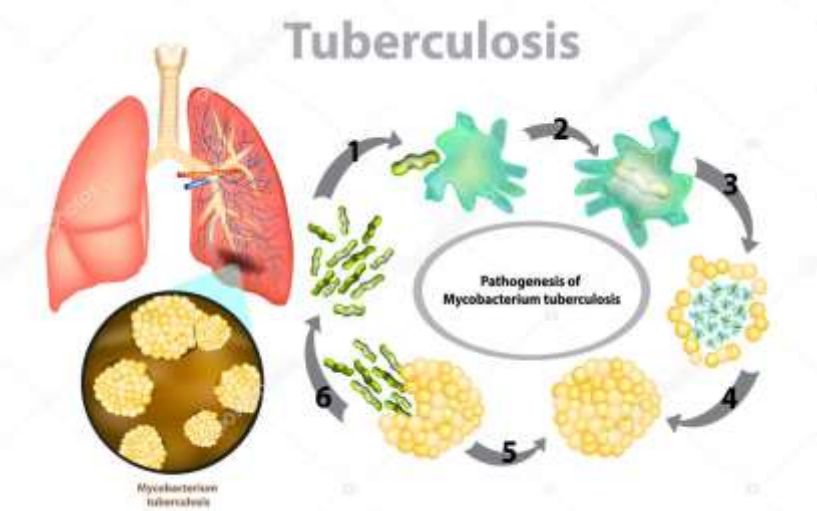


RSM-3
PULMONARY INFECTIONS-2

Dr. Eman Kreishan, M.D

16-10-2022

CHRONIC PNEUMONIAS

- Chronic pneumonia most often is a localized lesion in an immunocompetent individual, with or without regional lymph node involvement.

- There is typically granulomatous inflammation, which may be due to :

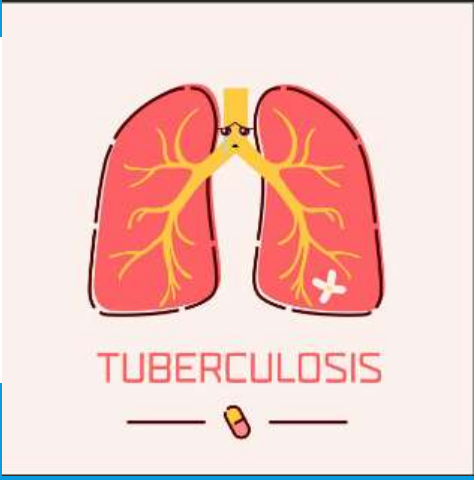
➢ bacteria (e.g., M. tuberculosis).

➢ fungi.

➢ In immunocompromised patients, the usual presentation is widespread disease due to systemic dissemination of the causative organism.

➢ Tuberculosis is by far the most important entity within the spectrum of chronic pneumonias

TUBERCULOSIS



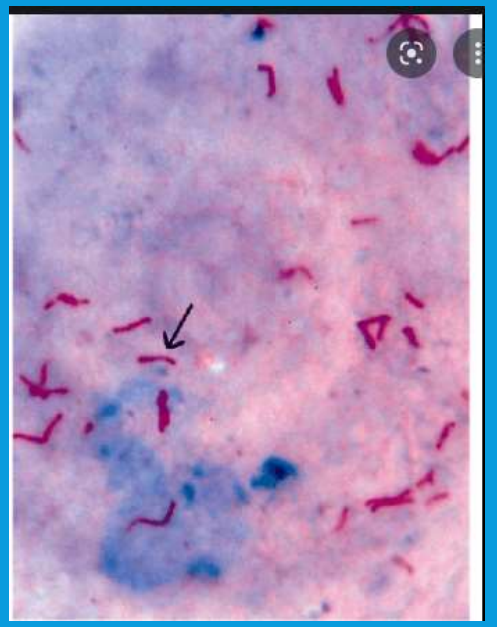
- Tuberculosis is a communicable chronic granulomatous disease caused by Mycobacterium tuberculosis.
- It usually involves the lungs but may affect any organ or tissue in the body.
- The World Health Organization (WHO) considers tuberculosis to be the most common cause of death resulting from a single infectious agent.

ETIOLOGY AND PATHOGENESIS

Mycobacteria are slender rods that are acid-fast (i.e., they have a high content of complex lipids that readily bind the Ziehl-Neelsen stain.

- M. tuberculosis hominis is responsible for most cases of tuberculosis; the reservoir of infection typically is found in individuals with active pulmonary disease.

