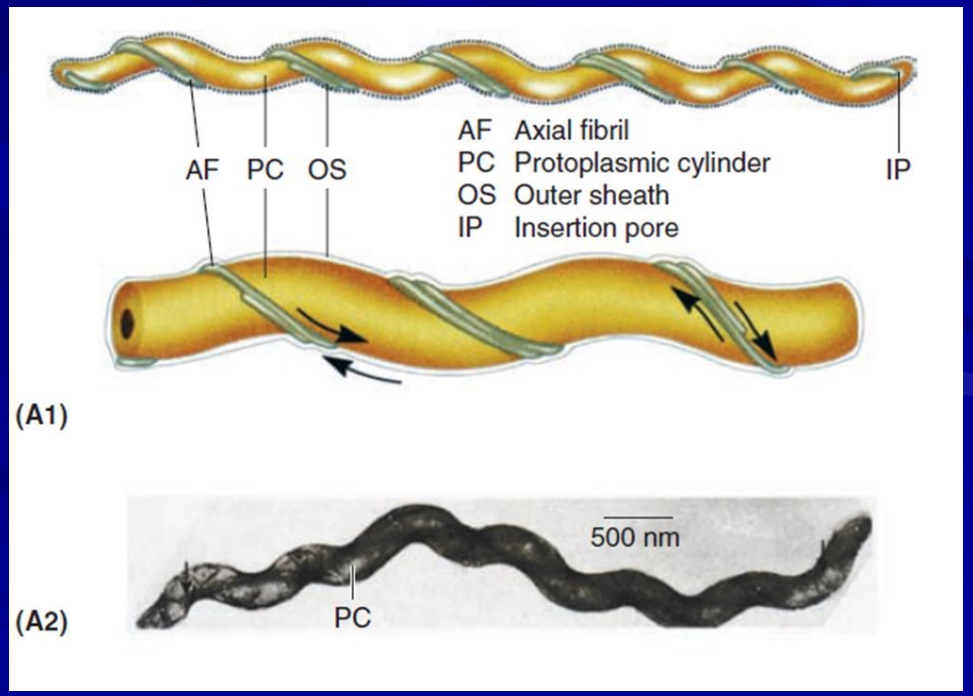
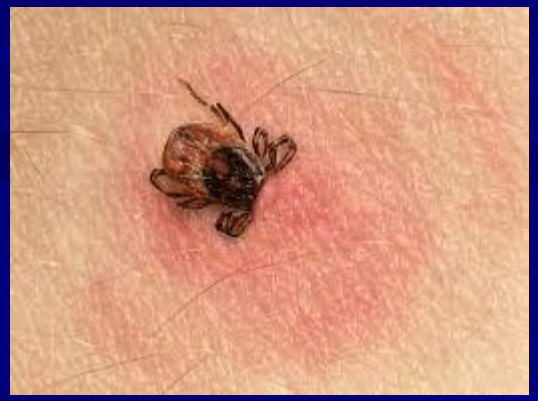
Genito-Urinary System

