Tuberculosis

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Professor

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TUBERCULOSIS

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- **The disease primarily affects lungs and causes pulmonary tuberculosis.**

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- **The disease also affects animals like cattle (bovine tuberculosis) which may be sometimes communicated to man.**

- **Pulmonary TB is the most important form of TB which affects man.**

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NATURAL HISTORY OF TUBERCULOSIS

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AGENT

Mycobacterium tuberculosis

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- **M. tuberculosis is a facultative intracellular parasite.(readily ingested by phagocytes and is resistant to intracellular killing).**

- **It is an acid fast, gram positive, rod shaped bacilli.**

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SOURCE OF INFECTION

- **There are two sources of infection-human and bovine.**

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- **HUMAN SOURCE : The most common source of infection is the human case whose sputum is positive for tubercle bacilli, who has not received treatment or not treated fully.**

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COMMUNICABILITY

- **Patients are infective as long as they remain untreated.**

- **Effective antimicrobial treatment reduces infectivity by 90% within 48 hours.**

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HOST FACTORS

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AGE & GENDER

- Tuberculosis affects all ages.

- TB is more prevalent in males than in females.

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HEREDITY

- **Tuberculosis is not a hereditary disease**.

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NUTRITION

- **Malnutrition (under nutrition) is widely believed to predispose TB.**

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IMMUNITY

- **Man has no inherited immunity against TB.**

- **It is acquired as a result of natural infection or BCG vaccination.**

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SOCIAL FACTORS

- **TB is social disease with medical aspects.**
  It is considered to be a barometer of social welfare.

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- **The social factors include factors such as poor quality of life, poor housing, overcrowding, population explosion, under nutrition, lack of education, large families, lack of awareness of cause of illness.**

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- **All the afore said factors are interrelated and contribute to the occurrence of TB.**

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MODE OF TRANSMISSION

- **TB is transmitted through droplet infection and droplet nuclei generated by sputum positive patients with pulmonary TB.**

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- **To transmit infection, the particles must be fresh enough to carry viable organism.**

- **Coughing generates the largest number of droplets of all sizes.**

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- **The frequency and vigour of cough and the ventilation of the environment influence transmission of infection.**

- **TB is not transmitted by fomites.**

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INCUBATION PERIOD

- **Ranges from 3 to 6 weeks, and thereafter the disease depends upon the closeness of contact, extent of the disease and sputum positivity of the source case (dose of infection) and host parasite relationship.**

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- **Thus the incubation period in the real sense may extend to weeks, months or years.**

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TB Pathogenesis (4)

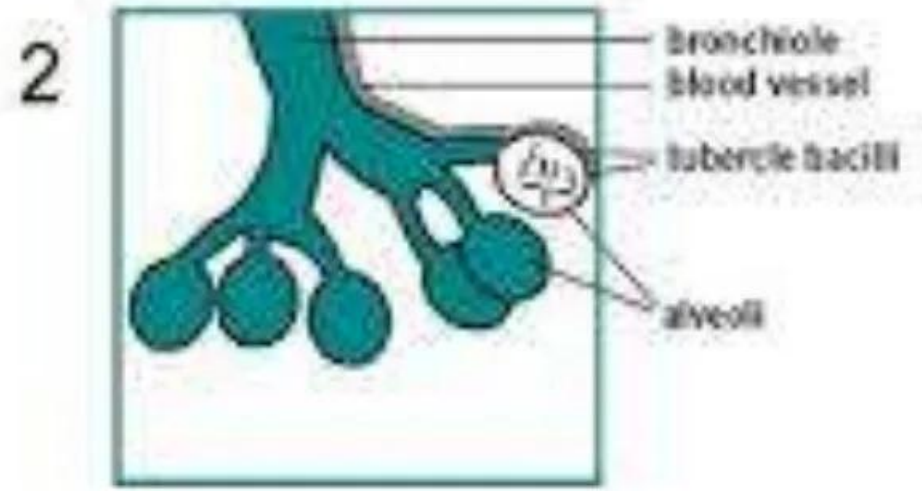
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Droplet nuclei containing tubercle bacilli are inhaled, enter the lungs, and travel to small air sacs (alveoli)

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TB Pathogenesis (5)



