

Sexually Transmitted Diseases

3rd Medical Students

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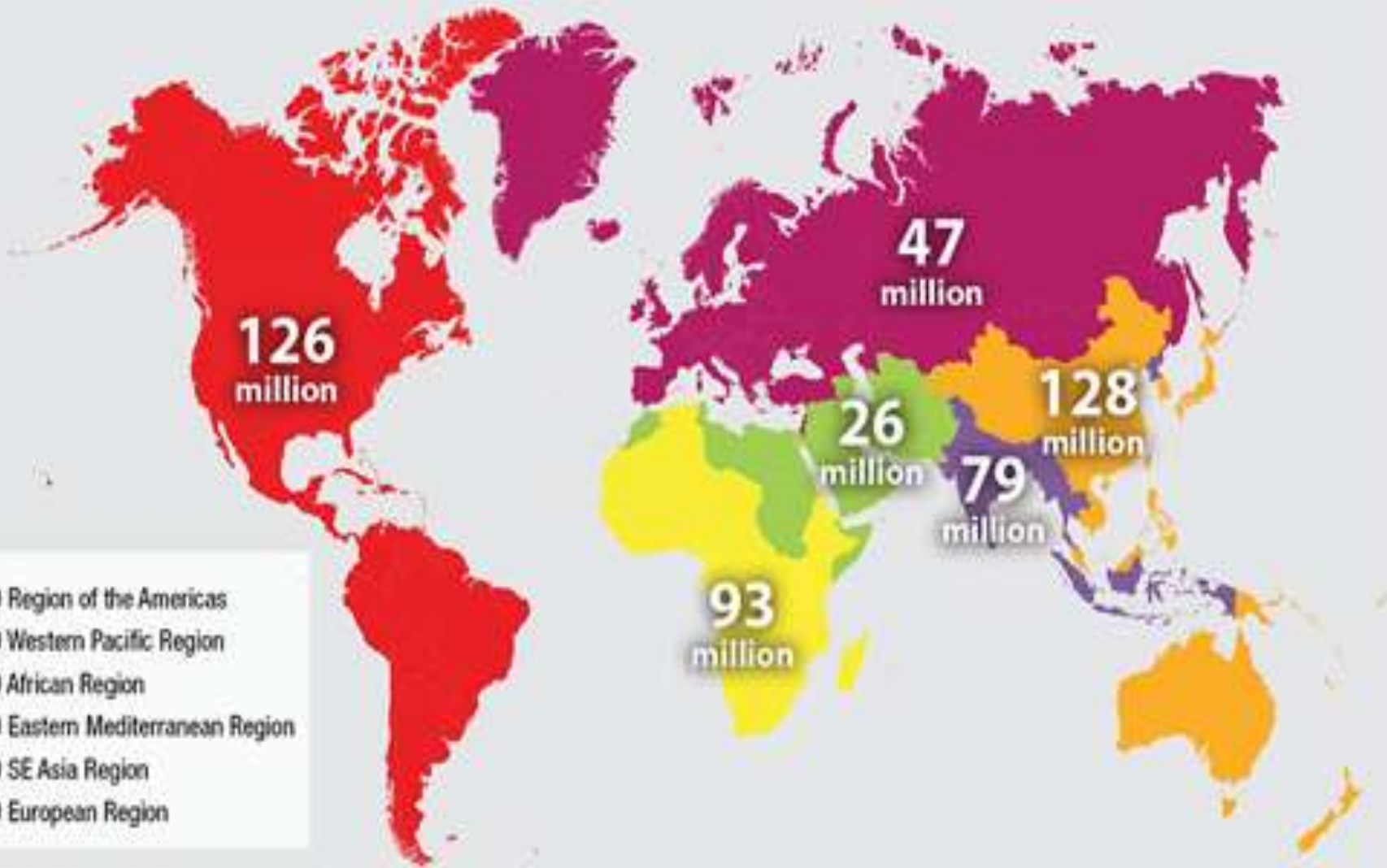
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Introduction

- More than 1 million people acquire a **sexually transmitted infection (STI)** every day.
- Each year, an estimated 500 million people become ill with one of 4 STIs: **Chlamydia, gonorrhoea, syphilis and trichomoniasis**.
- More than 530 million people have the virus that causes genital herpes (**HSV2**).
- More than 290 million women have a human papillomavirus (**HPV**) infection.
- The majority of **STIs** are present without symptoms.

