Syphilis

Urogenital Tract Module

Dr. Hala Mahmoud Altarawneh

Outlines

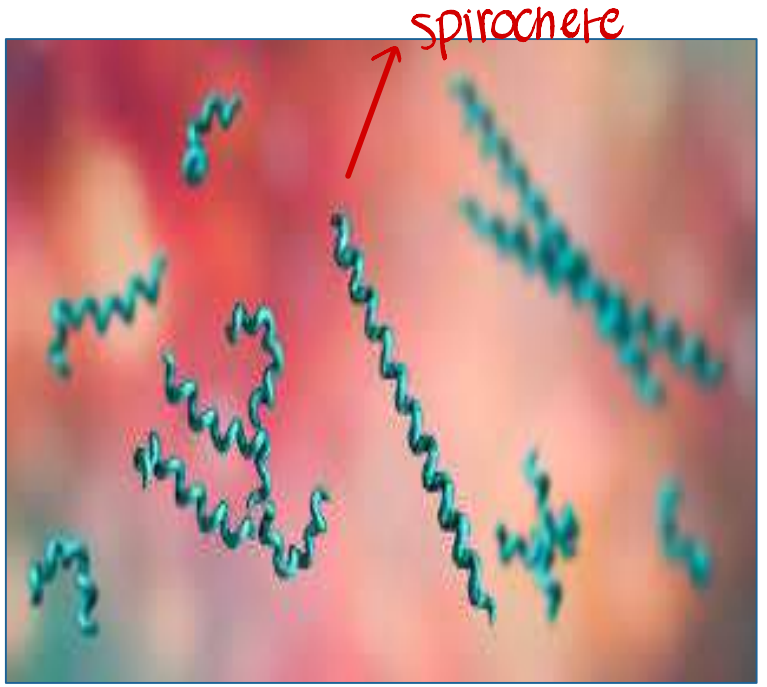
- Introduction
- Etiology: pathogen, pathophysiology, and transmission
- Clinical features:
  - Primary syphilis
  - Secondary syphilis
  - Latent, and tertiary syphilis
  - Congenital syphilis
- Diagnosis
- Treatment

Syphilis: Introduction

- Syphilis is a predominantly bacterial sexually transmitted infection caused by the spirochete *Treponema pallidum*.
- **Epidemiology:**
  - Worldwide annual new cases: 11 million
  - Incidence in the United States is rising.
  - Men > women (8:1) (Homosexual)
  - Most common age group: 20–29 years old

Syphilis: Etiology- Pathogen

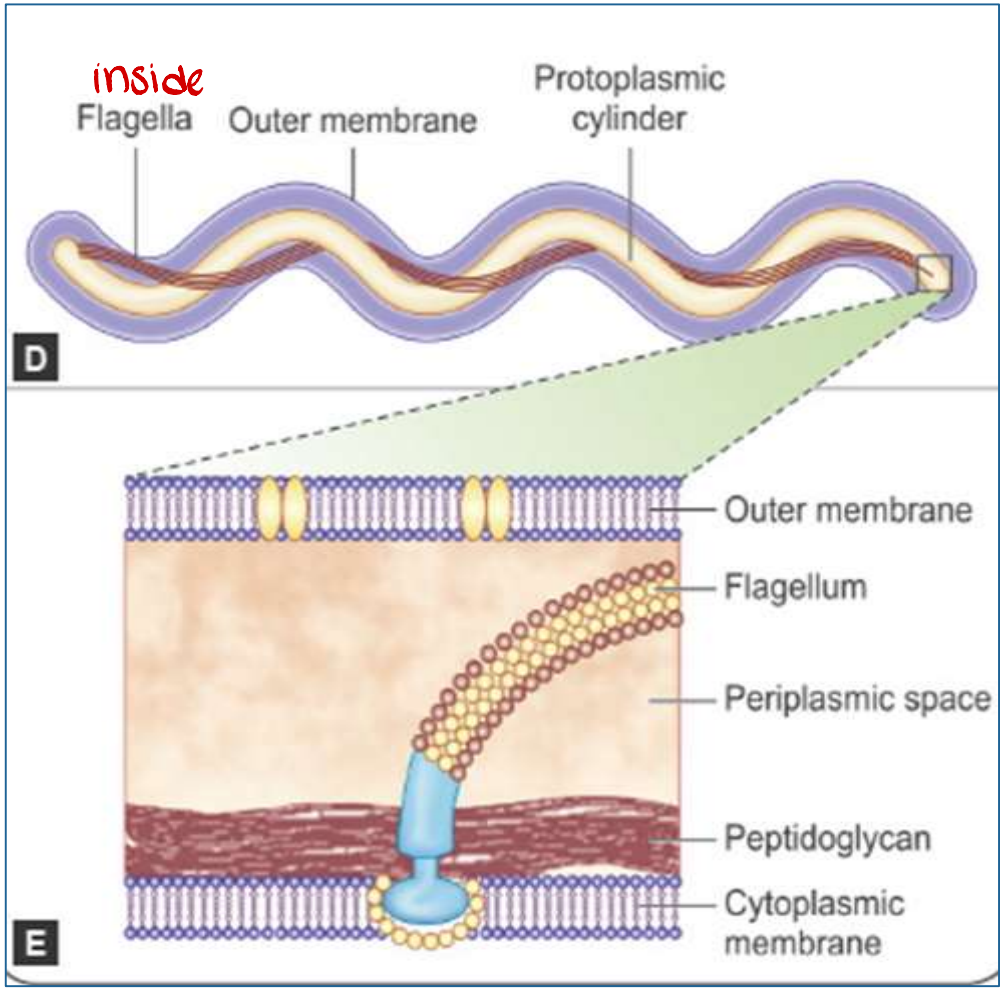
- **The causative organism:** *Treponema pallidum*
- **Basic features** of Treponema species:
  - Gram negative Spirochete (spiral shaped) bacteria
  - Microaerophilic
  - Cannot be grown in culture



Syphilis: Etiology- Pathogen

- **Basic features** of Treponema species:
  - Endo-flagellated:
    - 3 flagella originate from each end.
    - Located in the periplasmic space
  - Classic motility: Rotates rapidly about its longitudinal axis

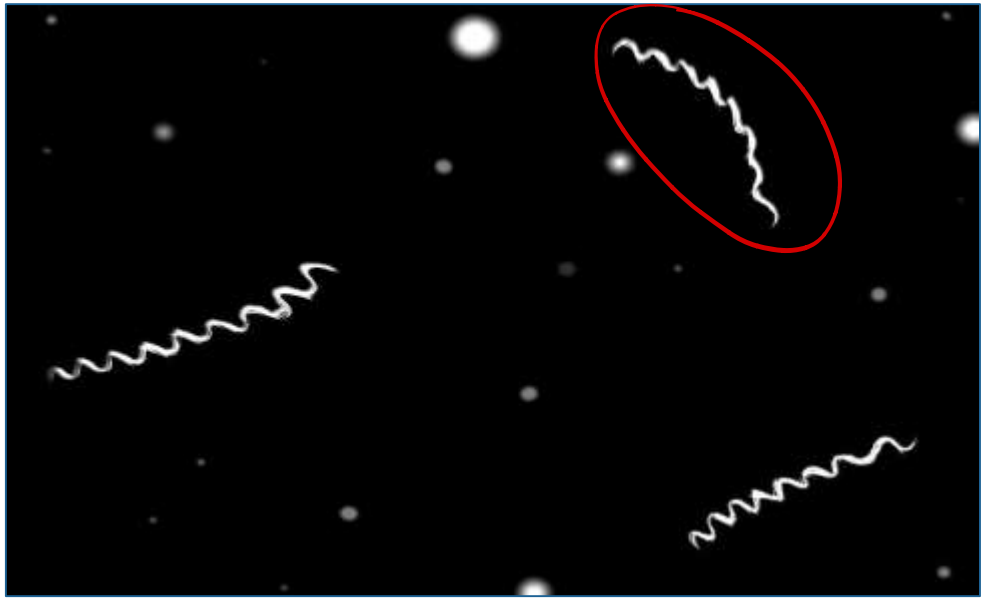
→ Corkscrew motility



Syphilis: Etiology- Pathogen

- **Basic features** of Treponema species:
  - Visualization: Dark-field microscopy because its too slender to be visualized using Gram or Giemsa stain

very difficult to stain



Syphilis: Etiology- Pathophysiology

- **Transmission:**
  - Humans are the only reservoir, and transmission is through human-to-human contact.
  - Sexual contact
  - Direct contact with infectious lesions
  - Vertical (congenital syphilis) mother → fetus

transplacental, by blood

Syphilis: Etiology- Pathophysiology

- *T. pallidum* adheres to skin or mucosal membranes → hyaluronidase production → tissue invasion
- The organism **coats itself in the host's fibronectin** → prevents recognition and phagocytosis by the immune system → development of the chancre (initial ulcerative lesion)
- Eventual local immune control → resolution of chancre
- During the primary period, some spirochetes move into local lymph nodes.
- Later stages:
  - Spirochetes multiply and disseminate through the bloodstream → invade other organs and tissues
  - Host immune-inflammatory response → systemic clinical manifestations

