



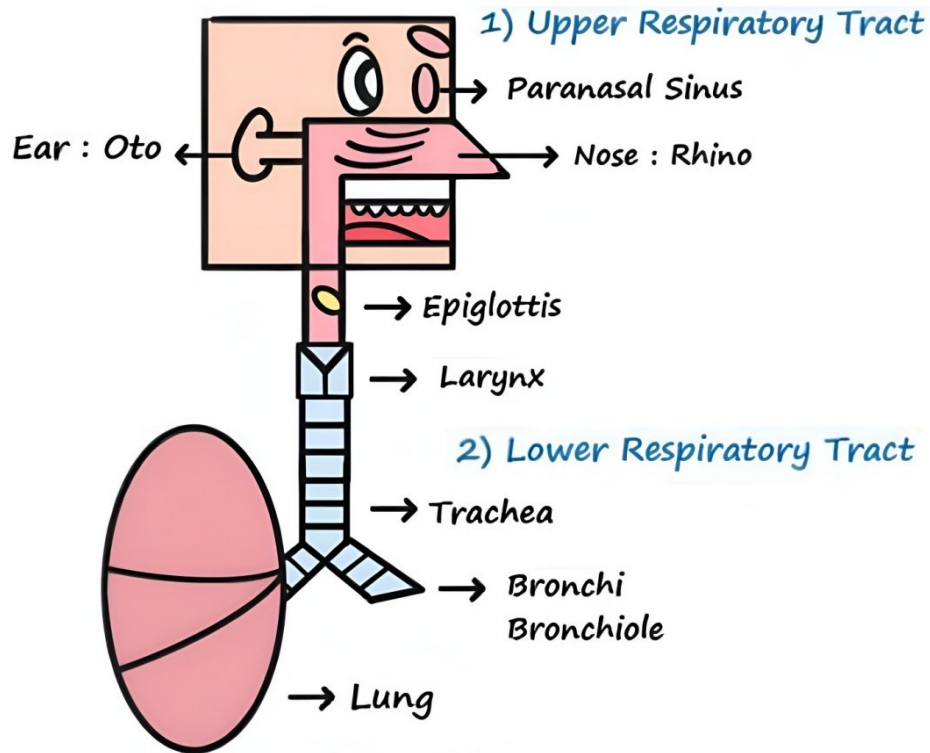
Respiratory module

Part 1

MICROBIOLOGY

Respiratory Infection Basics

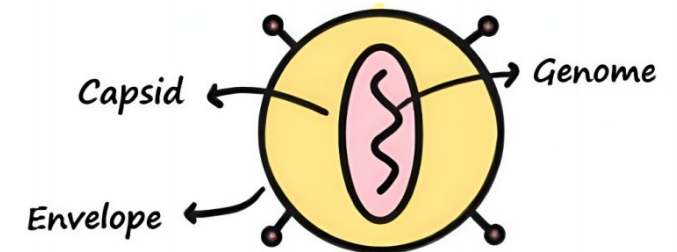
1- Anatomy + Pathology Basics of Respiratory system



2- NB : Flora of Respiratory Tract :

Upper Respiratory Tract	Lower Respiratory Tract
Rich with Flora Cool area with High O₂ capacity support growth of Microbes Examples of Flora 1- <i>S. aureus</i> 2- <i>S. Pneumoniae</i> 3- Diphtheroid 4- <i>Hemophilus ssp</i>	Sterile " No Microbe in Normal Condition " due to Immune system