- **STIs** can have serious complications beyond the immediate impact of the infection itself, through mother-to-child transmission of infections and chronic diseases.
- **Drug resistance**, especially for gonorrhoea, is a major threat to reducing the rate STIs worldwide.
- **STIs** are caused by more than **30 different bacteria, viruses and parasites** and are spread predominantly by sexual contact, including vaginal, anal and oral sex.
- Many STIs—including **chlamydia, gonorrhoea, hepatitis B, HIV, HPV, HSV2 and syphilis**—can also be transmitted from mother to child during pregnancy and childbirth

World Map STDs



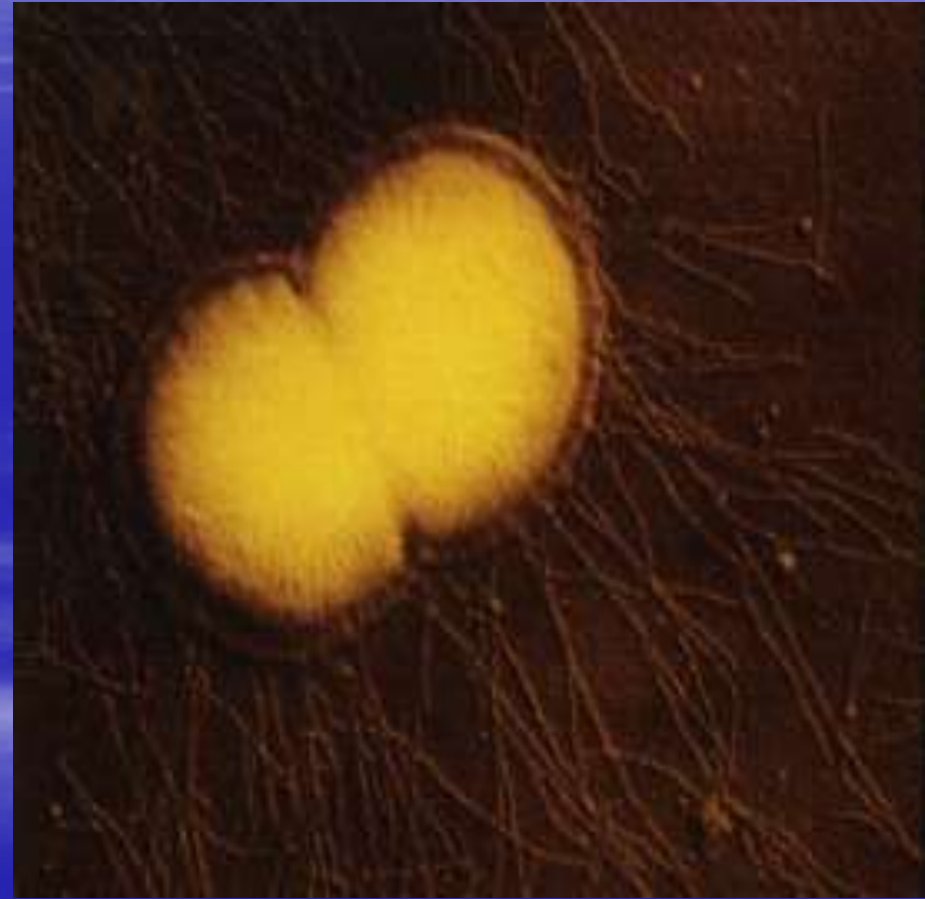
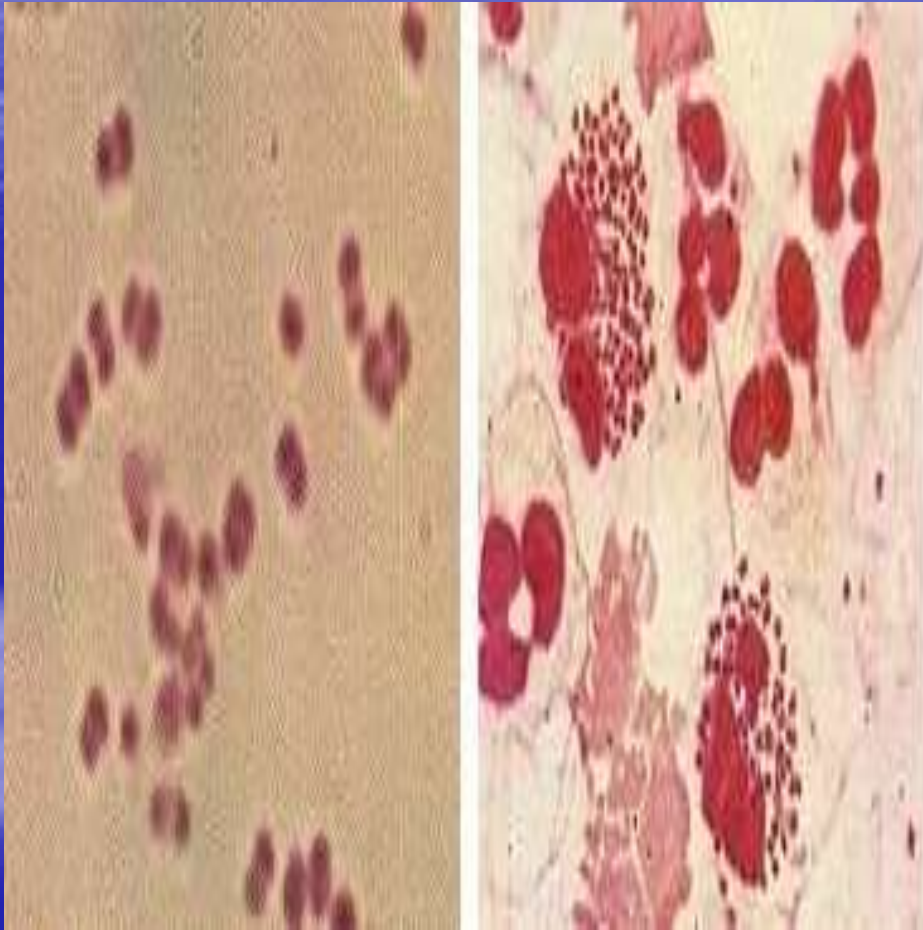
Common Bacterial & Fungal Agents of STDs