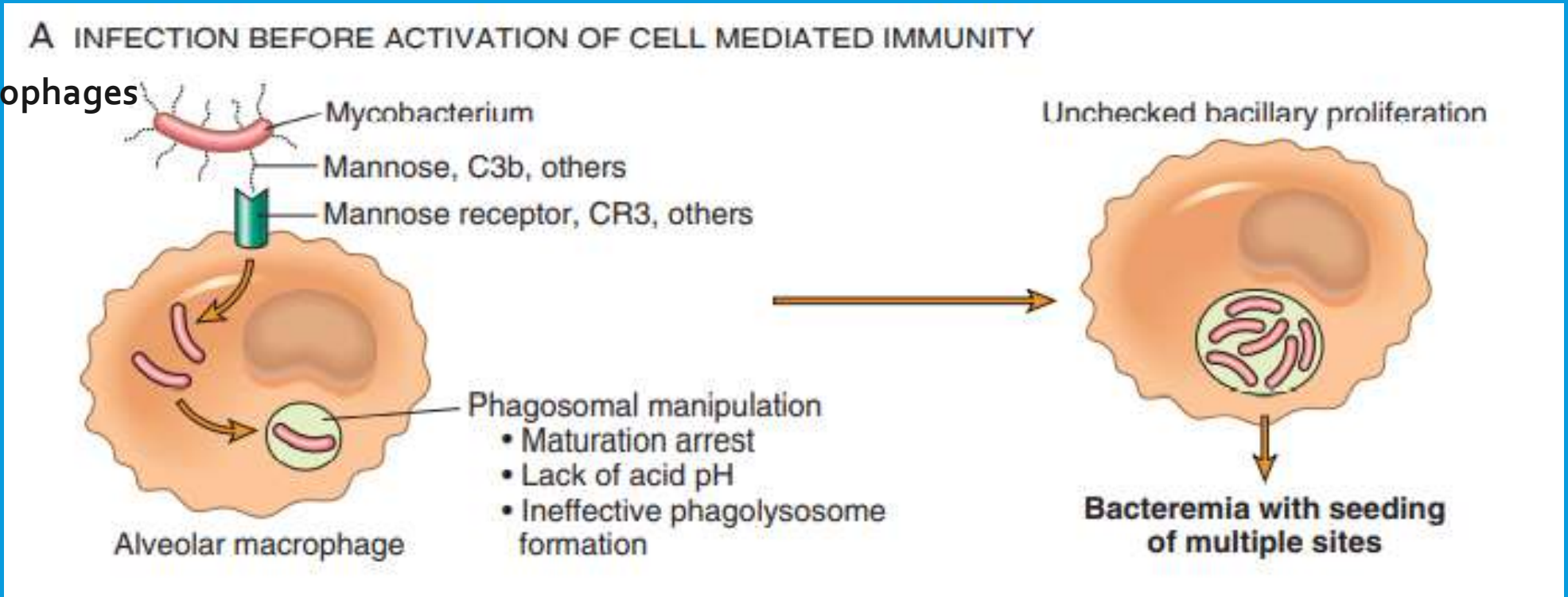
- Transmission usually is direct, by inhalation of airborne organisms in aerosols generated by expectoration or by exposure to contaminated secretions of infected individuals



PATHOGENESIS

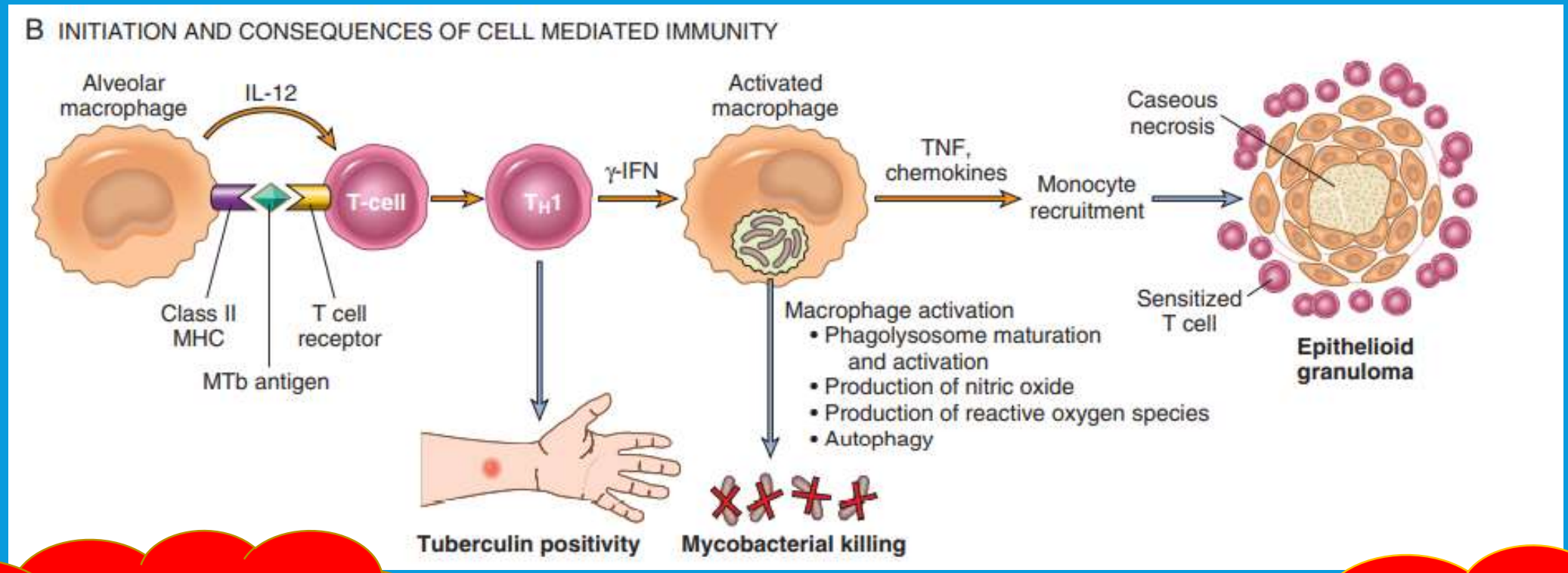
**(the first 3 weeks) in the nonsensitized patient

