BHARATHIDASAN UNIVERSITY

Tiruchirappalli- 620024
Tamil Nadu, India.

Programme: M.Sc., Biomedical Science

Course Title : Clinical Microbiology

Course Code : 18BMS48C15

Unit-III

TOPIC: Treponema

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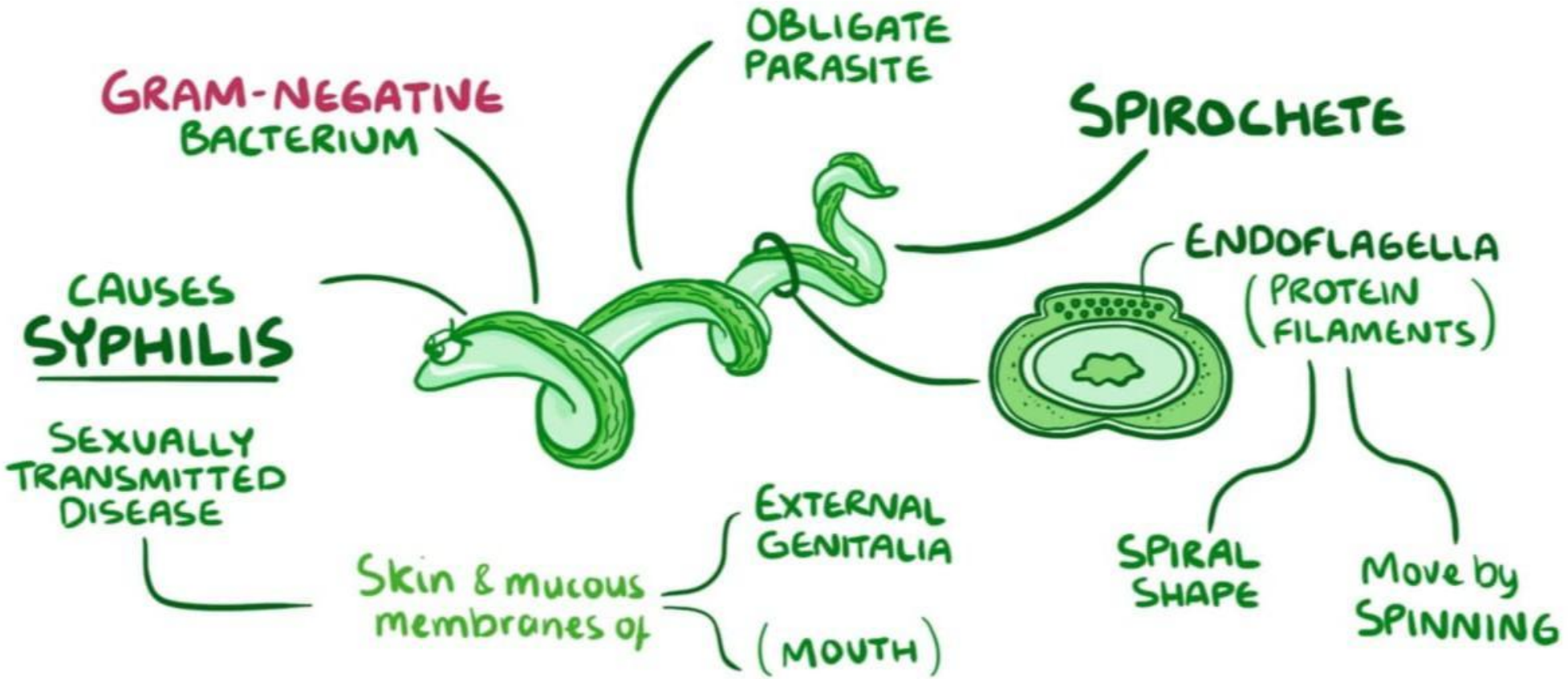
TREPONEMA

