

**PHB**



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## Chapter– 8 Infectious Diseases

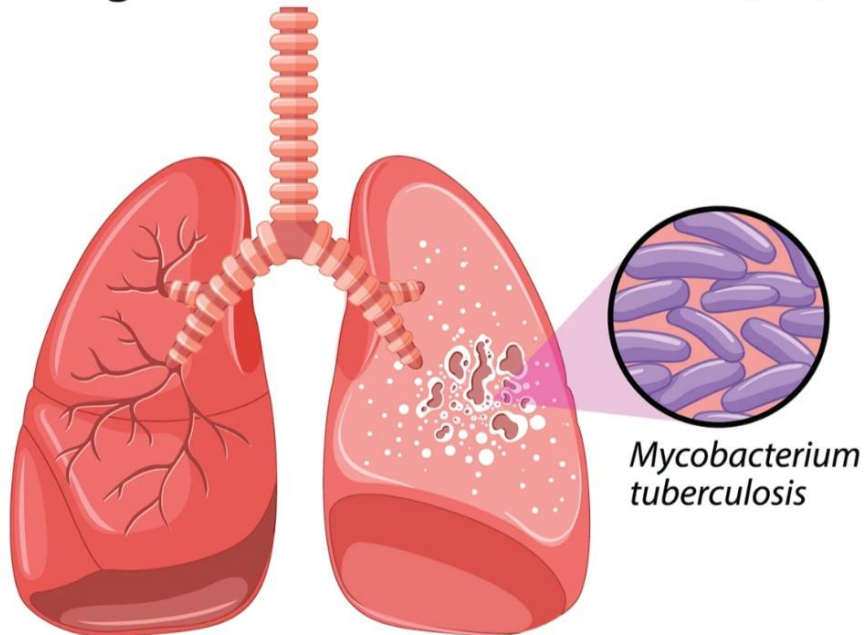
### Topic: TUBERCULOSIS

#### 8.1

#### Introduction

Tuberculosis (TB) is a bacterial infection caused by *Mycobacterium tuberculosis* that primarily affects the lungs, but can also affect other parts of the body.

### Lung infected with tuberculosis (TB)



#### 8.2

#### Etiopathogenesis

Some of the common causes include:

- 1. Mycobacterium tuberculosis:** The bacteria that causes TB.
- 2. Close contact:** Close contact with someone who has active TB.
- 3. Weakened immune system:** People with weakened immune systems, such as those with HIV/AIDS, are more susceptible to TB.
- 4. Age:** Older adults and young children are more susceptible to TB.

**5. Malnutrition:** Malnutrition can increase the risk of developing TB.

**8.3****Types**

Some common type of TB includes:

- 1. Pulmonary TB:** TB that affects the lungs.
- 2. Extrapulmonary TB:** TB that affects other parts of the body, such as the kidneys, spine, or brain.
- 3. Latent TB:** TB that is present in the body but is not active and not contagious.
- 4. Active TB:** TB that is present in the body and is active and contagious.

**8.4****Symptoms**

The symptom commonly includes:

- 1. Coughing:** A persistent cough that lasts for three or more weeks.
- 2. Chest pain:** Chest pain that worsens when coughing or taking deep breaths.
- 3. Coughing up blood:** Coughing up blood or rust-colored sputum.
- 4. Fatigue:** Feeling weak or tired.
- 5. Weight loss:** Unexplained weight loss.
- 6. Fever:** A low-grade fever that lasts for weeks.
- 7. Night sweats:** Night sweats that are recurring.

**8.5****Diagnosis**

Diagnostic procedures may include:

- 1. Chest X-ray:** A chest X-ray to look for signs of TB in the lungs.
- 2. Sputum test:** A sputum test to look for the presence of TB bacteria.
- 3. Blood test:** A blood test to look for signs of TB infection.
- 4. Biopsy:** A biopsy to examine tissue samples for signs of TB.

**8.6****Pharmacological managements**

Medications:

**First-line antitubercular agents:**

1. **Isoniazid (INH):** Inhibits the synthesis of mycolic acid, a key component of the mycobacterial cell wall.
2. **Rifampicin (RIF):** Inhibits RNA synthesis by binding to the beta-subunit of RNA polymerase.
3. **Ethambutol (EMB):** Inhibits the synthesis of arabinogalactan, a key component of the mycobacterial cell wall.
4. **Pyrazinamide (PZA):** Inhibits the synthesis of fatty acids, which are essential for the growth and survival of mycobacteria.
5. **Streptomycin (SM):** Inhibits protein synthesis by binding to the 30S subunit of the ribosome.

### **Second-line antitubercular agents:**

1. **Amikacin (AMK):** Inhibits protein synthesis by binding to the 30S subunit of the ribosome.
2. **Kanamycin (KM):** Inhibits protein synthesis by binding to the 30S subunit of the ribosome.
3. **Capreomycin (CM):** Inhibits protein synthesis by binding to the 30S subunit of the ribosome.
4. **Cycloserine (CS):** Inhibits the synthesis of peptidoglycan, a key component of the mycobacterial cell wall.
5. **Para-aminosalicylic acid (PAS):** Inhibits the synthesis of folic acid, which is essential for the growth and survival of mycobacteria.

