

• Unit 1 :- Introduction to Infectious Diseases of Human Body.

* Respiratory System :-

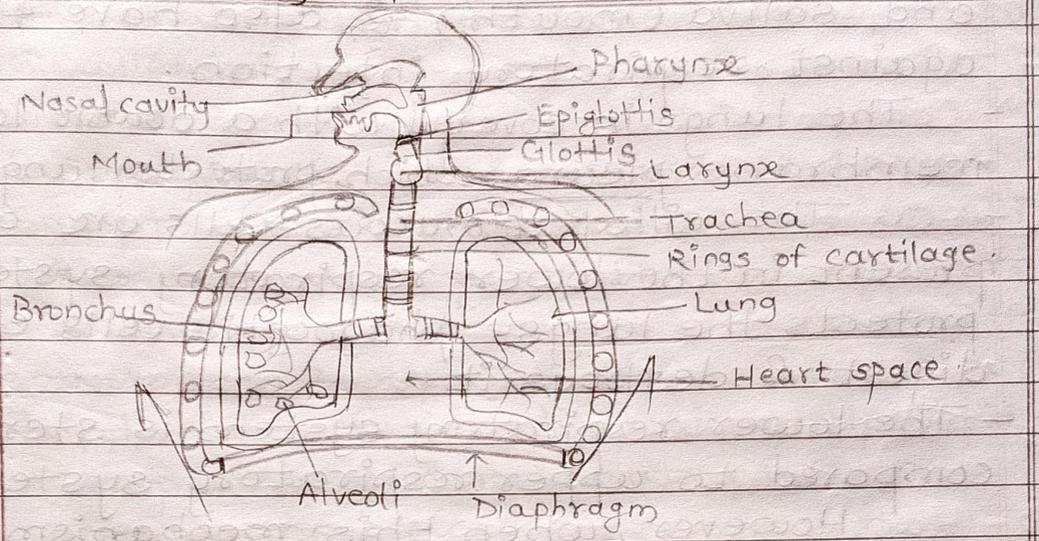


fig. Respiratory system

• Anatomy & physiology :-

- The respiratory system is one of the most important system of human body. It delivers oxygen to cells in our body, removes waste gases & carbon dioxide between lungs & blood.
- It allow body to talk & smell.
- This system is protected by defence mechanism include :
 - i) Mucous membrane
 - ii) Coarse Hair
 - iii) Ciliated mucous secreting cells.
- The cilia trap the dust particles & eliminate it by sweeping action.

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- (2)
- The Lymphoid tissue also play important role in resistance in spread in disease.
 - The Ig A antibody present in tears (eyes) and saliva (mouth) & also have fight against respiratory infection.
 - The lungs is covered with a double layered membrane pleura which protects lungs.
 - The ciliated mucous cells are also present in the lower respiratory system & protects the lungs. phagocytic cells engulf, digest & destroys it.
 - The lower respiratory system is sterile compared to upper respiratory system.
- However, when this mechanism failed respiratory disease occur.

• - Human Respiratory System divided into two parts :-

1) Upper Respiratory System :-

Nose, throat, ~~Nasal cavity~~ ^{pharynx} middle ear ^{sinuses}.

2) Lower Respiratory System :-

Larynx, trachea, bronchiale tubes, alveoli.

* Disease, Pathogen and common systems of Respiratory System :-

- The disease of Respiratory system spread by inhalation of droplet & droplet nuclei.
- Respiratory tract infection may occur in nasopharynx, oropharynx, middle ear, epiglottis, ~~Synases~~ ^{Sinuses}, Larynx, trachea.

* Bacterial Diseases :-

1) Streptococcal pharyngitis → Streptococcus pyogenes
• Symptoms → fever, inflammation, of tonsil, infection of middle ear, painful swallowing and talking.

2) Scarlet fever → Streptococcus pyogenes
• Symptoms → Pinkish red rashes on skin, skin seen to be peel off and appeared of sun burn.

3) Diphtheria → Corynebacterium diphtheriae
• symptoms → sore throat, fever, swelling neck.
- If the disease is very fatal it may affect
* to heart or kidney.
- Cutaneous diphtheria is also caused by Corynebacterium diphtheriae.

4) Otitis media → Staphylococcus aureus
• symptoms → ear ache, middle ear affected
- Direct infection can occur from water of swimming pool.

5) Pertussis (whooping cough) → Bordetella pertussis
• symptoms → cough, cold.

6) Tuberculosis → Mycobacterium tuberculosis
• symptoms → fever, loss of appetite, chill chest pain, breathing pain.