- *Neisseria gonorrhea*: Gonorrhea
- *Chlamydia trachomatis*, *Mycoplasma genitalium* / *Ureaplasma urealyticum*.. causing nonspecific urethritis, vaginitis, salpingitis, pelvic inflammatory disease by one or more organisms.
- *Treponema pallidum* : Syphilis
- *Haemophilus ducryi*: Chancroid
- *Gardenella vaginatis* : Vaginoses, Mixed bacteria infection
- *Candida spp.*: Vaginitis

Gonorrhea

- ***N. gonorrhoeae*** .. Gram-negative diplococci , killed rapidly outside human host. Presence pili & surface cell outmembrane proteins support cells attachment, infect & cause local inflammation of mucosa genital tract, throat, rectum both men and women.. **Acute & chronic stages.**
- **In women:** vagina & cervix are the first infected.. infection can spread into the uterus & fallopian tubes, resulting in **Pelvic Inflammatory Disease** (PID)/ endometritis and salpingitis ..
- **Common complication:** Ectopic pregnancy & infertility in about 10% of chronic infected women.
- New born eye-infection is common in asymptomatic infected mother.. **Ophthalmia neonatorum** ..causes cornea damage & blindness without treatment.

Neisseria Gram-ve diplococci



SYMPTOMS

- **Infection in women:** Mostly first mild without symptoms (80%).. bleeding can be associated with vaginal intercourse.. Later chronic infection.. painful burning sensations during urinating, occasionally yellow or bloody purulent vaginal discharge.
- **Infection in men:** Develop mostly as **acute urethritis** with symptoms more often than women including: fever, burning sensations, abdominal pain. Urethral discharge/ white/ yellow pus with mild to severe pain.. anal infection & itching. **Incub. period 2-10 days.**
- **Disseminated *N.gonorrhea*** may cause epididymitis, proctitis / orchitis & infertility.. **Complications:** Rarely blood sepsis, meningitis, endocarditis, dermatitis-arthritis syndrome.

