

SPIROCHEATES

Genus-Treponema

Spirocheates

Elongated, motile, flexible bacteria, twisted spirally along the long axis are termed as spirochaetes.

(Spira- coil, Chaite-Hair)



Classification

- Family- Spirochaeta

Non Pathogenic genus: Spirochaeta

Cristispira- Saprophytes

Pathogenic genus: Treponema

Leptospira

Borrelia

TREPONEMA

(Trepo-turn, Nema-Thread)

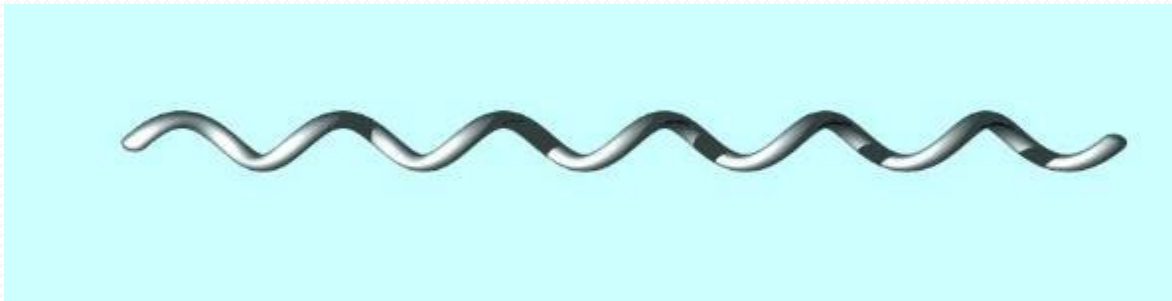
3 Species:

1. *T. pallidum*- Venereal syphilis
 - Pathogenic strain: Nichol's Strain
 - Non Pathogenic strain: Reiter's Strain
2. *T. pertunae*- Yaws
3. *T. carateum*- Pinta

Treponema pallidum

Morphology:

- Thin, delicate with tapering ends
- $10\mu\text{m}$ X 0.1 to $0.2\mu\text{m}$
- Ten regular spirals at $1\mu\text{m}$
- Motile: Rotation, Backward and forward, Flexion and extension.
- Endoflagella: 3-4 in number, wind round the axis of the cell between cell wall and outer membrane.



Pathogenicity

- Causes Syphilis
- Acquired by sexual contact with infected person-enters the body thru minute abrasions on skin & mucosa.
- Infectivity: max during first two years
- Infective dose: 60 treponemes
- Generation time: 30-33 hrs
- Incubation period-about a month

Stages of Syphilis

Primary stage:

- Hard chancre: on genitals, mouth or nipples which is painless, avascular, well circumscribed, superficially ulcerated, covered with thick glairy exudate.
- It heals in 10-40 days leaving a thin scar.
- Detection and management are easiest during the primary stage.



Stages of Syphilis

Secondary Stage:

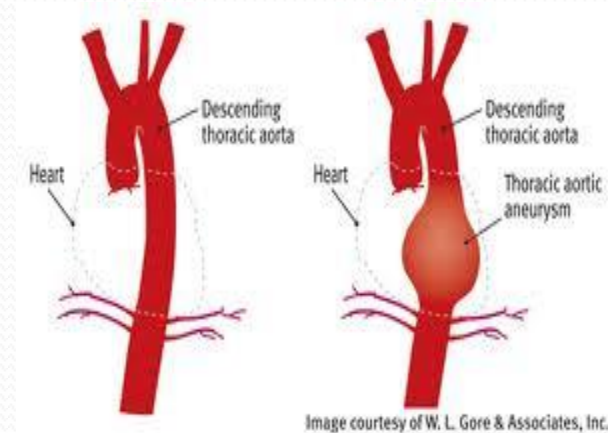
- 3 months after the primary lesion heals.
- Dissemination of infection in the blood
- Roseolar or papular rash, mucocutaneous lesions
- Most infective stage
- Followed by latent stage.



