

1. Acellular life
2. Bioenergtics
3. Biomolecules
4. Cell structure and Function
5. Diversity among animals
6. Enzymes
7. Evolution
8. Life Processes in Animals and Plants
   - Carnivorous plants/parasitic nutrition (pitcherplant, venus fly trap, sundew)
   - Water and mineral uptake by roots, xylem and phloem.
   - Osmotic pressure/potential
   - Forms and function in plants
   - Cardiovascular system (including human heart structure, blood vessels)
   - Lymaphatic system.
   - Circulation (chapter # 12)
   - Digestive system (Holozoic Nutrition) (chapter # 11)
   - Immune system (Immunity)
   - Respiratory system(Gaseous exchange)
9. Prokaryotes
10. Coordination and control/ nervous and chemical coordination) (Nervous coordination) (chemical coordination)
11. Reproduction
12. Support and movement
13. Variation and Genetics/ Inheritance

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Biology MDCAT Guide

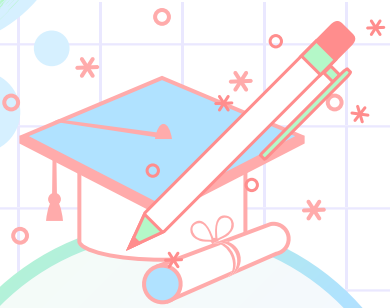
Shortlisting: It simply means to summarize each chapter's most important points on 2 to 3 pages so that instead of re-reading the whole chapter you can revise those shortlisted points from time to time (this will save a lot of energy and will be very beneficial during the last month of MDCAT prep).

Build your **concepts** rather than just cramming. Each line of your textbooks has some sort of concept in it.

Set a goal/Timetable: timetable helps you stay disciplined during your studies... make a weekly REALISTIC timetable and try to complete your daily goals.

Revision: Keep revising after every one day.

Lectures are important for you to build your concepts.. You can make your notes while taking lectures or while you are reading.



MDCAT prep is **40% lectures** and concepts and **60% practice**. Try to practice as much as you can. Stick to one resource and follow it religiously. I used my academy books and **www.Premed.Pk** (use one of the admin discount code if you are interested). It is an all-in-one resource with topical questions, nums, aku and mdcat mocks, nts,uhs, pmc,nums,etea past papers etc.

Techniques:
(1) You can use **pomodoro** technique (study for 25 min and take 5 min break) (teach concepts to yourself after learning)
(2) Spaced repetition (revise topics in every four days, 1 week, 2 weeks)

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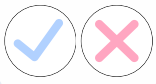
MCQ Solving Strategies

Understand Concepts
Ensure a solid grasp of underlying concepts and principles.

Read Questions Carefully
Pay attention to details and what's being asked.

Eliminate Wrong Answers:
Rule out obviously incorrect options to narrow down your choice

Review Mistakes
Learn from mistakes made in practice tests to avoid them in the future.



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Practice Regularly
Practice different types of MCQ's regularly to improve speed and accuracy.

Time Management
If time-bound, manage time effectively; don't linger too long on a single question..

Dear students! If you are in search of such a real platform for practice and your MDCAT preparation, then I have an exciting news for you and that is PreMeD. Practice makes a man perfect and this is the best platform for your MDCAT exam practice and you will definitely ace it
BEST OF LUCK FUTURE DOCTORS!

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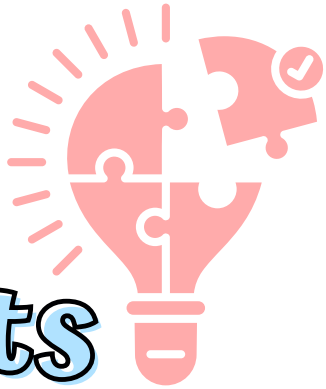
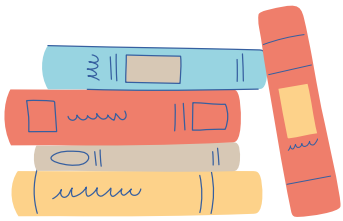
Biology Important Points