CLASSIFICATION

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

Treponema pallidum



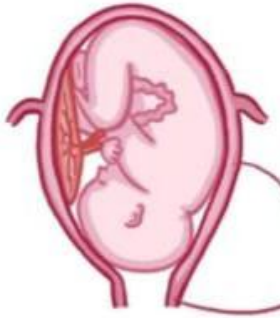
TRANSMISSION

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

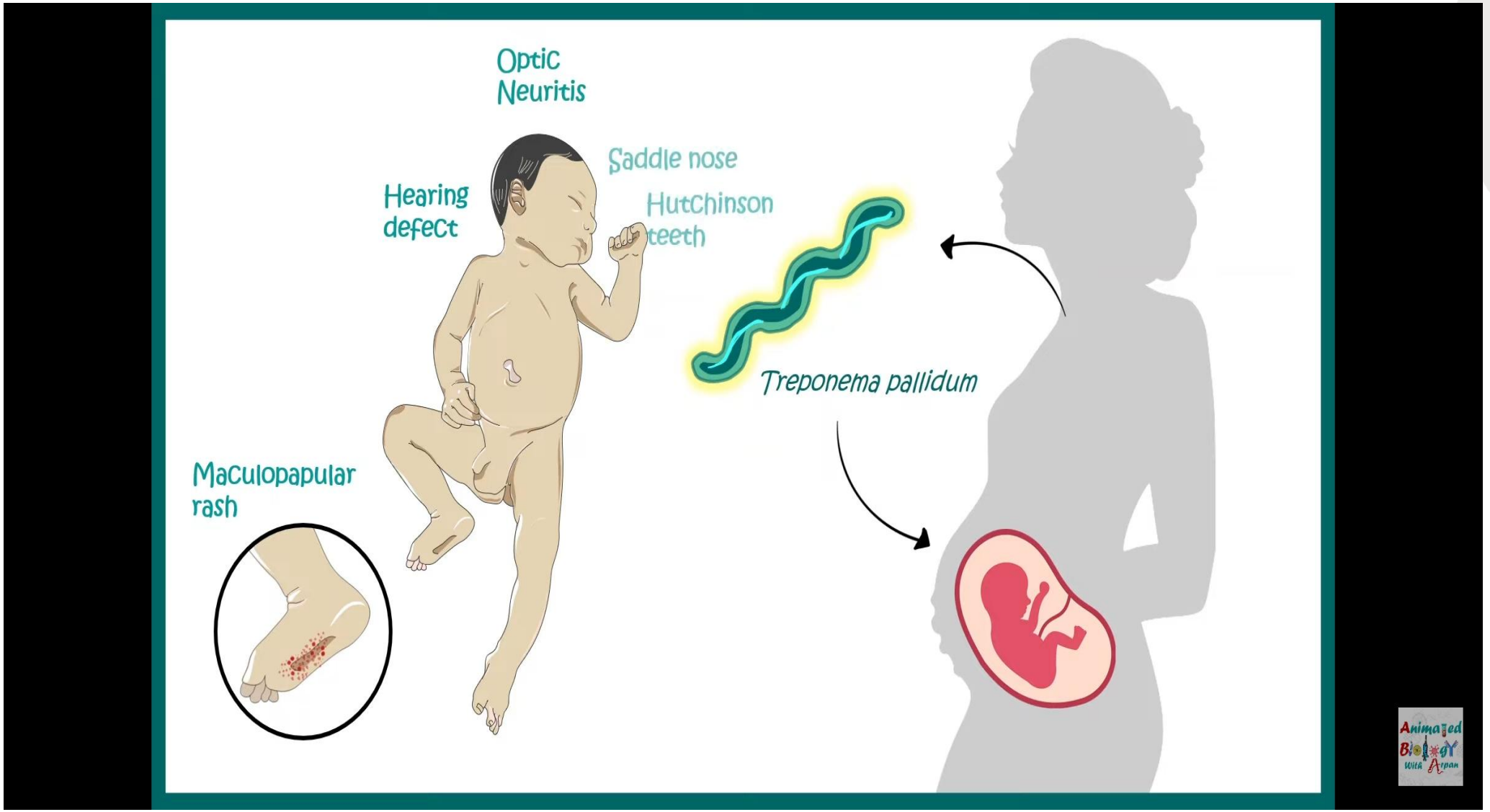
- CUTS / BREAKS in skin or mucous membranes
  - EXTERNAL GENITALIA
  - MOUTH
- SEXUAL CONTACT
  - ORAL
  - ANAL
  - VAGINAL
- CONTAMINATED NEEDLES
- DIRECT CONTACT with a skin lesion (spirochetes)