Syphilis: Etiology- Pathophysiology

- **Obliterative endarteritis**—is a hallmark pathological finding in syphilitic lesions.

T. pallidum shows a marked preference for invading the endothelium of arterioles and capillaries.

↓

The host mounts an intense perivascular immune response

↓

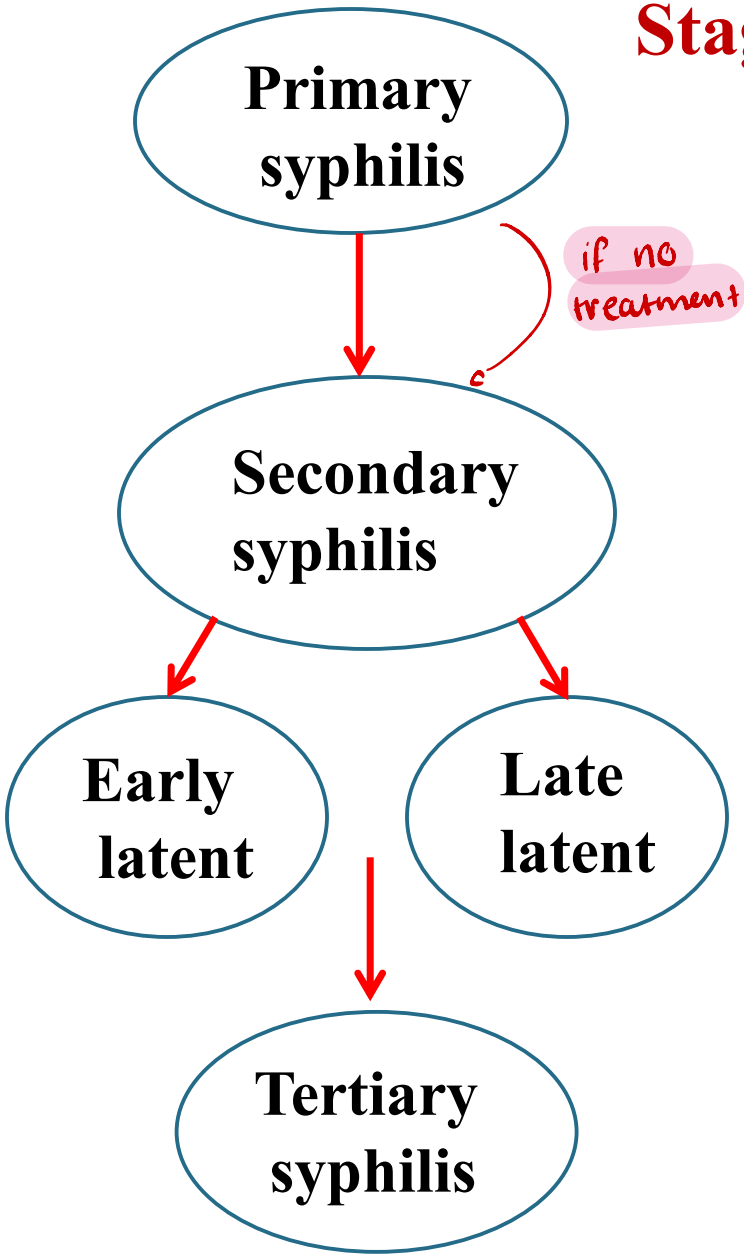
Thickening of the endothelial lining, Proliferation of the intima, Narrowing or occlusion of the vessel lumen, and **Ischemia of surrounding tissue**

Syphilis: Etiology- Pathophysiology

- Syphilis is a multistage disease. It has 4 clinical stages: primary, secondary, latent, and tertiary, each with different pathological mechanisms and tissue involvement.

Pathogenesis and Clinical Manifestations

Stages of syphilis



100 **untreated infected** patients with primary syphilis

↓

If untreated will undergo secondary syphilis

not All patient experience all stages

↓

If untreated will undergo latent syphilis

↓

Only 33% of untreated cases will develop tertiary syphilis

Syphilis: Clinical features- Primary syphilis

- Localized disease
  - 90–95%: genital primary syphilis
  - 5–10%: extragenital primary syphilis (most commonly, the oral cavity, finger, and anus or perianal region)
- ① Primary lesion (**chancre**): Skin lesion @ site of bact. invasion
  - Typically starts out as a solitary, raised papule (usually on the genitals)
  - Evolves into a painless, firm ulcer with indurated borders and smooth base
  - The primary lesion appears at the site of inoculation, usually persists for 4–6 weeks, and then heals spontaneously. (controlled by imm. system)
- ② Nontender regional lymphadenopathy (e.g., involvement of the inguinal lymph nodes in genital primary syphilis)