Stages of Syphilis

Tertiary Stage:

Cardiovascular lesions-
aneurysms, gummata,
meningovascular involvement.



Late Tertiary stage:

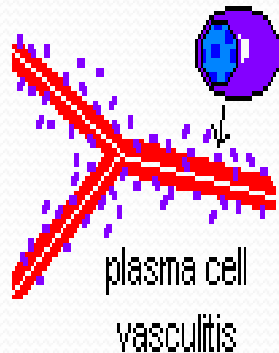
Neurosyphilis

- **Meningeal neurosyphilis**
 - includes acute syphilitic meningitis
 - headache, fever, CSF abnormalities
- **Meningovascular neurosyphilis**
 - “syphilitic stroke”
 - hemiparesis, hemiplegia, aphasia, seizure
- **Parenchymatous neurosyphilis**
 - general paresis
 - tabes dorsalis

Syphilis

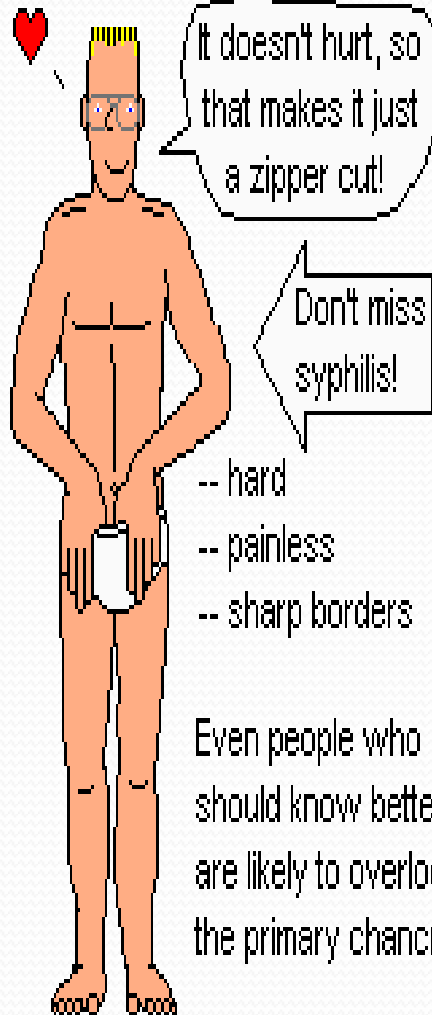
Easy to diagnose and treat -- if you think of it.

The consequences of a missed diagnosis are horrible.