2. CONGENITAL SYPHILIS

Mother has syphilis



T. pallidum infects baby in UTERUS or when exiting through VAGINA

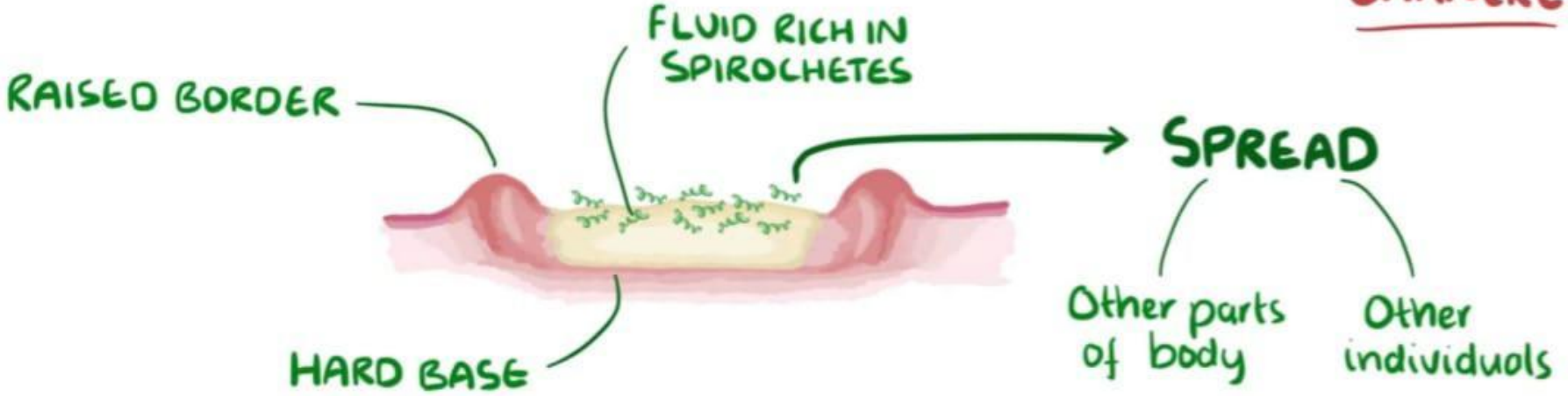

Optic Neuritis
Saddle nose
Hearing defect
Hutchinson teeth
Treponema pallidum
Maculopapular rash

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)

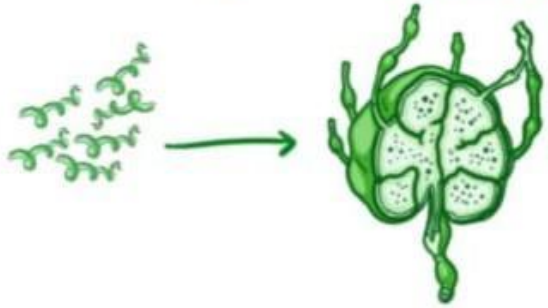
* SEXUAL CONTACT
* PHYSICAL TOUCH or other way