Syphilis

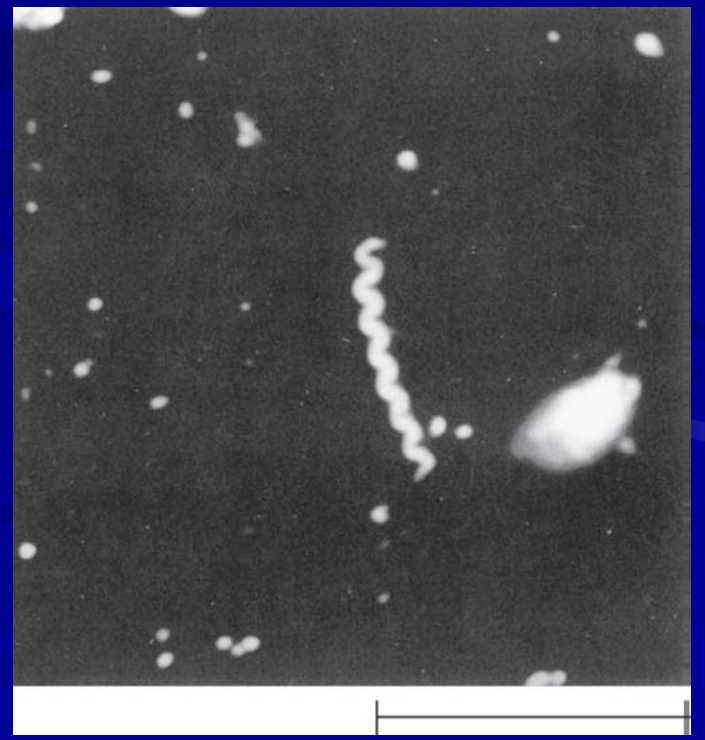
- Spirochetes are bacteria with a spiral morphology
  - Small, motile, gram –ve, slender, helically coiled, flexible
  - Intracellular flagella(endoflagella)



- Syphilis
  - Treponema pallidum subspecies pallidum
- yaws (chronic skin infection characterized by papillomas (noncancerous lumps) and ulcers
  - treponema pallidum pertenue
- Lyme disease(It is transmitted to humans through the bite of infected blacklegged ticks. Typical symptoms include fever, headache, fatigue, and a characteristic skin rash called erythema migrans. If left untreated, infection can spread to joints, the heart, and the nervous system
  - Borrelia bacterium

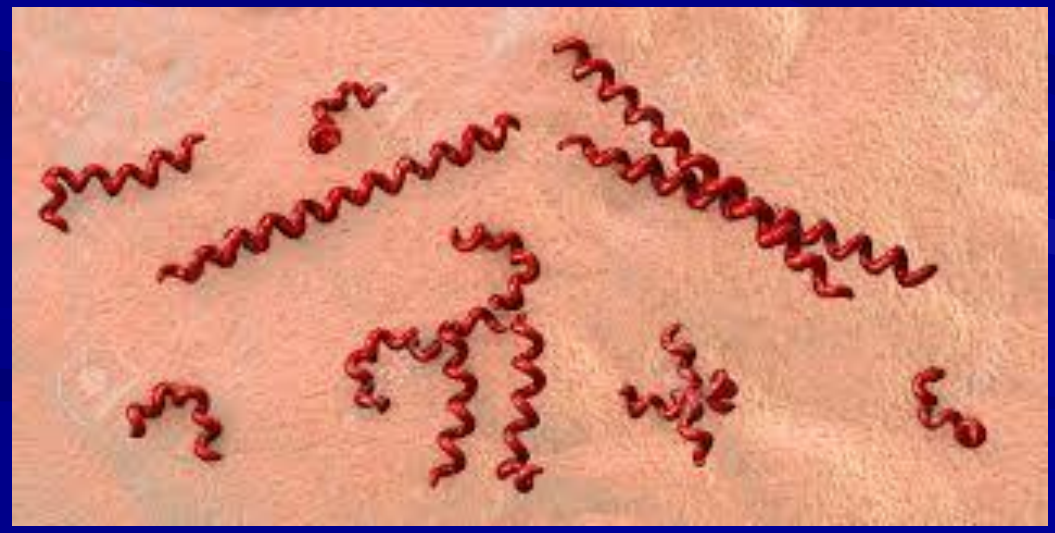


- Many spirochetes are difficult to see by routine microscopy.
  - Gram negative, many either take stains poorly or are too thin (0.15 µm or less) to fall within the resolving power of the light microscope.
- Only darkfield microscopy, immunofluorescence, or special staining techniques can demonstrate these spirochetes.