Syphilis: Clinical features- Primary syphilis

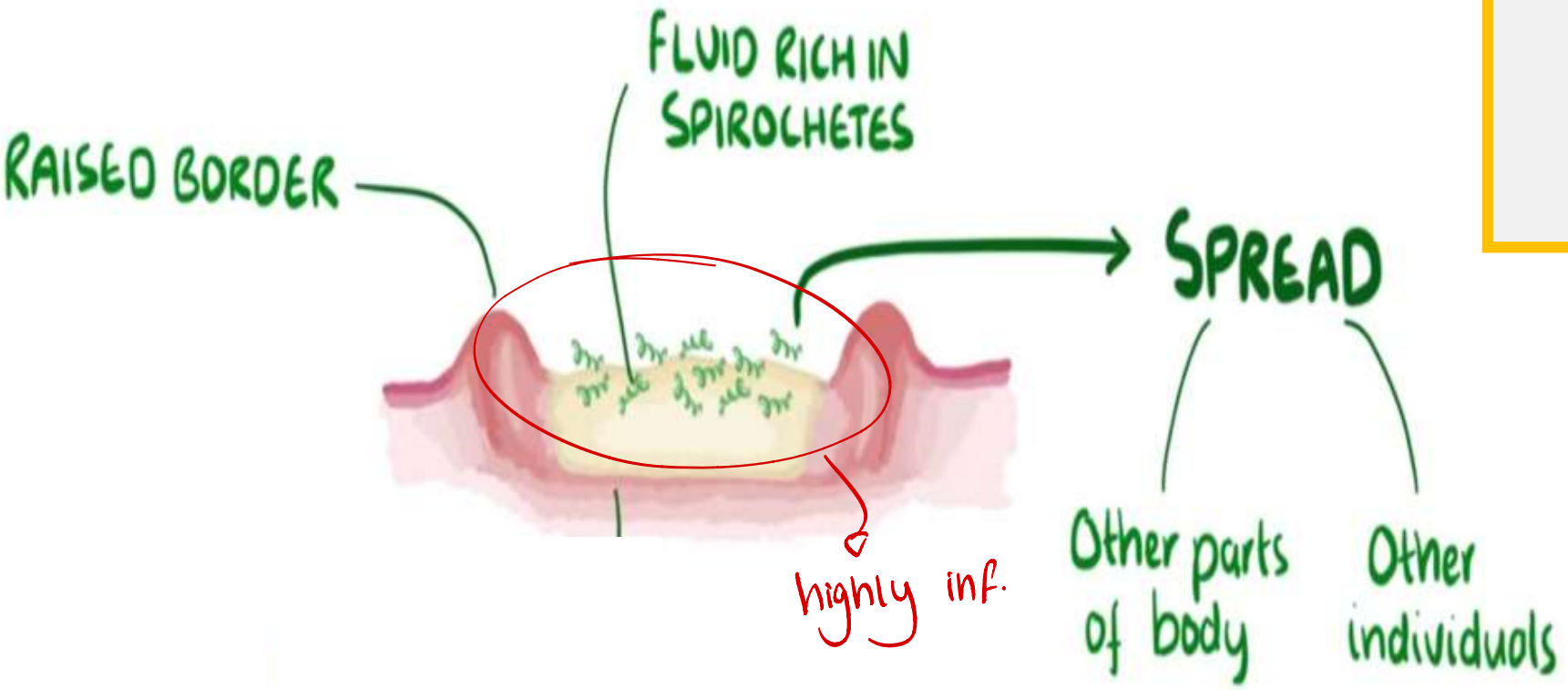
imp *

Primary

=

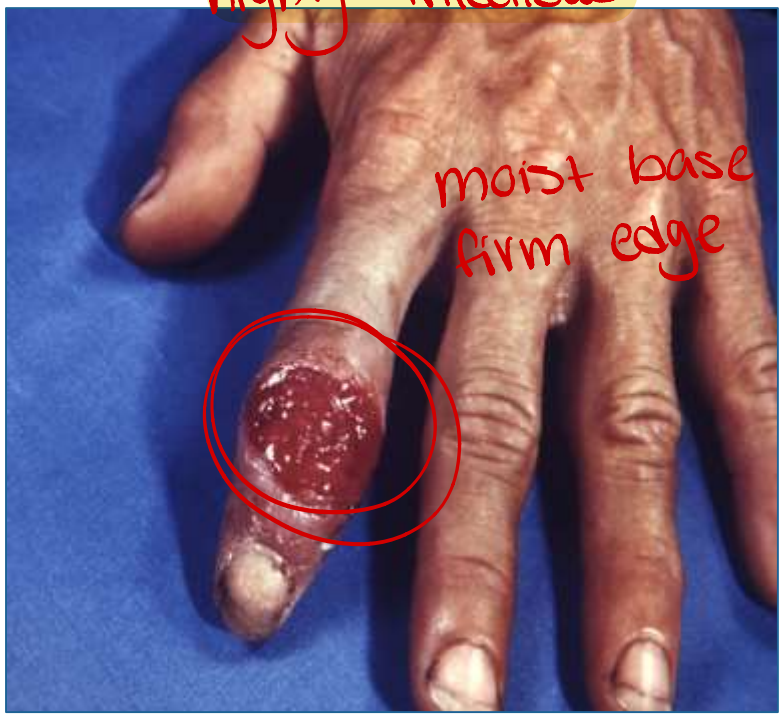
Painless

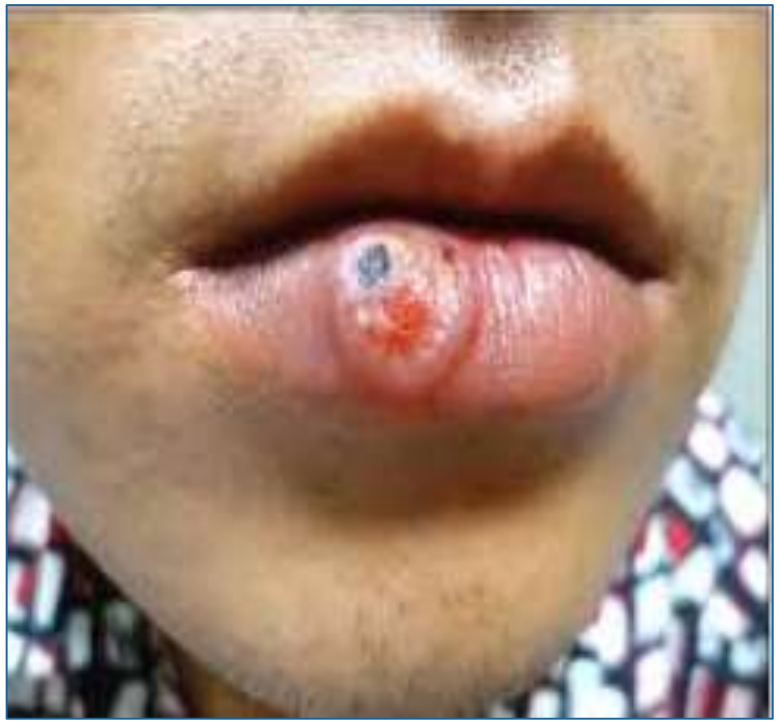
Chancre

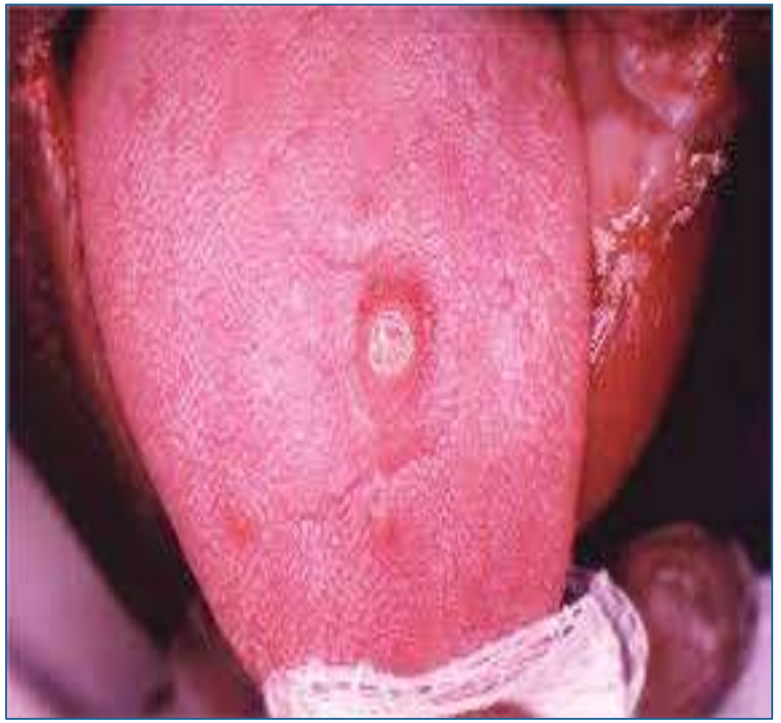


Syphilis: Clinical features- Primary syphilis

Chancre







Syphilis: Clinical features- Secondary syphilis

- Disseminated disease due to the **systemic spread** of the spirochetes, inducing an immunologic reaction
- Begins approx. 2–12 weeks after primary infection and typically lasts 2–6 weeks

1. Constitutional symptoms: fever, malaise, myalgias, headaches, anorexia, weight loss, nausea
2. Generalized nontender lymphadenopathy

non-specific

primary → regional

secondary → generalized

Secondary

=

Systemic

Syphilis: Clinical features- Secondary syphilis

3. Polymorphic rash (all are highly contagious)

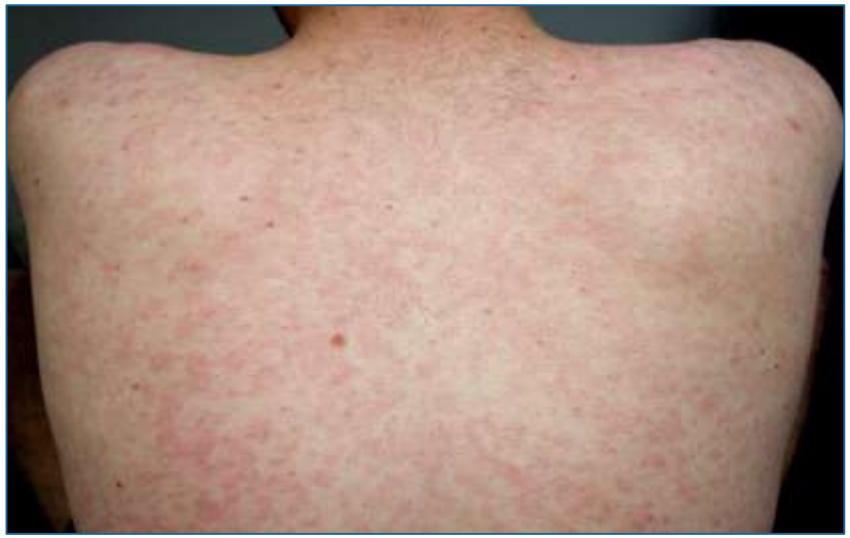
A. Generalized rash:

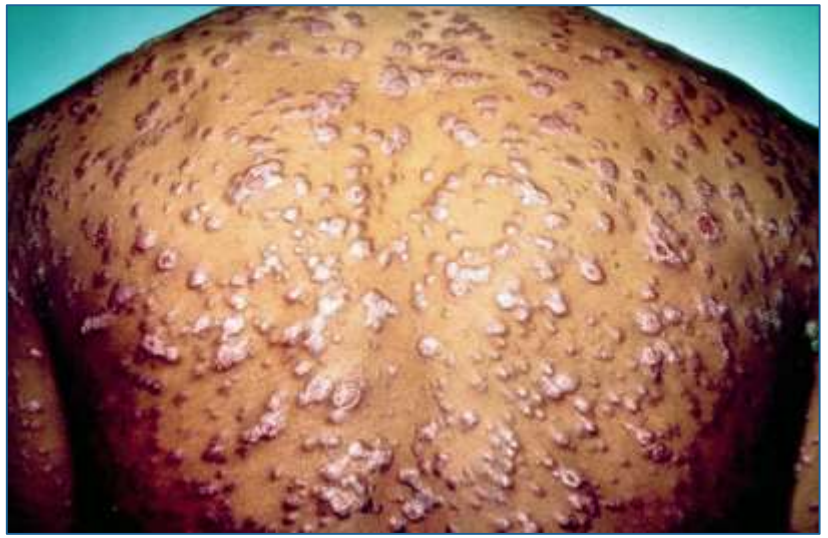
- Nonpruritic, Macular, papular, or nodular. Scaly or smooth
- Red, reddish-brown, or copper colour
- Involves the trunk, extremities, palms, and soles

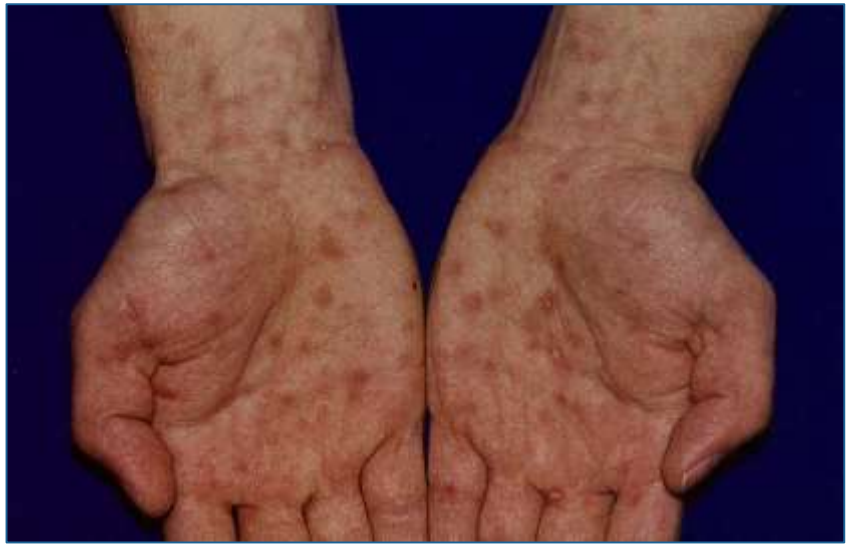
B. Superficial mucosal erosions (mucous patches)

- Commonly involve the oral or genital mucosa.
- The typical mucous patch is a painless silver-gray erosion surrounded by a red periphery.

Syphilis: Clinical features- Secondary syphilis







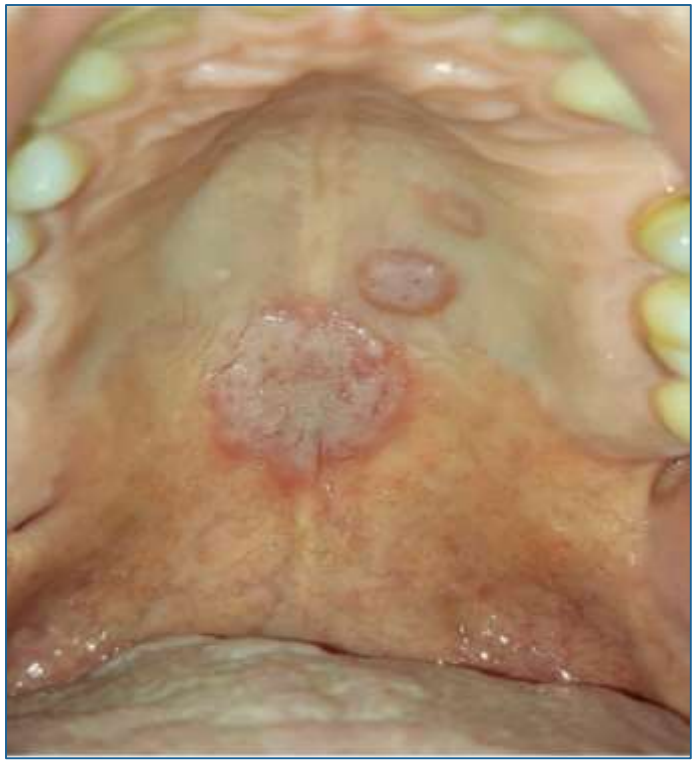
silver-gray erosion surrounded by a red periphery.

Syphilis: Clinical features- Secondary syphilis

3. Polymorphic rash (all are highly contagious)

C. Condylomata lata

- **In warm, moist**, intertriginous folds (commonly the perianal region, vulva, and scrotum), and on oral mucosa papules can enlarge to produce **painless broad, moist, pink or gray-white, highly infectious lesions** (condylomata lata).
- Cauliflower-like mass
- In 10% of patients with secondary syphilis



Syphilis: Clinical features- Latent syphilis

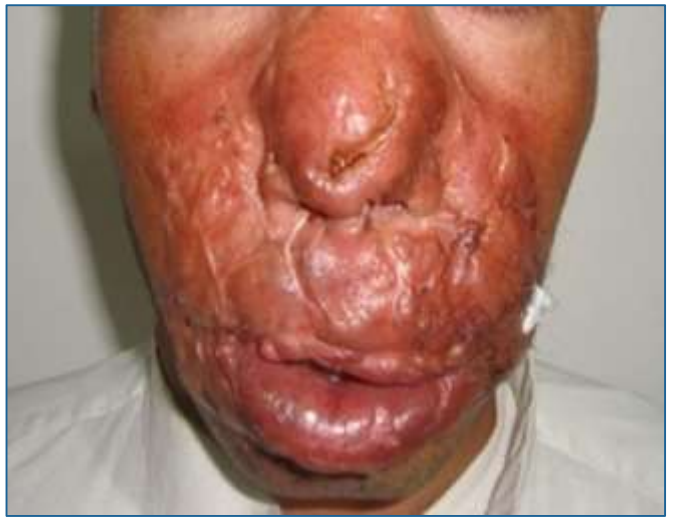
- **Pathophysiology:** *T. pallidum* is **not eradicated**; instead, it remains **dormant** in certain tissues. The immune system keeps the bacteria in check but cannot clear them.
- **No clinical symptoms**, despite **seropositivity**
- The disease can resolve, relapse with skin/mucosal lesions, or progress to tertiary syphilis.
- May last months, years, or even for the entire life of the patient
- Classified based on the duration since initial infection:
  - Early: < 1 year after initial infection
  - Late: > 1 year after initial infection] dormant