→ PRIMARY CHANCRE → EXTERNAL GENITALIA

→ HANDS or other body part

Heal on their own in a few months

LYMPHADENOPATHY



→ LYMPH → BLOOD

* BLOOD TRANSFUSION - May not be a primary chancre

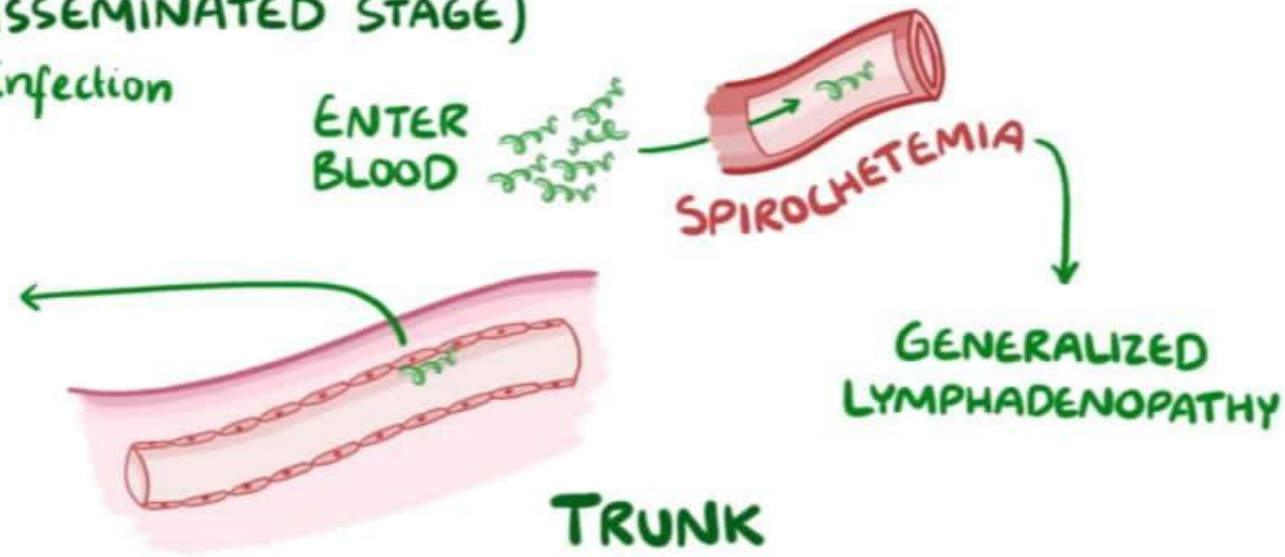
ACQUIRED SYPHILIS - 3 STAGES

2. SECONDARY (DISSEMINATED STAGE)

* 6-12 weeks after infection

NON-ITCHY MACULOPAPULAR RASH

- Small bumps
- Flat or raised



TRUNK

- ARMS → PALMS
- GENITALIA
- LEGS → SOLES

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

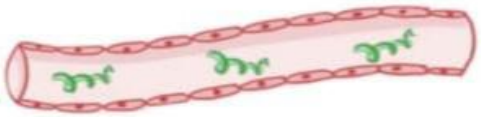
↓

STAY IN ORGANS
& TISSUES

ACQUIRED SYPHILIS - 3 STAGES

3. TERTIARY

Few spirochetes...



