



**BHARATHIDASAN UNIVERSITY**

**Tiruchirappalli-620024**

**Tamil Nadu, India.**

**Programme: M.Sc., Biomedical Science**

**Course Title : Clinical Microbiology**

**Course Code: BM36C9**

**Unit-III**

***Treponema***

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**Guest Lecturer**

**Department of Biomedical Science**

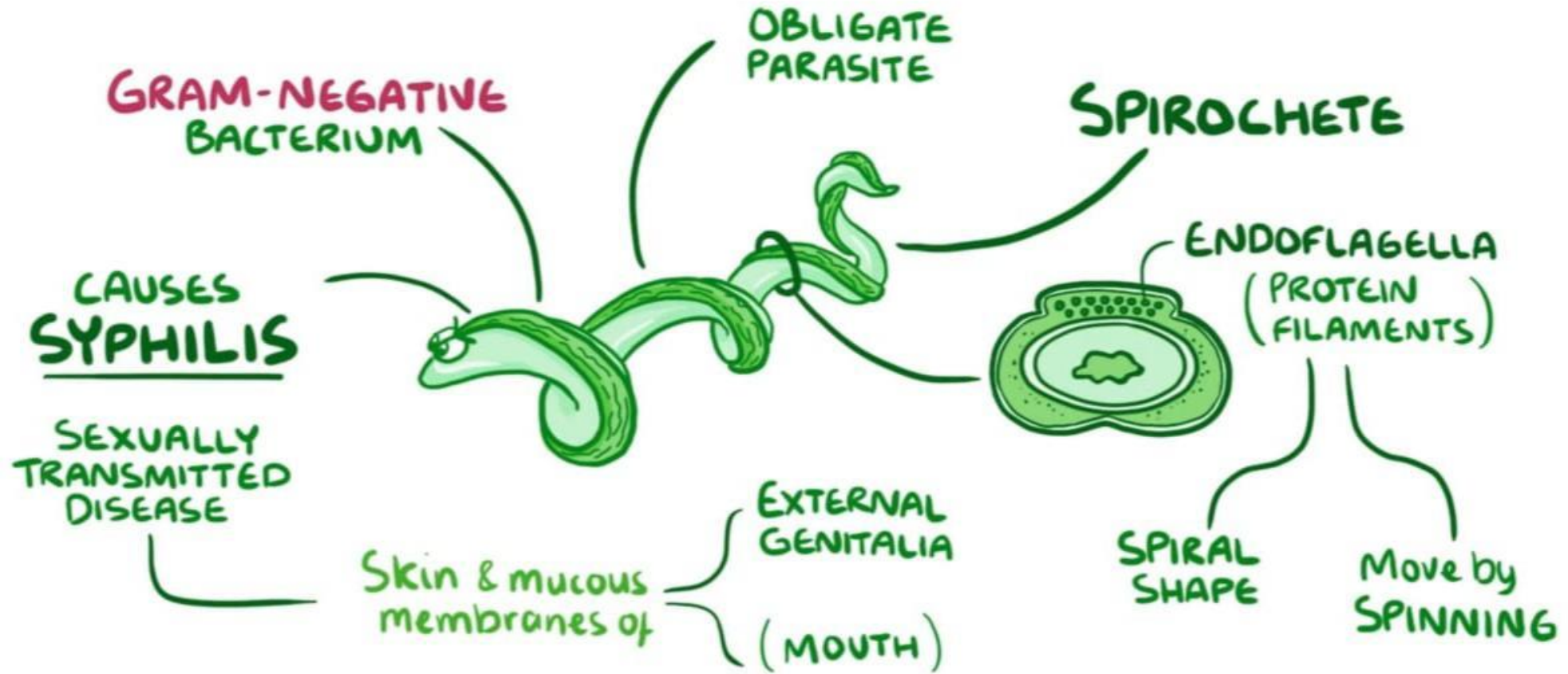
# TREPONEMA



# CLASSIFICATION

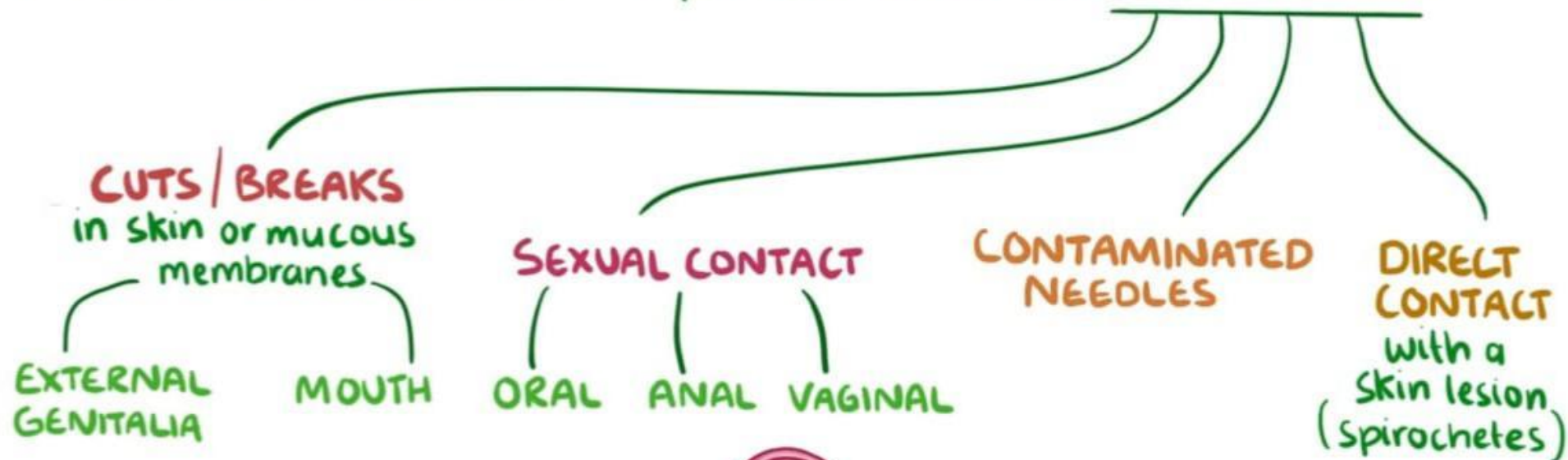
Kingdom:	Eubacteria
Phylum:	Spirochaetes
Class:	Spirochaetes