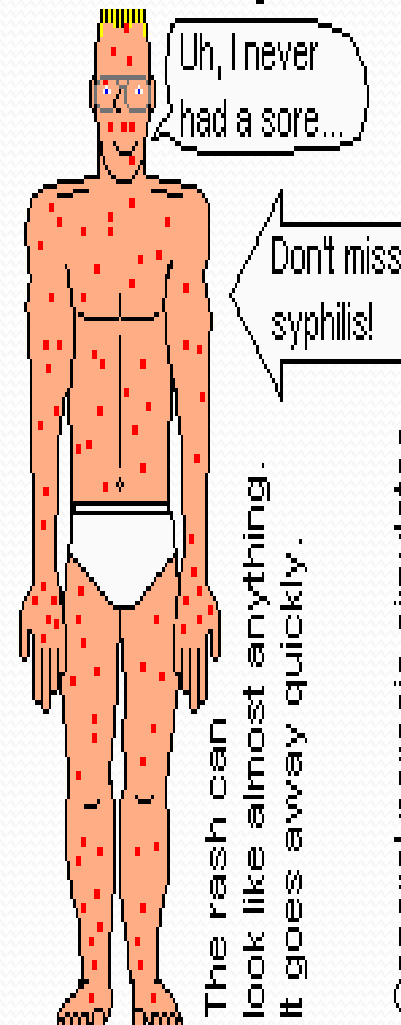


"When it comes to syphilis, suspect your grandmother."
-- Dr. Osler

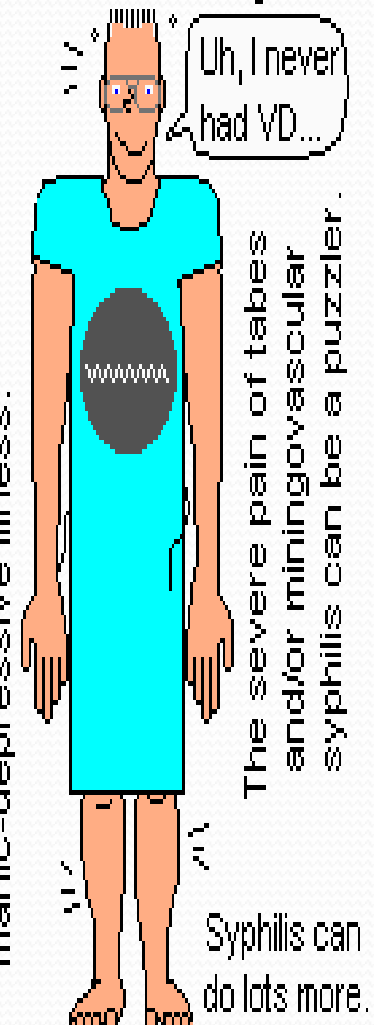
Primary



Secondary



Tertiary



Non Venereal Syphilis

- **Extra genital Chancre:** Fingers of Lab personel working on Treponema.



- **Transplacental Transmission:**

Early syphilis- chances of transmission is 75-95%

Obstetric History- Abortions, stillbirths-
Live births of infants with stigmata of syphilis

- Hutchinsons teeth- blunted upper incisors
- Keratitis
- Deafness
- Frontal bossing
- Saddle nose
- Hard palate defect
- Protuding mandible.
- Saber shin- sharp anterior bowing of the tibia

bulging of the frontal bones and depression of the nasal bridge



LAB DIAGNOSIS

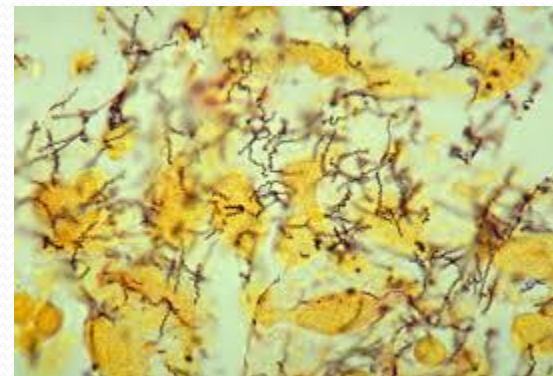
SAMPLE COLLECTION:

Lesion is cleaned with gauze soaked in warm saline- margins are gently scraped so superficial epithelium abraded-apply gentle pressure to the base and serum that exudates is collected.



MICROSCOPY:

- DGI
- Silver Impregnation Methods
 - Fontana
 - Levaditi



LAB DIAGNOSIS

CULTURE:

- Pathogenic strain- not cultivable in artificial media.

Maintained for 10-12 days by serial passage in rabbit testicles- **Nichol's Strain**.



- Non pathogenic Strain- **Reiter's Strain** grown in- Thioglycollate medium containing serum.



LAB DIAGNOSIS

SEROLOGICAL TESTS:

- **Standard tests:** VDRL, RPR, Kahn, Wasserman CFT, TRUST .
- **Group Specific tests:** RPCF
- **Species Specific tests:** TPI, FTA-ABS, TPHA.

Standard Tests

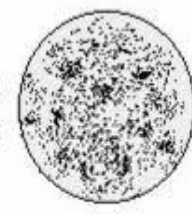
- Use cardiolipin antigen (Lipid Extract of beef heart with added lecithin and cholesterol)

VDRL Test: Slide flocculation test.