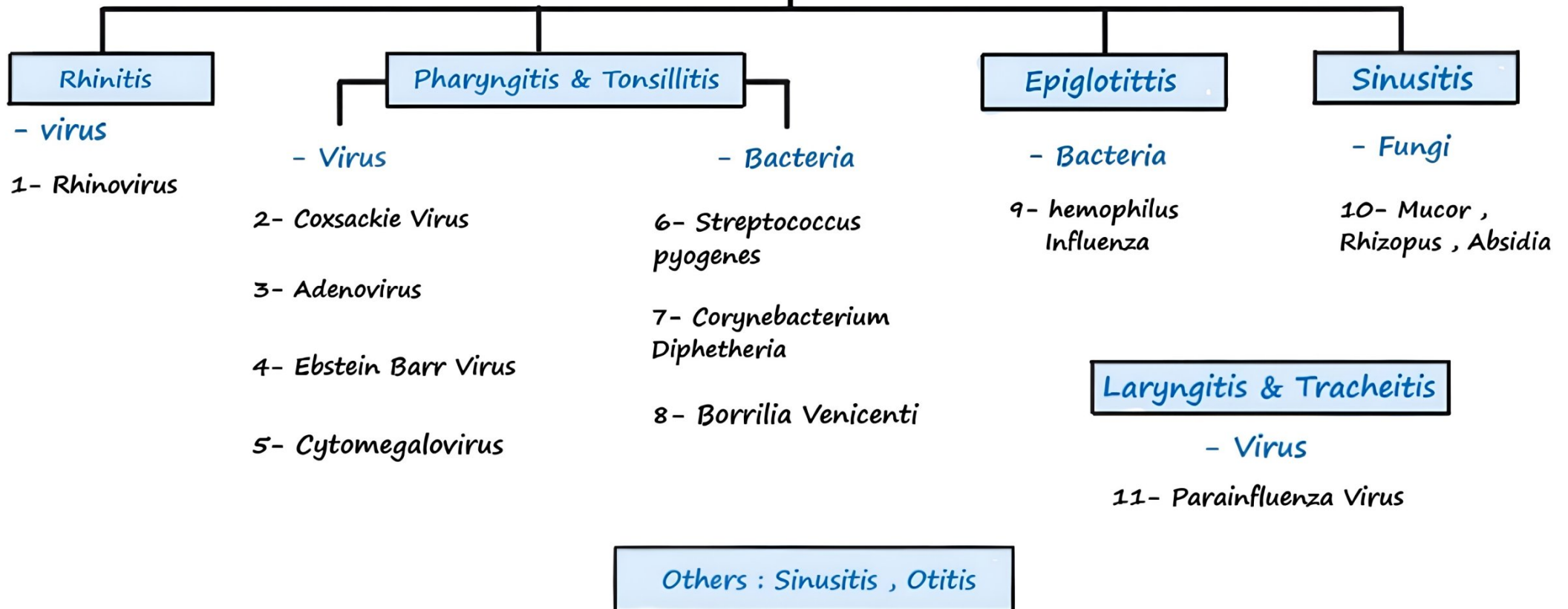
3- Basic of Viral Structure :



4- Respiratory Tract Infection Scheme : Same as Usual

Dr Karim Mind Map of Infections

Classification of Upper Respiratory Tract Infections



1- Common Cold الزكام: البرد

1- Causative organism : M/C is Rhinovirus " MCQ "

Rhinovirus

Structure : Belong to Picorna Virus

Non enveloped +ve Sense SS RNA virus " Contain Several Serotypes "

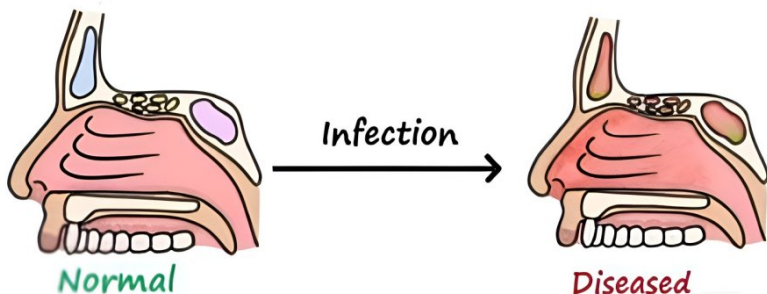
Grow best at 33°C " Infection is limited to URT and Conjunctiva

2- MOT : Droplet Infection and Contact : Direct or Indirect

3- Pathogenesis :

1- Virus attach Nasal Mucosal Cells " Infection " leads to loss of Cilia and Die

2- WBCs " neutrophil , eosinophil , plasma cell , lymphocytes Release of Inflammatory mediators stimulate Excess Mucous secretion causing edema and Thickening of Mucosa , Sneezing , Congestion



4- Clinical Picture :

1- Nasal Congestion : Rhinorrhea " Watery Discharge without Purulent "

2- headache , Malaise

3- Decrease sense of Smell

4- Sore throat



Complication :

Local : Otitis media and Sinusitis

Systemic Effect of : Asthma

2nd Infections :

A- Bacterial Pharyngitis or Bacterial Pneumonia

B- Croup خناق

5- Diagnosis : mainly Clinically

6- Prevention : No Vaccine due to Many Serotypes



2-Coxsackie A Virus

1-Structure : Same as Picorna

2-MOT : Same as Common cold

3-Clinical Picture :

Hand , foot and mouth Disease	Herpangina
 Vesicular Leison of Palate , hands and Feet	 Vesicular Papular Rash on Tonsils and Roof of the mouth

3-Adenovirus

1-Structure :

Non Enveloped DS DNA

2-MOT : Swimming Pool

3-Clinical Picture :