- Cutin is a lipid. it is not a protein.
- Sucrose is a non-reducing sugar.
- Isoprenoids are monomers of carotenoids,steroids and terpenes.
- ATP, RuBP, NADP all have ribose sugar in them.
- Most enzymes work at slightly Alkaline pH.
- With each cardiac output Kidney receives 10%.{both Kidneys receive 20 %}
- In a molecule of DNA, nucleotides are linked both vertically and horizontly.
- Tetroses are least abundant carbohydrates in nature.
- Charged pores in a cell membrane are formed by Channel proteins.
- Cytokinesis is the division of CELL after the division of cytoplasm.It is not the division of cytoplasm.
- Bacterial chromosome has DNA only,nothing else.
- NOSTOC lacks mitochondria and hence it is not present.
- Chromosome condensation is at PEAK in METAPHASE phase.
- All those sugars ending in "ulose" are KETO SUGARS { exceptions are Fructose and Dihydroxyacetone},these are also keto.
- Agar,Pectin,Starch do not contain NITROGEN in them.
- CHITIN has NITROGEN in it.
- Alkaloids { Nicotine,Daturine,Atropine } are frequently present in SOLANACEA family.
- Acoelomates,bPsuedocoelomates, Coelomates ALL have MESODERM in them.
- CAPSID of Polio Virus is SPHERICAL in shape.
- ENDOSPORES are formed during DECLINE phase.
- Spores are formed during ASEXUAL reproduction in Rhizopus.
- Most superficial infections are caused by Duetromycetes fungi.



- RED ALGAE also help in Coral formation.
- Secondary host of Liverfluke is SNAIL.
- TRANSDUCED bacteria has three types of DNA in it.{of itself,of other bacteria and of Virus }
- RHIZOPUS is Aseptate and Multinucleate.
- Bacteriophage is always DNA,it cannot have RNA. 5
- First organ system ever developed in evolution after formation of Mesoderm is neither Digestive,nor Nervous but it is EXCRETORY system by PLATYHELMENTHES.
- HYDRA has no specialized muscle cells because it lacks MESODERM.
- Triploblastic animals with radial symmetry are not coelenterates,Arthropoda,chordates.
- Mesoderm has originated from cell extensions of ectoderm and endoderm.
- In most of the animals around us, OPEN TYPE blood circulation is present.
- Longest part of Digestive system is ILEUM.
- innermost layer of digestive systems is MUCOSA.
- Pancreas is involved in Chemical digestion of LIPIDS.
- Mucous is made of glycoprotein.
- Trypsinogen is activated by Enterokinase enzyme.
- Ciliated Epithelial cells are present in TRACHEA.
- Respiratory surface is 2-cell thick.
- CO,carbon monoxide has highest affinity for Haemoglobin.
- Ptaylin works on the food when it passes through oesophagus.
- One fatty acid doesnot combine withanother fattyacid and hence no linkage is present in two fatty acids.
- An oxygen molecule in an alveolar space crosses 5 membranes till it reaches our red blood cells.

- Haemoglobin can carry both CO and CO2, 02 and CO2 simultaneously.
- Pappilary muscles are extensions of Endocardium.
- In case of fungal infections Eosinophils increases in numbers.
- Lymph flow requires a strong pumping by blood.
- Mitral valve is also known as Bicuspid valve.
- Urinogenital tract is also known as Urethra.
- Maximum reabsorption of water takes place in Proximal Convoluted Tubule.
- Covering of Kidneys is Fibrous capsule.
- Kidney interstitium is related to Aldosterone for more concentration.
- Hepatic Vein has maximum amount of Urea.
- Antibodies are transferred from mother to both foetus and Neonate.
- Interferon are the antibiotics produced against viral attack.
- Maturation of sperms take place in Epididymus.
- Thickest layer of female reproductive tract is Myometrium.
- First polar body is present alongwith secondry oocyte.
- Thickest endometrium is present just before Menstruation.
- Bulbouretheral gland performes the function of neutralization of urine and lubrication.
- Testosterone is secreted in human male before birth.
- Ovulation relates to the release of secondary oocyte.
- Olecranium process is the process involved in locking Ulna and Elbow joint.
- Smooth muscles first time appeared in Phylum Platyhelmenthes.
- Digestion is not controlled by Cerebrum.
- Medulla connects brain with spinal cord.
- Adrenaline and nor-adrenaline are synergistic.

- Veinous blood contains hormones.
- Posterior lobe of Pituitary secretes ADH,secretes Oxytocin but doesnot synthesize any hormone.
- Adrenaline dilates the pupil and ATROPINE also has the same function.
- Sense organs like ears,eyes and nose are controlled directly by forebrain.
- Neuroglial cells are actually SCHWANN cells .
- T-1 referes to producers,T-2 referes to primary consumers,T-3 refers to secondary consumers and T-4 refers to tertiary consumers.
- Mycorhiza is an association between plant growing in Acidic soil.
- Leaves are eaten by caterpillars and caterpillars are eaten by black birds.
- Grasses are resistant to grazing due to underground stem.
- Pesticide kills both insects and weeds. 8
- Stability in system is related to Food Web,more complex the web, the more is stability of the system.
- Symbiosis most correctly refers to living together of two organisms.
- Herbivores are reffered to as Primary Consumers and hence possess maximum amount of energy.
- A car parked in sunlight and its temperature is higher than outside.It is an example of Green house effect phenomenon.
- 10% energy flows from one level to another of the total amount of energy.
- Relation between T2 and T1 is GRAZING.
- relation between T2 and T3 is called Predation.
- Green house gases are CO2 and CFCs.
- Food web is benefical with more number of chains in it.
- Parasitism,Commensalism and Mutualism can be present between the same species.