Order:	Spirochaetales
Family:	Treponemataceae
Genus:	Treponema
Species:	T. pallidum

# Treponema pallidum



# TRANSMISSION

## 1. ACQUIRED SYPHILIS - *T. pallidum* enters via **BODY FLUIDS**



## 2. CONGENITAL SYPHILIS

Mother has syphilis



*T. pallidum* infects baby in

**UTERUS** or when exiting through **VAGINA**

Optic  
Neuritis

Hearing  
defect

Saddle nose

Hutchinson  
teeth



*Treponema pallidum*

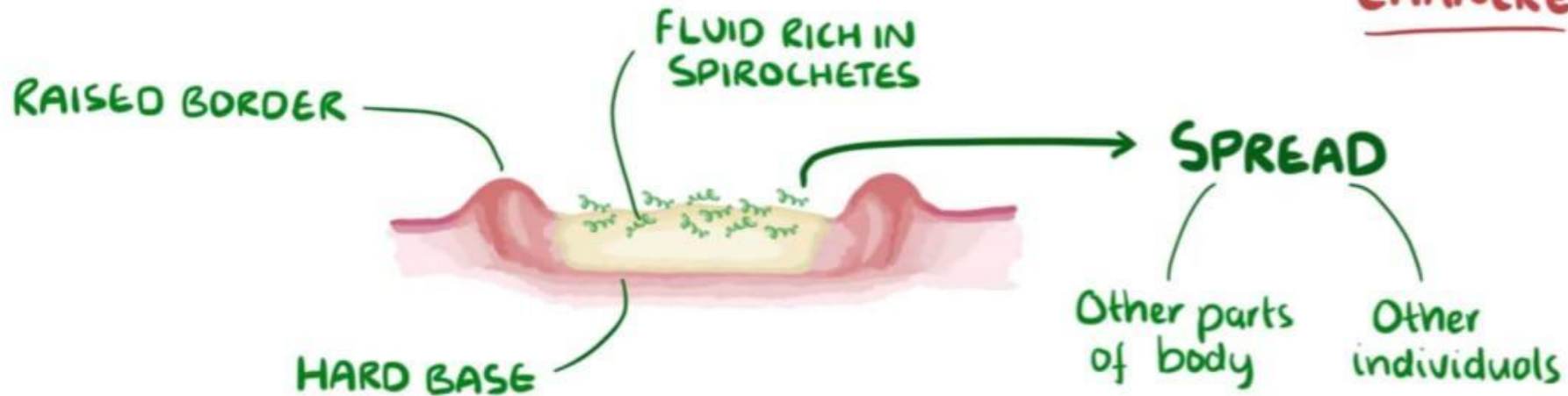
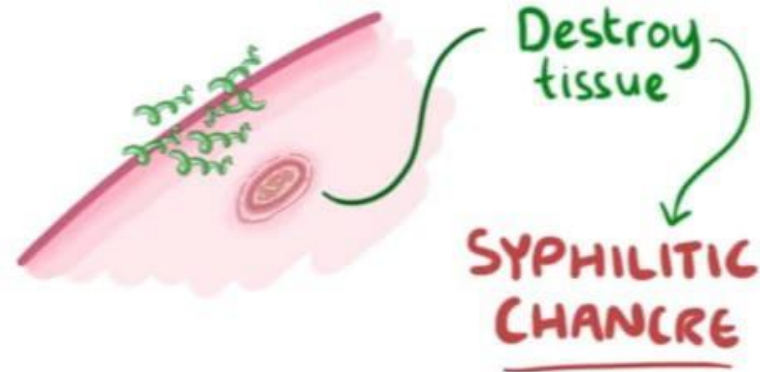
Maculopapular  
rash