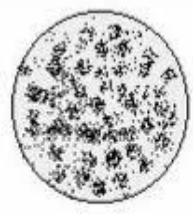
Inactivated serum + Cardiolipin ag-
Special slide - rotated for 4 mins - Seen
under Low power of microscope -
Visible clumps - +ve



Non reactive



Weakly reactive



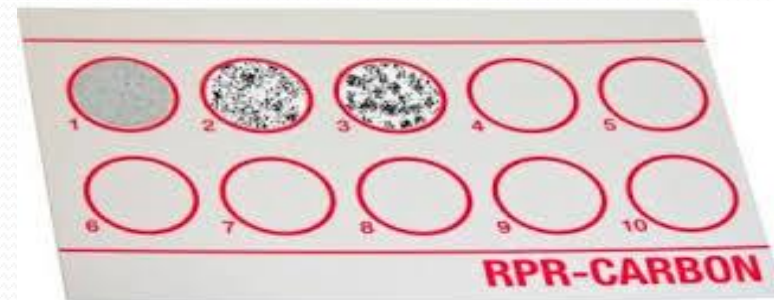
Strongly reactive

RPR Test:

(Fine carbon particles combined
with the antigen)

Adv: Read Macroscopically, Rapid

Disadv: Cannot be used for CSF.



Biologically false positive reactions

Positive reactions obtained in cardiolipin tests, with negative results in specific treponemal tests, in absence of past or present treponemal infection and not caused by technical errors.

Acute Conditions (few wks or months): acute infections, injuries, vaccinations.

Chronic Conditions (> 6months): SLE, Leprosy, Malaria, relapsing fever, infectious mononucleosis, hepatitis, tropical eosinophilia.

Species specific Tests: (Institute of Serology, Calcutta)

Treponima Pallidum Immobilisation (TPI):

- Most Specific Test
- Test serum incubated with complement and *Treponema pallidum*.
- If antibodies present- *Treponemes* are immobilized
- Test +ve- if >50% *Treponemes* are immobilized.

Species specific Tests

FTA-ABS: Indirect

Immunofluorescence test

Smears prepared on slide with Killed Nichol's Strain of *T. pallidum*.

+

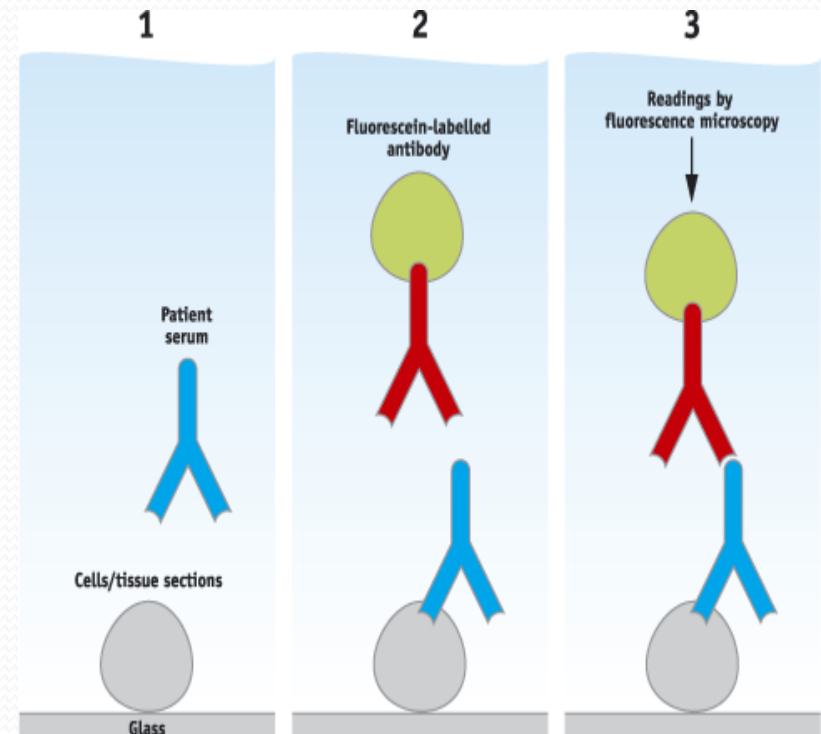
Test serum (pre-absorbed with sonicate of Reiter Treponemes to remove grp specific antigen)

+

Fluorescein labeled antihuman Ig and then seen under fluorescent microscope.