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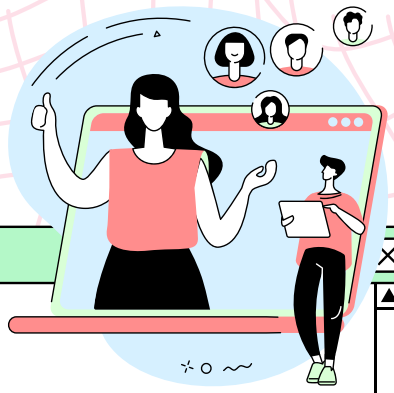


- Retrovirus is used for Gene Therapy.
- 20 RNA nucleotides in the primer of PCR.
- Male and female has more number of genes and more number of alleles respectively.
- Autosomal disease include colourblindness and haemophilia.
- Bombay disease refers to lack of an attacement factor.
- 50% RBC make composition of blood.
- Community is a biotic factor of the ecosystem.
- Golgi apparatus is absent in Blue green algae which is a prokaryote.
- Asperigillus is an example of Brown mold.
- Atropine and Adrenaline are synergistic.
- Enterobius Vermicularis is present in Large intestine.
- Primase plays the role of first logical step in the process of DNA replication.
- During replication nucleotides used are triphosphates.
- Golgi vesicles forming golgi apparatus probably bud off from Smooth endoplasmic reticulum.
- Hollow peristaltic contractions are called Hungerpangs.
- Glycerol is absorbed in VILLI.
- Carbonic acid is formed redblood cells.
- Semilunar valves are present in heart,blood vessels and lymph vessels.
- Granulocytes are polymorphonuclear in nature.
- Lithotripsy removes all types of stones present in gall bladder,urinar bladder and Kidney.
- Eosinophil and Basophil are antagonistic to each other.
- Fibrinogen,Thrombocytes and Basophills all are involved in clotting of blood directly or indirectly.
- Basophills release Heparin.
- Urine is formed in Distal convoluted tubule.

- CO is neutral in nature.
- Single molecule of Haemoglobin has 4 iron groups in it.
- Hip and shoulder joint are synovial joints.
- Hormones are always released in Veinous blood.
- Unmarried lady has more number of degenerated Corpus Luteum
- Ligaments differ from tendons in having Elastin.
- Fermentation occurs in cytosole and Mitochondria.
- Plasmid gene transfer are used for bacteria only.
- DNA ligase not required for PCR.
- Antigen of donor reacts with antibody of reciepient.
- Hydrogen bonds are more sensitive as compared to other bonds
- Chlorophyll a is common in antenna complex and reaction centre of photosynthesis.
- Evolution operates upon population.
- Product of evolution is the origion of a new species.
- Pilli are made up of PILLIN protein.
- Wheat grain is seed as well as fruit.
- Structural unit Reflex action is Neuron.
- Nerve Tracts are part of Central Nervous Ssystem.
- Secretion of Histamine by Basophills is sometimes related with use of Penicillin.
- Carotid Labyrinth is a swallowing at the base of carotid artery and its function is to maintain the pressure of blood.
- Most common form of glucose is in Ring form.
- In prokaryotes the transcription takes place in nucleoid.
- Leaves of Bamboo are used to cure the Horses.
- Antibodies are present in blood lymph and interstitial fluid.
- Retrovirus are not used in genetic engineering in bacteria.
- Aristotle first discussed evolution.