7) Pneumonia → Streptococcus pneumoniae
• Symptoms → High fever (102°C - 104°C), difficulty in breathing, chest & lung pain

* Viral Diseases :-

1) Common Cold → Corona virus or rhinovirus
• Symptoms → Sneezing, coughing, headache, sore throat, running nose.

2) Influenza → Various strains of Influenza virus
• Symptoms → chills, fever, headache, muscular ache.

3) Hanta virus → Hanta virus
• Symptoms → trouble in breathing, fever, muscle ache, fatigue.

* Fungal Diseases :-

1) Histoplasmosis → Histoplasma capsulatum
• Symptoms → fever, chills, headache, muscle ache, dry cough, fatigue.

2) Blastomycosis → Blastomyces dermatitidis
• Symptoms → @ fever to human by animals like sheep, goat, cattles.

3) Mycosis, aspergillosis → Mucor aspergillus
• Symptom → High temperature, coughing, feeling breathelessness, coughing up sputum or even blood.

* Protozoal Disease :-

1) Pneumocystis → Pneumocystis carini pneumonia

- symptoms → fever, chills, dry cough, shortness of breathe, fatigue, chest pain, weight loss.

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* Gastrointestinal Tract :-
(Digestive System)

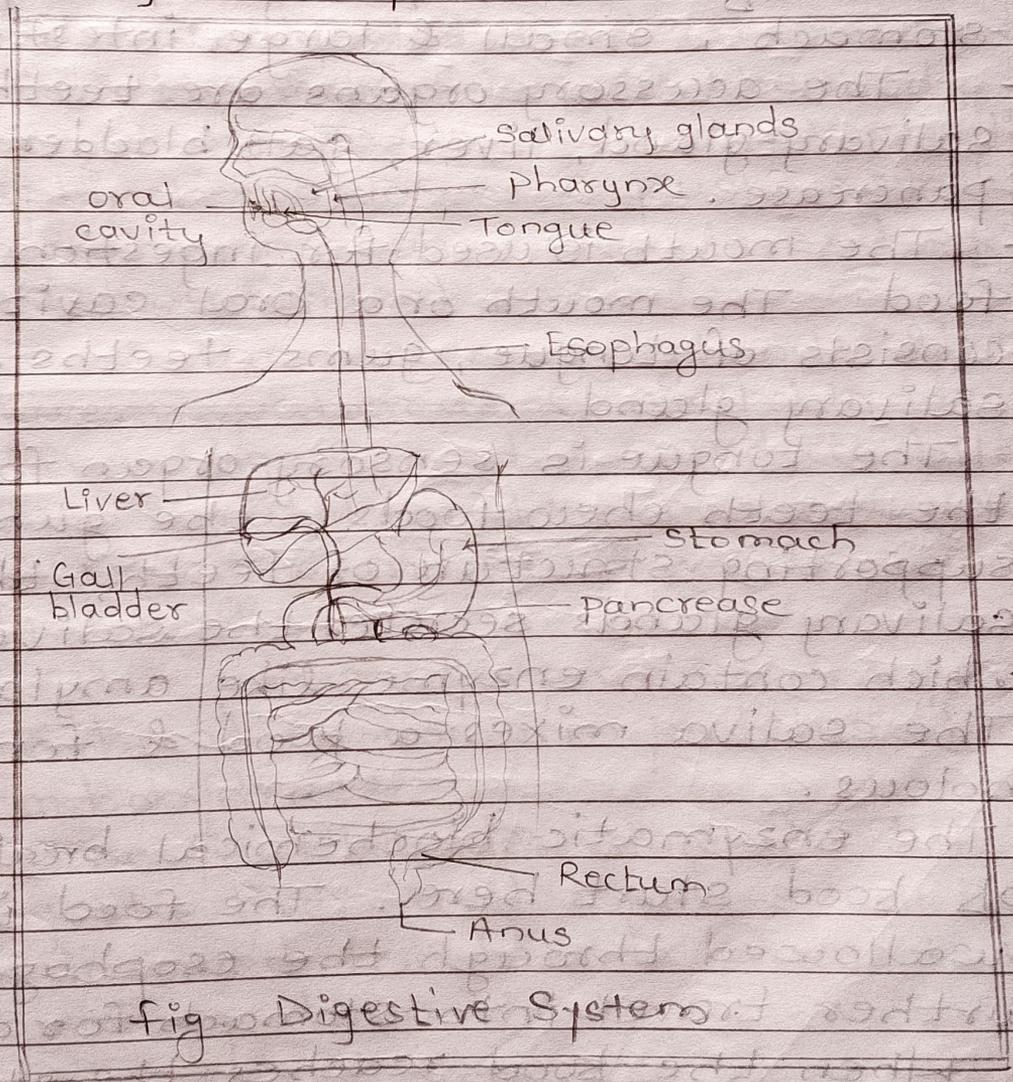
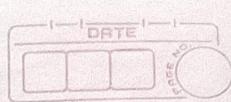