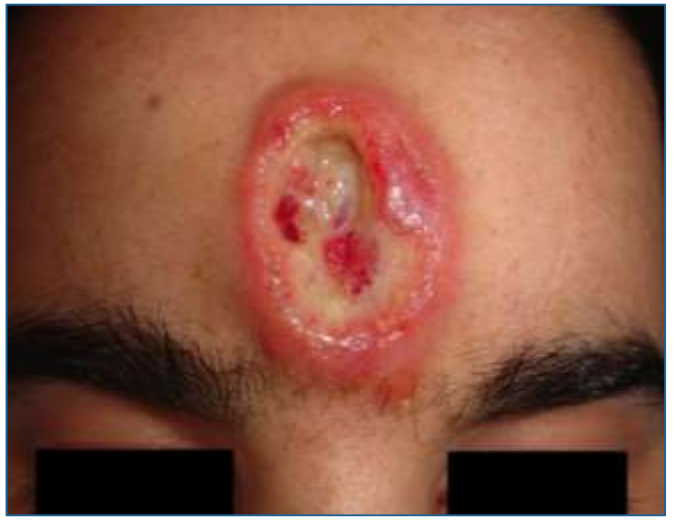
Syphilis: Clinical features- Tertiary syphilis "Immune-Mediated Destruction"

- Seen in 33% of untreated cases
- Occurs 1–30 years after the initial infection
- Caused by **delayed-type hypersensitivity reactions** to *T. pallidum* antigens, not by direct spirochete activity.

A. Gummas:

- Soft, solitary, granulomatous lesions with central necrosis
- Variable in size
- Destructive (leaves scars)
- Occurs on skin, bones, or organs
- Bone involvement may cause deep, boring pain





Syphilis: Clinical features- Tertiary syphilis

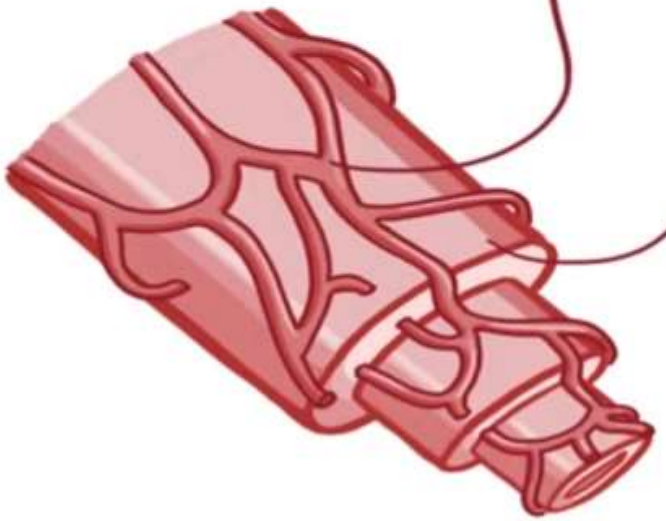
B. Cardiovascular syphilis:

- A consequence of Treponema-induced vasculitis of the vasa vasorum of the large vessels (especially the aorta), resulting in vessel wall atrophy, and thereby, aneurysm formation
- Findings: Aortitis, ascending aortic aneurysm (thoracic aortic aneurysm), and aortic root dilation → aortic regurgitation

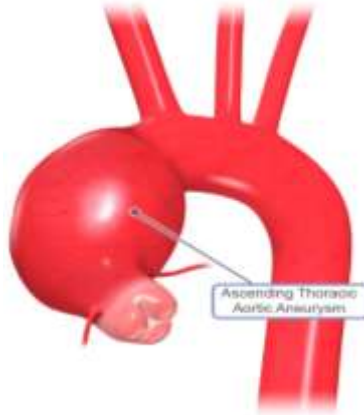
Syphilis: Clinical features- Tertiary syphilis

CARDIOVASCULAR SYPHILIS – ENDARTERITIS

INFLAMMATION in the VASA VASORUM



AORTA



AORTITIS & AORTIC ANEURYSMS

Syphilis: Clinical features- Tertiary syphilis

B. Neurosyphilis:

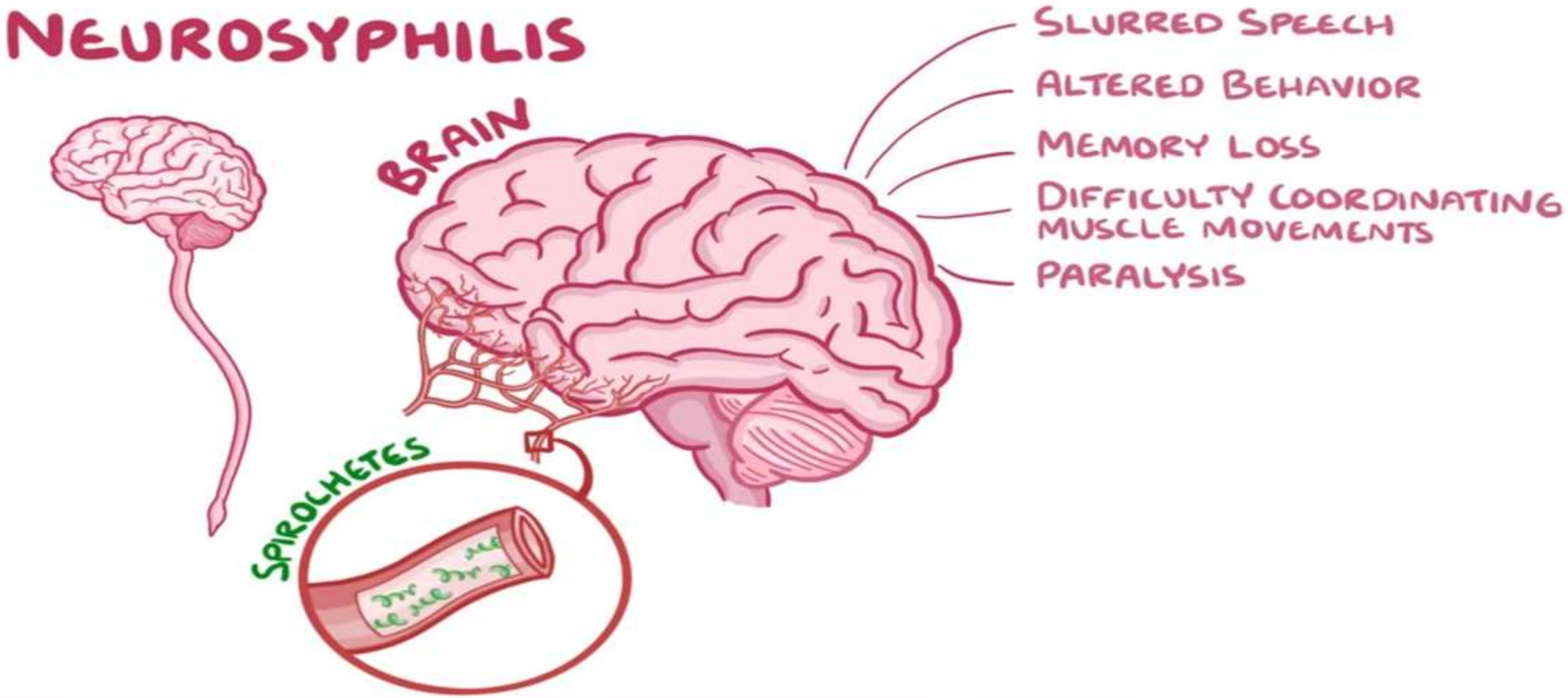
- Neurosyphilis is an infection with treponemal invasion of the CNS (e.g., meninges, cerebral vasculature and/or parenchyma).
- Clinical features: highly variable
  - Acute syphilitic meningitis
  - Subacute stroke, meningitis, and/or cranial nerve disorders

⊛ **Paretic Neurosyphilis** (also called general paresis (شلل) of the insane): *T. pallidum* invades the cerebral cortex, particularly the frontal and temporal lobes.

since ⊛ thinking ...

