

Tuberculosis

By

DR. PRAMOD KUMAR MAHISH

Asst. Professor & Head (Biotechnology)

Govt. Digvijay PG College Rajnandgaon (C.G.)

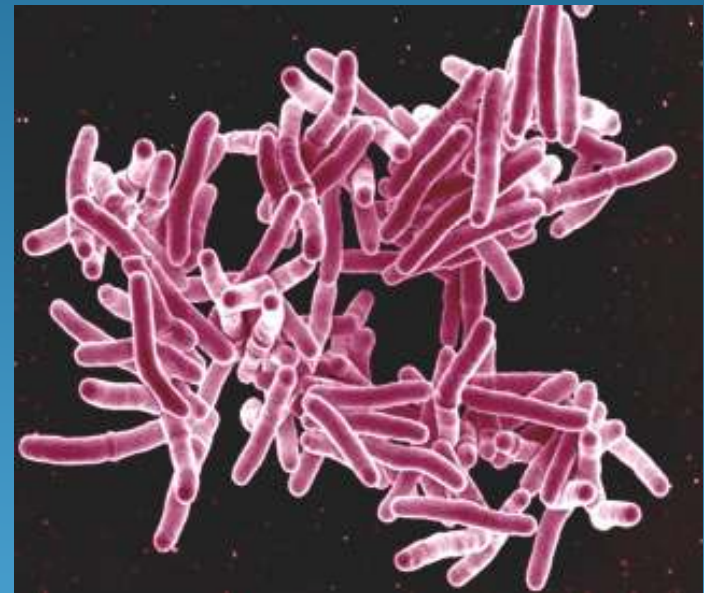
pramod.mahish@rediffmail.com

Introduction

- Tuberculosis (TB) is caused by a bacterium called *Mycobacterium tuberculosis*.
- The bacteria usually attack the lungs, but TB bacteria can attack any part of the body such as the kidney, spine, and brain.
- If not treated properly, TB disease can be fatal.

Organism

- Mycobacterium tuberculosis – Humans
- Mycobacterium bovis – Cattle
- **Morphology**
- $0.4 \times 3 \mu\text{m}$
- coccoid and filamentous

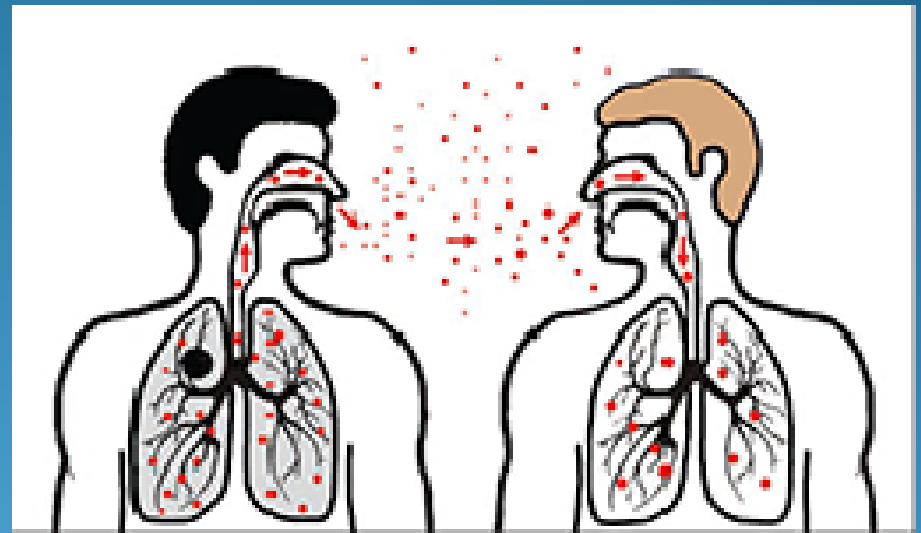


Growth

- Aerobic
- Multiplication – 18hr
- Temperature – 22-33°C

Transmission/Spreading

- TB is spread through the air from one person to another. The TB bacteria are put into the air when a person with TB disease of the lungs or throat coughs, sneezes, speaks, or sings.
- People nearby may breathe in these bacteria and become infected.



Latent TB Infection

- TB bacteria can live in the body without making you sick.
- This is called latent TB infection. In most people who breathe in TB bacteria and become infected, the body is able to fight the bacteria to stop them from growing.
- People with latent TB infection do not feel sick and do not have any symptoms. People with latent TB infection are not infectious and cannot spread TB bacteria to others.
- However, if TB bacteria become active in the body and multiply, the person will go from having latent TB infection to being sick with TB disease.

TB Disease

- TB bacteria become active if the immune system can't stop them from growing. When TB bacteria are active (multiplying in your body), this is called TB disease. People with TB disease are sick. They may also be able to spread the bacteria to people they spend time with every day.
- Many people who have latent TB infection never develop TB disease. Some people develop TB disease soon after becoming infected (within weeks) before their immune system can fight the TB bacteria. Other people may get sick years later when their immune system becomes weak for another reason.

Causes

- Primary tuberculosis
- Multiply intracellularly, in blood, respiratory tract and lung
- Secondary tuberculosis
- Mortality rate – 60%
- Fever, weight loss, chest pain, bloody sputum
- Extrapulmonary tuberculosis
- Lymph node, kidney, brain,

Symptoms

Symptoms of TB disease include:

- a bad cough that lasts 3 weeks or longer
- pain in the chest
- coughing up blood or sputum
- weakness
- weight loss
- fever
- sweating at night

TB Risk Factors

he chance of developing TB disease is higher if the person:

- Has HIV infection;
- Has been recently infected with TB bacteria (in the last 2 years);
- Has other health problems, like diabetes, that make it hard for the body to fight bacteria;
- Abuses alcohol or uses illegal drugs; or
- Was not treated correctly for TB infection in the past

Microbial Diagnosis

- Staining
- Acid Fast staining (Ziehl-Neelsen Staining)
- Once stain by basic dye – cannot decolorized by alcohol
- Acid alcohol – 95% ethyl alcohol with 3% HCl
- Decolorize all bacteria except mycobacterium
- Sputum - Smear
- Gives yellow orange fluorescence with auramine and rhodamine

Molecular Identification

- ELISA
- Diagnosis of IgM
- IgM increases
- DNA
- Diagnosis of 16S RDNA

Culture

- Egg medium
- Lowenstein –Jensen
- Egg, glycerol, Salts, Malachite green
- Agar Medium
- Middelbrook 7H10, 7H11
- Broth
- 7H9, 7H12

Drug

- First line drug –
 - Rifampicin
 - Streptomycin
 - Ethambutol
 - Isoniazide
- Secondline drug
 - Cycloserine
 - Clarithromycin



Thankyou