... but SEVERE

TYPE IV HYPERSENSITIVITY REACTION → IMMUNE RESPONSE → lead by T-CELLS

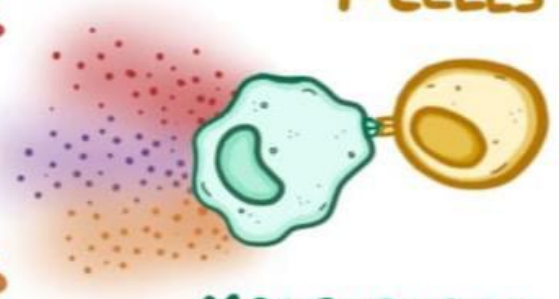
PLASMA CELLS

- SWELLING
- EDEMA
- REDNESS
- WARMTH
- FEVER

TUMOR NECROSIS FACTOR

IL-1

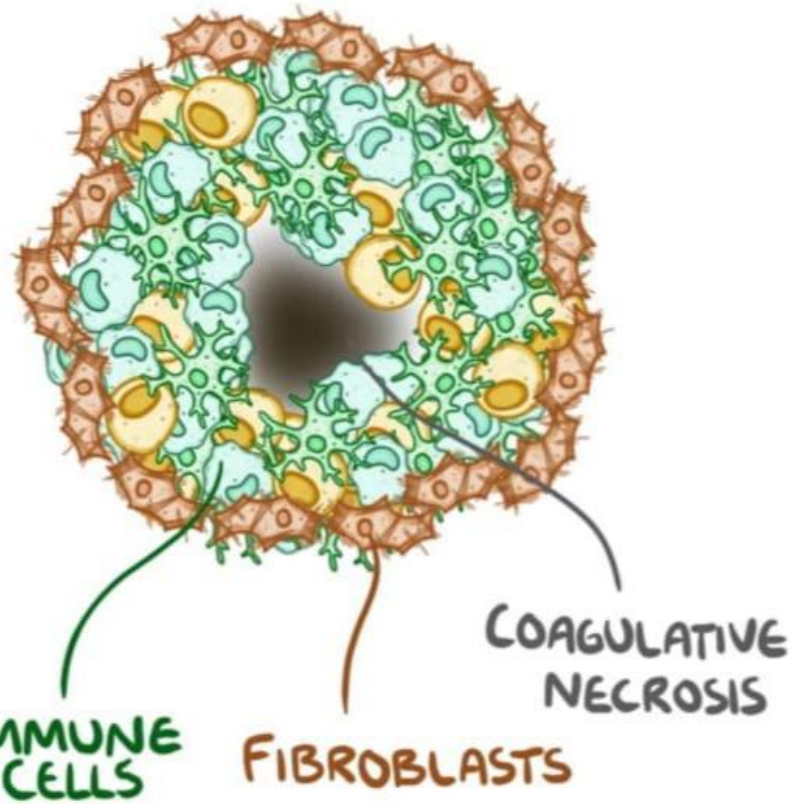
IL-6



MACROPHAGE

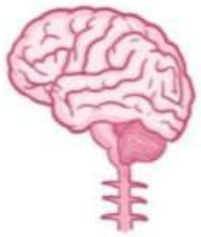
* GROUP-SPECIFIC ANTIGEN
  (All treponemas)
* SPECIES-SPECIFIC ANTIGEN
  (Specific to *T. pallidum*)
* CARDIOLIPIN
  (Spirochetes & cells in our bodies)

