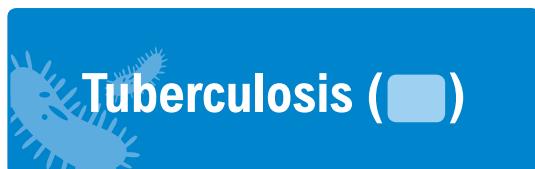
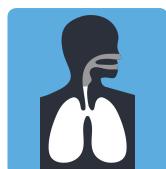


## TOPIC: MICROBIAL INFECTIONS – RESPIRATORY SYSTEM

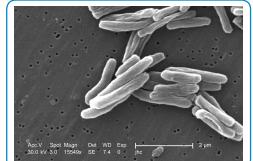
### Tuberculosis



#### Bacterial

GRAM \_\_\_\_\_ bacteria

SHAPE: Non-endospore forming rod.

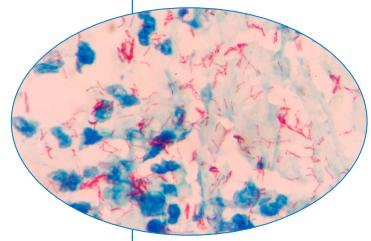


(Ray Butler, MS/ CDC)

#### CAUSE

*Mycobacterium tuberculosis* (*M. tuberculosis*).

- ◆ \_\_\_\_\_ growing.
- ◆ Mycolic acid – \_\_\_\_\_ outer layer of cell wall.
- ◆ Cord factor: glycolipid containing \_\_\_\_\_ acid in cell wall.
  - Keeps daughter cells attached.
  - \_\_\_\_\_ to mammalian cells.
  - Inhibits \_\_\_\_\_.



#### SPREAD

Direct transmission → respiratory droplets.

- May infect tissues other than the lungs as well.
- Less common for \_\_\_\_\_ infection.

#### SYMPTOMS

Change with disease progression.

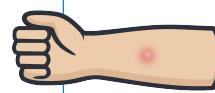
- ◆ Latent: \_\_\_\_\_ symptoms. Immune system isolates bacteria inside \_\_\_\_\_.
- ◆ Progression of active infection:
  - Difficulty \_\_\_\_\_.
  - Chest pain.
  - \_\_\_\_\_ in sputum.



#### DIAGNOSIS

**Mantoux Tuberculin Skin Test:** injects purified protein derivative (PPD).

- ◆ Negative: \_\_\_\_\_ reaction → no immune response.
- ◆ Positive: \_\_\_\_\_ at injection site → \_\_\_\_\_ response.
  - Past/latent infection; immunized; active Infection.



**Chest \_\_\_\_\_:** looks for Ghon complexes.

#### TREATMENT

Intensive \_\_\_\_\_ treatment.

- ◆ **Multidrug-resistant strains:** resist first-line drugs (Isoniazid & Rifampin).
- ◆ **Extensively drug-resistant strains:** virtually \_\_\_\_\_.

#### IMMUNITY

\_\_\_\_\_ vaccine: usually only given in areas w/ \_\_\_\_\_ TB infection rates.

## EXAMPLE

Gina must take a Mantoux test (PPD test) before she can start volunteering at a hospital. After receiving the injection, she came back 48 hours later with an induration that measured 12 mm, which is considered a positive result.

---

a) Does this mean that she is contagious for tuberculosis? \_\_\_\_\_

b) What could be the possible causes of her positive result?  
\_\_\_\_\_

c) Based on the results of her Mantoux test, the doctor decides to take a chest X-ray. What may the doctor be looking for on the X-ray to indicate TB infection? \_\_\_\_\_

## PRACTICE

Which of the following is required for *M. tuberculosis* to be virulent?

---

- a) Ghon complexes.
- b) Presence of neuraminidase enzyme.
- c) Infection by a phage.
- d) Presence of cord factor.

## PRACTICE

Tuberculosis can be especially difficult to treat for which of the following reasons?