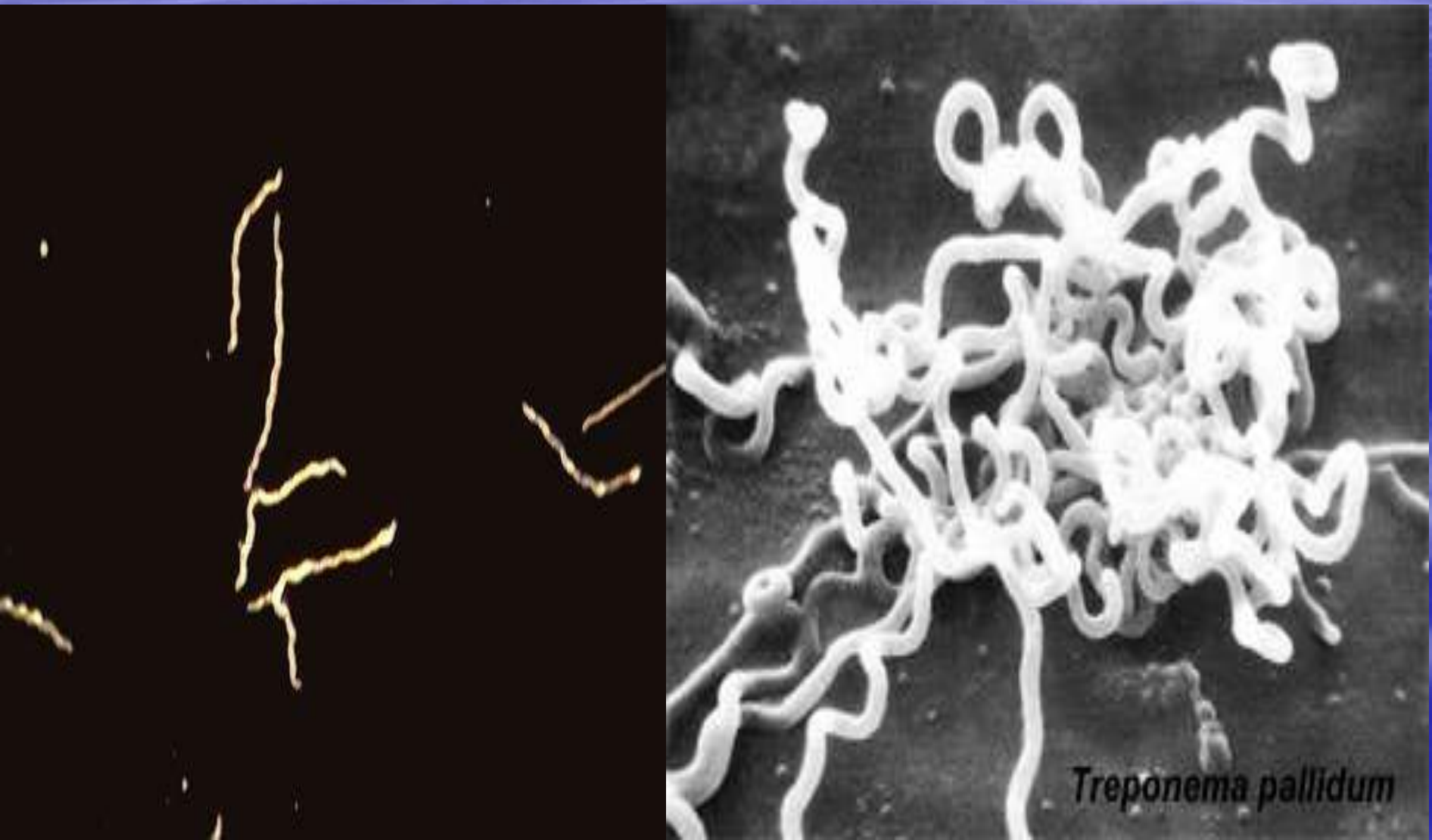
DIAGNOSIS & TREATMENT

- Direct Gram-Stain **smear from urethral/vaginal discharge** , presence intracellular Gram-negative diplococci resembling *Neisseria* in polymorphonuclear leukocytes .
- Rapid culture of specimens-discharge-cervical swabs, rectal swab /throat.. Blood/ Chocolate agar (**Thayer-Martin blood agar includes certain antibiotics**), 24-48 hrs, microaerophilic incubation, biochemical sugar test & +ve oxidase & catalase.
- **Antimicrobial drugs**.. mostly R-penicillin, Relatively Effective drugs Cefixime, Ceftriaxone, Ciprofloxacin, Doxycycline ..susceptibility test should be done.
- No immunity after infection .. No vaccine is available