- DNA CONTAINING

=Enveloped viruses

HBV, Pox virus, Herpes virus

=Non enveloped viruses

Bacteriophage

- RNA CONTAINING

=Non enveloped viruses

HAV
HEV
TMV
Polio virus

=Enveloped viruses

HCV
HDV
HIV
Paramyxoviruses
Influenza virus
Rabies virus

= Unenveloped plus strand

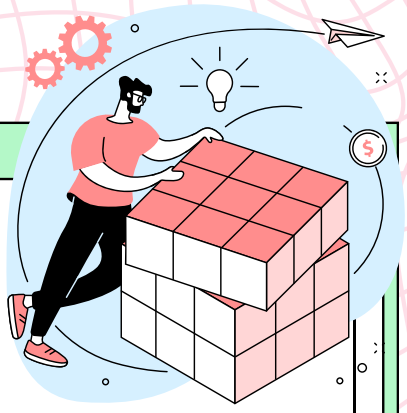
PRC (polio rhino cold)

= Enveloped plus strand

CALY (hep C hep A Leukemia Yellow fever)

=Minus Strand RNA

FMRP (Flu Mumps Rabies pox)



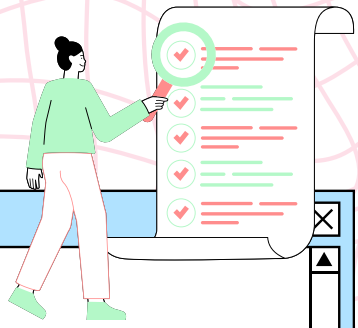
= Retrovirus
Ss RNA HIV , Ds dna hep b

= DS RNA icosahedron
RC (reovirus, colorado tick fever)

= Small genome DNA
HPW (hep, parvo, wartz)

= Medium genome large DNA
Herpes cancer causing

- Cnidarians=planula larva
- Annelids=trochophore larva
- Molluscs=trochophore larva
- Echinidermates=bipinnaria larva
- Hemichordates=tornaria larva
- Fish and Amphibians=Anamniota
- Reptiles, birds and mammals=Amniota
- Polyp and Medusa convert into each other
- All 7 kingdom are protosomes except Echonodermata & Chordata which are deutrosomes.
- Snakes have no limbs,nO eyeliDs and nO ears.
- Green tuRtle lays eggs on the same coast where it was born.
- Largest fishes are Whales.
- Farming Of honey bees is called Apiculture.
- Lamprey has No jaws.(jawless fishes)



- **Porifera:**

diploblastic, assymmetrical, sexes are sperate asexual (fragmentation & regeneration), sycon, euplectella, euspongia

- **Cnidaria:**

diploblastic, radially symmetrical,nervous system in the form of network, sexes separate,asexual by fragmentation & budding

- **Platyhelminthes:**

triploblastic, bilaterally symmetrical, acoelomata, nervous system (brain ganglia & pair of connected nerve cords), excretion(flame cells & proto-nephridia), hermaphrodite.

- **Aschelminthes(nematodes):**

bilaterally symmetrical, triploblastic, pseudocoelom, complete digestive & circulatory system,nervous(nerve cords)

- **Annelida:**

bilaterally symmetrical, triploblastic, alimentary canal (tube-like), true coelom, circulatory sys(close type), hearts two Or more, excretion(nephridia), nervous sys(double nervecord), sexes separate.

- **Mollusc:**

bilateral symmetry, triploblastic, coelom, respiration(gills & lungs), excretion(kidneys), heart present, circulatory sys(open-type), nervous(cerebral ganglion & pair of pedal nerves), hermaohrodite as well as separate sexes.

- **Arthropoda:**

bilateral symmetrical, triploblastic, circulatory sys (opentype), coelom, respiration(trachea & book lungs), excretion (malphigian tubules), sexes separate.

- Bat is the only flying mammal.
- Whale is the largest animal on earth.
- Elephant is the largest animal on land.

- Echinoderms and hemichordata are exclusively marine.
- Sea horse is a fish.
- Cuttlefish belongs to phylum Mollusca (cephalopoda) .
- Silver fish is an insect.

- **Larval Stages:**

Porifera: Amphiblastula.
Cnidarians: Planula.
Annelida and Mollusca: Trochophore.
Echinodermata: Bipinnaria
Hemichordata: Tornaria.
Agnatha: Ammocoete.

- **Cultures:**

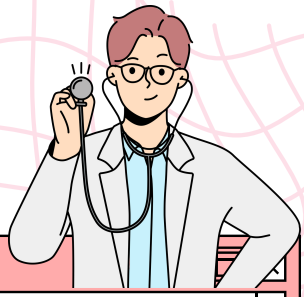
Honey bee: Apiculture
Silkworm: Sericulture

- **Studies:**
- Fishes: Ichthyology
- Birds: Ornithology
- Insects: Entomology

- **Waste products:**

UREA: some Molluscs, annelida, amphibians, mammals.
AMMONIA: echinoderms, cnidarians, fishes.
URIC ACID: reptiles, insects, birds.

- Nematodes are pseudocoelomates.
- Circulatory system first formed in anelida.
- Cnidarians contain nerve net as nervous system.
- Poriferians sexually are hermaphrodites.