# ACQUIRED SYPHILIS - 3 STAGES

## 1. PRIMARY (EARLY LOCALIZED)

- \* 1-3 weeks after *T. pallidum* lands on skin or mucous membrane
- \* Painless



# ACQUIRED SYPHILIS - 3 STAGES

## 1. PRIMARY (EARLY LOCALIZED)



Heal on their own  
in a few months

LYMPHADENOPATHY



LYMPH → BLOOD

\* BLOOD TRANSFUSION - May not be a primary chancre



# ACQUIRED SYPHILIS - 3 STAGES

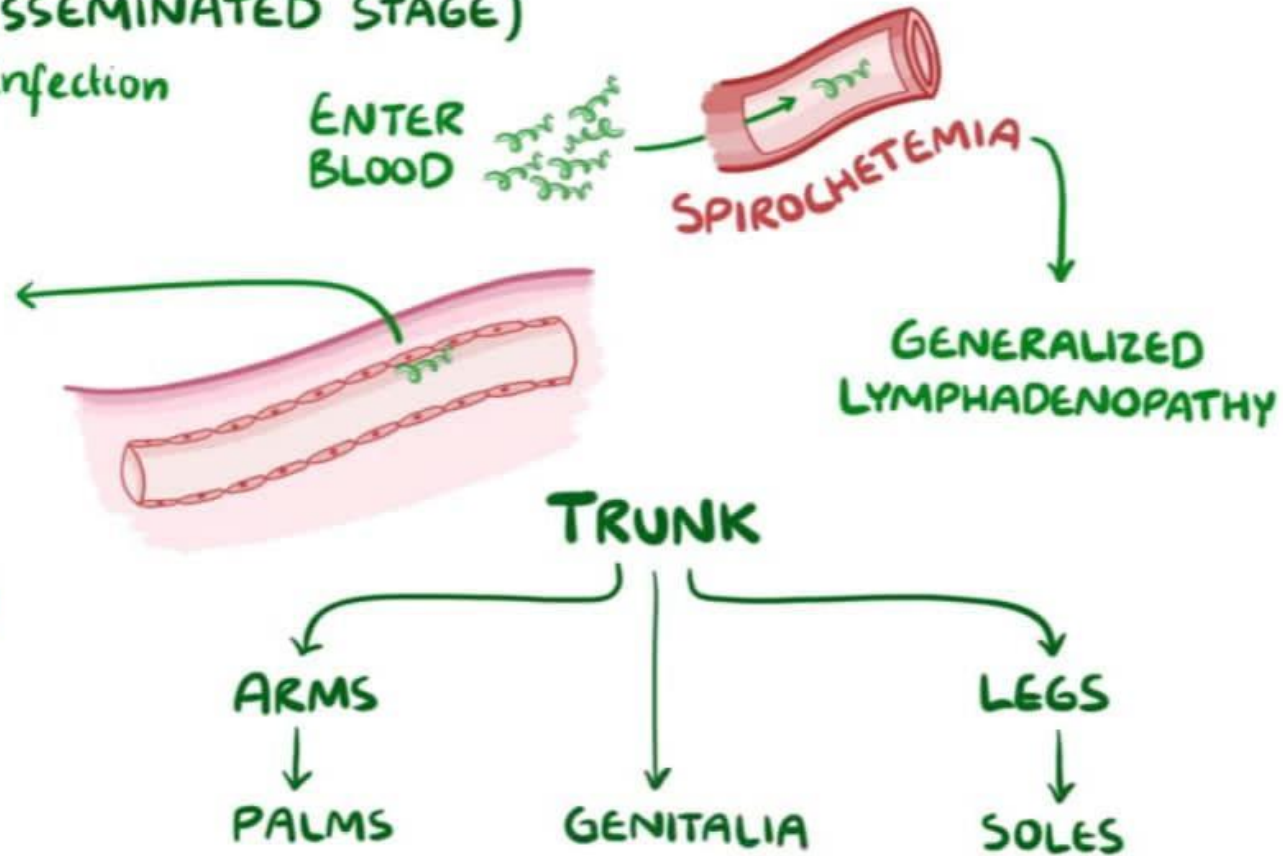
## 2. SECONDARY (DISSEMINATED STAGE)