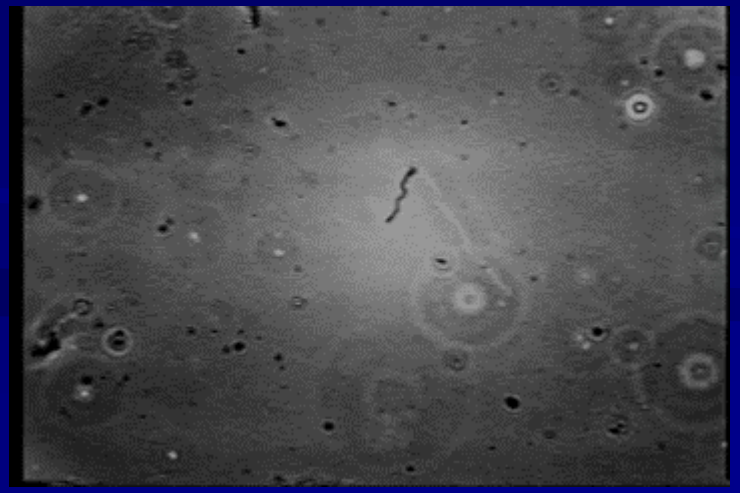
Treponema pallidum

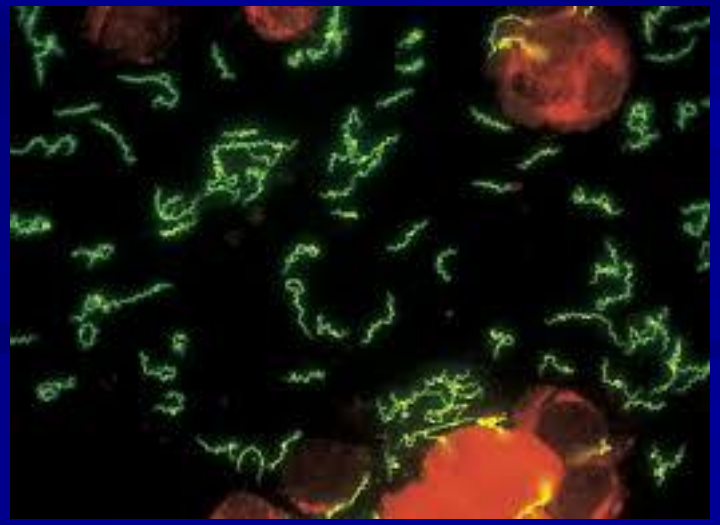
- *T. pallidum* is the causative agent of syphilis, a venereal disease first recognized in the 16th century.
- *T. pallidum* is a slim (0.15 μm) spirochete 5-15 μm long with regular spirals that resemble corkscrews .

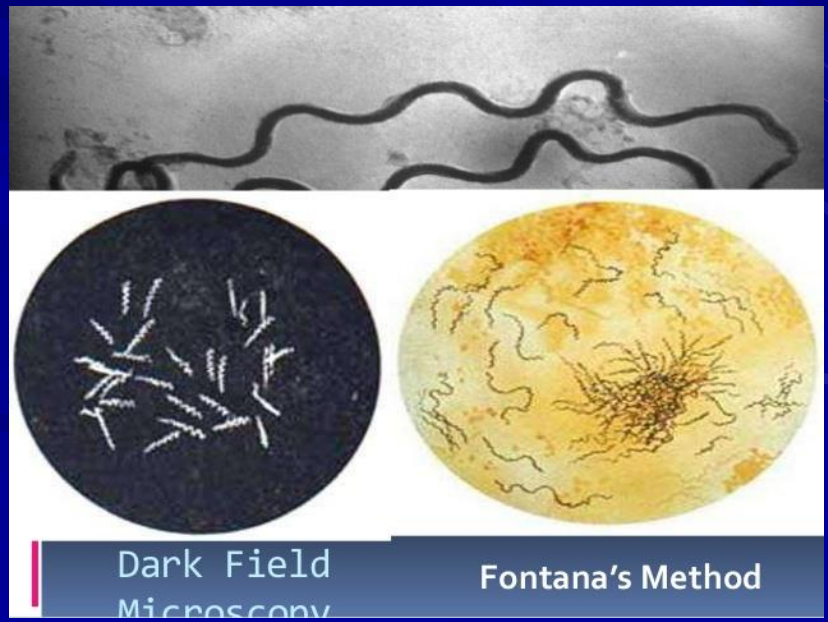


Treponema pallidum

- It is readily seen only by immunofluorescence, darkfield microscopy, or silver impregnation histologic techniques.
- Live *T. pallidum* cells show characteristic slow, rotating motility with sudden 90-degree angle flexion.







