



Lung tree note





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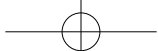
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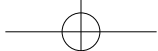
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Part.1

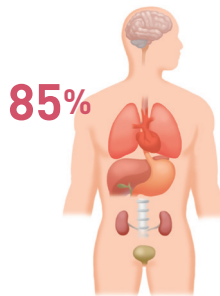
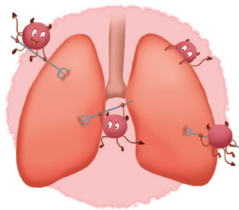
Overview of Tuberculosis





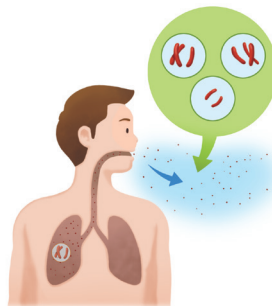
“ What is tuberculosis¹ ? ”

- Tuberculosis is a disease caused by a tuberculosis bacterium, called *Mycobacterium tuberculosis*. About 85% of tuberculosis occurs in lung but can occur anywhere in our body.



“ How does tuberculosis bacterium look like¹ ? ”

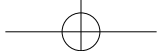
- *Mycobacterium tuberculosis* is a rod-shaped bacterium. Compared to other bacteria, proliferation rate of *Mycobacterium tuberculosis* is very slow and it is a contagious bacterium that has been bothering humanity for the longest time.



✓ Tuberculosis is a disease caused by a tuberculosis bacterium, called *Mycobacterium tuberculosis*.

✓ *Mycobacterium tuberculosis* is a rod-shaped bacterium that proliferates very slowly.

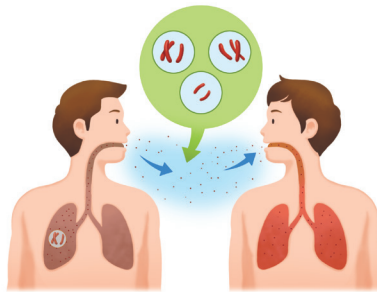




“ How is tuberculosis infected¹? ”

• TB bacteria usually spread from person to person through the air.

- ① When TB patient coughs or sneezes, fine mucus droplets that contain TB bacteria come out into the air
- ② This TB bacteria remain in the air
- ③ When a nearby person inhales this air, the TB bacteria can penetrate into the lung and may cause infection



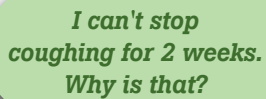
*In that case, anyone
can be infected with
tuberculosis?*

*Yes, that's right. In that
reason, it is important
to treat and manage
tuberculosis.*



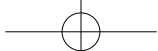


- **Cough** needs to be tested for tuberculosis if coughing continues for more than 2 weeks
- **Hemoptysis** coughing up of blood-stained mucus
- **Dyspnea** difficulty breathing even with a little movement
- **Fatigue/Tiredness** easily gets tired and no energy
- **Low-grade fever/Chill** presented with low-grade fever and night sweats
- **Loss of appetite/weight loss** experiencing loss of appetite and losing weight continuously



You look tired and have lost your weight a lot as well. I'd like you to be tested for tuberculosis if you have been coughing more than 2 weeks.





“ How is tuberculosis diagnosed²? ”

- Collecting sputum specimens is the most accurate way of diagnosing tuberculosis and there are smear test and culture test.



In addition, there are other tests available.

- Chest X-Ray



Chest X-ray is useful for diagnosis of tuberculosis disease.

- Tuberculin Skin Test



TST identifies *Mycobacterium tuberculosis* infection.

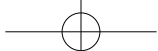
- Drug Susceptibility Test



Cultured isolate is tested for resistance to the anti-tuberculosis drugs.



- ✓ Sputum test is the most accurate way of diagnosing TB.
- ✓ Drug susceptibility test is useful to determine effective medication for TB treatment.



“ How can tuberculosis be prevented¹? ”

● BCG Vaccine

- It is a vaccination for tuberculosis to increase immunity against.
- It can prevent severe tuberculosis usually in infants and children.
- It needs to be administered within 1 month of birth.



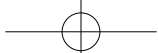
● Strengthening of Immune System

- Decreased immunity due to exhaustion, stress, and excessive loss of weight can be a cause of tuberculosis.
- It is important to maintain well-balanced nutritional status and healthy body.
- Stop drinking alcohol and smoking.

Can tuberculosis be prevented in advance?

Of course, it's good to vaccinate BCG within 1 month of birth. Also it is important to form a habit to increase immune system.

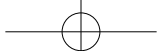




Part. 2

Treatment of Tuberculosis





“ How is tuberculosis treated¹? ”



Taking TB medications is the only way to kill tuberculosis bacteria. Tuberculosis is a disease that can be cured with proper administration of 3~4 TB medications for at least 6 months.



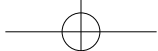
Do not stop taking TB medications without consultation. It is very important to continue taking prescribed dose of medications at the appointed time.