\* 6-12 weeks after infection



NON-ITCHY  
MACULOPAPULAR RASH

- ↳ Small bumps
- ↳ Flat or raised



# ACQUIRED SYPHILIS - 3 STAGES

## 2. SECONDARY (DISSEMINATED STAGE)

\* 6-12 weeks after infection

### ↳ PUSTULAR

Filled with white fluid



### ↳ PAPULOSQUAMOUS

Scaly & hard



### ↳ CONDYLOMA LATA

Smooth, white, painless  
Genitals, anal region,  
armpits



\* All over the body

\* Full of Spirochetes

\* **MOST INFECTIOUS STAGE**

\* Usually resolves weeks-months

# ACQUIRED SYPHILIS - 3 STAGES

**LATENT (DORMANT, ASYMPTOMATIC)**

- Spirochetes in capillaries of organs & tissues

**EARLY PHASE**

WITHIN A YEAR  
of infection



Can circulate in blood



SYMPTOMS

**LATE PHASE**

AFTER A YEAR  
of infection

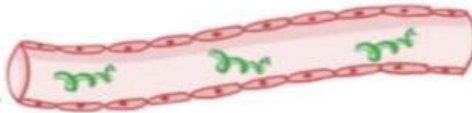


STAY IN ORGANS  
& TISSUES

# ACQUIRED SYPHILIS - 3 STAGES

## 3. TERTIARY

Few spirochetes...



... but

SEVERE



TYPE IV HYPERSENSITIVITY REACTION



PLASMA CELLS

- \* **GROUP-SPECIFIC ANTIGEN**  
(All treponemas)
- \* **SPECIES-SPECIFIC ANTIGEN**  
(Specific to *T. pallidum*)
- \* **CARDIOLIPIN**  
(Spirochetes & cells in our bodies)

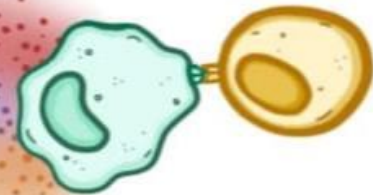
SWELLING  
EDEMA  
REDNESS  
WARMTH  
FEVER