1.Entry into macrophages



2.Replication in macrophages.

Development of cell-mediated immunity. This occurs approximately 3 weeks after exposure

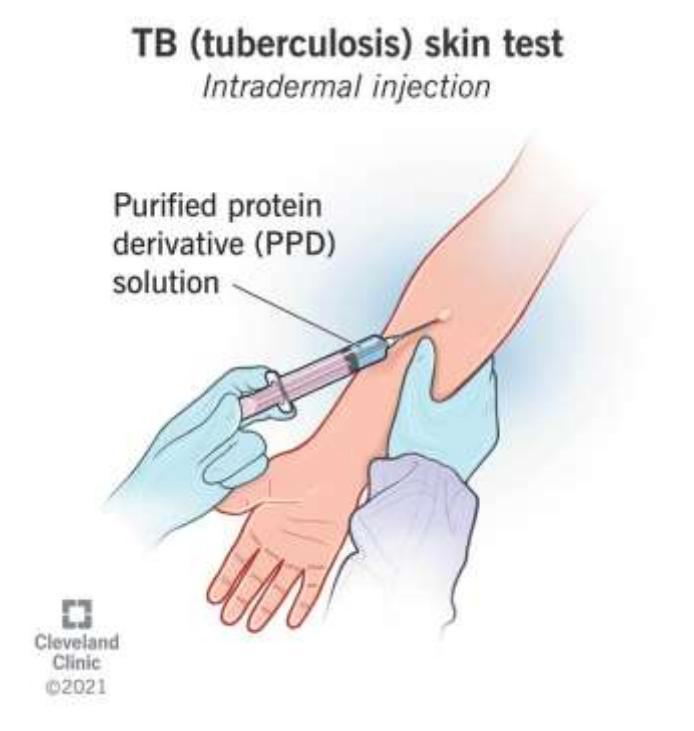


Individuals with inherited mutations in any component of the TH1 pathway are extremely susceptible to infections with mycobacteria

patients with rheumatoid arthritis who are treated with a TNF antagonist have an increased risk for tuberculosis reactivation.

TUBERCULIN TEST

- About 2 to 4 weeks after the infection has begun, intracutaneous injection of 0.1 mL of sterile purified protein derivative (PPD) induces a visible and palpable induration (at least 5 mm in diameter) that peaks in 48 to 72 hours



PRIMARY TUBERCULOSIS

- Primary tuberculosis is the form of disease that develops in a previously unexposed and therefore unsensitized patient.
- In the large majority of healthy individuals, the only consequence of primary tuberculosis are the foci of scarring (fibrocalcific nodule at the site of the infection).
- **BUT!!!!!!!!!**
- these foci may harbor viable bacilli and thus serve as a nidus for disease reactivation at a later time if host defenses wane

