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**Viva Assignment: Bacterial genetics**

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## **Topic: Tuberculosis(TB):**

### **Introduction:**

Tuberculosis (TB) is an airborne bacterial infection caused by the organism *Mycobacterium tuberculosis* that primarily affects the lungs, although other organs and tissues may be involved.

### **Key Points**

While contagious, TB is not easily spread from person to person.

About 1.8 billion people, or one-quarter of the world's population, are infected with tuberculosis but most of these people have latent TB.

About 10 million people have active TB worldwide.

In the United States, TB is much less common can almost always be treated and cured if you take medicine as directed.

### **How TB Affects Your Body**

TB is caused by the bacterium *M. tuberculosis*. It spreads person to person when an infected individual coughs or sneezes out the bacteria, spreading it through the air to be breathed in by others. It takes prolonged exposure to become infected with TB, so you would typically get sick from a close family member or co-worker, not a casual acquaintance. Once you have inhaled the bacterium, the bacterium lodges in the lung tissue.

Healthy individuals may contract latent TB, but the disease may not become active until months or years later, at a time when the immune system becomes weak for some reason. However, people with weakened immune systems are at a greater risk for developing active TB right away. When they breathe in the bacterium, it settles in their lungs and starts growing because their immune systems cannot fight the infection. In these instances, TB disease may develop within days or weeks after the infection.

When a person gets active TB disease, it means TB bacteria are multiplying and attacking the lung(s) or other parts of the body, such as the lymph nodes, bones, kidney, brain, spine and even the skin. From the lungs, TB bacteria move through the blood or lymphatic system to different parts of the body.

## **Who Is at Risk of TB?**

The chances of getting infected by the TB germ are highest for people that are in close contact with others who are infected. This includes:

- Family and friends of a person who is infected
- People from parts of the world with high TB rates, including India and parts of Asia and Africa.
- People in groups with high rates of TB transmission, including the homeless, injection drug users and people living with HIV
- People who work or reside in facilities that house high risk people such as hospitals, homeless shelters, correctional facilities, nursing homes and residential homes for those with HIV

Not everyone who is infected with the TB germ (latent TB) develops clinically active TB disease. People at the highest risk for developing active TB disease are those with a weak immune system, including:

- Babies and young children
- People with chronic conditions such as diabetes or kidney disease
- People with HIV/AIDS
- Organ transplant recipients
- Cancer patients undergoing chemotherapy
- People receiving certain treatments for autoimmune disorders such as rheumatoid arthritis or Crohn's disease/

## **Symptoms of TB:**

People with TB disease usually have symptoms and may spread TB bacteria to others.

- Woman coughing
- A cough lasting 3 weeks or longer is a symptom of TB disease.

- TB bacteria most commonly grow in the lungs, and can cause symptoms such as:
- A bad cough that lasts 3 weeks or longer
- Pain in the chest
- Coughing up blood or sputum (mucus from deep inside the lungs)

Other symptoms of TB disease may include:

- Weakness or fatigue
- Weight loss
- No appetite
- Chills
- Fever
- Sweating at night

## **Treatment**

Medications are the cornerstone of tuberculosis treatment. But treating TB takes much longer than treating other types of bacterial infections.

For active tuberculosis, you must take antibiotics for at least six to nine months. The exact drugs and length of treatment depend on your age, overall health, possible drug resistance and the infection's location in the body.

## **Most common TB drugs**

If you have latent tuberculosis, you may need to take only one or two types of TB drug. Active tuberculosis, particularly if it's a drug-resistant strain, will require several drugs at once. The most common medications used to treat tuberculosis include:

- Isoniazid
- Rifampin (Rifadin, Rimactane)
- Ethambutol (Myambutol)

- Pyrazinamide

If you have drug-resistant TB, a combination of antibiotics called fluoroquinolones and injectable medications, such as amikacin or capreomycin (Capastat), are generally used for 20 to 30 months. Some types of TB are developing resistance to these medications as well.

Some drugs may be used as add-on therapy to the current drug-resistant combination treatment, including:

- Bedaquiline (Sirturo)
- Linezolid (Zyvox)

### **Completing treatment is essential**

After a few weeks, you won't be contagious and you may start to feel better. It might be tempting to stop taking your TB drugs. But it is crucial that you finish the full course of therapy and take the medications exactly as prescribed by your doctor. Stopping treatment too soon or skipping doses can allow the bacteria that are still alive to become resistant to those drugs, leading to TB that is much more dangerous and difficult to treat.

To help people stick with their treatment, a program called directly observed therapy (DOT) is recommended. In this approach, a health care worker administers your medication so that you don't have to remember to take it on your own.

### **Why I choose this topic:**

I choose Tuberculosis topic because I want to know more about TB because my uncle is suffering from TB from last 3 months and he is on his TB course taking a lot of medicines as his doctor prescribed, also Tuberculosis (TB) remains one of today's global health challenges, ranking as the second leading infectious cause of death and one of the most burden-inflicting diseases in the world. ... Better tools are needed to control TB worldwide. The 2014 WHO Global Tuberculosis Report estimated a worldwide incidence of 9.0 million new cases and 1.5 million deaths in 2013. Understanding latent TB infection and persistence of infection after treatment is of the utmost importance. The discovery of new markers for high and low risk

individuals, in terms of development of TB and adequacy of treatment, would allow evidence-based determination of who to treat, how to treat, and how long to treat both for prevention and cure.

### **Risk of TB for humanity:**

As TB is second leading infection that causes death. And this is rapidly transmitted disease due to which many people effects in short period of time .To reduce TB cases we all should be aware of this disease, as how it is transmitted from one person to another so that we take precautionary measurements.

There should be more inventions of new tools for treatment of this disease.

There should be some awareness classes arrange for rural areas people and a team of experts should guide them well about TB.