TUMOR  
NECROSIS  
FACTOR

IL-1

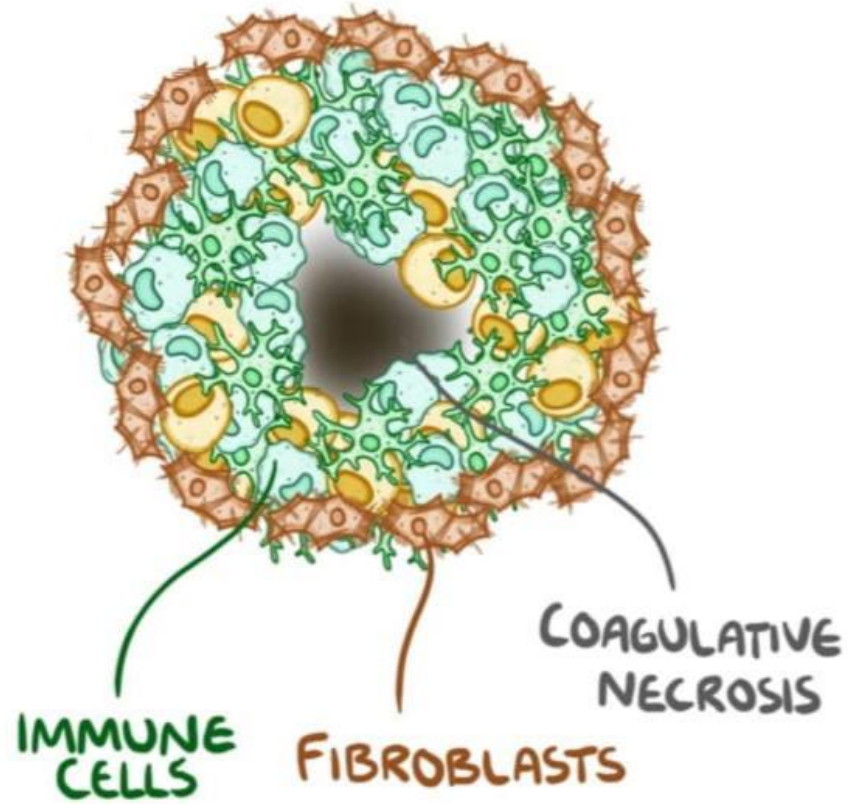
IL-6

Lead by  
T-CELLS

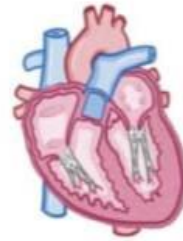


MALROPHAGE

# GRANULOMATOUS LESION - GUMMA



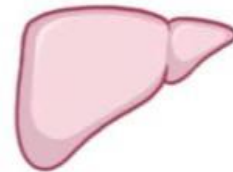
# TERTIARY SYPHILIS: ORGAN DAMAGE



- **CARDIOVASCULAR SYPHILIS**



- **NEUROSYPHILIS**



**LIVER**

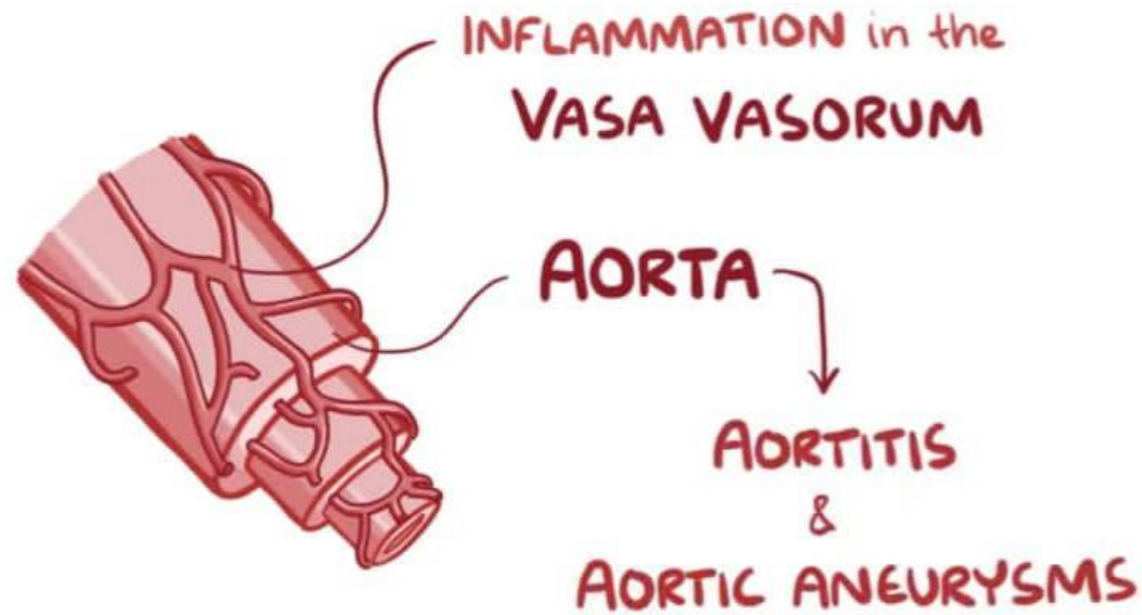


**JOINTS**

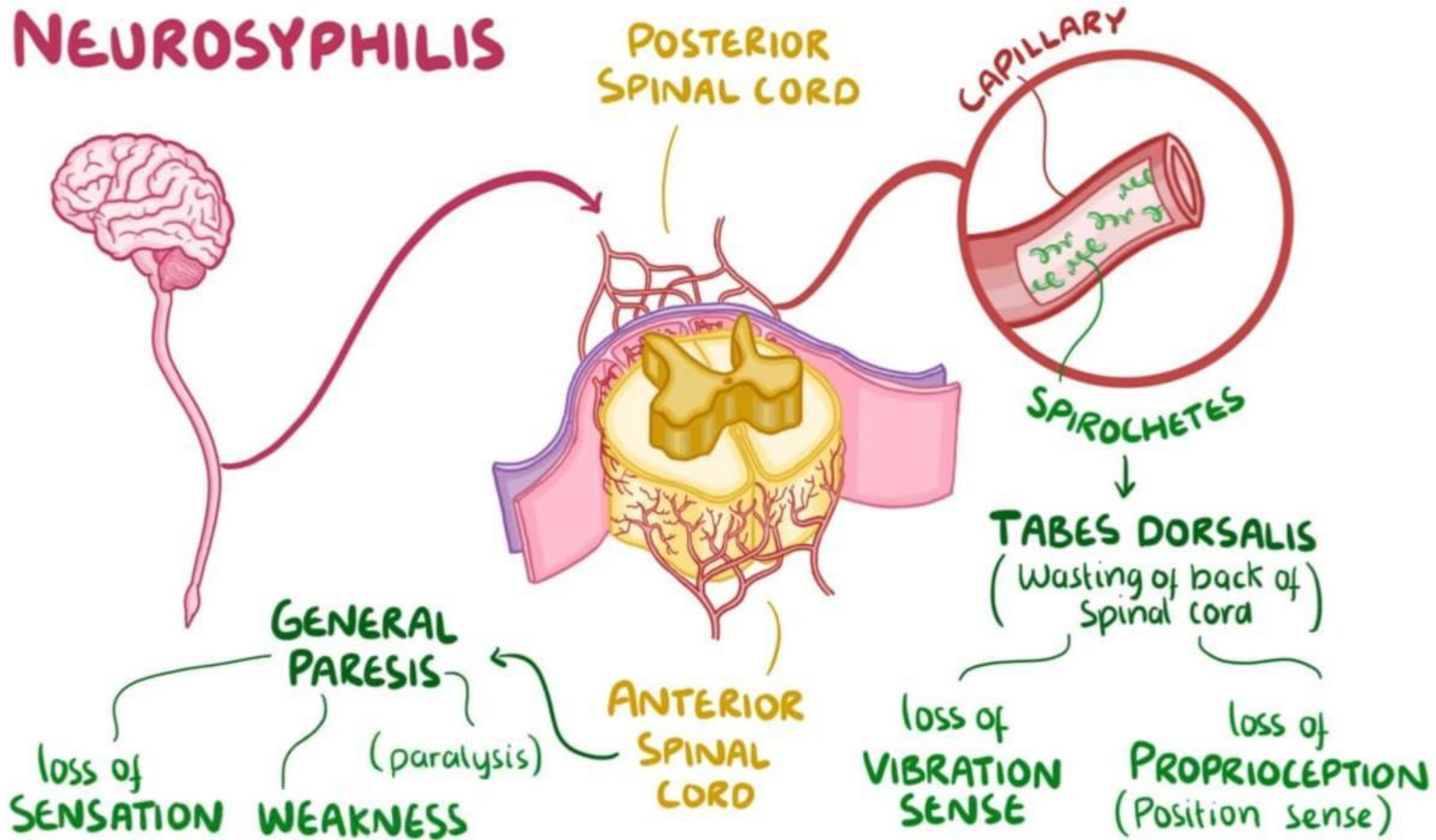


**TESTES**

# CARDIOVASCULAR SYPHILIS - ENDARTERITIS



# NEUROSYPHILIS



# NEUROSYPHILIS



BRAIN



SLURRED SPEECH

ALTERED BEHAVIOR

MEMORY LOSS

DIFFICULTY COORDINATING  
MUSCLE MOVEMENTS

PARALYSIS

SPIROCHETES



EYE

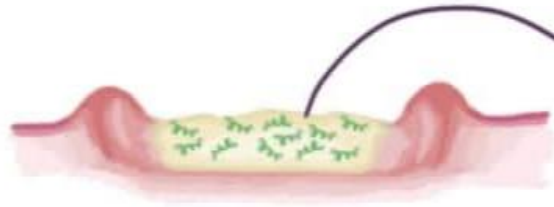
ARGYLL  
ROBERTSON  
PUPIL

PUPIL LOSES LIGHT REFLEX

- Doesn't constrict with too much light
- Does have ACCOMODATION REFLEX



# DIAGNOSIS - ACQUIRED



Identify **SPIROCHETES** in **CHANCRES**  
↳ **DARK FIELD MICROSCOPY**  
(Background dark, spirochetes light up)