Tubercle bacilli multiply in alveoli, where infection begins

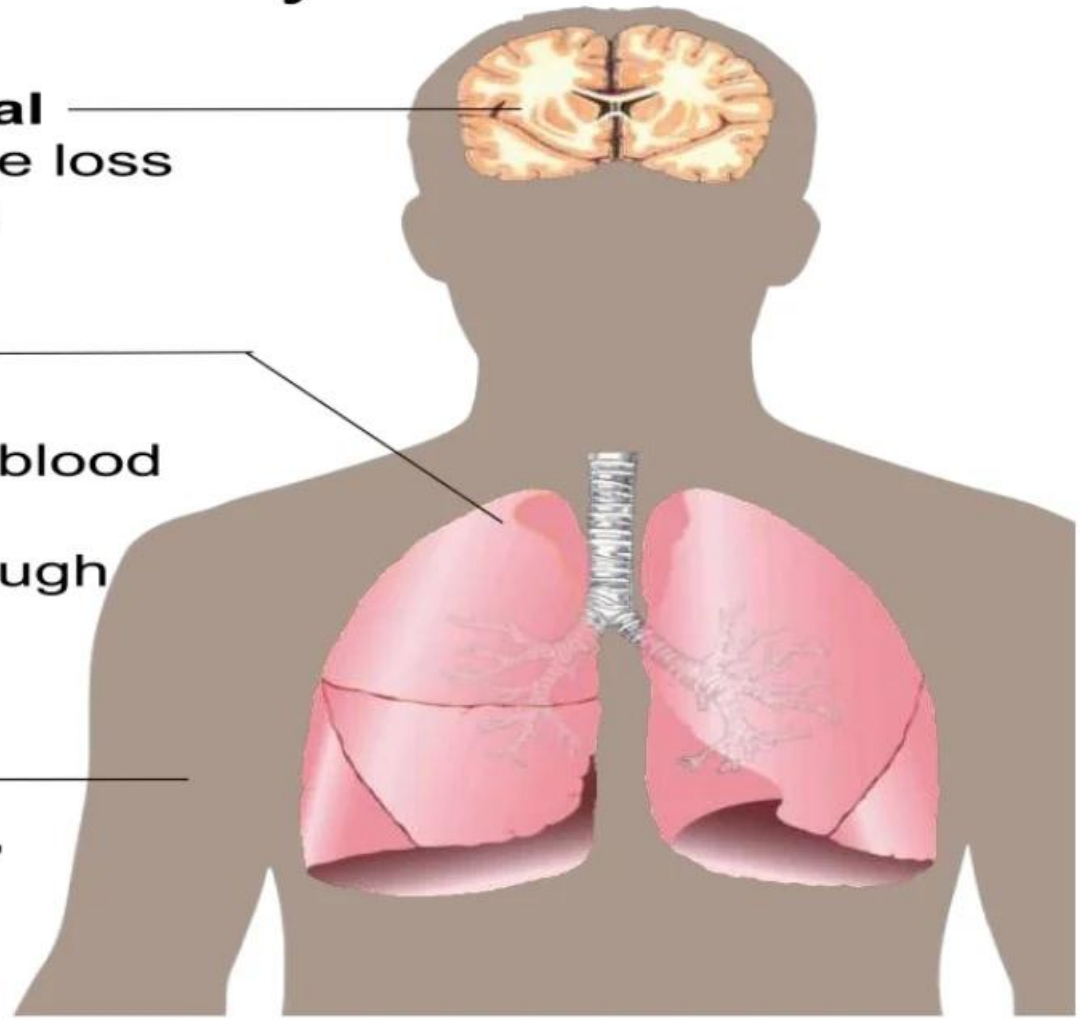
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Main symptoms of
Pulmonary tuberculosis