fig Digestive System

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* Anatomy and physiology :-

• Gastrointestinal System and Liver —

- Gastrointestinal tract also known as digestive tract or alimentary canal.
- It has two openings
- Divided into 2 groups :-
 - i) intestinal tract
 - ii) accessory glands.
- Digestive system is tube like structure consist of mouth, pharynx, esophagus, stomach, small & large intestine.
- The accessory organs are teeth, tongue, salivary gland, liver, gall bladder and pancreas.
- The mouth is used for ingestion of food. The mouth or a oral cavity is consists of tongue, gums, teeth & salivary gland.
- The tongue is sensory organ for taste. The teeth chew foods, the gums supporting structure of teeth, the salivary glands secretes the saliva which contain enzyme like amylase.
- The saliva mixes a food & form a bolous.
- The enzymatic biochemical breakdown of food start here. The food is swallowed through the esophagus & further travel into stomach for digestion.
- When the food reaches the stomach due to the gastric juices present there the food get churned. most of the digestion process completed in stomach

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& further move into small intestine where food is digested again & nutrients such as electrolytes, minerals & vitamins are absorbed.

- 90% of nutrients are absorbed in small intestine & 10% move to large intestine.
- The large intestine absorb water & electrolytes & eliminate faeces.
- The undigested food form a stool. when the rectum is full the body feels bowel movement. The internal & sphincter relaxes & pushes stool from rectum to anus. Anus is end of gastrointestinal tract.
- The accessory glands like Liver, pancreas & Gall bladder.
- Liver digest food & produce bile. this bile breakdown the fats & store vitamins & minerals & also remove the toxins.
- The pancreas produce enzyme helps in breaking down in proteins, fats & carbohydrate.
- The Gall bladder store the bile produced by the liver. and when small intestine is in need the bile is passes to it for breaking down the fat.

* Disease, pathogens & common symptoms of Digestive system :-

- The disease of digestive system is 2 types
 - i) food infection
 - ii) food intoxication.
- In food infection pathogen present in food & water.
- In food intoxication the pathogen produces toxin produce by organism. in both cases diarrhoea occurs.