Syphilis: Clinical features- Tertiary syphilis

حسب المكان



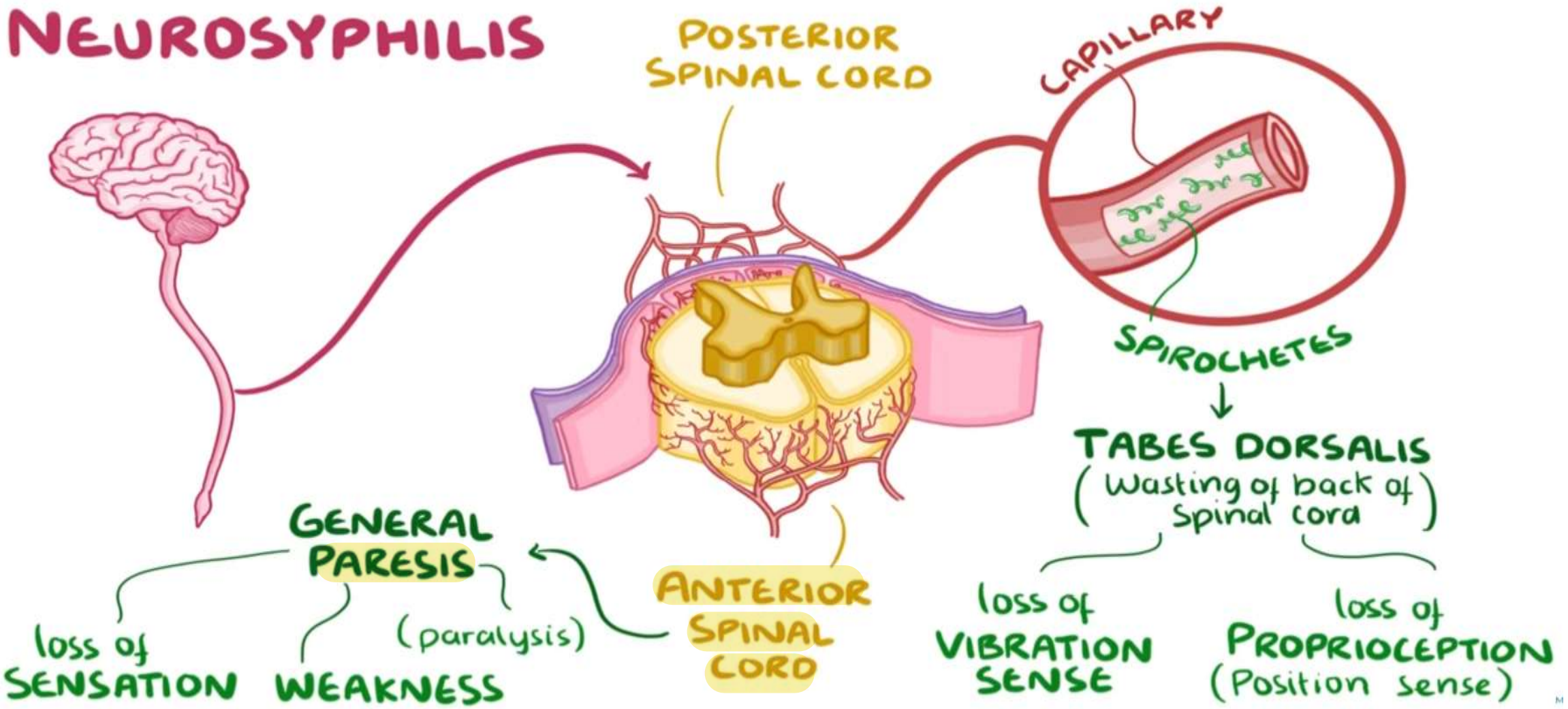
Syphilis: Clinical features- Tertiary syphilis

B. Neurosyphilis:

USMLE

- Tabes dorsalis: Demyelination of the dorsal columns and the dorsal roots
  - Loss of vibratory sense and proprioception, Loss of sensation, predominantly in the lower extremities.