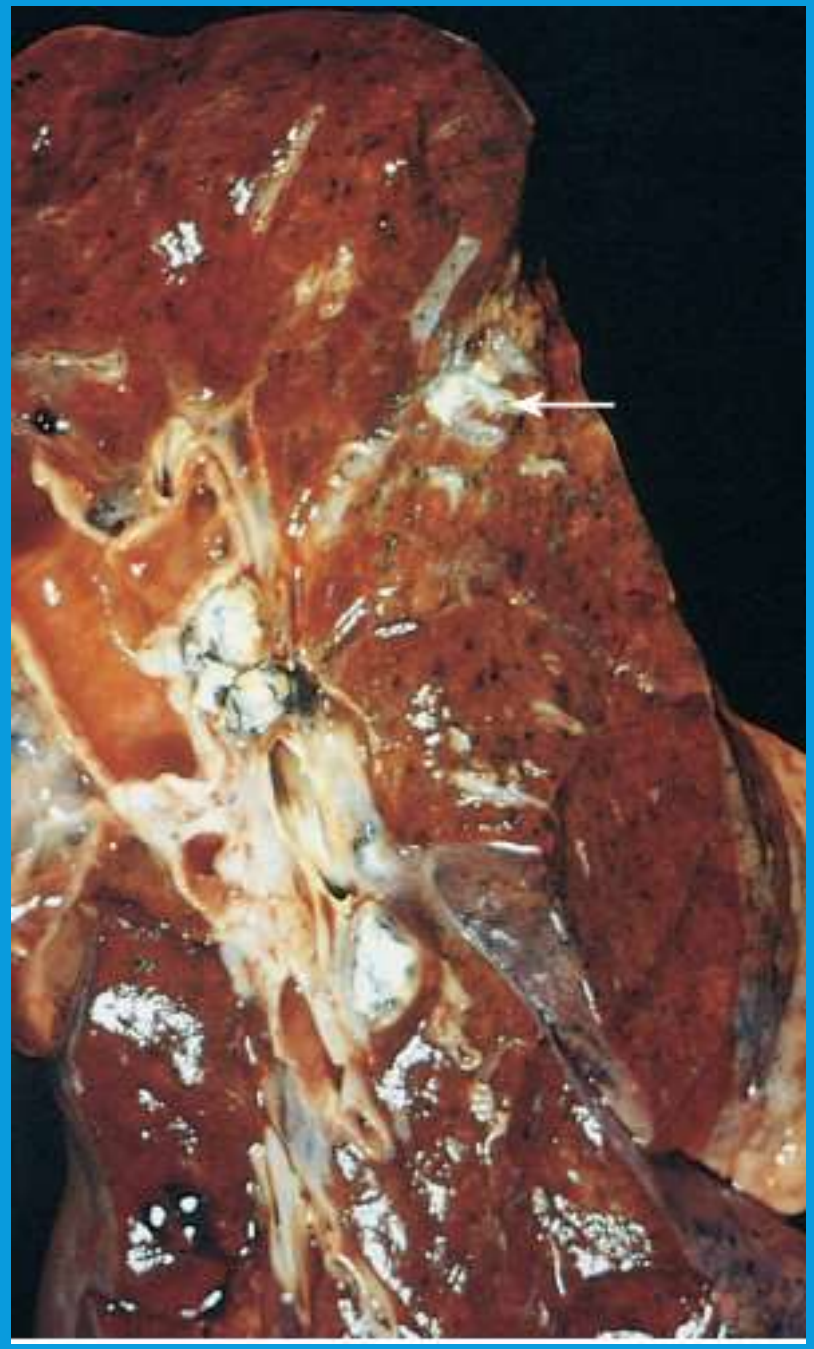
MORPHOLOGY

- A 1-cm to 1.5-cm area of gray-white inflammatory consolidation emerges. This is called the **Ghon focus,** with caseous necrosis in the center.

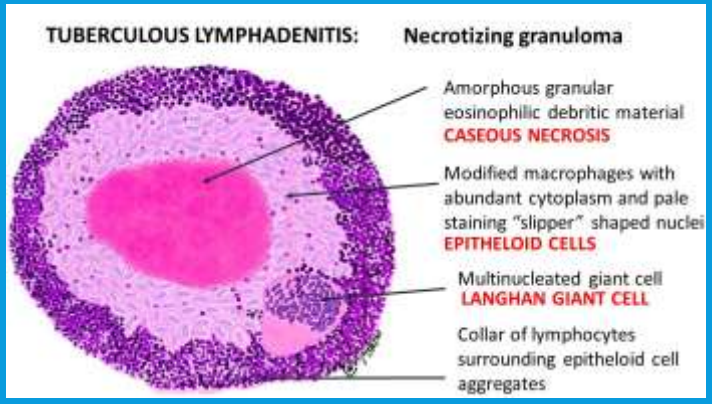
- Tubercle bacilli, either free or within phagocytes, travel via the lymphatic vessels to the regional lymph nodes.
- This combination of parenchymal and nodal lesions is called the **Ghon complex.**