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* Urogenital System :-

* Urinary System :-

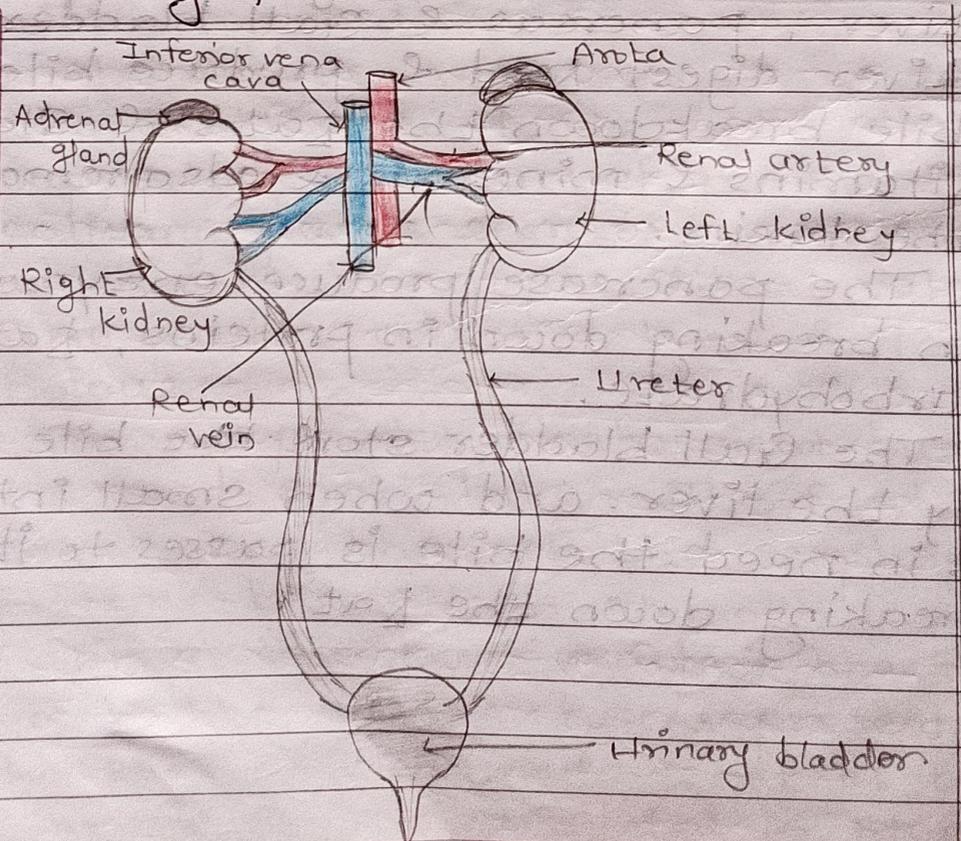


fig. Urinary System

• Urinary System —

- Urogenital system is been named by urinary systems & genital system.

- The Urinary system consist of —

- i) pair of kidney
- ii) Ureter
- iii) Urinary bladder
- iv) Urethra.

- The kidneys filter & remove the waste



The waste is remove in form of urine & this urine is carry ureter to bladder.



The urinary bladder store urine & once it is full it throw out urine from urethra. and urethra is an opening of urinary system.

- The functional unit of urinary system is Nephron.

- The urinary system regulates the chemical composition and excrete nitrogenous waste product & water in the form of urine.

• At a site of entry of ureters into bladder there is present of valves that prevent backflow of urine which helps kidney from lower urinary tract infection.

- The urine has acidic pH it makes it mic. antimicrobial in nature.

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* Nervous System :-

Nervous System

CNS

PNS

- Brain

- Spinal cord

- Nerves communicates from branches of brain & spinal cord.

- The nervous system is a complex collection of nerves and it has a specialised cells known as neurons.

- This Neurons transmits signals to diff. parts of the body.

- Nervous system has two compartment:

(i) CNS → Brain & spinal cord.

(ii) PNS → All nerves i.e. attaches from brain & spinal cord.

• functions :-

(i) Sensory input - which are skin, nose, ears, eyes & tongue.

(ii) Information processing - carried out by brain which gives signals to muscles & glands.

(iii) Motor output - The motor output convert energy into mechanical energy.

* The basic functional unit of nervous system is neuron.

* The nervous system has various parts!

① Skull :-

It protects the brain.

② Meninges & CSF :-
Also give protection to brain. CNS

③ Cerebrum :-
It is a lobes of brain which gives a meaningful information from sense organ also responsible for logical thinking, reasoning & memory.

④ Cerebellum :-
It maintain the posture, balance & tone of body and coordination of movement

⑤ Spinal Cord :-
It is an organisation of complex nerves responsible for movement & sensation.

⑥ Peripheral Nervous System :-
It is lines of communication between Central nervous system, various parts of body & external environment.