GRANULOMATOUS LESION - GUMMA



TERTIARY SYPHILIS: ORGAN DAMAGE

– CARDIOVASCULAR SYPHILIS



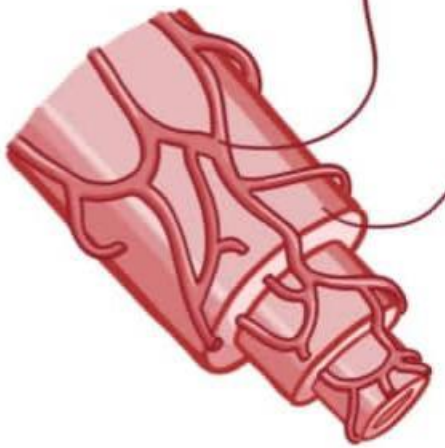
– NEUROSYPHILIS

LIVER

JOINTS

TESTES

CARDIOVASCULAR SYPHILIS – ENDARTERITIS

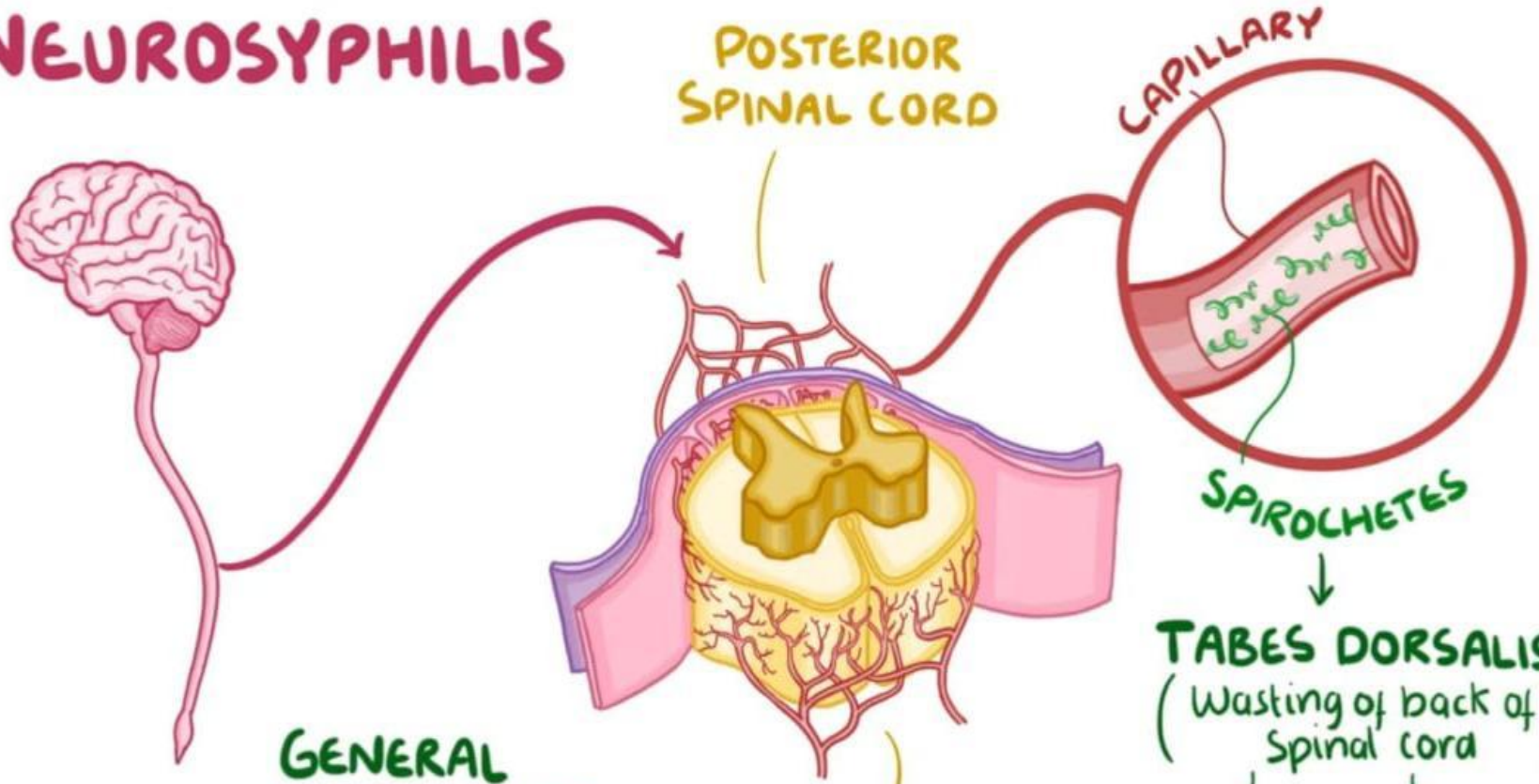


INFLAMMATION in the VASA VASORUM