- Cnidarians are radially symmetrical in whole life while echinodermates are radially symmetrical in adult life.
- Bile is a digestive fluid produced by the liver and stored in the gallbladder.
- Cells of stomach: Oxyntic cells/Parietal cells:--produce HCl
- Zymogen cells/Chief cells:-- Produce Pepsinogen Pepsin
- Mucous cells/Goblet cells:-- Produce Mucous
- Gastrin cells:--Produce Gastrin Hormone
- Oesophagus travels through the neck and thorax, behind the trachea.
- The food is moved by rhythmical muscular contractions known as peristalsis. It connect Pharynx with Stomach.

- **Menstrual Cycle:**

(**1**) Menstruation occurs in human, apes and old world monkeys.
(**2**) Menstruation is bleeding from the uterus of adult females at intervals of one lunar month.
(**3**) Beginning of menstruation or first menstruation is called menarche.
(**4**) The beginning of menstruation varies. It usually occurs between 12 and 15 years.
(**5**) The cycle of events starting from one menstruation till the next one is called Menstrual Cycle.
(**6**) In human females, menstruation is repeated at an average interval of about 28/29 days.
(**7**) One ovum is released (ovulation) during the middle of each menstrual cycle.
(**8**) It is regulated by certain hormones, some of which are secreted by the pituitary gland.
(**9**) The pituitary gland is stimulated by releasing factors produced in the hypothalamus.

(**10**) The hormones produced by the pituitary gland influence the ovaries. The hormones secreted by the ovaries affect the walls of the uterus.

- **Phases of Menstrual Cycle:**

The menstrual cycle consists of following four phases:

(**1**) **Menstrual Phase:**

(**i**) In a 28 days menstrual cycle,the menses takes place on cycle days 3 to 5.

(**ii**) The production of LH from the anterior lobe of the pituitary gland is reduced.

(**iii**) The withdrawal of this hormone causes degeneration of the corpus luteum and, therefore progestrone production is reduced.

(**iv**) Production of oestrogen is also reduced in this phase.

(**v**) The endometrium of uterus breaks down & menstruation begins.

(**vi**) The cells of endometrium secretions, blood & unfertilised ovum constitutes the menstrual flow.

(**2**) **Follicular Phase:**

(**i**) This phase usually includes cycle days 6-13 or 14 in a 28 days cycle.

(**ii**) The follicle stimulating hormone (FSH) secreted by the anterior lobe of the pituitary gland stimulates the ovarian follicle to secrete oestrogens.

(**iii**) Oestrogen stimulates the proliferation of the endometrium of the uterine wall.

(**iv**) The endometrium becomes thicker by rapid cell multiplication and this is accompanied by an increase in uterine glands & blood vessels.

(**3**) **Ovulatory Phase:**

(**i**) Both LH & FSH attain a peak level in the middle of cycle (about 14th day).

(**ii**) Oestrogen concentration in blood increases.
(**iii**) Rapid secretion of LH induces rupturing of graffian follicle and thereby the release of ovum.
(**iv**) In fact LH causes ovulation.

(**4**) **Luteal Phase:**
(**i**) Includes cycle days 15 to 28.
(**ii**) Corpus luteum secretes progestrone.
(**iii**) Endometrium thickens.
(**iv**) Uterine glands become secretory.

- **Hormonal Control of Menstrual Cycle:**

(**i**) FSH stimulates the ovarian follicles to produce oestrogens.
(**ii**) LH stimulates corpus luteum to secrete progestrone.
(**iii**) Menstrual phase is caused by the increased production of oestrogens.
(**iv**) LH causes ovulation
(**v**) Proliferative phase is caused by the increased production of oestrogens.
(**vi**) Secretory phase is caused by increased production of progestrone.

Carnivorous or Insectivorous Plants:

- They are found in nitrogenous deficient soil such as acidic bogs and rock outcropping. These plants obtain their nitrogen by capturing insects.
- Insectivorous plants can perform photosynthesis.
- Some of the examples of carnivorous plants are pitcher plant, Venus fly trap, sundew WAR plant, bladder wort and water fly trap.
- Insectivorous plants are truly autotrophs.
- They supplement organic food by trapping and digesting insects and small animals.