* Central Nervous System :-

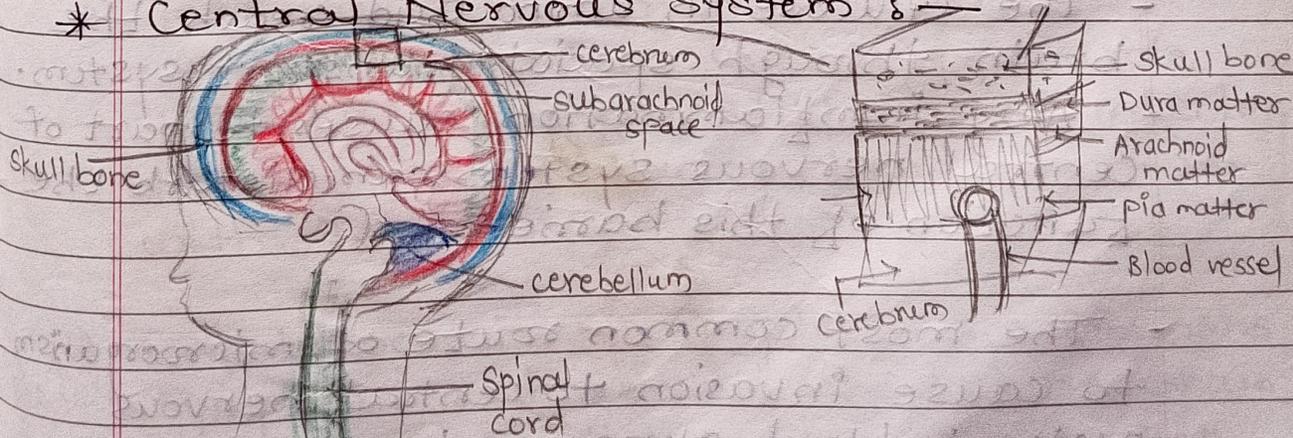


Fig. Central Nervous System

- The whole central Nervous system is covered by bone.
- The brain is protected by skull and spine, which protect the brain from physical injury.
- Below to this bony structure there is a Cranial meninges, this cranial meninges also protect brain & having 3 layer membrane:
 - (i) Pia matter
 - (ii) arachnoid matter
 - (iii) Dura matter
- The space between arachnoid & pia matter is a sub arachnoid space consists of CSF.
- This cerebrospinal fluid helps in circulating antibodies & macrophages.
- The ~~any~~ another important protecting mechanism is blood-brain barrier.
- The capillaries which supply blood to brain is permeable which allows only the lipid soluble substances to pass through it.
- The Glucose in amino acid reach the brain through special transport system.
- Any inflammation causes to part of central nervous system can disturb the function of this barrier.
- The most common route of microorganism to cause invasion to central nervous system is blood stream, lymphatic system and altered permeability of blood-brain

barrier due to inflammation.

* Disease, pathogenesis & symptoms of CNS :-

1) Pneumococcal meningitis → Streptococcus pneumoniae

- Symptoms → chest pain, cough, high fever, vomiting, headache, weakness, nausea is observed.
- vaccine is available

2) Botulism → Clostridium botulinum.

- Symptom → stomach pain, nausea, vomiting, diarrhoea, difficulty in swallowing & general weakness.

3) Leprosy → Mycobacterium leprae.

- Symptoms → painless growth on skin thick, stiff or dry skin, painless ulcer & of feet, painless lumps on faces, patches of anaesthesia.

4) Tetanus → Clostridium tetanae.

- Symptoms → Jaw cramping, muscle tightening, painful stiffness of muscle, trouble in swallowing, headache, fever with sweat.

5) Cryptococcosis → Cryptococcus neoformans

- Symptoms : headache, fever, neck pain, nausea, vomiting, sensitive to light sudden changes in behaviour & always in confusion.

⑥ Poliomyelitis → Polio virus
• Symptoms :- headache, fever, sore throat & nausea.
- The virus also enters blood & causes viraemia.
- The paralysis of _____ is very common here & death can cause.

2) Botulism → Clostridium botulinum.
• Symptoms → stomach pain, nausea, vomiting, diarrhoea, difficulty in swallowing & general weakness.

3) Leprosy → Mycobacterium leprae.
• Symptoms → painless growth on skin, itchy, stiff or dry skin, painless ulcers & patches of anaesthesia on face, patches of anaesthesia.

4) Tetanus → Clostridium tetani.
• Symptoms → jaw clamping, muscle spitting, painful stiffness of muscles, trouble in swallowing, headache, fever with sweat.

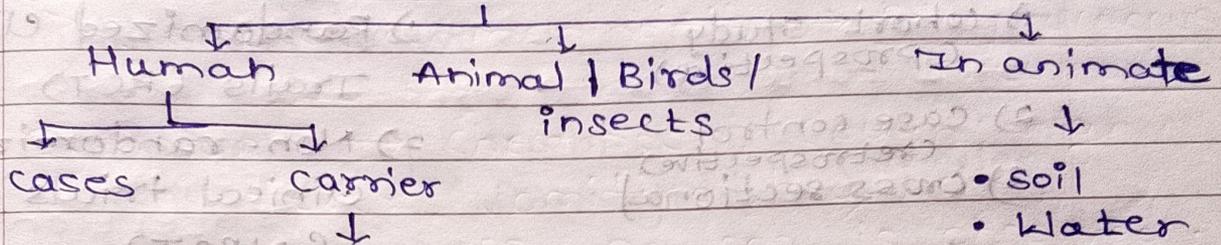
5) Carbotococcosis → Carbotococcus neoformans.
• Symptoms :- headache, fever, neck pain, nausea, vomiting, sensitive to light, sudden change in behaviour & collapse in confusion.