While taking TB medications, medical observations are required as TB progresses. Chest X-ray and sputum test are repeated every 2~3 months to check TB improvement and adverse reactions from TB medications.



- ✓ TB can be completely cured with proper administration of medications.
- ✓ TB is treated with combination of multi-drugs for a long-term.
- ✓ It is important to complete the entire course of treatment without giving-up.
- ✓ Chest X-ray and sputum test are routinely done to check TB progress.



“ Are you aware of drug administration management system for infectious tuberculosis patient¹ ? ”

● Objectives

- To manage drug administration of TB patient and monitor adverse reactions to the TB medications.
- To help patients to complete the entire course of treatment and to block spread of TB in the beginning.

● Details

- Subject and Duration : minimum of 2 weeks monitoring of drug administration for a newly
- diagnosed infectious TB patient, or other patients depending on the situation or their conditions

● Management Method



Manager, a person in charge of monitoring patient's drug administration, phones in to check whether patient has taken medications or not and also to monitor adverse reactions from anti-TB medications.



Mobile DOT (Direct Observed Therapy)

Patient can download TB Zero application into his/her smartphone and send the self-video of taking medications to the manager.



Management Visit

Patient visits hospital or public health center in person and checks for drug administration and adverse reactions.

● Monitoring Items

- Drug administration
- Adverse reactions, temporary drug discontinuation



“ What kinds of medications are available for tuberculosis³ ? ”

- TB medications are categorized into "**first-line medication**," the medication that is primarily used for its effectiveness and little adverse reactions and "**second-line medication**," the medication that has serious adverse reactions so it is used only when it's imperatively necessary.
- Also TB medications are classified into **5 groups** according to the effectiveness and mechanism of action.

Anti-TB Medication Group 1

-The **first-** choice oral medications that are very effective and have less adverse reactions.



Isoniazid



Rifampin



Ethambutol



Pyrazinamide



Rifabutin

Anti-TB Medication Group 2, 3, 4, 5 (Second-line medication)

When first-line anti-TB medication can not be used due to the drug resistance and/or adverse drug reactions.

● Anti-TB Medication Group 2 (Injectibles)



Kanamycin



Amikacin



Capreomycin



Streptomycin

● Anti-TB Medication Group 3 (Quinolones)



Levofloxacin



Moxifloxacin

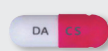


Ofloxacin

● Anti-TB Medication Group 4 (Oral Second-Line Anti-TB Medication)



Prothionamide



Cycloserine



PAS

● Anti-TB Medication Group 5 (Require medical consultation from doctor)



Bedaquiline



Clofazimine



Linezolid



Amoxicillin



Clarithromycin



Imipenem

* Shapes can be varied by manufacturers





“ What are some precautions for tuberculosis patients² ? ”



● Wearing Mask

Please wear mask not to transmit TB bacteria to other people.



● No smoking, No drinking alcohol

Please stop smoking and drinking alcohol for successful TB treatment.

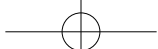


Please obtain
a **well-balanced diet**
to improve immune system.



√ TB patients have to be fully aware of precautions for themselves
as well as for other people around.





“ LTBI Examination Project for the Family of Tuberculosis Patients¹ ”

● Importance

- Family members, friends and co-workers of TB patient can be infected because they are exposed to TB bacteria sharing daily activities with TB patient.
- Some people with LTBI can develop into active TB with weakened immune system.

● Overview

- The project support the cost of the examination to check whether the family members, and other people in close contact with pulmonary TB patients who are reported to public health center and hospital are infected with TB or not.

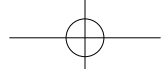
● Details

- TB-diagnosed patient in public health center and hospital will be provided with "Person in Close Contact Examination Note" to the number of exposed people.
- Person exposed within 1 month can visit public health center and other participating facilities and examine for free with examination note.
- TB examination: chest x-ray, sputum smear and culture
- LTBI examination: tuberculin skin test

Is there any national support project for LTBI?

Yes. There is a support for LTBI examination costs of family members of TB patients to check whether they are infected with TB bacteria or not.