- inability to grow the organism in culture.
- It multiplies for only a few generations in cell cultures and is difficult to subculture.
  - cultured mammalian cells.
- Small genome
- Few structures or product
- The sluggish growth (mean generation time more than 30 hours)
- lacks lipopolysaccaride (LPS) and contains few proteins.

- extremely susceptible to any deviation from physiologic conditions.
- It dies rapidly on drying
- is readily killed by a wide range of detergents and disinfectants.
- The lethal effect of even modest elevations of temperature (41° to 42°C) was the basis of fever therapy early in the last century.

- Bacterial
- Spiral
- Darkfield microscopy
- Slow, rotating motility
- Not grow in culture
- Slow grow
- Few structure
- Small genome
- Few protein
- No lipopolysachraide
- Sensitive

EPIDEMIOLOGY

- Treponema pallidum is an exclusively human pathogen
- Infection is acquired from direct sexual contact with a person who has an active primary or secondary syphilitic lesion

Sex

Genital ulcer
(lesion at the point of entry)

weeks later

Secondary syphilis

Generalized
maculopapular rash

latency
years to decades

Tertiary syphilis

Focal lesions

Sex

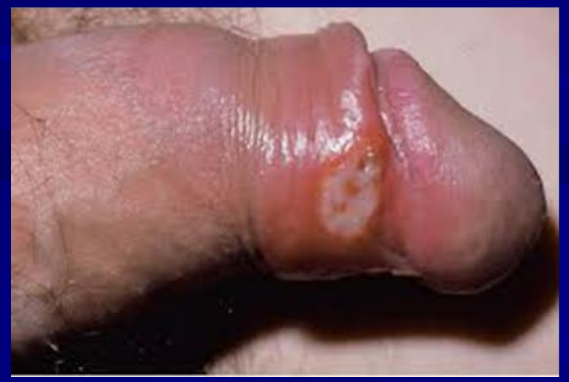
3 weeks (3 to 90d)

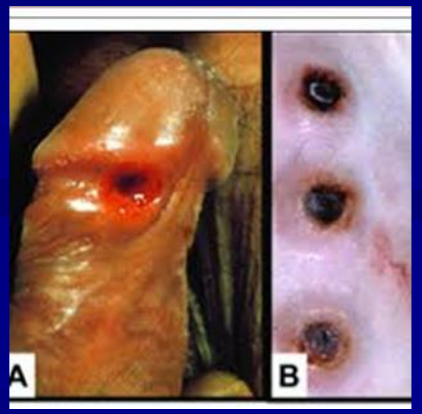
The primary syphilitic lesion

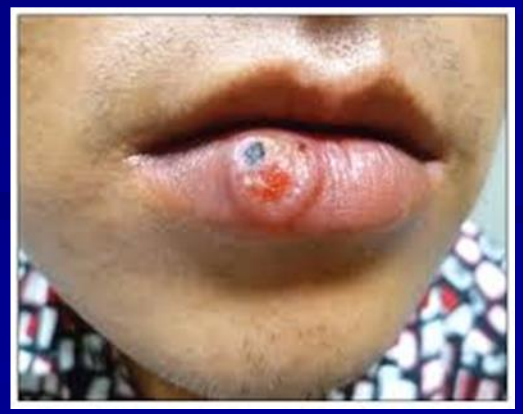
Genital ulcer
(lesion at the point of entry)

Papule…ulcer,,,,indurated and ulcerates but remains painless (chancre).