- In some of the insectivorous plants trapped insects are decomposed by bacteria.
- In some of the insectivorous plants trapped insects are digested by enzymes.
- Pitcher plant's scientific name is sarracenia pupurea. They have modified leaves in sac or a pitcher, partly filled with water, end of leaf is modified to form hood which partly covers the open mouth of the pitcher, insects that fall into the pitcher are prevented from climbing out by numerous stiff hairs, product is absorbed by the inner surface of the pitcher leaf.
- Venus fly trap's scientific name is Dionaea muscipula, their leaf is bilobed with midrib between them. In venus fly trap there is a row of long stiff bristles along the margins of each lobe, when an insect touches small sensitive hairs then lobes quickly come together with their bristles interlocked.
- Sundew plant's scientific name is Drosera intermedia. They have tiny leaves bear numerous like tentacles each with gland at tits tip.

Human Digestive System:

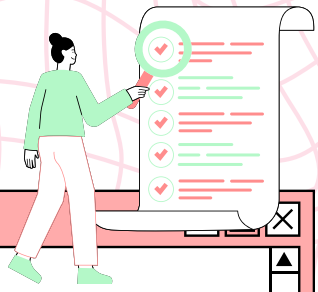
- Holozoic nutrition occurs in humans which is also known as animal like nutrition.
- In holozoic nutrition large complex organic foods will convert into smaller diffusible form of food particles by the help of enzymes.
- Holozoic nutrition has all steps of nutrition.
- Steps involved in holozoic nutrition are ingestion (taking in of food), digestion (break down of food), absorption (transfer of diffusible food into blood), transport (transportation of absorbed food from blood to all cells), assimilation (extraction of energy from food) and egestion (removal of undigested as waste).
- Mitochondria is considered as assimilatory organelle of cell.

- In human extracellular digestion (outside the cell) occurs. Tube like digestive system (having two openings) is present in humans..
- Human digestive system is comprises of two parts G.I.T and digestive glands.
- G.I.T is 10.5 meter long comprises of mouth and oral cavity, pharynx, oesophagus, stomach, small intestine, large intestine and anus.
- Digestive glands present in human body are salivary gland, pancreas and liver. Liver and pancreas does not come direct contact with food.
- Digestion occurs from oral cavity to jejunum (second part of small intestine).
- Peristallic movement in G.I.T starts from oesophaus to rectum. Hunger contraction is example of peristallic movement.
- All the blood vessels have normal blood sugar level except hepatic portal vein.
- There are 3 sites of digestion oral cavity, stomach and small intestine.
- Digestive molecules which can be digested in human body are carbohydrates, proteins, lipids and nucleic acid.
- We take carbohydrates in the form of polysaccharide which is broke down in dextrin in oral cavity. Dextrin is further converted into disaccharides in duodenum (1" part of small intestine). Finally disaccharides is converted into monosaccharides in jejunum.
- We take proteins in the form of polypeptide which is converted into long chain peptides (peptones) in stomach. Peptones are converted into short chain peptides (peptides) in duodenum. Peptides are finally converted into amine acid in jejunum.
- Lipids are just converted into fatty acids and glycerol in duodenum.
- Nucleic acid is converted into nucleotides in duodenum.
- Nucleotides are further converted into nucleosides in jejunum.

- Mostly digestion occurs in duodenum as it has large no of the enzymes. Mouth can be considered as upper and lower lips from where we take in food.
- Oral cavity is bounded by plate, tongue, teeth and cheeks. Food is tested, smelled and felt here.
- Tongue is responsible to taste and swallow food. Tongue has taste buds for selection.
- Tongue moves upwards and backwards against the roof of mouth for swallowing.
- Tongue also forces the epiglottis (a flap of cartilage).
- Beginning of swallowing is voluntary then it become automatic by peristallic movement. Teeth's role in digestion is biting and grinding (mastification).
- There are 3 conditions of having teeth which are diphyodont, hetrodont and thecodont. In dyphyodont two sets of teeth are present deciduous and permanent.
- In hetrodont condition different types of teeth are present.
- In thecodont condition teeth are fixed in gums. Teeth grinds the food (mechanical digestion) because oesophagus allows small pieces to pass. Also small pieces have much more surface for enzymes to attack.
- There are 32 teeth present in human body. Out of them 8 are incisors for biting, 4 canines for tearing the meat, 8 pre-molars and 12 molars for grinding of food.
- Well developed canines are present in carnivores.
- Wisdom teeth are including molars which are 4 in no.
- There are 3 types of salivary glands which releases saliva in oral cavity which are parotid gland (below ear pinna), sublingual gland (below tongue) and submandibular gland (below mandible).