Positive test--- Treponema fluoresce.

Standard Reference test.



Species specific Tests

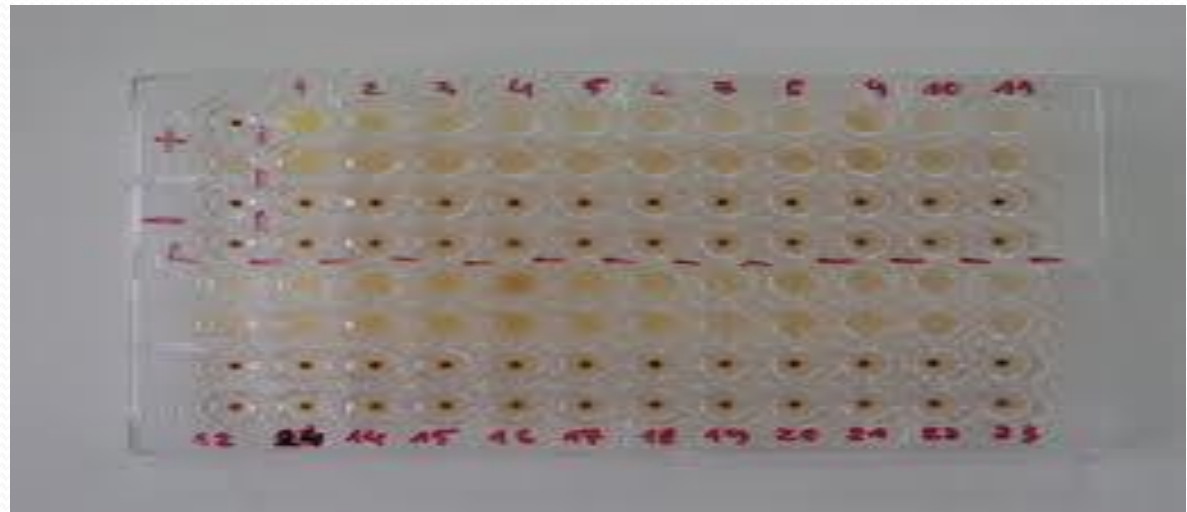
TPHA:

Tanned erythrocytes coated with *T.pallidum*

+

Serum of Patient:

= +ve test if heamagglutination.



Frequency of reactive serological tests in untreated syphilis(%)

Stage	VDRL/RPR	FTA-ABS	TPHA
Primary	70%	80%	65%
Secondary	100	100	100
Tertiary	70%	65%	95%

Prophylaxis:

- Avoiding sexual contact with infected person
- Use of Physical barriers
- Antiseptics (KMnO_4)

Treatment:

Benzathin Penicillin G---24lac
units i/m in single dose.

Doxycycline 100mg twice a day
for 15 days.



Yaws- *T. pertunae*

- Primary lesion – extragenital papule – ulcerating granuloma.
- Secondary and tertiary manifestations follow.
- Destructive gummatous lesions of bones are common.



Pinta- *T. carateum*

- Extragenital papule – lichenoid or psoriaform patch (no ulceration).
- Secondary skin lesions – hyper/hypo pigmentation.



Important Questions

Short Answer Questions:

1. Standard tests for Syphilis.
2. Non venereal syphilis.
3. Pathogenesis of syphilis infection.

LONG ANSWER QUESTION:

1. Enumerate organisms causing STDs. Classify Spirochetes. Give lab diagnosis of Syphilis.