Syphilis

- ***T. pallidum*** has a characteristic helical/Spiral shape.. 4-15 um.. Related to Gram-negative bacteria..can't demonstrated by Gram-stain.
- Treponema cell wall contains **peptidoglycan layer rich in Lipids & Endoflagella** within outer membrane.. Responsible for motility.
- Treponema cells are very sensitive to drying, heat and disinfectant.. survive few minutes outside the human body.. **Infect only human host.**
- **Pathogenicity:** Hyaluronidase, high lipids enhance invasiveness , contributes to granulomatous lesions & autoimmune reaction during progressive infection.
- Can't be cultured in vitro, but it can be isolated in Rabbit testicles for research.

Morphology of Treponema



General Feature

- **Transmission:** Sexual contact, blood, body fluids of infected person.
- Bacteria pass infected **skin or mucous membranes** usually of genital area, lips, mouth, anus.
- Treponema active cells penetrate and reside in epithelial cells.. multiply slowly..**2-6 Weeks**
- **Syphilis** has so many clinical symptoms
- Presence HIV infection at the same time can change the symptoms and course of syphilis.
- **Syphilis** other than congenital syphilis, occurs in **3-4 stages** that sometimes overlap over many years.

Primary Syphilis-1

- Primary syphilis is often a small, round firm , painless **ulcer /chancre/ lesion..** Highly infectious
- Most lesions appears on **Extra Skin Genitalia / Vagina**, but ulcers can also develop on the cervix, tongue, lips, or other parts of the body..can be easily overlooked without symptoms.. **No fever.**
- There is often only **one ulcer**.. nearby swollen lymph nodes .. The ulcer usually appears about 3 weeks after infection, but it can occur any time within **3 months** after exposure to infection & disappears after 4 weeks .

Secondary syphilis-2

- If primary syphilis is not treated.. mostly progress to the **Secondary stage**.
- Most persons with secondary syphilis have red maculopapular skin rash.. including often palms of hands and soles of feet.. Associated with moist lesions.. **Candylomas** which occur in the anal or genital areas as a flat soft lesions.
- **Other common symptoms include:**
Sore throat, fatigue, headache, swollen lymph glands. Less frequent symptoms include fever, hepatitis, meningitis, glomerulonephritis, weight loss, hair loss, lesions (cold sores) in the **mouth or genital area**.
- Most lesions of secondary syphilis contain many **Active Treponema**.. Patients is highly infectious.

Diffuse skin rash associated with Syphilis



Congenital Syphilis

- **Pregnant** woman with **secondary syphilis** may infect fetus vertically in utero during first trimester & at birth.. Infection may cause miscarriage, premature babies & stillbirth.
- Few percentage of infants with **Congenital syphilis** have symptoms at birth.. but the majority develop symptoms later.. After 2 years.
- Untreated babies may have **facial & tooth deformities**.. delays in growth or seizures along with many other problems such as rash, fever, swollen liver and spleen, jaundice, anemia, including damage to their bones, teeth, eyes, ears, brain.

Latent/Tertiary Syphilis-3

- As with primary syphilis.. secondary syphilis will disappear even without treatment.. infection will progress to the **next hidden stages**.
- **latent syphilis**: Positive blood syphilis test.. often without clinical signs or symptoms.. Rare transmission of Infection.. Without treatment will progress slowly over many years to **Tertiary syphilis**
- During this stage **antibodies, cell-mediated immunity, hypersensitivity** developed to Treponema antigens.. play a role in immunity.. But not sufficient to stop the development of disease complication in each case.
- Few % infected people develop **Tertiary Syphilis**

Tertiary syphilis-4

- **Tertiary Syphilis** is autoimmune reaction to **Treponema antigens**.. Which damages heart, eyes, brain, nervous system, bones, joints.. almost any other part of body by developing **Gummas**.
- **Gummatos syphilis**.. progressive destructive granulomatous lesions over many years.. Mostly skin, bones, Liver, mucocutaneous tissues.. Lesions are free of *Treponema*.. Noninfectious.. High mortality.
- **Neurosyphilis** .. meningovascular syphilis.. associated with degenerative CNS.. brain or spinal cord damage.. is one of the most severe signs of this stage..Paralysis and Death
Cardiovascular syphilis.. affects heart muscles.. causing fatal aortic aneurysm.