---

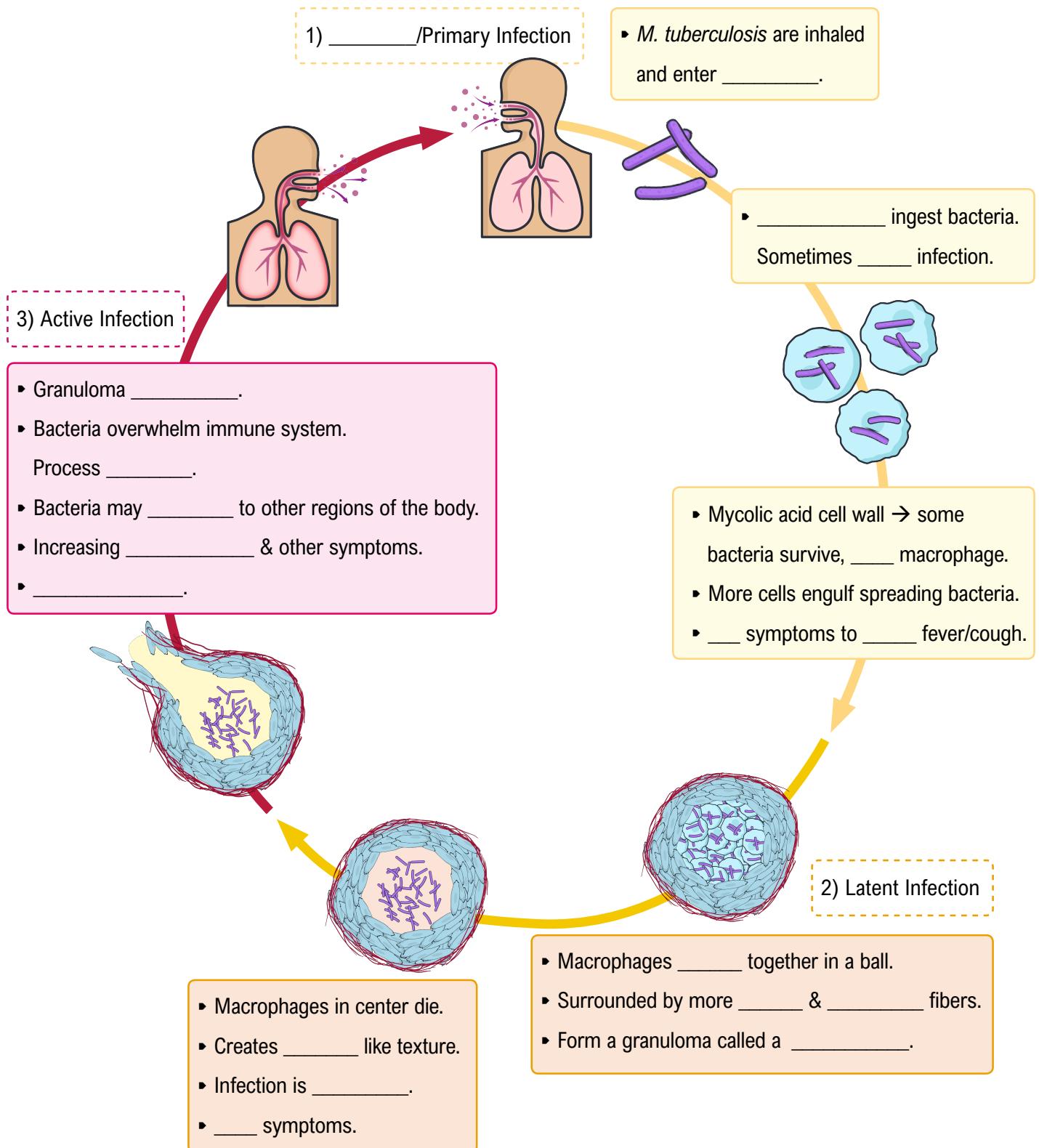
- I. It is slow-growing.
- II. Multi-drug-resistant strains are becoming more common.
- III. The presence of mycolic acid and cord factor in the cell wall.

a) I & II.      b) I & III.      c) II & III.      d) I, II, & III.

## TOPIC: MICROBIAL INFECTIONS – RESPIRATORY SYSTEM

### Tuberculosis Pathogenesis

- ♦ *M. tuberculosis* infections have \_\_\_\_ stages:



## EXAMPLE

For each statement below, write “T” if the statement is **true** and “F” if the statement is **false**.

Correct each false statement on the line below.

---

1. An active tuberculosis infection is characterized by *M. tuberculosis* bacteria actively reproducing

within a tubercle: \_\_\_\_\_

---

2. In the majority of people, most tubercles will never rupture and the disease will never move past the latent stage: \_\_\_\_\_

---

3. Tuberculosis may infect other regions of the body, but it is generally considered a less serious an infection when it does: \_\_\_\_\_

---

4. *M. tuberculosis* are able to reproduce inside of macrophages: \_\_\_\_\_

---

## PRACTICE

The exact progression of tuberculosis can vary based on the individual. For individuals that progress to severe disease, which of the following orders the stages of a tuberculosis infection correctly as most commonly experienced?

---

- a) Active infection → latent infection → dormant infection.
- b) Initial infection → dormant infection → latent infection.
- c) Dormant infection → active infection → latent infection.
- d) Initial infection → latent infection → active infection.

## PRACTICE

Which of the following statements about tuberculosis tubercles is correct?

---

- a) They contain cord factor as part of the mycolic acid component of their cell wall.
- b) They have been infected with a phage that codes for an exotoxin.
- c) They infect the alveoli rather than being sequestered to the upper respiratory tract.
- d) They are part of a pseudomembrane, which allows them to become established in the airway more easily.