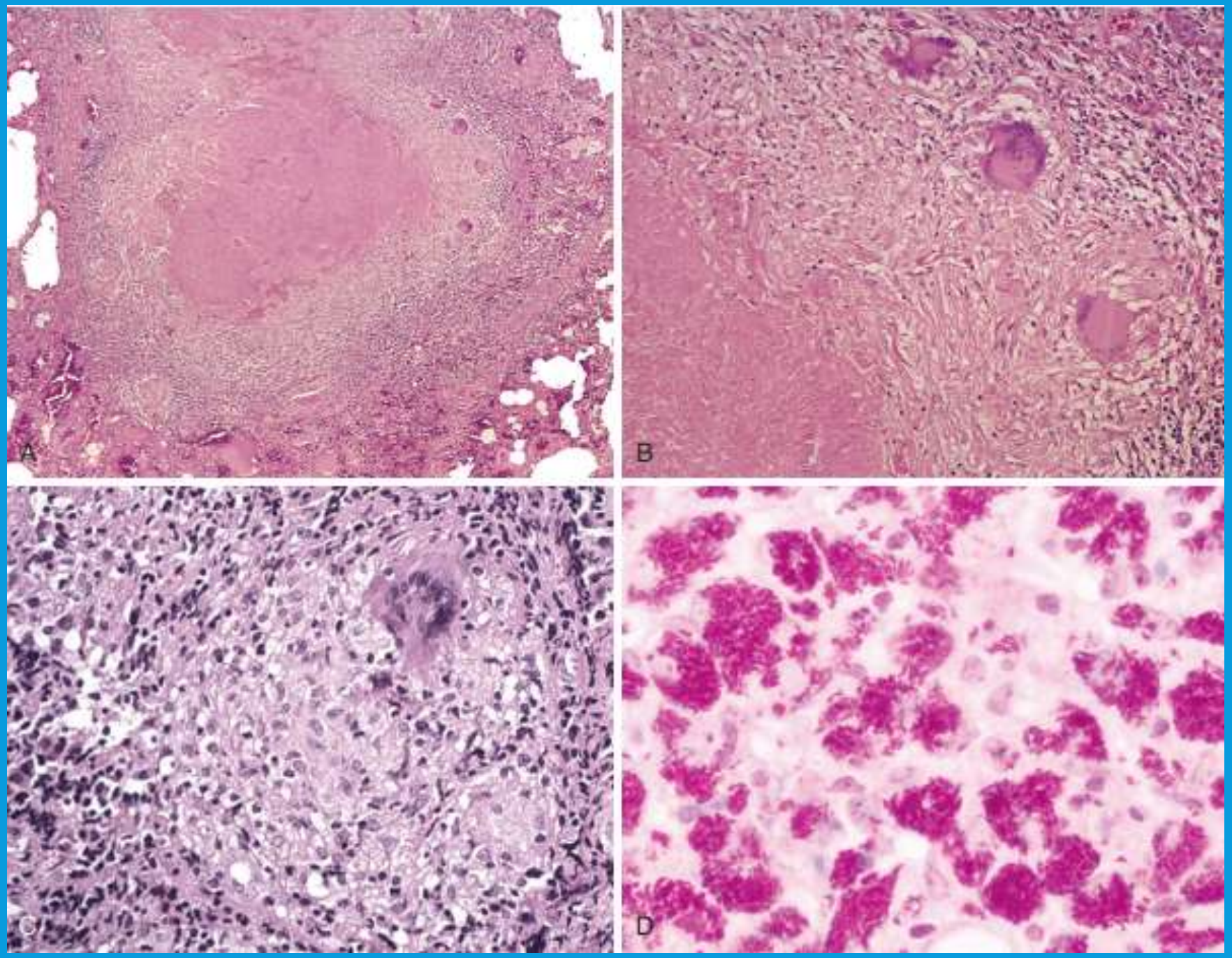
- Lymphatic and hematogenous dissemination to other parts of the body also occurs during the first few weeks.

Ghon complex:
The gray-white parenchymal sub pleural focus with Hilar lymph nodes caseation.



- Histologically:
- sites of infection are involved by a characteristic inflammatory reaction marked by:
- the presence of caseating and noncaseating granulomas, which consist of epithelioid histiocytes and multinucleate giant cells.