Non-sexually transmitted Treponema

- **Pinta-Yaws**.. both are contagious, non-venereal infection caused by *T. pertenue*, *T. carateum*
- Human infection occurs mainly in children less than 15 years.. Following direct skin to skin contact with infected person.. causing depigmentation skin lesions in legs, finger, face, chest, abdomen..
- The disease occurs primarily in warm, humid, tropical subtropical areas of Africa, Asia, South America.
- **Bejel** is non-venereal syphilis-like disease.. called endemic Syphilis caused by *T. endemicum*.
- Transmission.. Direct contact.. First soft oral & skin lesion in face, later may affect Nasopharynx and bones.. **Diagnosis & Treatment similar to Syphilis.**

Lab Diagnosis-1

- It is very difficult to diagnose syphilis based on clinical symptoms without the presence of the **first genital ulceration or skin rash**.
- Symptoms and signs of the disease might be absent.. or be confused with those of other diseases.
- **Direct Dark Field Microscopy** can detect *Treponema* spiral forms and motility from fresh collected exudates-lesions
- ***T. pallidum*** can't be observed in Gram-stain.. Silver-stain can be used in biopsy.. No Culture in vitro

Lab Diagnosis-2

- **Serology Screening Tests**.. Non-Specific tests:
 - 1-VDRL – Venereal Disease Research Laboratory.
 - 2-RPR – Rapid Plasma Reagin .. Both used antigens include Cardiolipin + cholesterol+ Lecithin
- Both detect **anti-lipid IgG & IgM** in host Serum after infection 2-4 weeks .. After disappear the skin lesions (Primary / Secondary Syphilis).
- Both tests become negative after antibiotic treatment and in **Tertiary Syphilis**.
- The test may give positive results with other diseases.. Collagen vascular disease, Acute febrile disease, Recent bacterial vaccination.

Specific Confirmatory Tests

- **Fluorescent Treponemal Antibody Absorption- FTA-ABS test..** (Killed Treponema cells +Patients serum+ Labeled antihuman gamma globulin) .. Detects presence of IgG & IgM in **Serum & CSF**.. High specific and sensitive for all stages.
- ***T.pallidum* Microhemagglutination Assay** detects syphilis antigens.. specific and sensitive..confirm most stages of infection
- All tests can't distinguish Syphilis from other non-sexually transmitted Treponema infections.. Yaws & Pinta, Bejel .

Treatment & Prevention-1

- Syphilis is easy to cure in its early stages.. Intravenous **Penicillin** is the best treatment for syphilis.
- **Doxycycline** can be given.. For Penicillin allergic persons.
- Always both partners should be treated
- Late syphilis.. **Cann't be reversed**.. Untreated syphilis in women can cause miscarriages.. premature births, stillbirths, or death.. No Vaccine is available

Chlamydia trachomatis-1

- ***C. trachomatis*** is one of the most widespread bacterial of STDs .. About **50 Million** of new cases each year worldwide.. Human natural host, **Genital serotypes**.. Intracellular Growth.. Elementary bodies.. Infectious stage, Reticulate bodies replicate in infected mucosal tissue as inclusion bodies.
- Chlamydial infection followed vaginal/anal sexual contact with an infected partner.. Sexual Infection is more **asymptomatic in women than men** (80%).. Incub. 1-3 weeks.
- **In men**, most early symptoms are mild, few pus cells- dysuria, nonspecific urethritis.. Non-treated infection may progress slowly over years to cause epididymitis, proctitis, proctitis & Infertility.

