* **Normal Microbial Flora and Innate Immune System of Respiratory Tract**
* By
* Dr. Syed Yousaf Kazmi
* Assist Prof Microbiology
* OBJECTIVES
* Describe innate immune defense mechanisms of respiratory tract
* Identify normal microbial flora of upper respiratory tract
* Discuss beneficial role & disease causing ability of normal flora of respiratory tract
* INTRODUCTION
* 8,500 L air is conveyed daily by the airway
* Inhaled air contains inorganic substances e.g. smoke and soot as well as organic particles e.g. pollen, fungi, viruses and bacteria
* Structurally and functionally two main compartments:
* Conducting part (nasal cavity, naso-pharynx, larynx, trachea, bronchi and bronchioles)
* Respiratory part (terminal bronchial tree & alveoli)
* INTRODUCTION
* UPPER RESPIRATORY TRACT
* Nose, Sinuses, Pharynx
* LOWER RESPIRATORY TRACT
* Larynx, Trachea, Bronchi, Bronchiole, Alveoli
* Most imp portal of entry of infections into body
* Very efficient defense mechanism
* INNATE IMMUNITY OF RESP TRACT
* Nonspecific host defense not acquired through contact with an antigen e.g. intact skin etc.
* Characteristics of innate immunity
* Resistance that exists prior to exposure
* Readily available
* Non specific
* Does not improve on repeated exposures
* There is no immunologic memory
* Innate immunity of resp tract has following mech
* ANATOMICAL
* PHYSIOLOGICAL
* BIOCHEMICAL
* MICROBIOLOGICAL
* ANATOMICAL BARRIERS
* Hair follicles in anterior nares
* Filter large dust / other large airborne particles etc.
* Nasal conchae/ nasal meatus
* Wet surfaces- trap airborne particles
* Mucus blanket-prevents attachment
* Cilia in resp epithelium-dislodge pathogens
* PHYSIOLOGICAL
* Cough Reflex
* Helps propel sputum from LRT
* Sneeze Reflex
* Helps expels irritant out from URT
* Mucociliary Escalator
* Constant movement of mucus from LRT towards pharynx
* Extremely important mech
* Damage to this causes many infective diseases of LRT
* MUCO-CILIARY ESCALATOR

VIDEO

* BIOCHEMICAL & CELLULAR COMPONENTS
* UPPER RESP TRACT
* Nasal fluid contains
* Lysozyme
* Lactoferrin
* IgA antibodies
* LOWER RESP TRACT
* No cilia
* Alveolar fluid
* Lysozyme
* IgG antibodies
* Alveolar macrophages (phagocytosis)
* Neutrophils
* Inflammatory response
* MICROBIOLOGICAL
* Mainly URT
* LRT is devoid of microbiota
* Anterior Nostrils
* *Staph aureus* ; 20% persistent, 20% non carriers & 60% intermittent carriers
* *Corynaebacterium, Propionibacterium*
* Nasopharynx
* *Streptococci, Neisseria spp, Haemophilis*
* Oropharynx
* *Ns. meningitidis, S. pneumoniae, S. pyogenes, H. influenzae, Candida*
* BENEFICIAL ROLE OF MICROBIOTA
* Inhibits attachment of pathogens
* Covers the receptor sites
* Physical competition for nutrients
* Create adverse environment for pathogen by
* Mutual inhibition by metabolic or toxic products
* Mutual inhibition by antibiotic materials or bacteriocins
* Other mechanisms
* HARMFUL EFFECTS OF RESPIRATORY FLORA

ENDOGENOUS INFECTIONS

* URT infections by viruses, smoking etc.-ciliary damage
* Acute bacterial meningitis (*Ns. Meningitidis*)
* Acute lobar pneumonia (*Streptococcus pneumoniae*)
* Extension of resp flora to sinuses –Acute sinusitis
* Nasal packing in epistaxis-Infective endocarditis (Viridans Streptococci)
* HARMFUL EFFECTS OF RESPIRATORY FLORA
* Use of antimicrobials
* Thrush (Candida)
* Immune suppression results in overgrowth of flora
* Acute esophagitis (Candida ) in HIV

EXOGENOUS INFECTION/ NOSOCOMIAL INFECTIONS

Surg site infection in hosp by *Staph aureus*

Usually source is healthcare provider

MRSA outbreaks in ITCs/ wards from poor hand hygiene