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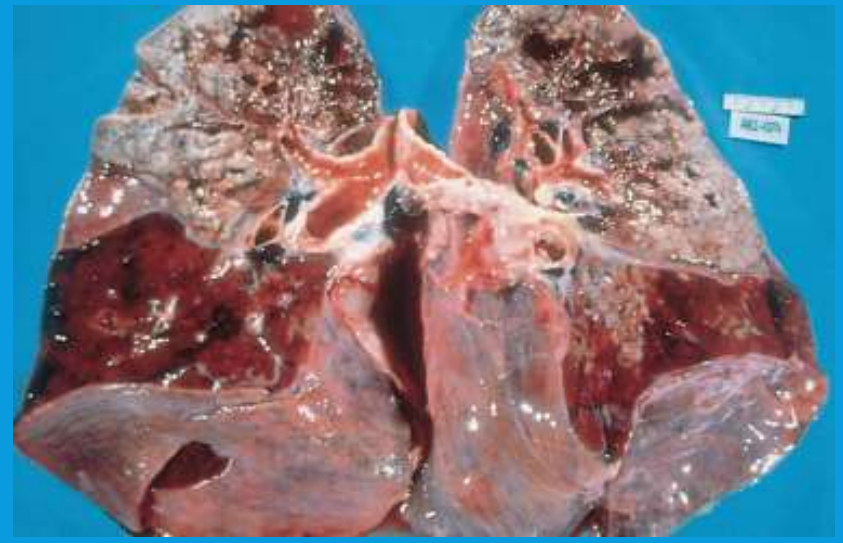
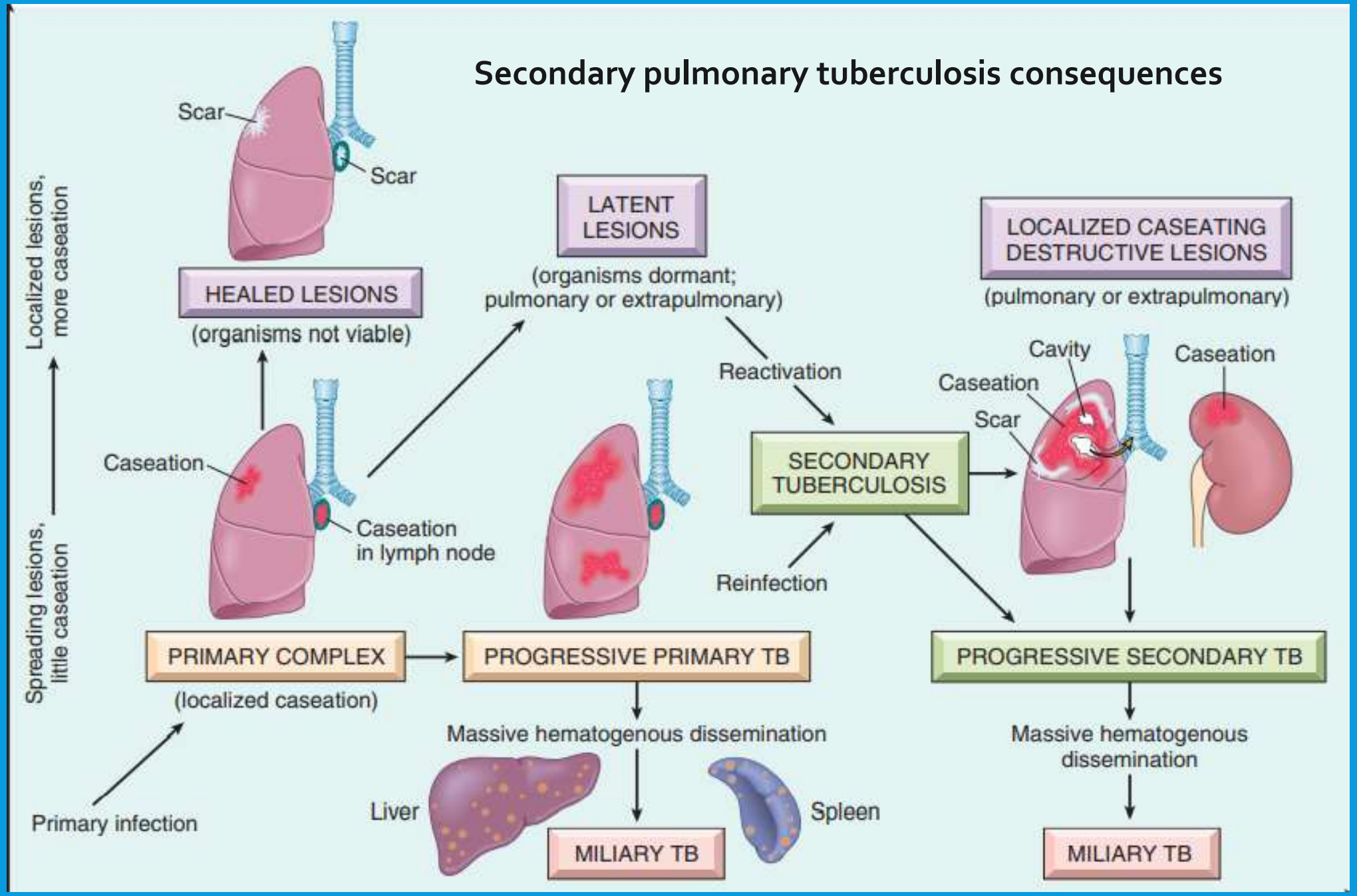
SECONDARY TUBERCULOSIS (REACTIVATION TUBERCULOSIS)

- Secondary tuberculosis is the pattern of disease that arises in a previously sensitized host.
- It may appear shortly after primary tuberculosis, but more commonly arises from reactivation of dormant primary lesions many decades after initial infection.
- only a few patients (<5%) with primary disease subsequently develop secondary tuberculosis.

- Secondary pulmonary tuberculosis is classically localized to the apex of one or both upper lobes, may relate to high oxygen tension in the apices.
- the regional lymph nodes are less prominently involved early in the disease .
- cavitation is common in the secondary form, leading to erosion into and dissemination along airways.
- So the sputum containing many bacilli!!!!!!



Secondary pulmonary tuberculosis consequences



Secondary pulmonary tuberculosis consequences

- 1. progressive pulmonary tuberculosis:

➢the apical lesion enlarges and the area of caseation expands.

➢Erosion into a bronchus evacuates the caseous center, productive cough?

➢Erosion of blood vessels results in hemoptysis.

2. Miliary pulmonary disease :

➢occurs when organisms reach the bloodstream through lymphatic vessels and then recirculate to the lung via the pulmonary arteries.

3. pleural involvement:

pleural effusions, tuberculous empyema, or obliterative fibrous pleuritis may develop.