Central
- appetite loss
- fatigue

Lungs
- chest pain
- coughing up blood
- productive, prolonged cough

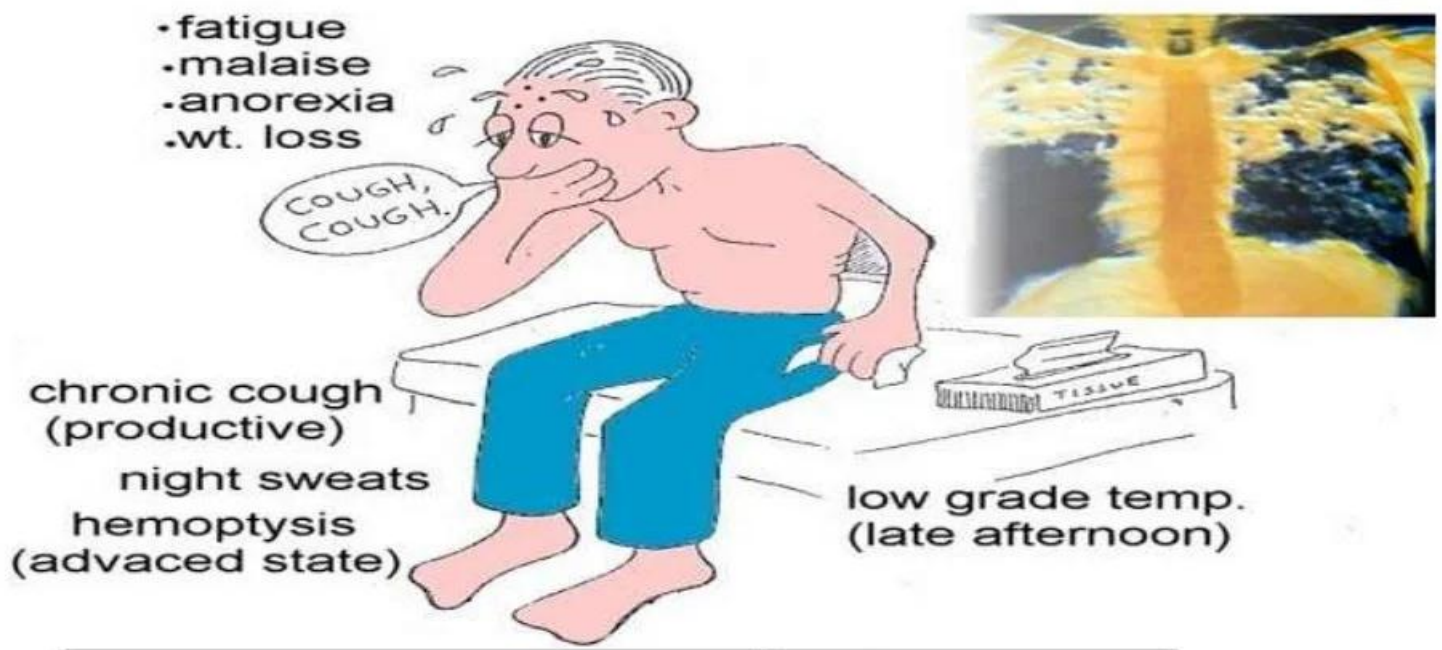
Skin
- night sweats,
- pallor



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CLINICAL MANIFESTATION

TUBERCULOSIS (TB)



Treatment:	Diagnostic:
TB medications 6 to 12 months bedrest until sypmtoms resp isolation until negative sputum frequently out-pt basis	TB skin test chest x-ray bacteriologic sputum studies

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CONTROL OF TB

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- **The control measures consists of :**

1. CURATIVE COMPONENT.

2. PREVENTIVE COMPONENT.

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- **The most powerful tool in containing the disease is CASE FINDING AND TREATMENT.**

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CASE FINDING

- **The first step in a tuberculosis control programme is early detection of sputum positive cases.**

- **This must be done as an intensified ongoing programme.**

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CASE DEFINITION

- **WHO defines a case as “a patient whose sputum is positive for tubercle bacilli, and such cases are the target of case finding.**

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SUSPECTS

- **All other possible sufferers from tuberculosis whose sputum is negative but show suggestive shadows in chest x-rays are reckoned as “suspects”.**

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CASE FINDING TOOLS

1. SPUTUM EXAMINATION.
2. RADIOGRAPHY.
3. SPUTUM CULTURE.

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SPUTUM EXAMINATION

- **Sputum smear examination is considered as the method of choice.**
- **The tool is reliable and cheap.**
- **It enables to discover epidemiologically most importance cases of pulmonary TB.**
- **This group contributes most of the new cases to the “pool of infection” every year.**

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COLLECTION OF SPUTUM SAMPLES

- Secretions build up in the airways overnight.
- So an early morning sputum sample is more likely to contain TB bacilli.

ZIEHL-NEELSON ACID FAST STAIN

- ZN Stain detects the acid fast bacilli.
- The ZN staining procedure is as follows.

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- **Sputum smear microscopy for tubercle bacilli is positive when there are at least 10,000 organisms present per ml of sputum.**

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TREATMENT

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WHO – Approved Fixed – Dose combinations of Anti tuberculosis drugs

Isoniazid	150 mg	+	Ethambutol 400 mg	
Rifampin	60 mg	+	Isoniazid 30 mg	
	150 mg	+	75 mg	
	300 mg	+	150 mg	
	60 mg	+	60 mg	} For Intermittent use
	150 mg	+	150 mg	

Rifampin	+	Isoniazid	+	Pyrazinamide	
60 mg		30 mg	+	150 mg	
150 mg	+	75 mg	+	400 mg	
150 mg	+	150 mg	+	500 mg	For Intermittent use

Rifampicin + Isoniazid + Pyrazinamide + Ethambutol
150 mg + 75 mg + 400 mg + 275 mg

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BACTERICIDAL DRUGS	BACTERIOSTATIC DRUGS
1. Rifampicin (RMP).	1. Ethambutol.
2. INH.	2. Thiacetazone.
3. Strptomycin.	
4. Pyrazinamide.	

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THE SECOND LINE DRUGS

- Fluoroquinalones.
- Ethionamide.
- Capreomycin.
- Kanamycin and Amikacin.
- Cycloserine.
- Macrolides.

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DOSAGE FOR ADULTS

WHO RECOMMENDED TREATMENT REGIMEN - TUBERCULOSIS

CATEGORY OF TREATMENT	TYPE OF PATIENT	REGIMEN
Category I	New sputum smear positive	$2(HRZE)_3$, $4(HR)_3$
	Seriously ill sputum smear negative Seriously ill extra-pulmonary	

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