- Saliva is 90% composed of water and remaining 10% are minerals, mucous, lysozyme (antibacterial properties) and amylase (ptalyin) enzyme.
- Functions of saliva are digestion of carbohydrates (polysaccharides dextrin), helps in swallowing, maintain oral hygiene, helps to develop taste and also helps in speech.
- Saliva contain bicarbonate and other salts which helps in to stabilize the PH of food,
- Fresh saliva is alkaline with nearly PH OF 8. Quickly loses CO, and gets PH of 6 Ptaylin or amylase converts starch/glycogen into maltose.
- Pharynx is common opening for trachea and oesophagus.
- Epiglottis resists food to enter into trachea.
- Oesophagus is long muscular tube, connect pharynx perform peristalsis to move the bolus into stomach.
- Trachea is present to the ventral side of oesophagus.
- In oral cavity and stomach both mechanical and (enzymatic) digestion occur.
- Antiperistalsis leads to vomiting.
- Oesophagus is present to dorsal side of the trachea.
- Hunger contraction is directly dependent on the low level of glucose in blood. Hunger contraction creates uncomfortable sensation called hunger pang.
- Hunger pang usually begins 12 to 14 hours after previous meal.
- Stomach is situated below the diaphragm on the left side.
- Stomach has capacity of 1-4 liter.
- Stomach is sac like organ, can store food upto 6 hours.
- Stomach has three types of muscles
- It helps in mechanical digestion and in peristalsis, movement are circular, longitudinal and oblique or transverse.

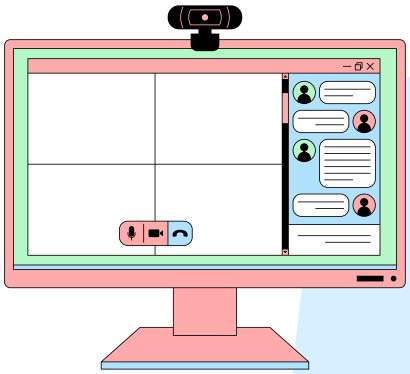
- Stomach wall is covered by three layers outer is compose of connective tissue, middle is composed of smooth muscle and inner one is composed of mucous layer.
- Stomach contain 2 sphinters cardiac at top and pyloric at base. The upper part of stomach next to the cardia is called fundus of stomach.
- In stomach food is partially digested known as chyne.
- Cells of stomach are oxyntic, zymogen, mucous and G-cells.
- Oxyntic cells are also called parietal cells responsible to produce HCl.
- Zymogen cells are also called chief cells responsible to produce pepsinogen (inactive enzyme).
- Mucous cells are also called goblet cells to produce mucous layer.
- G-cells or gastric cells produces gastric hormone.
- HCl, pepsinogen and mucous layer are collectively known as gastric juice.
- Gastric hormone regulate the amount of gastric juice. More gastrin hormone more gastric juice.
- Secretion of gastric hormone is regulated by smell, sight and quality of food. More protein more gastric hormone.
- Gastric hormone is transported in blood to reach the targeted cells which are oxyntic, zymogen and chief cells.
- Mucous is protective layer which prevents the underlying walls to being digested. HCl is responsible for conversion of pepsinogen (inactive) to pepsin (active).
- Pepsin converts the polypetide chain into peptones.
- HCl functions are to kill the germs and also softens the food.
- HCl adjust the PH of stomach contents ranging from 2-3 for the pepsin to act on protein as enzymes are sensitive to PH.
- Heartburn or pyrosis is back flush of acidic chyme into oesophagus.
- Small intestine is the largest part of G. IT having length. of 6.3 Imeter and diameter of 2.5cm.



- Small intestine he is divided into three parts duodenum 30cm in length (S.B) 20-25cm(P.B), jejunum 2.4m in length and ilium 3.6m in length.
- Duodenum receives two types of juices bile and pancreatic juice Bile juice conain no enzymes but pancreatic have pancreatic juice contact with duodenum through pancreatic duct while bile juice through bile duct.
- Bile and pancreatic duct are collectively known as hepato-pancreatic duct.
- Bile juice is produced by liver but stored by gall bladder.
- When acidic food enters into duodenum, it releases secretin hormone.
- Acidity stimulates the secretin production by interstinal mucosa.
- Secretin hormone stimulates the release of bile juice from gall bladder and panc juice from pancreas into duodenum.
- Secretin inhibits gastric secretion.
- Secretin has positive effects on gall bladder and pancreatic secretion but negative effect on gastric production
- Secretion of liver, pancreas is stimulated by acidity.
- Bile juice is green alkaline food, have no enzymes, contain salts, helps in emulsification of fats (conversion of fats in soluble form), helps to kill germs, also neutralize the acidic food, helps in excretion of RBC. pigments bilirubin (yellow) and biliverdin (green).
- Bile color is green due to bile pigments which are formed by break down of RBC in liver. Accumulation of bile in blood cause condition jaundice. Cholesterol secreted by liver, may precipitate in the gall bladder to produce gall stones, which may block the release of bile.
- Pancreatic juice also contain bicarbonate to neutralize the chyme because enzymes of pancreas do not work well in acidic conditions.
- Pancreatic juice contain enzymes for digestion of molecules.