- heals spontaneously after 4 to 6 weeks.
- Firm, nonsuppurative, painless enlargement of the regional lymph nodes
  - 1 week of the primary lesion and may persist for months.







Primary Syphilis

Sex

Genital ulcer
(lesion at the point of entry)

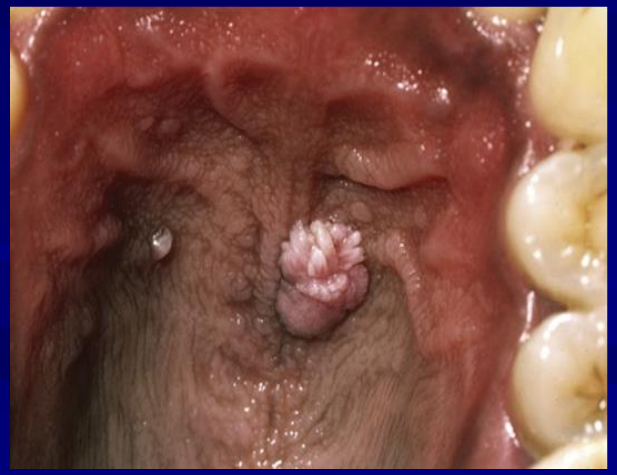
2 to 8 weeks after the chancre

Secondary syphilis

Generalized maculopapular rash

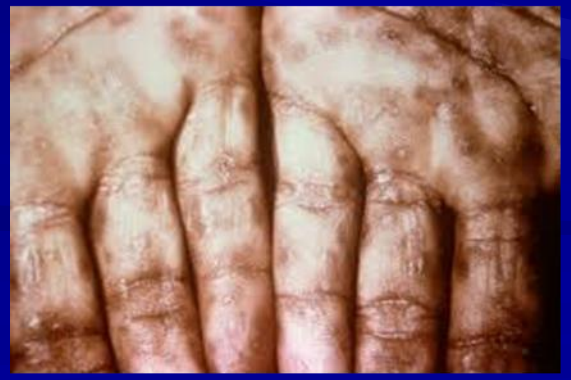
About 1/3 of patients condylomata lata,

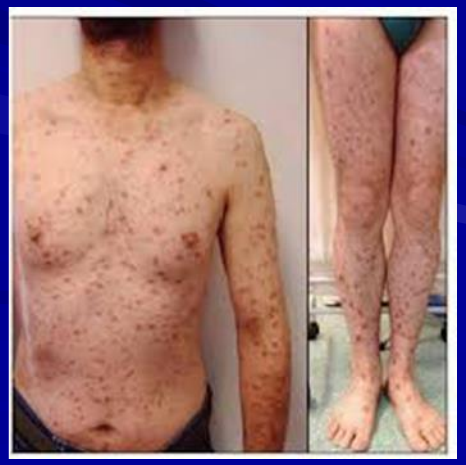
- painless mucosal warty erosions
- usually develop in warm, moist sites such as the genitals and perineum.



Source: Maxine A. Papadakis, Stephen J. McPhee, Michael W. Rabow: Current Medical Diagnosis and Treatment 2020
Copyright © McGraw-Hill Education. All rights reserved.

- Symmetric non itchy muco -cutaneous maculopapular rash
- generalized non-tender lymph node enlargement
- fever and malaise.
- Skin lesions are distributed on the trunk and extremities, often including the palms, soles, and face.





All the lesions are highly infectious

Sex

Genital ulcer
(lesion at the point of entry)

weeks later

secondary syphilis

Generalized
maculopapular rash

1/3: They resolve spontaneously after a few days to many weeks,
2/3: The illness enters the latent state

Latent Syphilis

No clinical manifestations
+ serologic tests

Early
1-4y

Relapses of secondary syphilis

Late
>4y

relapses cease

Transmission

- From the relapse
- Blood transfusion
- Mother to baby

Tertiary Syphilis

- one third of patients with untreated syphilis develop tertiary syphilis.
- The manifestations may appear as early as 5 years after infection but characteristically occur after 15 to 20 years.