Syphilis: Clinical features- Tertiary syphilis

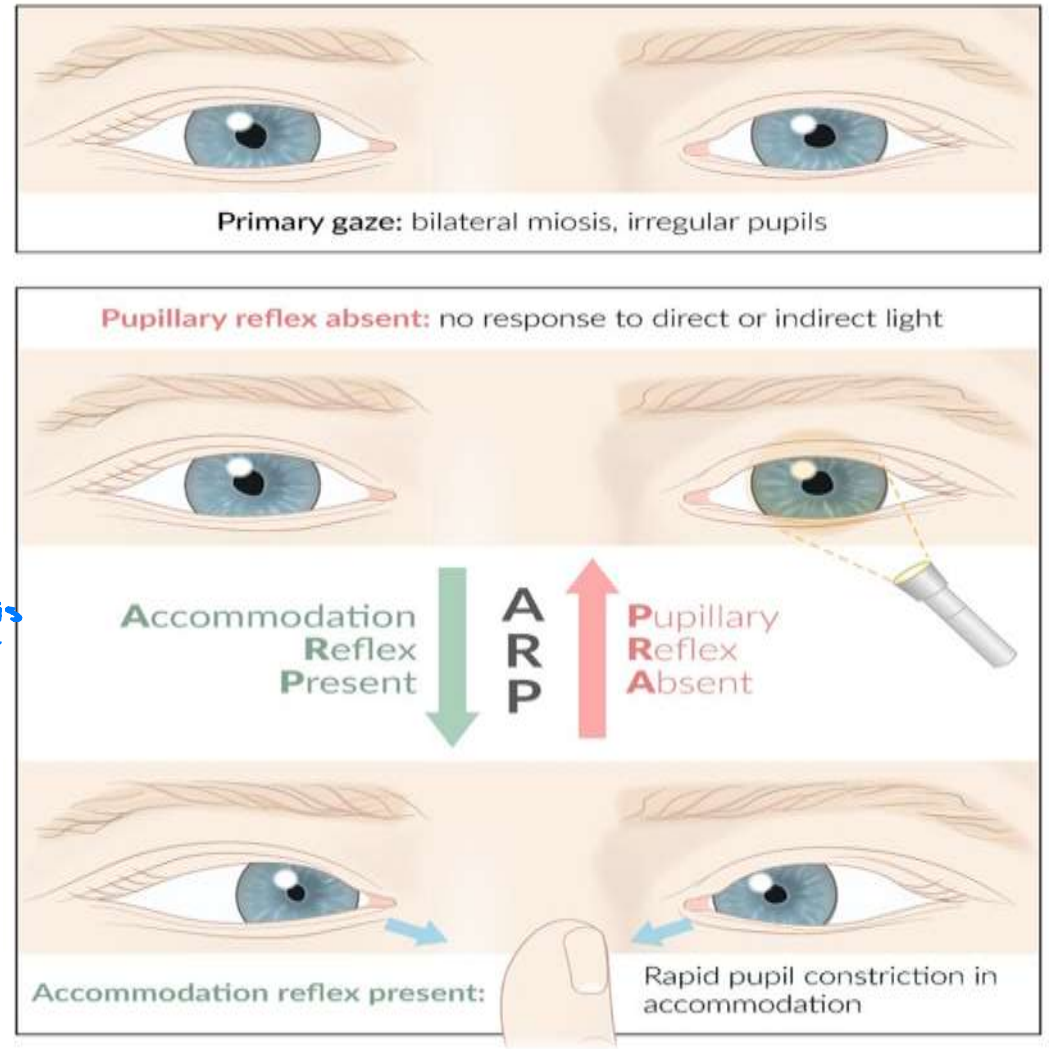


Syphilis: Clinical features- Tertiary syphilis

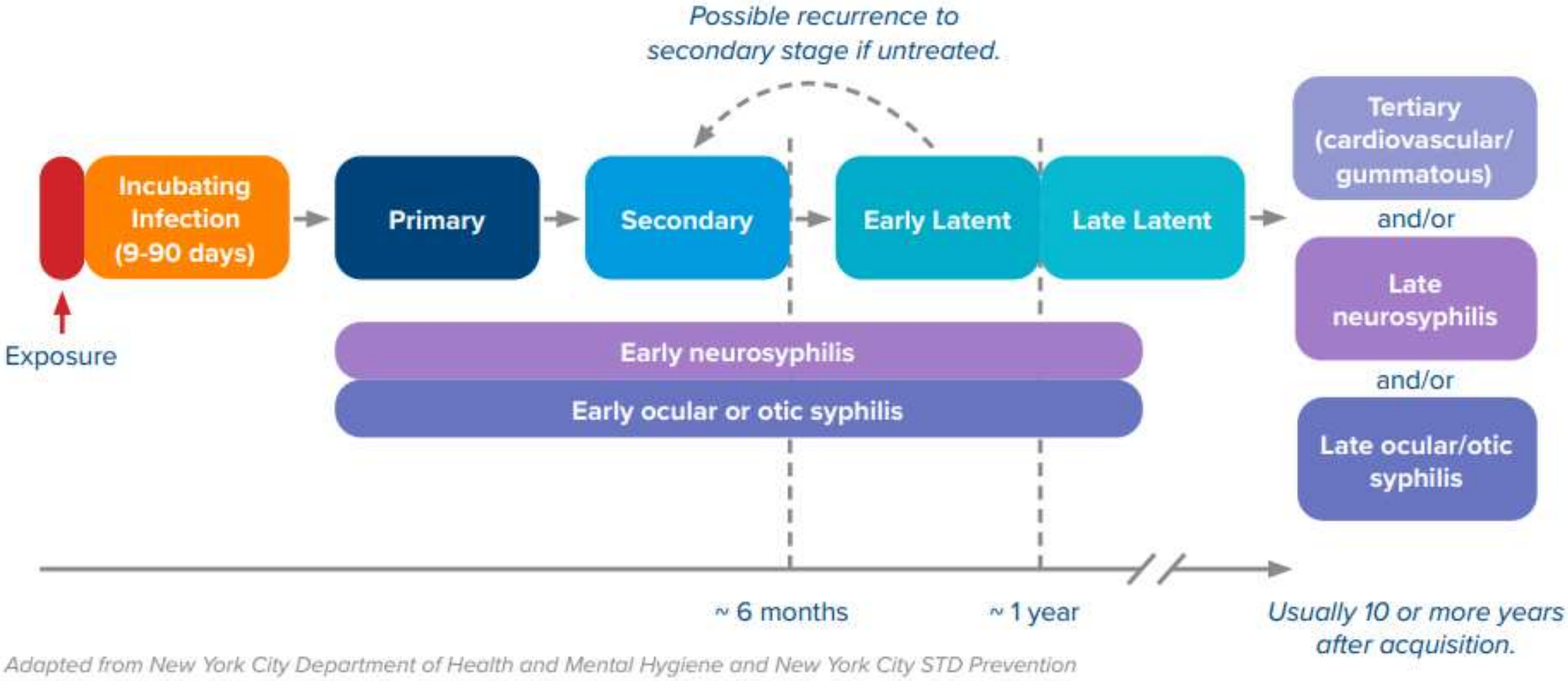
B. Neurosyphilis:

- **Argyll Robertson pupil:** bilateral small pupils that **fail to constrict in response to bright light** but exhibit constriction during near vision tasks

So the dysfunction is neural NOT muscular



Summary



Adapted from New York City Department of Health and Mental Hygiene and New York City STD Prevention

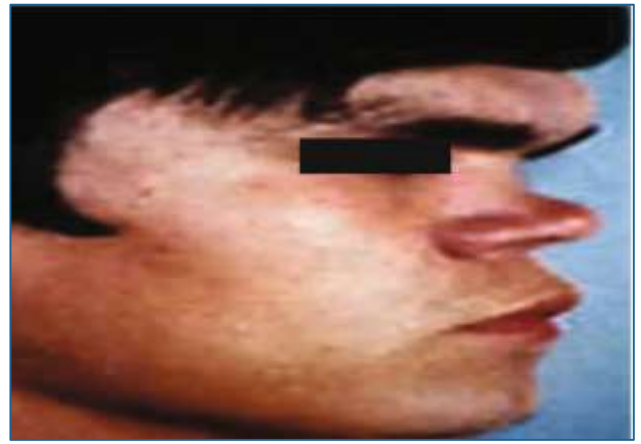
Syphilis: Clinical features- Congenital syphilis

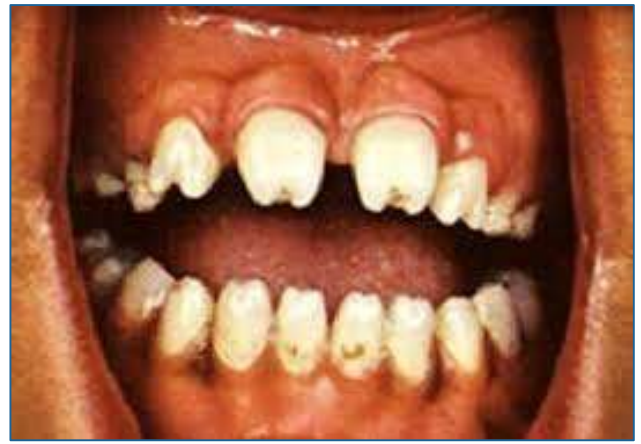
- **Transplacental transmission** from infected mother
- Clinical features of congenital syphilis:
  - In utero syphilis: Miscarriage, Stillbirth
  - Early congenital syphilis (onset < 2 years of age)
    - Hepatomegaly and jaundice
    - Rhinorrhoea with white or bloody nasal discharge (also called "snuffles")
    - Maculopapular rash on palms and soles

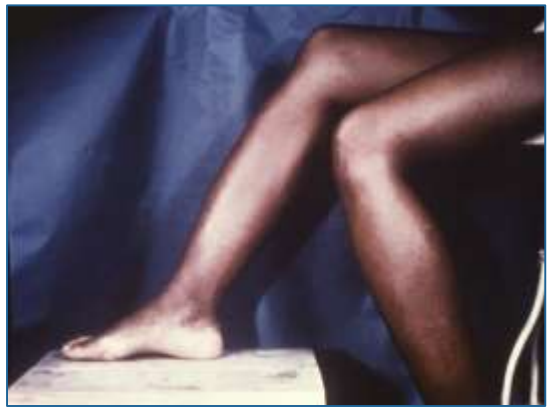
Syphilis: Clinical features- Congenital syphilis

if not treated @ early cong.

- Late congenital syphilis (onset > 2 years of age)
  - Typical facial features: saddle nose, frontal bossing
  - Dental findings: Hutchinson's teeth (notched, widely spaced teeth)
  - Saber shins: An anterior bowing of the tibia
  - Hearing loss



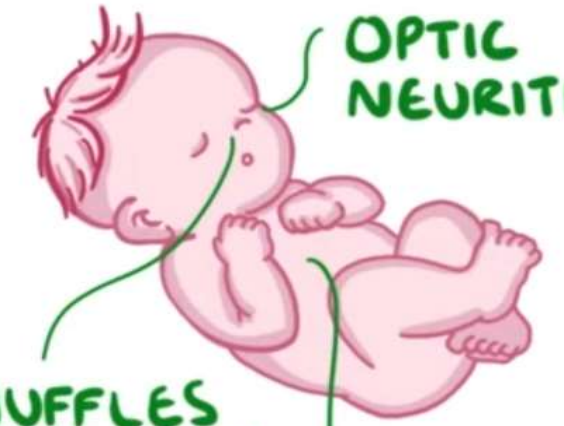




CONGENITAL SYPHILIS

Summary

EARLY DISEASE (First 2 years)