2. Epidemiology

* Epidemiology of infectious Disease :-

• Sources & Reservoirs -

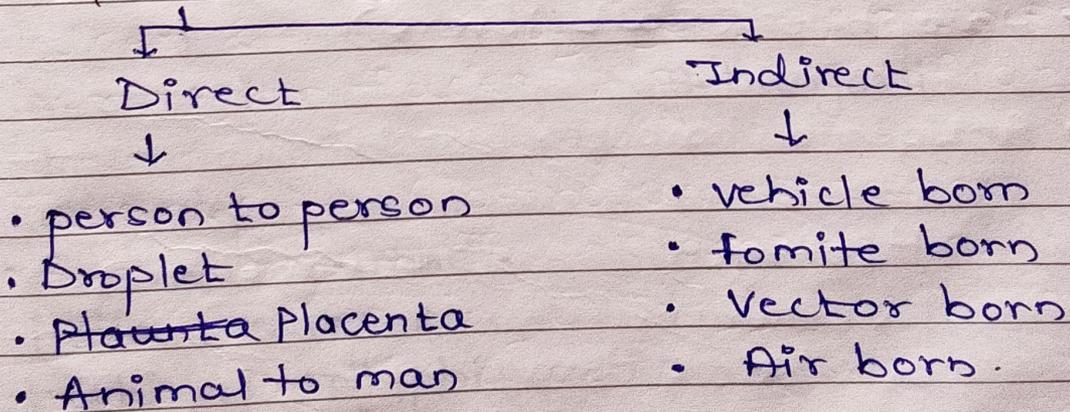
Reservoirs



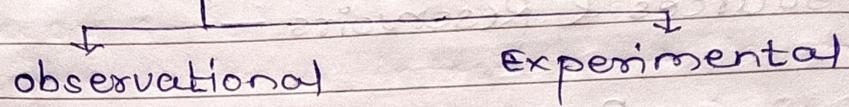
- Temporary
- Chronic
- Convalescent
- Healthy
- Incubatory

- Sources $\left\{ \begin{array}{l} \rightarrow \text{Endogenous (inside)} \\ \rightarrow \text{Exogenous (outside)} \end{array} \right.$

* Modes of Disease Transmission :-

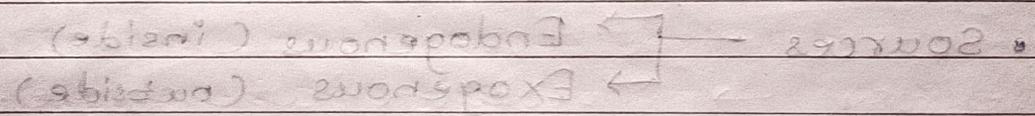


* Clinical study :-

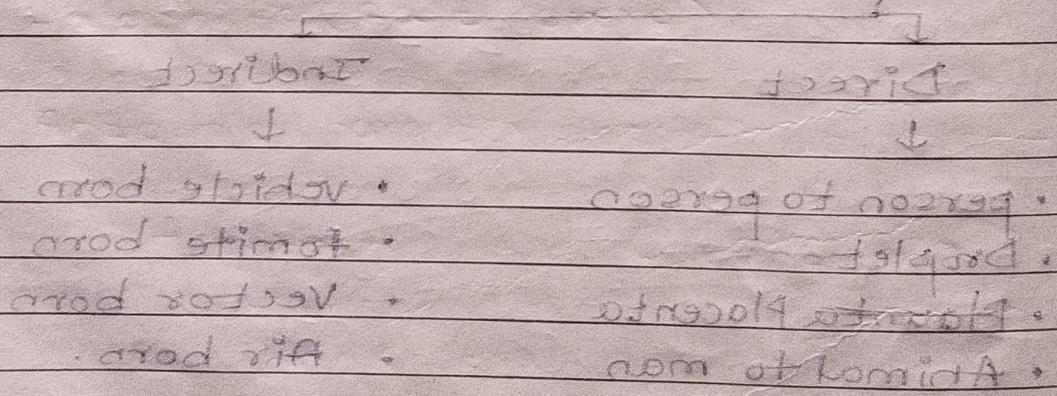


- 1) cohort study (Prospective)
- 2) case control (retrospective)
- 3) cross sectional

- 1) Randomized clinical trials (RCT)
- 2) Non-randomized clinical trials (NRCT)