Tertiary Syphilis

spirochetal lipoproteins → inflammatory response → immune complexes

delayed-type hypersensitivity

↓

granulomatous

arteriolar walls

↓

Gumma

manifestations depend on the body sites

Nervous and Cardiovascular systems.

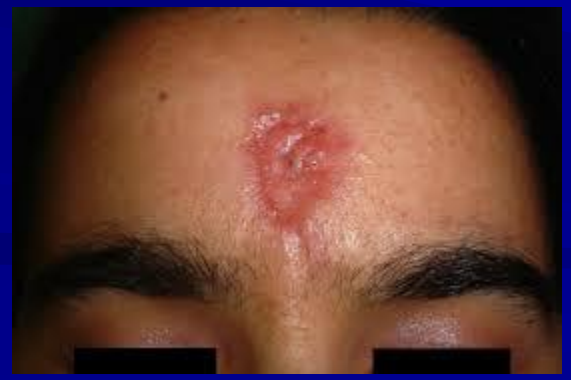
Tertiary Syphilis

- **Neurosyphilis**
  - Neurosyphilis is due to the damage produced by a mixture of meningovasculitis and degenerative parenchymal changes in virtually any part of the nervous system.

- Cortical degeneration of the brain
  - mental changes ranging from decreased memory to hallucinations or frank psychosis.
- In the spinal cord demyelination of the posterior columns, dorsal roots, and dorsal root ganglia produces a syndrome called tabes dorsalis
  - which includes ataxia, wide-based gait, foot slap, and loss of the sensation.

- **Cardiovascular syphilis**
  - arteritis involving the vasa vasorum of the aorta
  - dilatation of the aorta and aortic valve ring leading to aneurysms of the ascending and transverse segments of the aorta and/or aortic valve incompetence.

- A localized, granulomatous reaction to *T. pallidum* infection called a **gumma** may be found in skin, bones, joints, or other organ.
- Any clinical manifestations are related to the local destruction as with other mass-producing lesions, such as tumors.