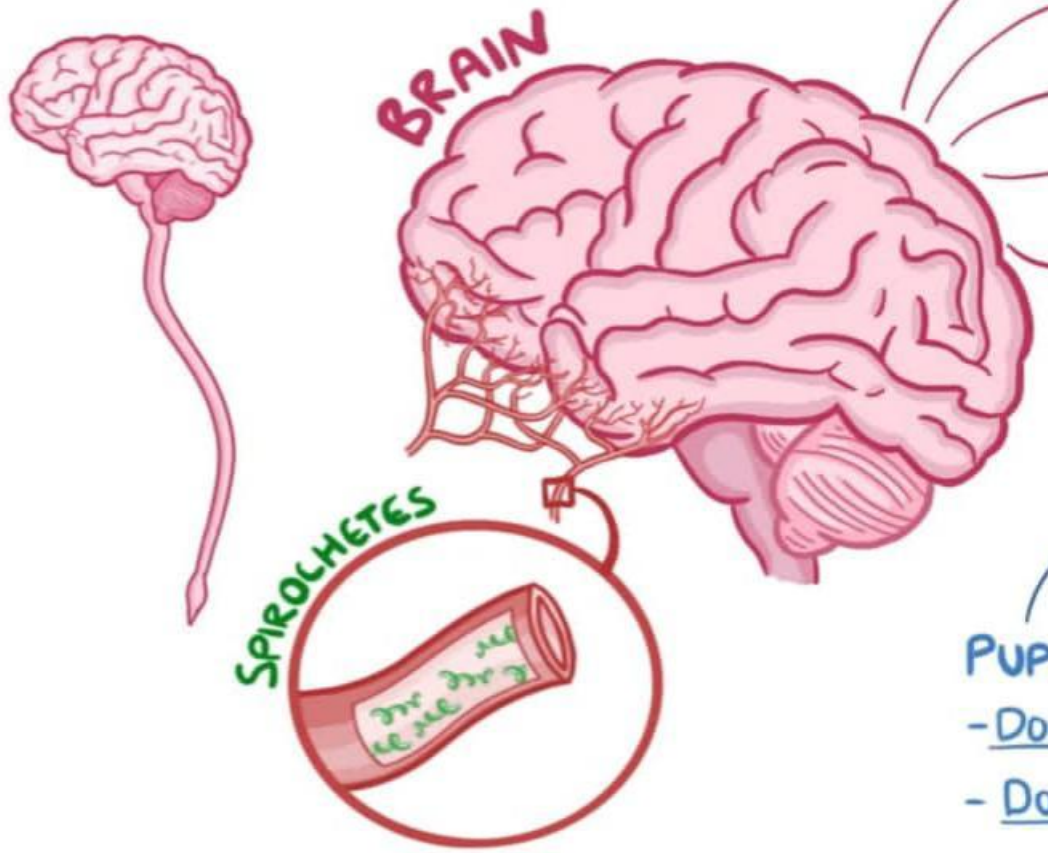
AORTA

AORTITIS & AORTIC ANEURYSMS

NEUROSYPHILIS



NEUROSYPHILIS



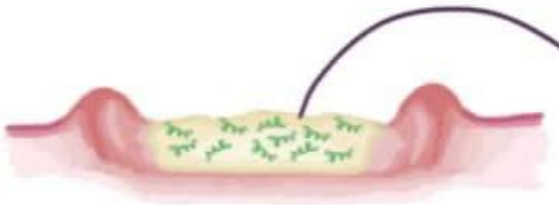
- SLURRED SPEECH
- ALTERED BEHAVIOR
- MEMORY LOSS
- DIFFICULTY COORDINATING MUSCLE MOVEMENTS
- PARALYSIS

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)