Chlamydia Elementary- and Reticulate bodies



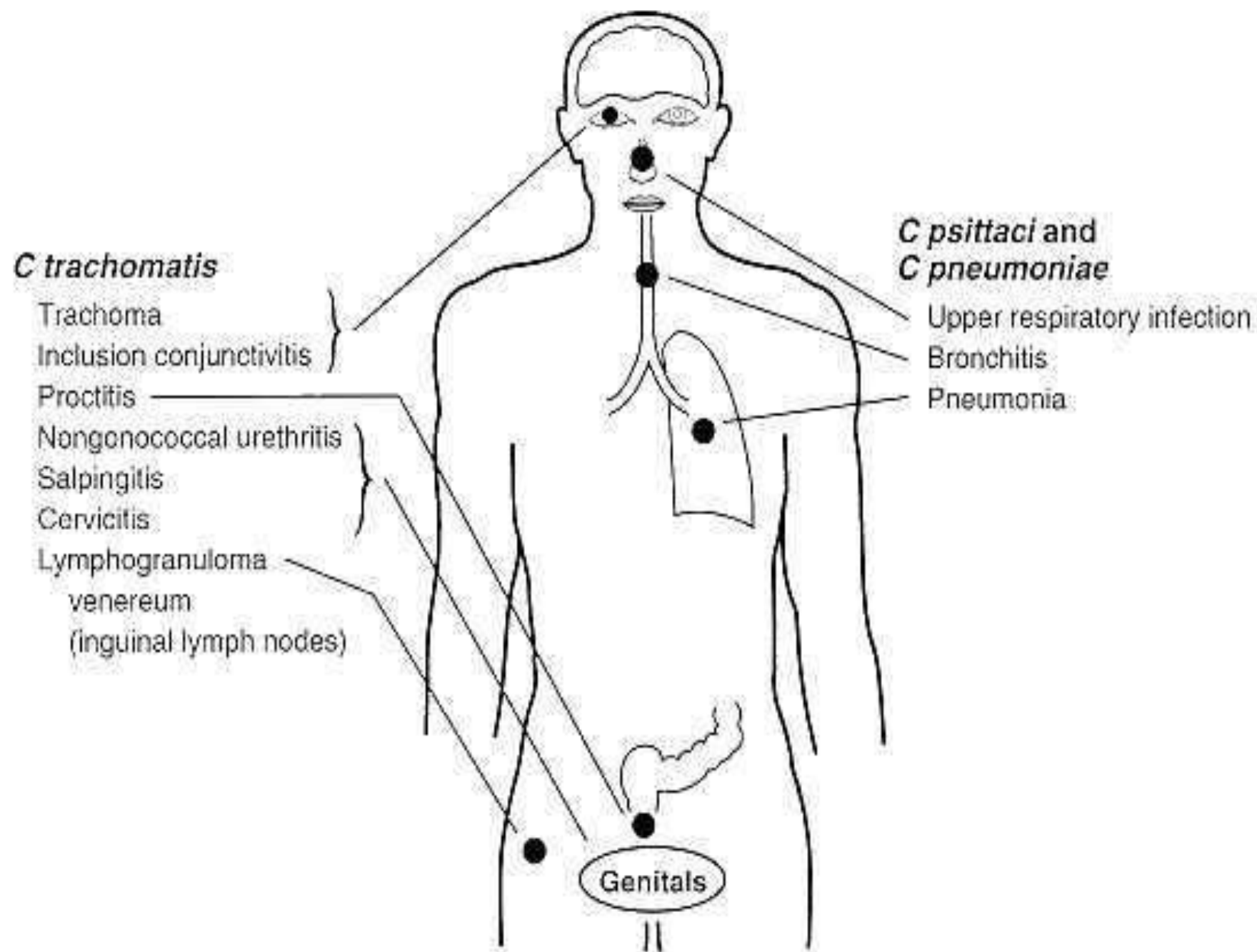
C trachomatis

Trachoma
Inclusion conjunctivitis
Proctitis
Nongonococcal urethritis
Salpingitis
Cervicitis
Lymphogranuloma
venereum
(inguinal lymph nodes)

***C psittaci* and
*C pneumoniae***

Upper respiratory infection
Bronchitis
Pneumonia

Genitals



Chlamydia symptoms-2

- **In women** infection causes cervicitis, urethritis, Proctitis, endometritis, salpingitis.. pelvic inflammatory disease (PID).. Pelvic adhesion & Infertility.
- Newborn baby may be infected during delivery .. develop **eye infection**.. inclusion conjunctivitis..
Ophthalmia neonatorum.
- Symptoms of conjunctivitis, which include discharge and swollen eyelids, usually develop within the first 10 days of life.
- **Complication:** Trachoma, Blindness.. Rarely cause Neonatal atypical pneumonia.
- **Adult infection inclusion conjunctivitis** due to spread from genitalia to eye by contaminated fingers.