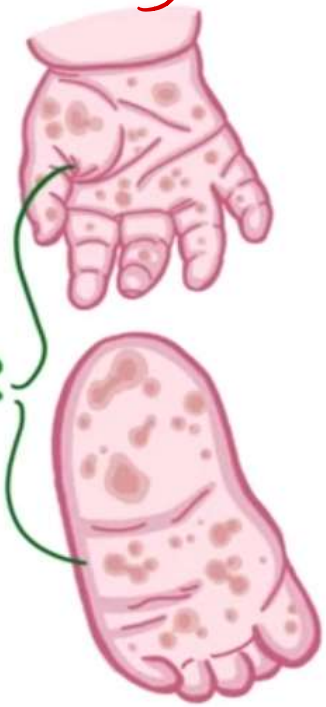
OPTIC NEURITIS

SNUFFLES (Spirochetes)

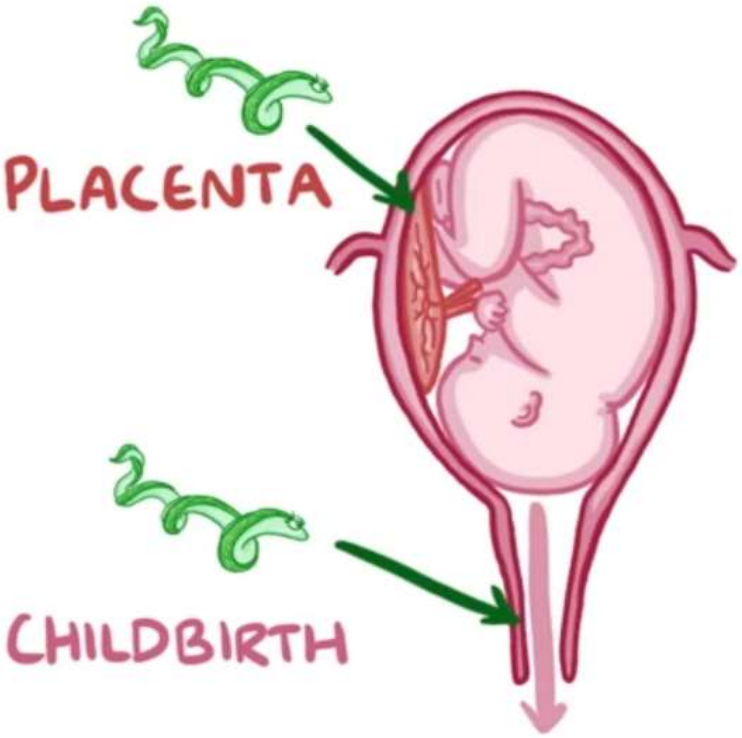
STILLBORN

DYING IN WOMB

MACULOPAPULAR RASH



Damage to LIVER & SPLEEN
└ HEPATOSPLENOMEGALY



LATE DISEASE (>2 years)

SADDLE NOSE

SABER SHINS

HUTCHINSON TEETH

HEARING LOSS

Syphilis: Diagnosis

Direct detection:

- Darkfield microscopy: visualization of motile spirochetes on wet mount under a dark-field microscope
- Direct fluorescent antibody for *T. pallidum*: visualization of immunofluorescent antibodies on the specimen
- Nucleic acid amplification (e.g., PCR)

Syphilis: Diagnosis

Serological studies

A. Nontreponemal testing

- Use for screening purposes since the tests are sensitive, but not specific.
- Detects anticardiolipin antibodies
- Options: Rapid plasma reagin test, VDRL

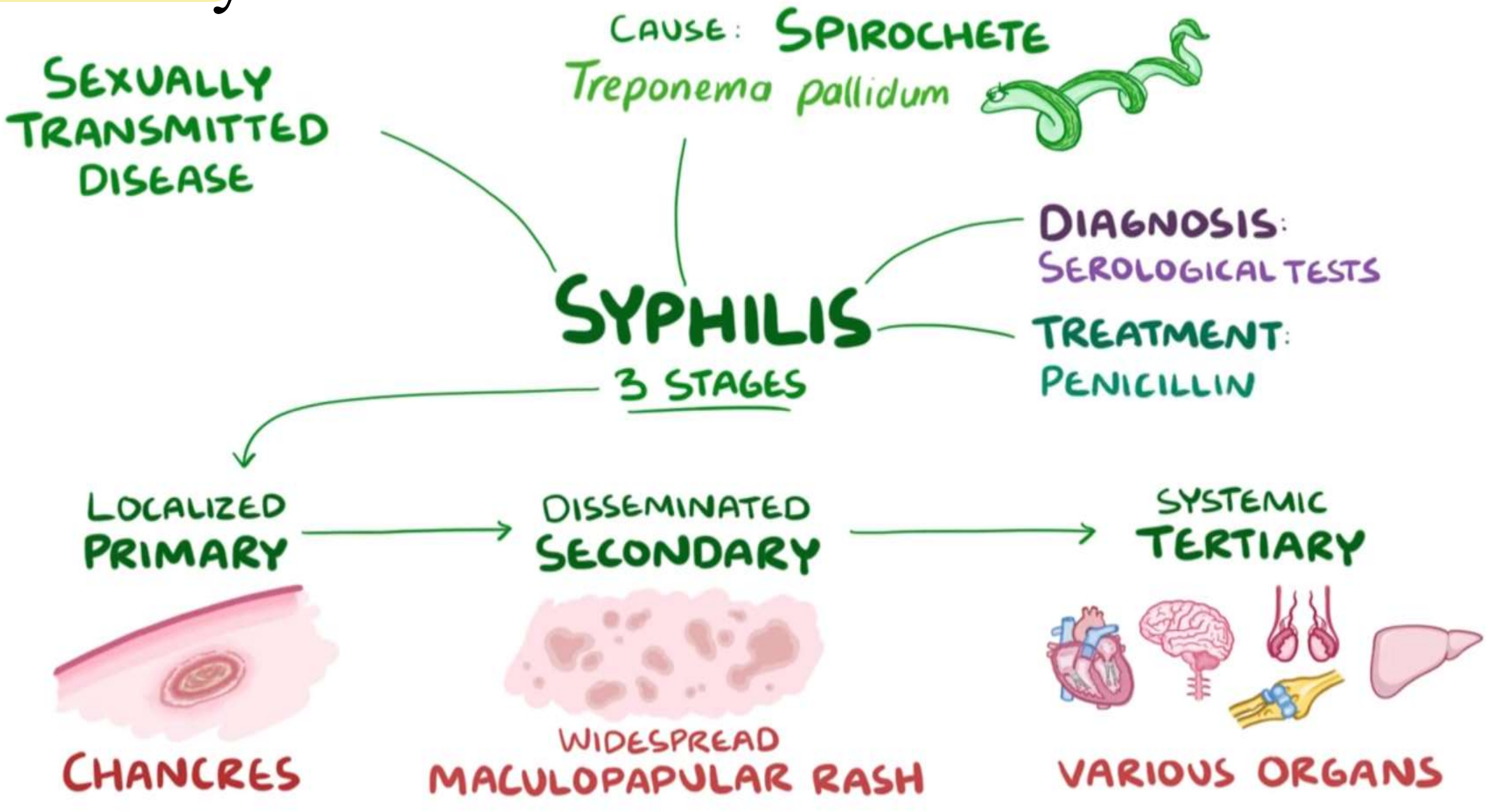
B. Treponemal testing

- Confirmatory tests that detect antibodies to Treponema antigens
- *T. pallidum* particle agglutination test (TPPA)
- *T. pallidum* enzyme immunoassay (TP-EIA)

Syphilis: Treatment

Penicillin G is the first-line therapy for all patients.

Summary…


SEXUALLY TRANSMITTED DISEASE
CAUSE: SPIROCHETE
Treponema pallidum
DIAGNOSIS:
SEROLOGICAL TESTS
SYPHILIS
3 STAGES
TREATMENT:
PENICILLIN
LOCALIZED
PRIMARY
DISSEMINATED
SECONDARY
SYSTEMIC
TERTIARY
CHANCRES
WIDESPREAD
MACULOPAPULAR RASH
VARIOUS ORGANS