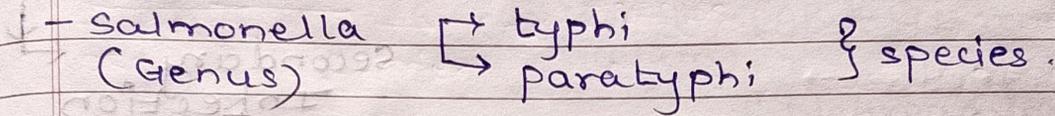
* Modes of Disease Transmission :-



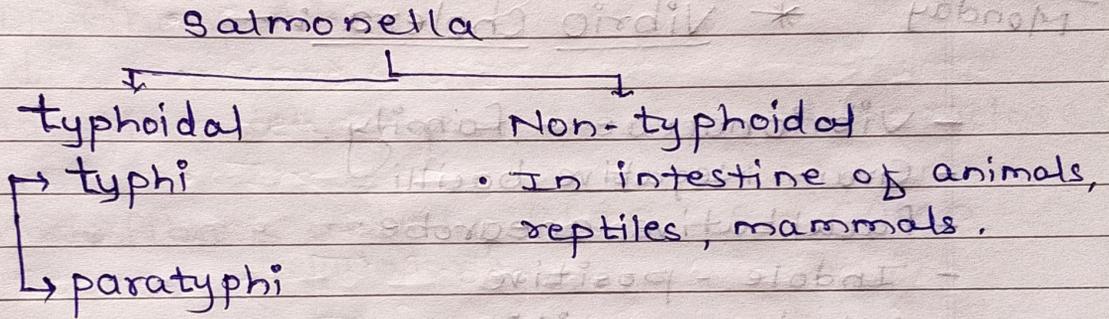
• Study of Bacterial Pathogens.

1) Salmonella :-

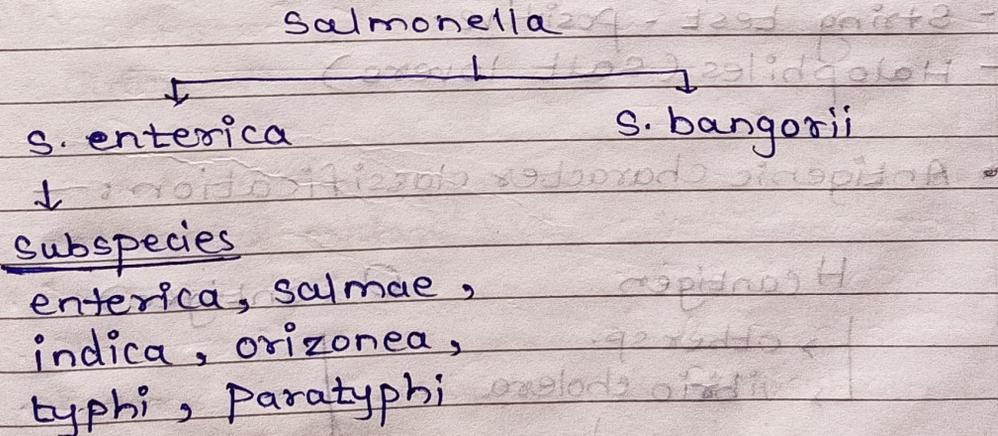
- Enterobacteriaceae family
- Gram -ve bacteria.
- catalase positive
- oxidase Negative.



• Clinical classification :-



• Molecular Classification :-



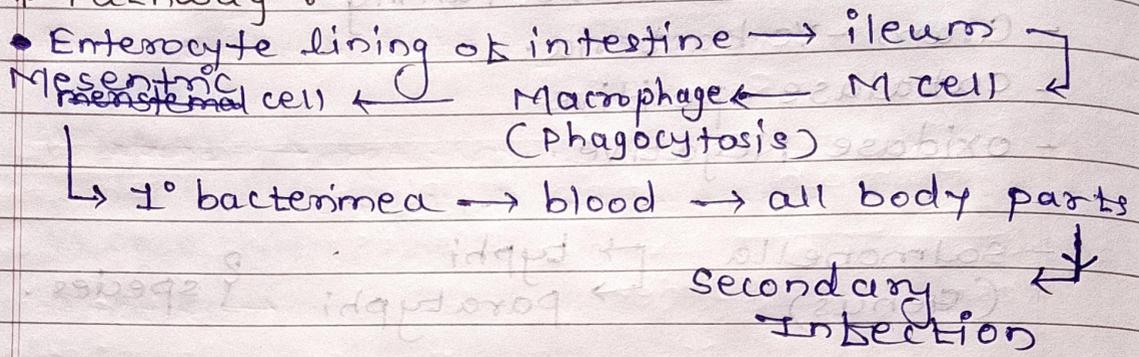
• Antigenic character :-

- O antigen → somatic, polysaccharide, Heat stable, low immunogenicity (Recent typhoid fever)
- H antigen → protein, heat liable, high immunogenicity (long lasting typhoid fever)