Pharyngeoconjunctival Fever " MCQ "

Pharyngeoconjunctival	
 Pharyngitis	 Conjunctivitis

3-Epsein barr virus : EBV

Cause Infectious Mononucleosis

1-Structure : Enveloped DS DNA

2- MOT : Saliva " Kissing "

3-Pathogenesis & C/P : IP : 2 months

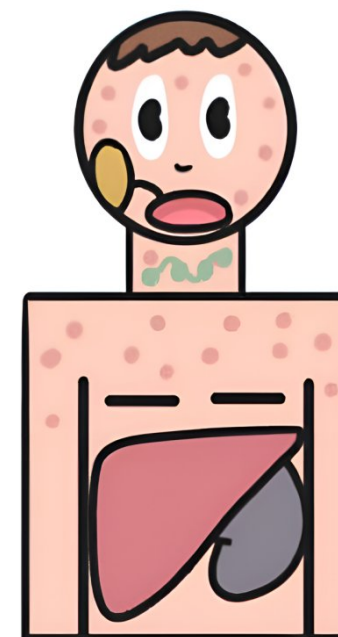
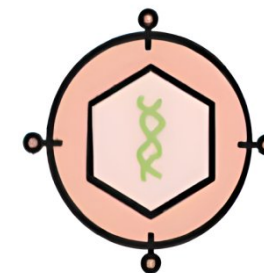
Virus Replicate in Nasopharynx then Oropharynx and Salivary gland " Transmit by Saliva "

Then Viremia to the RES " Liver , spleen , BM and B cells "

Cause Infectious Mononucleosis

Clinical Picture of Infectious Mononucleosis

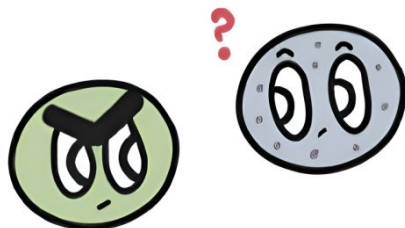
- 1- FAHM
- 2- Pharyngitis
- 3- Lymphadenopathy
- 4- Maculopapular Rash
- 5- Heptosplenomegaly with / Without jaundice



4- Complications

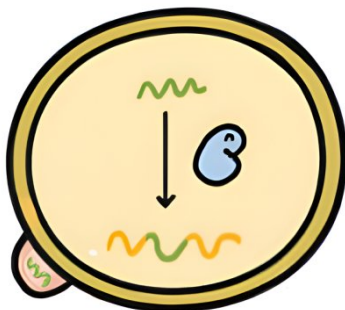
EBV may Infect B cell

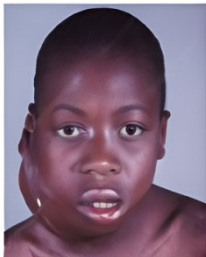
CTLs destroy EBV infected B cells and Reducing their Numbers
Characteristic " Atypical T Lymphocyte " Found in the Blood



NB : VIP

The virus Remain in the B cells and Oropharyngeal Cell " Integration of the Viral DNA with Host cell Chromosome " result in Tumor Formation



Type	Nasopharyngeal Carcinoma	Burkitt Lymphoma
C/P		

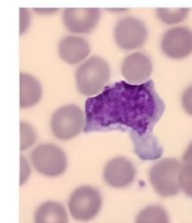
5-Lab Diagnosis

Specimen : Saliva , Blood , Lymphoid tissue

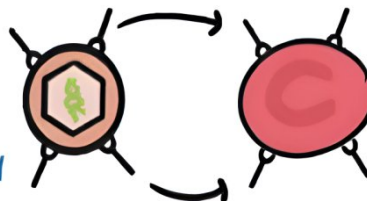
CBC : lymphocytosis with Atypical lymphocyte

PCR : viral DNA

Serology :



Atypical Lymphocyte

Non Specific Ab " Heterophil "	specific Ab
Patient with acute Infection develop transient ab which agglutinate Sheep RBCs Detected by : paul bunnell or Monospot test is +ve 	A-Detect " Viral Capsid Antigen " VCA IgM in Recent Infection B- Detect VCA IgG which persist for life

5-Cytomegalovirus : CMV

Cause Infectious Mononucleosis Like Syndrome

1- Structure : Same as EBV

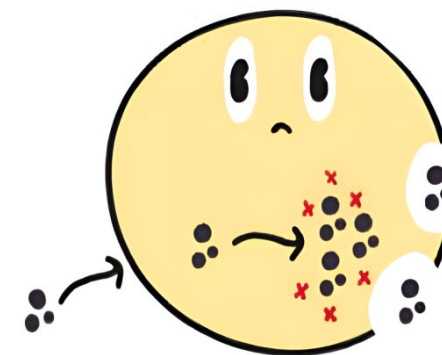
2- Pathogenesis :