Confirm - Serological tests for **ANTIBODIES** against *T. pallidum*

## NON-TREPONEMAL TESTS:

- \* Rapid Plasma Reagin Test (RPR)
- \* Venereal Disease Research Laboratory Test (VDRL)

Detect **Anti-cardiolipin** antibodies ("REAGIN")

**NOT SPECIFIC** for syphilis

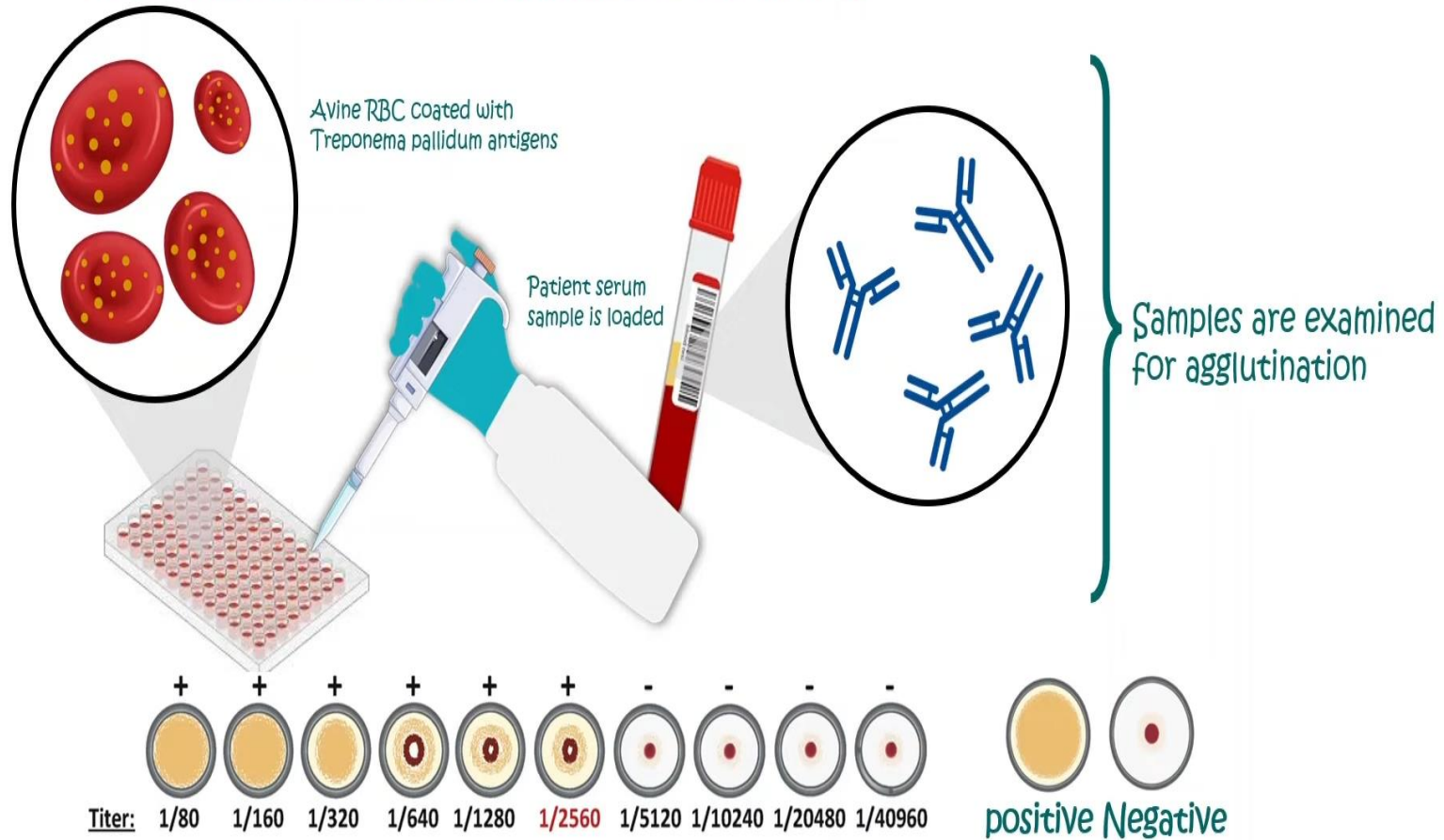
## TREPONEMAL TESTS:

- \* *T. pallidum*-particle agglutination (TPPA)
- \* Fluorescent treponemal antibody absorbed (FTA-ABS)

Detect **antibodies** that Specifically target *T. pallidum*



## *Treponema pallidum* particle agglutination test (TPPA)



Other tests : Fluorescence *Treponema* antibody absorbed (FTA-abs)

# DIAGNOSIS - CONGENITAL

	MOTHER	BABY
Non-Treponemal Serological Titer	1:64	1:16

CONGENITAL SYPHILIS

$\times 4$

## CSF FLUID



VDRL

CELL  
COUNT

PROTEIN

## LONG BONE X-RAYS



## EYE EXAM



## HEARING SCREEN



# TREATMENT

PENICILLIN

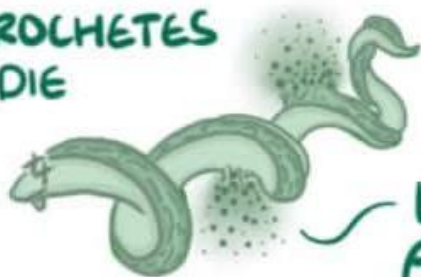
( & DOXYCYCLIN )



JARISCH-HERXHEIMER REACTION



SPIROCHETES DIE



LOTS OF ANTIGENS

FEVERS

SWEATING

MUSCLE & JOINT PAIN (hours - days)



***OVERVIEW***

***OF SYPHILIS***

SEXUALLY TRANSMITTED DISEASE

CAUSE: SPIROCHETE  
*Treponema pallidum*



# SYPHILIS

DIAGNOSIS:  
SEROLOGICAL TESTS

TREATMENT:  
PENICILLIN

3 STAGES

LOCALIZED  
PRIMARY



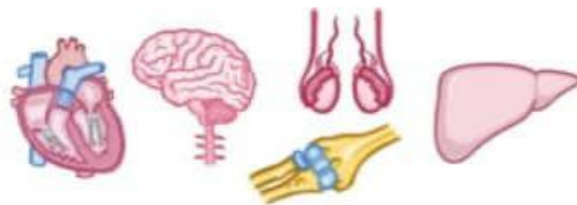
CHANCRES

DISSEMINATED  
SECONDARY



WIDESPREAD  
MACULOPAPULAR RASH

SYSTEMIC  
TERTIARY



VARIOUS ORGANS

# TREPONEMA PALLIDUM, SUBSP. ENDEMICUM (NONVENEREAL SYPHILIS)

- This subspecies is responsible for nonvenereal syphilis, which occurs endemically in certain circumscribed areas in the Balkans, the eastern Mediterranean, Asia, and Africa.
- The disease manifests with maculous to papulous, often hypertrophic lesions of the skin and mucosa.
- These lesions resemble the venereal efflorescences. The pathogens are transmitted by **direct contact or indirectly on everyday objects** such as clothes, tableware, etc.
- The incubation period is **three weeks to three months**. Penicillin is the therapy of choice. Serological syphilis tests are positive.

# TREPONEMA PALLIDUM, SUBSP. PERTENUE (YAWS)

- This species causes yaws (German “Frambo” sie,” French “pian”), a chronic disease endemic in moist, warm climates characterized by epidermal proliferation and ulceration. Transmission is by **direct contact**.
- The incubation period is **three to four weeks**. Treponemes must be found in the early lesions to confirm diagnosis. Serological syphilis reactions are positive.
- Penicillin G is the antibiotic of choice.



# TREPONEMA CARATEUM (PINTA)

- This species causes pinta, an endemic treponematosiis that occurs in parts of Central and South America, characterized by marked dermal depigmentations.
- The pathogens are transmitted by direct contact. The incubation period is **one to three weeks**.
- The disease often has a chronic course and can persist for years. Diagnosis is confirmed by identification of treponemes from the skin lesions. Penicillin G is used in therapy

# **Reference**

**David Greenwood, Richard B Slack and John F. (2021). Medical Microbiology. Peutherer. Chirchill Livingstone (London) 16th Edition.**

**THANK YOU**