- 4. Systemic miliary tuberculosis:

➢ when the organisms disseminate hematogenously throughout the body.

➢ Systemic miliary tuberculosis is most prominent in the liver, bone marrow, spleen, adrenal glands, meninges, kidneys, fallopian tubes, and epididymis

5. Isolated-organ tuberculosis:

if one of the organs or tissues seeded hematogenously and may be the presenting manifestation of tuberculosis.

- Organs typically involved include the meninges (tuberculous meningitis), kidneys (renal tuberculosis), adrenal glands, bones (osteomyelitis), and fallopian tubes (salpingitis).

- 6. Lymphadenitis :

- is the most frequent form of extrapulmonary tuberculosis, usually occurring in the cervical region .
- Lymphadenopathy tends to be unifocal.

CLINICAL FEATURES

- Localized secondary tuberculosis may be :

- Asymptomatic.
- Cytokines-related (TNF, IL-1) symptoms:
- include malaise, anorexia, weight loss, and fever.
- mucoid and later purulent-bacilli containing sputum.
- hemoptysis .
- Pleuritic pain.

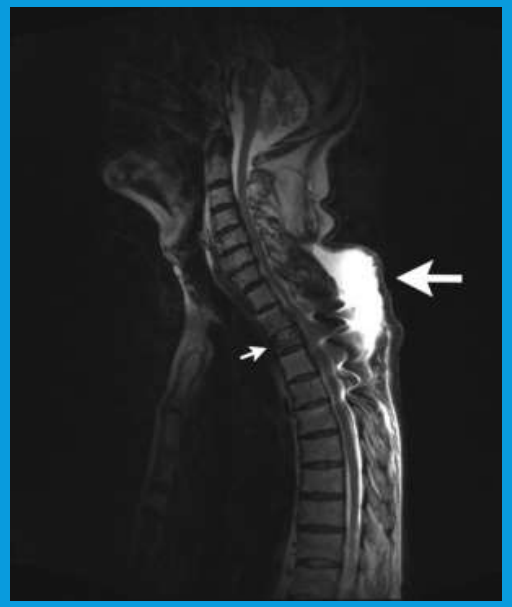
EXTRAPULMONARY MANIFESTATIONS

- E.g Extrapulmonary manifestations of tuberculosis :

➢tuberculous salpingitis may present as infertility.

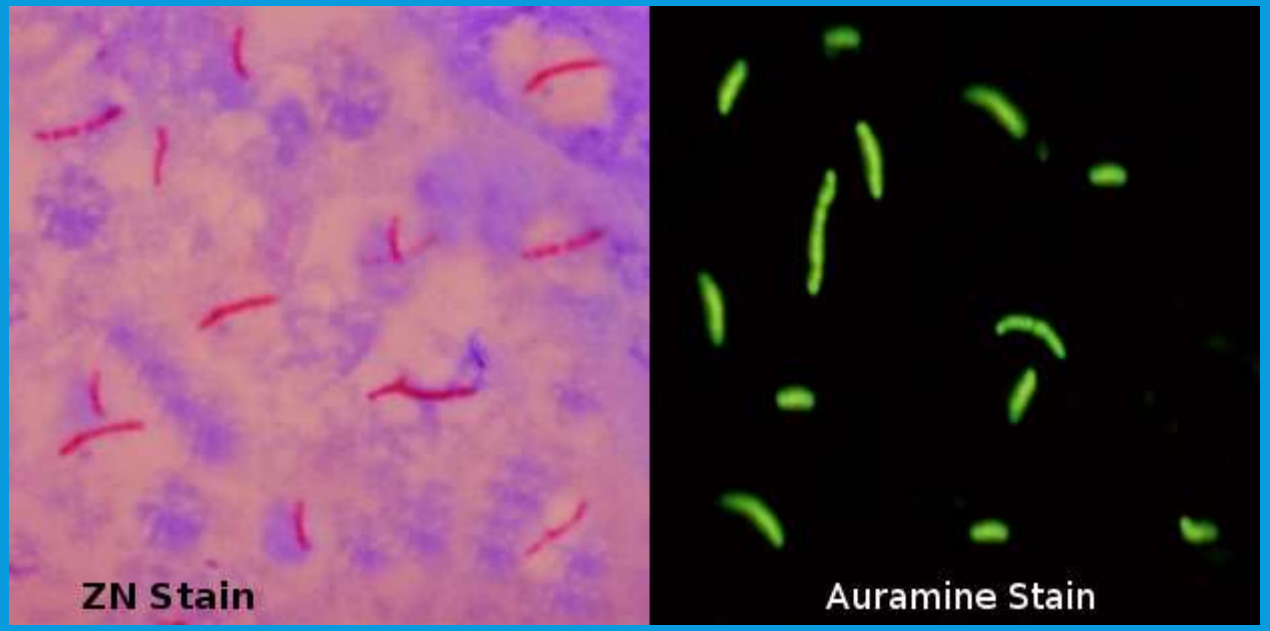
➢tuberculous meningitis with headache and neurologic deficits.