### **Third-line antitubercular agents:**

1. **Linezolid (LZD):** Inhibits protein synthesis by binding to the 50S subunit of the ribosome.
2. **Tedizolid (TZD):** Inhibits protein synthesis by binding to the 50S subunit of the ribosome.
3. **Bedaquiline (BDQ):** Inhibits the ATP synthase enzyme, which is essential for the growth and survival of mycobacteria.
4. **Delamanid (DLM):** Inhibits the synthesis of mycolic acid, a key component of the mycobacterial cell wall.

## 8.7

### Non - Pharmacological managements

Non-pharmacological management of TB disorder includes:

#### **Rest and Relaxation**

1. Adequate rest: Patients with TB need to get plenty of rest to help their body recover from the infection.

2. **Reduced physical activity:** Patients should avoid strenuous physical activity to conserve energy.

### **Nutrition and Diet**

1. **Balanced diet:** A balanced diet rich in protein, calories, and micronutrients is essential for patients with TB.

2. **Increased caloric intake:** Patients with TB may require increased caloric intake to support their energy needs.

3. **Vitamin and mineral supplements:** Vitamin and mineral supplements, such as vitamin D and calcium, may be necessary to support bone health.

### **Infection Control**

1. **Isolation:** Patients with active TB should be isolated from others to prevent the spread of the infection.

2. **Mask use:** Patients with active TB should wear a mask when in public to prevent the spread of the infection.

3. **Hand hygiene:** Patients and healthcare workers should practice good hand hygiene to prevent the spread of the infection.

## **8.8**

### **Complications**

Complications of untreated TB:

**1. Lung damage:** TB can cause permanent lung damage.

**2. Spinal cord compression:** TB can cause spinal cord compression, leading to paralysis.

**3. Meningitis:** TB can cause meningitis, a potentially life-threatening condition.

## Practice Questions

### MULTIPLE CHOICE QUESTIONS

1. What is the primary causative agent of tuberculosis?
  - a) Streptococcus pneumoniae
  - b) Mycobacterium tuberculosis
  - c) Escherichia coli
  - d) Staphylococcus aureus
2. Which of the following is the primary route of transmission for tuberculosis?
  - a) Sexual contact
  - b) Contaminated food and water
  - c) Inhalation of airborne droplets
  - d) Skin-to-skin contact
3. Which diagnostic test is commonly used to confirm tuberculosis infection?
  - a) Blood culture
  - b) Chest X-ray
  - c) Tuberculin skin test (TST)
  - d) Polymerase chain reaction (PCR)
4. Which of the following is a common symptom of pulmonary tuberculosis?
  - a) Joint pain
  - b) Night sweats
  - c) Abdominal pain
  - d) Visual disturbances
5. What is the primary target organ of tuberculosis infection?
  - a) Liver
  - b) Kidneys
  - c) Lungs
  - d) Heart
6. Which of the following drug combinations is commonly used for the treatment of tuberculosis?

- a) Rifampin, isoniazid, ethambutol, streptomycin
  - b) Isoniazid, pyrazinamide, ethambutol, fluoroquinolone
  - c) Rifampin, ethambutol, pyrazinamide, streptomycin
  - d) Isoniazid, rifampin, pyrazinamide, ethambutol
7. What is the standard duration of treatment for drug-sensitive pulmonary tuberculosis?
- a) 4 weeks
  - b) 6 months
  - c) 1 year
  - d) 2 weeks
8. Which of the following populations is at increased risk for developing tuberculosis?
- a) Young adults
  - b) Elderly individuals
  - c) Healthcare workers
  - d) Immunocompromised individuals
9. What is the name of the vaccine used for tuberculosis prevention in children?
- a) MMR vaccine
  - b) BCG vaccine
  - c) Hepatitis B vaccine
  - d) Polio vaccine
10. Which of the following is NOT a complication of tuberculosis?
- a) Meningitis
  - b) Hepatitis
  - c) Pericarditis
  - d) Osteomyelitis

**FILL IN THE BLANKS**

1. Tuberculosis is caused by the bacterium named \_\_\_\_\_. (***Mycobacterium tuberculosis***)
2. The most common form of tuberculosis affects the \_\_\_\_\_. (***Lungs***)
3. Tuberculosis is primarily transmitted through \_\_\_\_\_ droplets. (***Airborne***)
4. A persistent \_\_\_\_\_ is one of the main symptoms of tuberculosis. (***Cough***)
5. The standard test used for diagnosing tuberculosis is the Tuberculin Skin Test (TST) or \_\_\_\_\_. (***Mantoux test***)
- 6.



**SHORT ANSWER TYPE QUESTIONS**

1. What is tuberculosis, and how does it spread?
2. Describe the typical symptoms of tuberculosis.
3. How is tuberculosis diagnosed?
4. What are the treatment options for tuberculosis?
5. What is the primary route of transmission for tuberculosis?

**LONG ANSWER TYPE QUESTIONS**

1. Explain the difference between latent tuberculosis infection (LTBI) and active tuberculosis disease.
2. Explain the steps involved in the diagnosis of tuberculosis.
3. Describe the pathogenesis of tuberculosis.
4. Discuss the complications with untreated tuberculosis.
5. What is tuberculosis? Give the outline the strategies for tuberculosis prevention and control at the community at levels.

**MCQ Answer**

<b>1.</b>	<b>B</b>	<b>3.</b>	<b>C</b>	<b>5.</b>	<b>C</b>	<b>7.</b>	<b>B</b>	<b>9.</b>	<b>B</b>
<b>2.</b>	<b>C</b>	<b>4.</b>	<b>B</b>	<b>6.</b>	<b>D</b>	<b>8.</b>	<b>D</b>	<b>10.</b>	<b>B</b>