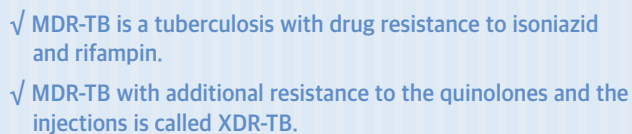
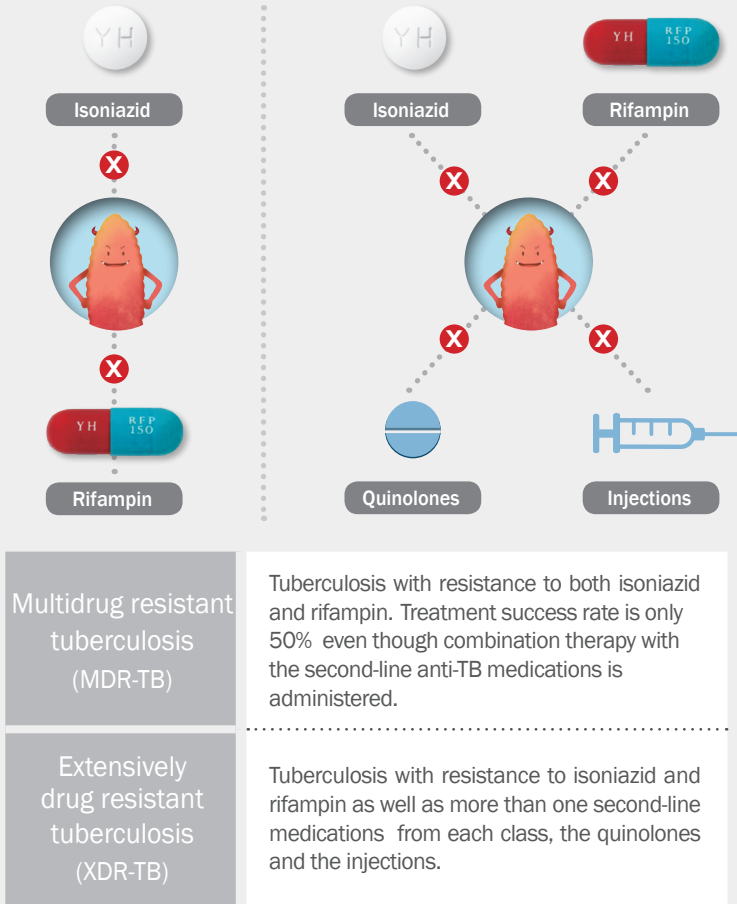
Part. 3

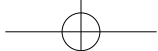
Drug Resistant Tuberculosis





“What types of drug-resistant tuberculosis are there¹? ”





“ How is multi-drug resistant tuberculosis treated³? ”

Since isoniazid and rifampin can't be used for MDR-TB, the second-line anti-TB medications are usually prescribed.

- **Concentrated Management of MDR-TB Treatment**
 - PZA (pyrazinamide) + 4 effective second line anti-TB medications (including injections)
 - 8 months

*What is MDR-TB?
Is it treated differently
from regular TB?*

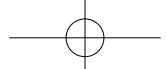
*MDR-TB is a TB that is not
treatable with the 1st line anti-
TB medications due to resistance.
Therefore, the 2nd line anti-TB
medications are prescribed for
treatment.*





	Anti-TB Medication	Shape	Adverse Reactions
Group 2	Injections		ototoxicity, renal toxicity, tingling around mouth
Group 3	Levofloxacin		GI trouble, headache, dizziness, joint pain
	Moxifloxacin		
	Ofloxacin		
Group 4	Cycloserine		depression, mental disorder
	Prothionamide		GI trouble, hepatotoxicity
	PAS		loss of appetite, nausea, vomiting, abdominal discomfort, hepatotoxicity
Group 5	Linezolid		myelosuppression, peripheral neuropathy
	Bedaquiline		abnormal ECG, arrhythmia, abnormal liver function
	Delamanid		abnormal ECG, nausea, vomiting, sleepiness

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“ Are there any new tuberculosis medications available?⁴⁻⁷ ”



Bedaquiline^{4,6}

Bedaquiline is a medication that inhibits mycobacterial ATP (adenosine 5'-triphosphate) synthase, an enzyme that is essential for the generation of energy in TB bacteria. Therefore, it inhibits duplication of TB bacteria as well. Recent clinical study with MDR-TB patients confirmed that patients treated with bedaquiline took less time for negative culture conversion and had more negative culture conversion rate than patients treated with the compared medication. Bedaquiline is administered 400mg daily for 2 weeks, then 200mg three times weekly until week 22. Maximum treatment duration is 6 months and bedaquiline can be administered with food for better absorption.



Delamanid^{5,7}

Delamanid inhibits the synthesis of mycolic acid, a component of TB bacteria's cell wall. Recent clinical study with MDR-TB patients showed that combination of delamanid and standard TB therapy significantly improved the negative culture conversion rate from sputum culture test at 2 months. For adults, take Delamanid 100mg twice daily with food and it's recommend to take continuously for 24 weeks.





Does tuberculosis recur after complete cure¹?

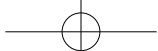
About 3 % of TB patients have a risk of relapse after TB was completely cured. TB bacteria can be proliferated again when patient's immune system is weakened.

Risk factors for TB relapse

- physical characteristic
- environment
- daily habit
- stress
- underlying disease that weakens immune system (diabetes, cirrhosis of the liver, AIDS)
- treatment that weakens immune system (hemodialysis, adrenocortical steroids, immunosuppressants, anti-cancer medications)
- elderly (Elderly TB patients are usually from TB relapse)

Patient with such underlying diseases needs to be treated under a special care from physician. Also, patient needs to keep a good nutritional status and stress management to prevent TB relapse.





Lung tree care

Publishing Office Information

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2. Janssenkorea 25F, LS Yongsan Tower, Hangangro 2-Ga, Yongsan-Gu, Seoul 140-702, Korea Tel.+82-2-2094-4500

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