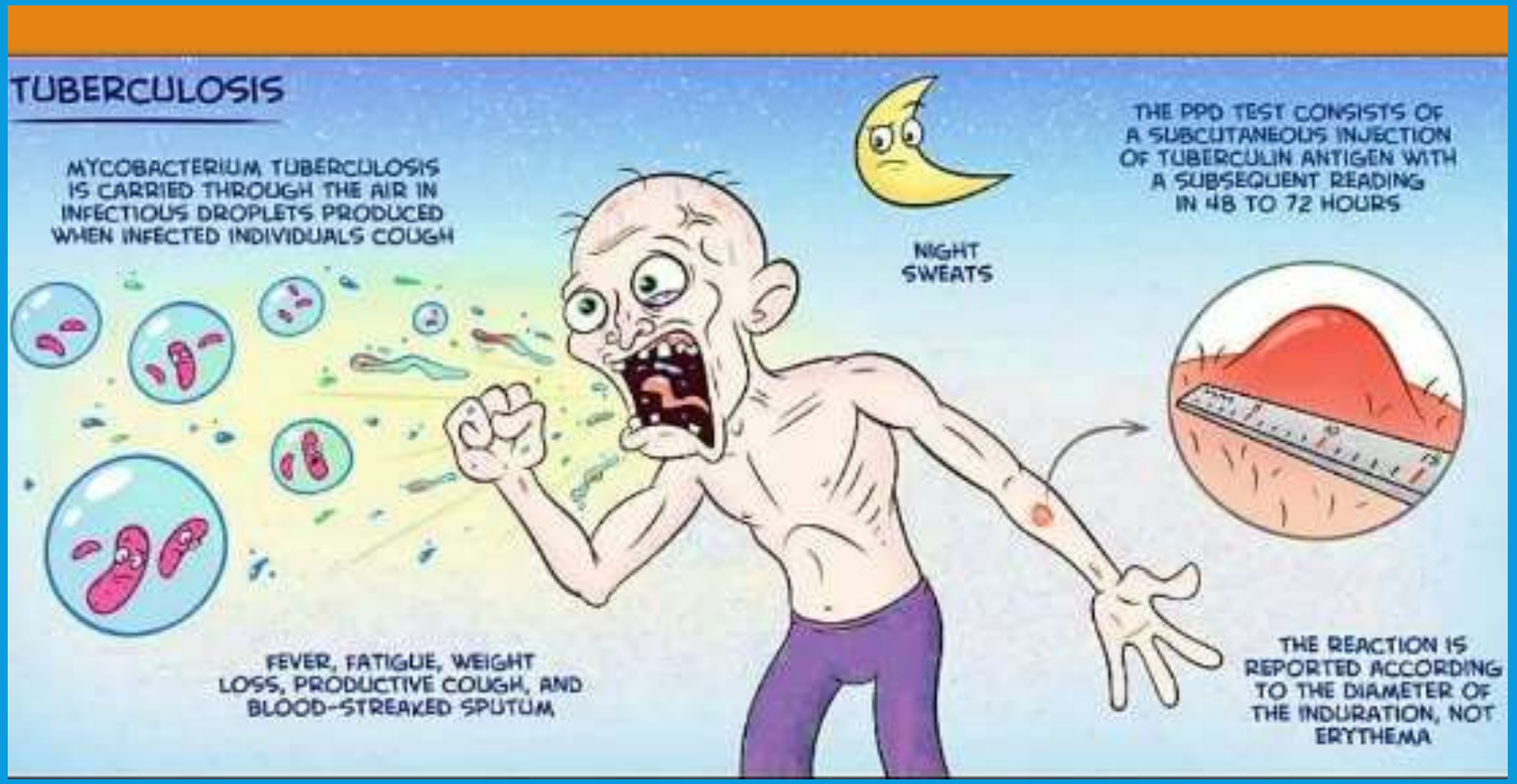
➢ Pott disease with back pain and paraplegia.



DIAGNOSIS

- demonstration of acid-fast organisms in sputum by staining or by use of fluorescent auramine rhodamine.
- cultures for mycobacteria require up to 10 weeks.
- . PCR amplification.




TUBERCULOSIS
MYCOBACTERIUM TUBERCULOSIS IS CARRIED THROUGH THE AIR IN INFECTIOUS DROPLETS PRODUCED WHEN INFECTED INDIVIDUALS COUGH
NIGHT SWEATS
THE PPD TEST CONSISTS OF A SUBCUTANEOUS INJECTION OF TUBERCULIN ANTIGEN WITH A SUBSEQUENT READING IN 48 TO 72 HOURS
FEVER, FATIGUE, WEIGHT LOSS, PRODUCTIVE COUGH, AND BLOOD-STREAKED SPUTUM
THE REACTION IS REPORTED ACCORDING TO THE DIAMETER OF THE INDURATION, NOT ERYTHEMA