- Most of digestion occurs in duodenum and all substances which can be digested in human body have proper step in duodenum due to pancreatic juice as it contain large no of enzymes.
- Pancreatic enzymes are trypsinogen which is converted into active form trypsin by enterokinase or enteropeptidase responsible for conversion of peptones into peptides, chymotrypsinogen which is converted into chymotrypsin by trypsin responsible for digestion of milk protein, amylase which converts the dextrin into sucrose, maltose and lactose(milk sugar), lipase which converts the lipids into fatty acid and glycerol, nuclease which converts the nucleic acid into nucleotides.
- Trypsin also act as activation factor.
- Enterokinase is enzyme which is secreted by lining of duodenum
- Pancreatic amylase is also called amylopsin which converts the starch/glycogen to maltose.
- Jejunum covers the 2/5 of the small intestine, contain Digestion of food will complete in jejunum enzymes for digest.
- Enzymes present in jejunum are peptidase/erypsin which converts the peptides into amino acids, sucrase which converts the sucrose into glucose and fructose, maltase which converts the maltose into glucose and glucose, lactase which converts the lactose into glucose and galactose and nucleotidase which converts the nucleotides into nucleosides.
- Ilium is the largest part of small intestine covers the 3/5th of small intestine.
- No digestion occurs in ilium. Just absorption of the smaller diffusible form of the food particles takes place.
- Absorption in ilium is takes place by the help of villi.
- Villi also helps to increase the surface area for absorption.
- Villi also facilitate to make sure the contact with each and every food particle.

- Villi contain blood capillaries and lacteals.
- Lacteals are the vessels of fymphatic system helps in transport of lipids.
- Villi are supplied with blood capillaries and lacteals within a covering of epithelial cells. Large intestine is 1.5m long and 6.5cm in diameter, having three parts caecum, colon and rectum.
- Caecum is that point at which small intestine connects with large intestine. Ileocaecal Caecum has finger like vestigial organ known as vermiform appendix valve will allow the contents to move in caecum.
- Caecum has capacity of 500ml
- There are 4 sub parts of colon ascending, transverse, descending and sigmoid. Colon helps in absorption of water and minerals.
- Mucosal lines are present in colon..
- Rectum stores the undigested food as waste material.
- Rectum has capacity of 150ml.
- Anus is surrounded by two sphinters, the internal is composed of smooth muscles and external is composed of striped muscles.
- Many human develop intestinal gas and diarrhea from consuming milk products, because they lack the enzymes for digesting lactose.
- Appendix sometimes gets inflamed due to entrapping and then putrification of food cause appendicitis which has to be removed surgically in many instances. Fecal matter contain large amount of bacteria, plant fibers, sloughed off mucosal cells, mucus, cholesterol, bile pigments and water.
- Lips/cheeks and tongue helps in manipulation of food (holds food in the teeth). position be
- Gall bladder also absorbs the water and electrolytes.
- Goblet cells are responsible for protection.
- Entamoeba histolytica live in large intestine.
- Fats stored in adipose tissues.

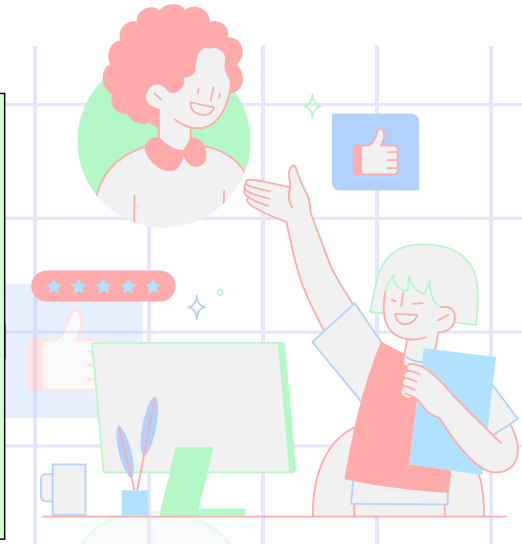


MCQ RESOURCES FOR BIOLOGY

1. Premed.pk
2. SKN worksheets
3. Anees Hussain Books
4. STEPS
5. KIPS books
6. Redspot Biology (If you have time)

BEST YOUTUBE CHANNELS

1. Neem Hakeem
2. Biological Guardian
3. Dr. Sohail Lectures



---- GOOD LUCK ! ----