Chlamydia diagnosis-3

- Detection Chlamydia Plasmid/DNA in urine/cervical swabs/ urethral swabs by PCR test.
- Elementary bodies of Chlamydia can be identified by direct smear prepared from discharge.. stain with monoclonal antibodies, detected by florescence microscopy by **Direct immunofluorescent test** .
- Chlamydia antigen test is a rapid test detect the Chlamydia antigen from female cervical swab, male urethral. **MaCoy cell tissue culture** used for isolation & antibiotic susceptibility
- **Serological test** is not significant for detection genital infection.

Chlamydia -4

- Chlamydia is easily confused with gonorrhea in women because the symptoms of both diseases are similar and both diseases may occur together.
- **Lymphogranuloma venerum..** *C. trachomatis..* serotypes L1-L3.. Common in tropical countries.. Infection starts as genital ulcer with Lymphadenopathy.. spread to genitourinary and gastrointestinal tract.. causing inflammation & strictures in genital tract.
- **Treatment:** Doxycycline.. Erythromycin
- No vaccine

Other genital Infections

- ***Mycoplasma genitalium*/ *M. hominis*, *Ureaplasma urealyticum***: These can be present without any symptoms in about 20% genital tract males/females.. Single or more organisms may cause up to 25% cases of **non-specific urethritis** ..mostly *M. genitalium* in men.. Mild discharge few pus cells, burning and pain during urinating.
- **In women**, cases of mucopurulent cervicitis & PID can be associated with *M. hominis*/ *M. genitalium*
- **Vaginitis** inflammation vagina result in discharge, itching, burning, pain due to change in the normal balance of vaginal bacteria .. reduced lactobacilli or estrogen levels after menopause.. Also associated with *Candida* spp. or mixed infection.

Vaginitis-2

- **Bacterial vaginosis** (BV).. Mixed bacteria is the most common cause of vaginitis.
- ***Gardnerella vaginalis***: Part of vaginal flora.. may cause in association with anaerobic or other bacteria vaginosis.
- **Diagnosis**: Direct Gram-stain..presence of numerous "clue cells" (cells from the vaginal lining.. coated with numerous gram-variable bacteria, pus cells & fishy odor.. Culture urine / cervical swabs
- **Vaginitis treatment of Mycoplasma** : Doxycycline.. Erythromycin
- **Vaginosis treatment**: metronidazole or clindamycin

YEAST INFECTION

- Vaginal yeast infection, or **vulvovaginal candidiasis**, is a common cause of vaginal irritation..discharge
- This common fungal infection occurs when there is an increase in presence of one or more *Candida albicans* or others *C. glabrata*, *C. tropicalis*, *C. krusei*
- Although this infection is not considered an **STI**, 10 to 15 percent of men/women develop symptoms after sexual contact with an infected partner.
- ***Candida spp.*** are always present in the vagina in small numbers.. Several factors are associated with increased yeast infection in women, including:

Candida albicans Pseudohyphae



Yeast infection-2

- Pregnancy, using oral contraceptives , using steroid drugs/ antibiotics, having uncontrolled diabetes mellitus.
- Wearing tight, poorly ventilated clothing and synthetic underwear may contribute to vaginitis.
- The most frequent symptoms of yeast infection in women are itching, burning, and irritation of the vagina. Painful urination are common.
- Vaginal discharge is not always present and may be a small amount. **The thick, whitish-gray discharge** is typically ..it can vary from watery to thick discharge.
- Repeat occurrence vaginal candidiasis is very common.

Yeast infection- 4 Diagnosis & Treatment

- Microscopic examination of discharge/urine
Presence of numerous yeast cells.. **Pseudohyphae.**
- Culture on Sabouraud Dextrose Agar, ChromCandida Agar, Serum Germ Tube test.
- Various antifungal vaginal drugs are available to treat yeast infections.
- Antifungal creams can be applied directly to the area.. oral or vaginal cream of fluoconazole, miconazole, clotrimazole.