NOT SPECIFIC for Syphilis

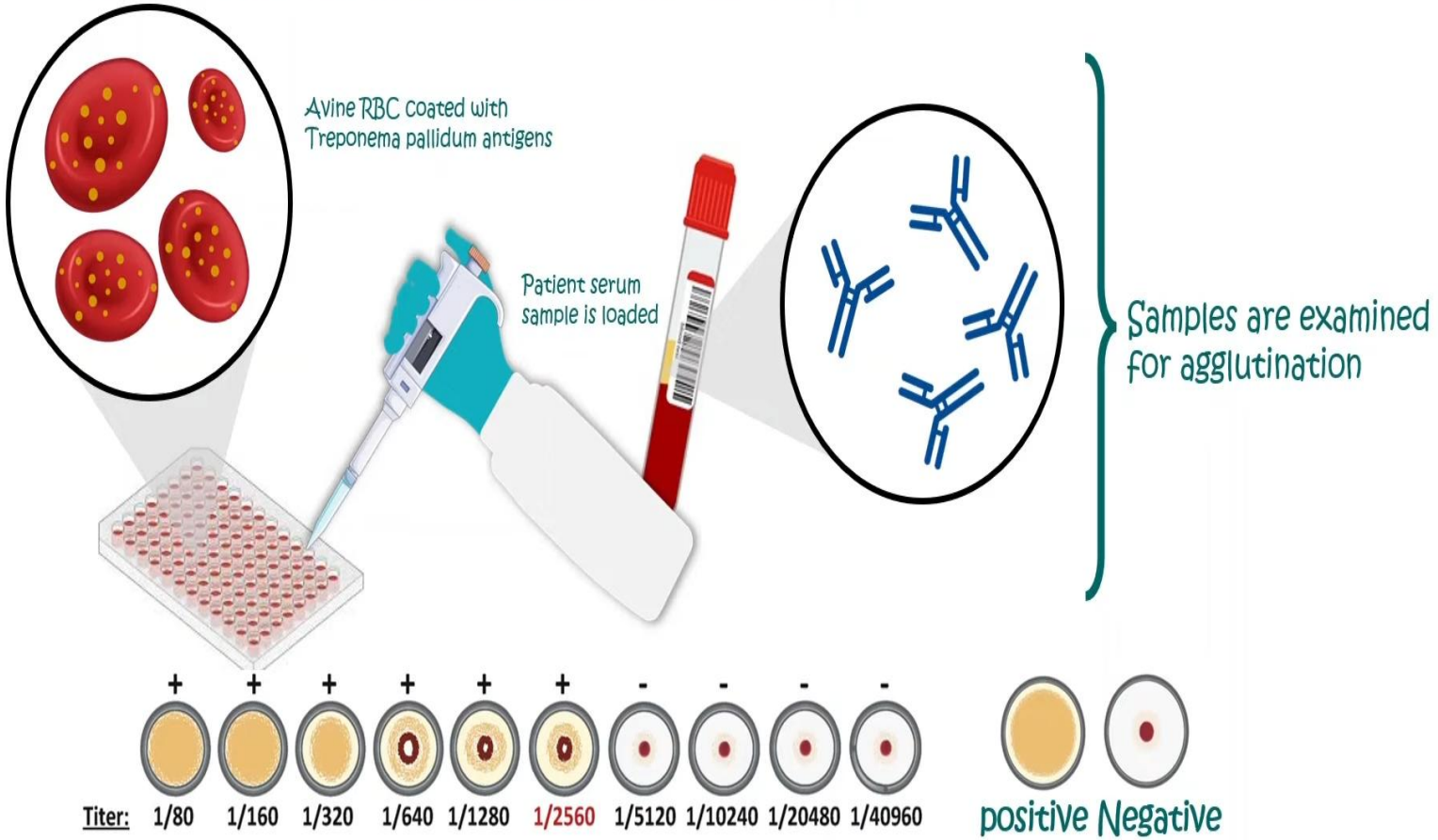
Detect anti-cardiolipin antibodies ("REAGIN")

TREPENEMAL 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

× 4

→ CONGENITAL SYPHILIS

CSF FLUID

- VDRL
- CELL COUNT
- PROTEIN

LONG BONE X-RAYS

EYE EXAM

HEARING SCREEN

TREATMENT

PENICILLIN — JARISCH-HERXHEIMER REACTION

(& DOXYCYCLIN)

FEVERS

SWEATING

MUSCLE & JOINT PAIN (hours - days)

IMMUNE SYSTEM

OVERVIEW OF SYPHILIS

SEXUALLY TRANSMITTED DISEASE

CAUSE: SPIROCHETE
Treponema pallidum

SYPHILIS

3 STAGES

DIAGNOSIS:
SEROLOGICAL TESTS

TREATMENT:
PENICILLIN

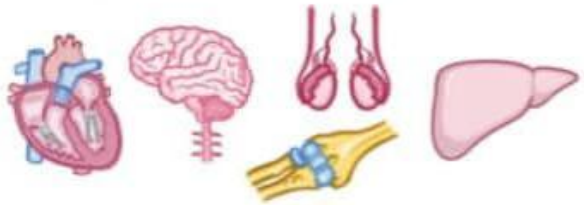
LOCALIZED
PRIMARY

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 thevenereal 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 incubationperiod 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 treponematosis 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