• Mesenteric cell → Mesenteric Lymph node

- Salmonella multiply in ^{Mesenteric} mesenteric cell

* Pathway :-

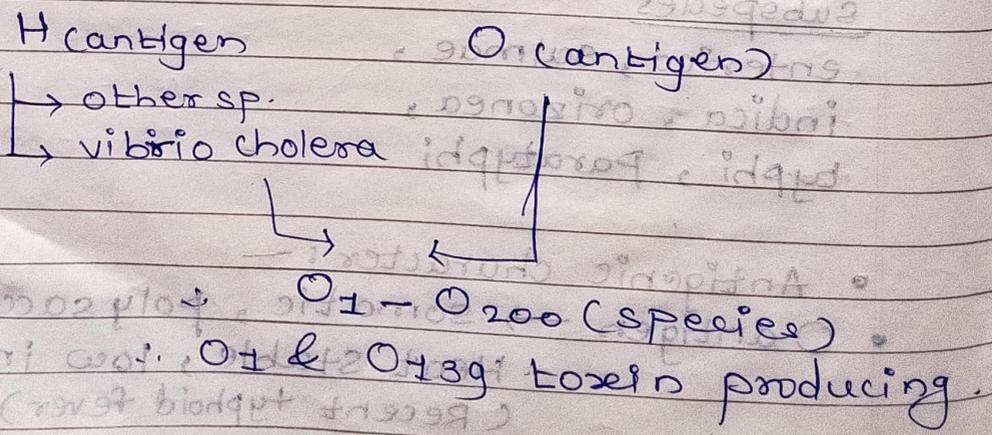


10/10/22
Monday

* Vibrio Cholera :-

- Vibrionaceae - family
- Gram Negative bacilli
- facultative anaerobe
- Indole - positive
- Catalase - positive
- oxidase - positive
- string test - positive
- Halophiles (salt lovers)

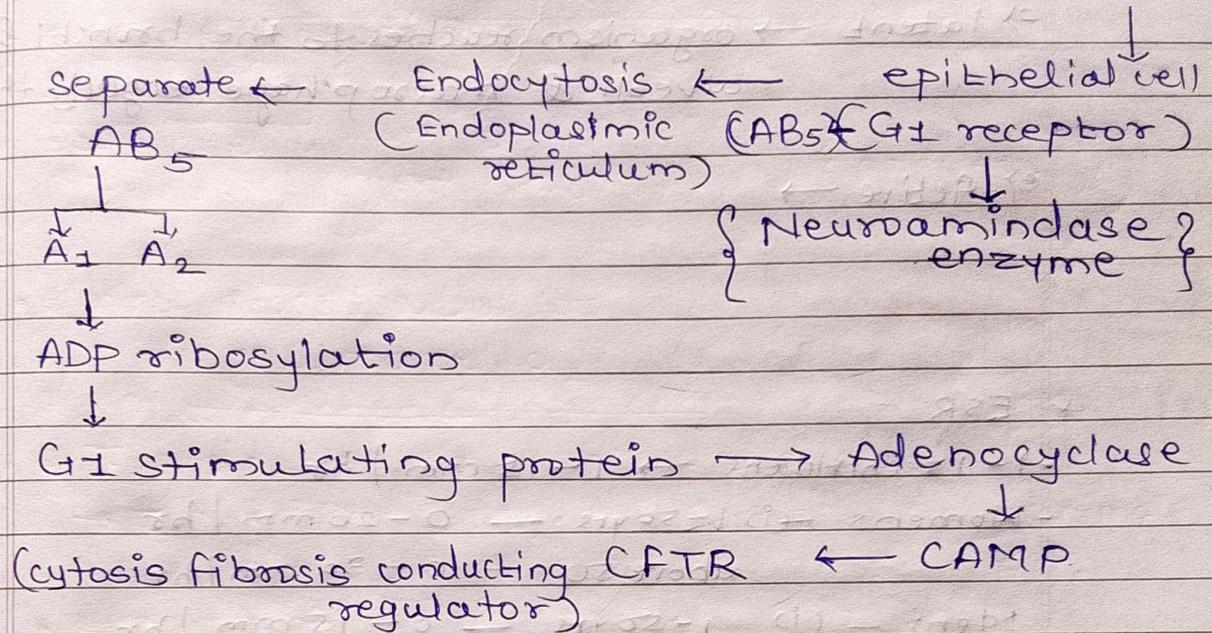
• Antigenic character classification :-



• pathogenicity :-

- Mobile & having pilli (adhesion working)

- Vibrio cholera → Intestine → mucous layer



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Friday

* Neisseria meningitidis *

- Gram -ve
- Non motile
- non spore forming.
- Catalase & oxidase +ve
- Lactose +ve

* Degrades Antibody IgA.

• Diseases → Meningitis & Septimia.

1) Meningitis → Brain Infection.

- Entry point - (i) Blood brain barrier.
- (ii) Nasopharyngeal area.

2) Septimia → caused by Endotoxin.

- Bacteria → has bean shape (lipooligosaccharide layer)
 - encapsulated
 - Pilli (cytoplasmic extensions)