Latent in Mononuclear cells to be Reactivated with immune Suppression

3- Complication :

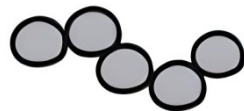
Life threatening pneumonia

4- Lab Diagnosis : -ve Monospot test



6-Streptococcus pyogenes

1-Structure : Gram +ve Cocci arranged in Chains



Virulence factors :

1- Structural :

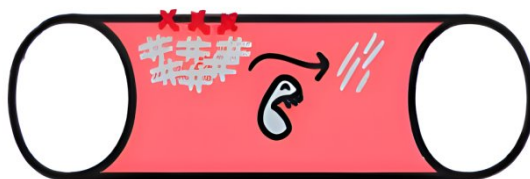
A-M protein :	B-Hyaluronic Capsule :
Major Virulence factor & Antiphagocytic	Antiphagocytic & Non Immunogenic



2- Enzymes : Spreading Enzymes

A-Streptokinase " Fibrinolysin " Convert Plasminogen to Plasmin cause lysis of Fibrin Clots

It's Injected IV to lyse Coronary or Pulmonary Embolism or Thrombus



B- Streptodornae " DNase " : liquifaction of DNA

C- Hyaluronidase : lysis of Hyaluronic acid " Cement Substances "

3-Toxin :

A- Leucocidin

B-Hemolysin " Streptolysin "

Type	Streptolysin S	Streptolysin O
O2 Stability	Oxygen Stable	Oxygen labile
Antigenicity	Non Antigenic	Antigenic
Function	Responsible for B hemolytic activity	Increase B hemolytic Diameter in anaerobic media

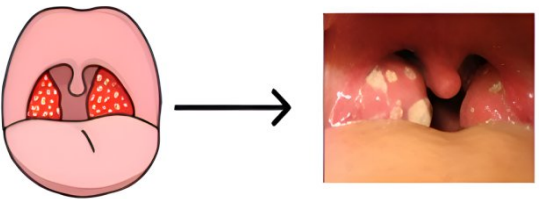
C-Pyrogenic Exotoxin

Type	Type A : Super Ag	Type B
Disease	Toxic Shock Syndrome	Necrotizing Fasciitis

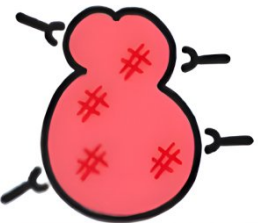
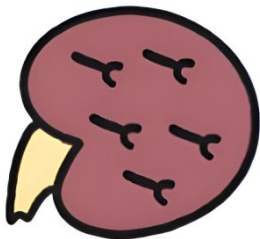
D-Erythrogenic Exotoxin " Super Ag " : Disesae : Scarlet fever

Clinical picture			
	Diffuse Erythema	Strawberry Tongue	Pharyngitis

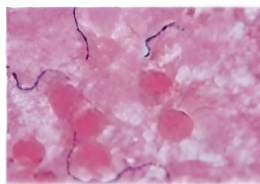
Stages of Streptococcal Pharyngitis :

Type	Acute Tonsillitis	Acute Follicular Tonsillitis	Quinsy
			
Clinical picture	Fever , pain , Dysphagia tachycardia , leukocytosis Enlarged Cervical Ln	Enlarged , Red , Yellow spots " Crypt filled with Debris and pus "	Peritonsillar abscess with deviation of Uvula to Opposite site

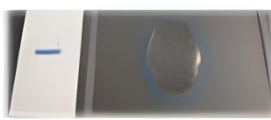
Post Streptococcal Complications : Immunological " Hypersensitivity "

A-Rheumatic fever	B-Post streptococcal Glomerulonephritis
Type II Hypersensitivity	Type III Hypersensitivity
Auto Ab cross react between Myosin protein of the heart and M protein of S.pyogenes	Ag-Ab Complex Deposition on the Kidney
	

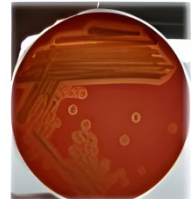
Lab Diagnosis : throat Swab



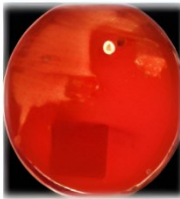
1- G+ve Cocci in
arranged in Chains in Pus



2-Catalase -ve



3-B hemolysis



4- Bacitracin sensitive

5-" ELISA
Latex agglutination "