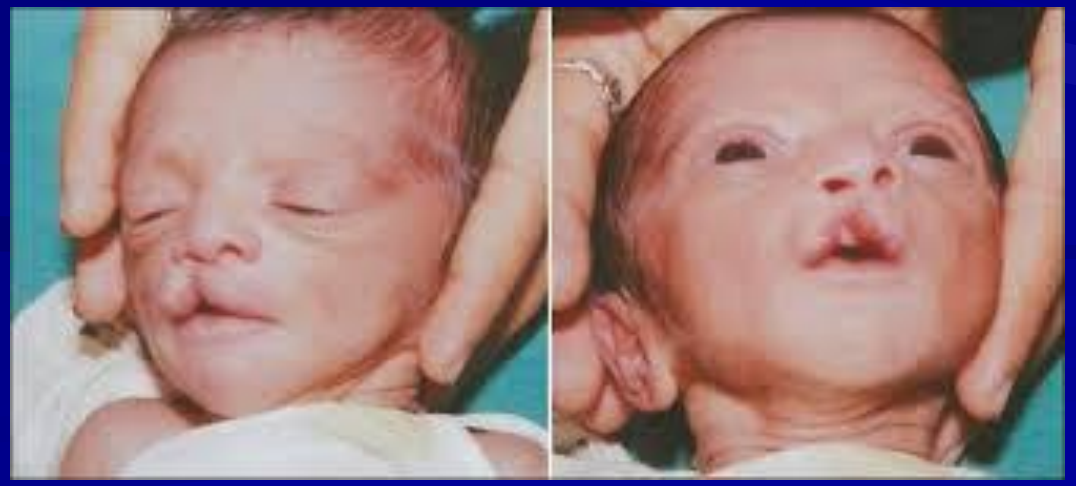


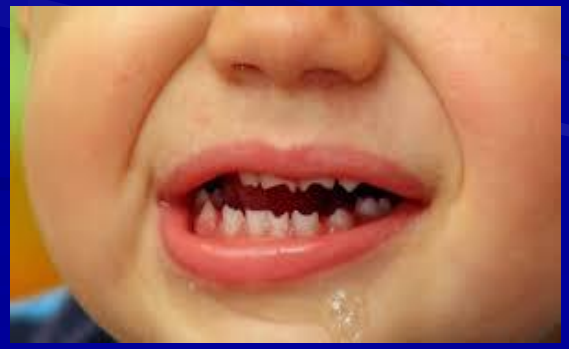
Congenital Syphilis

- Untreated maternal infection may result in fetal loss or congenital syphilis.

Congenital Syphilis

- Untreated maternal infection may result in fetal loss or congenital syphilis.
- Bone involvement produces characteristic changes in the architecture of the entire skeletal system (saddle nose, saber shins, Hutchinson teeth, hearing loos). Anemia, thrombocytopenia, and liver failure are terminal events.





- Less commonly,
  - Non-genital contact with a lesion (e.g., of the lip),
  - sharing of needles by intravenous drug users,
- Late disease is not infectious.

DIAGNOSIS

Microscopy

- *T. pallidum* in primary and secondary lesions can be seen by darkfield microscopy.
  - It requires experience and fluid from deep.
  - A negative test does not exclude syphilis.
- Darkfield microscopy of oral and anal lesions is not recommended
  - because of the risk of misinterpretation of other spirochetes present in the normal flora.

Serologic Tests

- Most cases of syphilis are diagnosed serologically using serologic tests that detect antibodies directed at either lipid or specific treponemal antigens.
- The former are called non-treponemal tests, and the latter are referred to as treponemal tests.
- Their use in screening, diagnosis, and therapeutic evaluation of syphilis has been refined over many decades.

Non-Treponemal Tests (non-specific test)	Confirmatory Treponemal Tests
Venereal Disease Research Laboratory test (VDRL)	Treponemal pallidum particle agglutination test (TP-PA)
	Fluorescent treponemal antibody absorbed test (FTA-ABS)
Rapid plasma reagin test (RPR)	T. pallidum enzyme immunoassay antibody test (TP-EIA)
	Chemiluminescence immunoassay (CIA)

Note: The non-treponemal tests (titers) detect antibodies that are not specific for *Treponema pallidum*.

Note: As a group, these tests are based upon the detection of antibodies directed against specific treponemal antigens. Treponemal tests are qualitative only and are reported as "reactive" or 'non-reactive".

The use of only one type of serologic test is insufficient for diagnosis.

Non-treponemal tests	Treponemal tests
• Antibody directed against cardiolipin (lipid complex) (reagin)	• antibody specific to T. pallidum
• Nonspecific*	• Specific
• Sensitivity and low cost :preferred for screening ○ if positive, they must be confirmed by one of the more specific treponemal tests	• not useful for screening ○ Positive result confirms RPR and VDRL
• following treatment	• They are not useful for following therapy (once positive, they usually remain so for life)
▪ With successful antibiotic therapy nontreponemal serologies slowly revert to negative.	• The treponemal IgM tests are useful in establishing the presence of an acute infection in infants (congenital syphilis

- *in a variety of auto-immune diseases or in diseases involving substantial tissue or liver destruction, such as lupus erythematosus, viral hepatitis, infectious mononucleosis, and malaria.
- False-positive results can also occur occasionally in pregnancy and in patients with HIV infection

TREATMENT AND PREVENTION

- *T. pallidum* remains exquisitely sensitive to penicillin, which is the preferred treatment in all stages.
- In primary, secondary, or latent syphilis persons hypersensitive to penicillin may be treated with tetracyclines, erythromycin, or cephalosporins.

TREATMENT AND PREVENTION

- In penicillin-hypersensitive patients with neurosyphilis or congenital syphilis be desensitized rather than use an alternate antimicrobial.
- Safe sex practices are as effective for syphilis prevention.
- No vaccine is available so far.