

# Sexually Transmitted Diseases

## 3<sup>rd</sup> Medical Students

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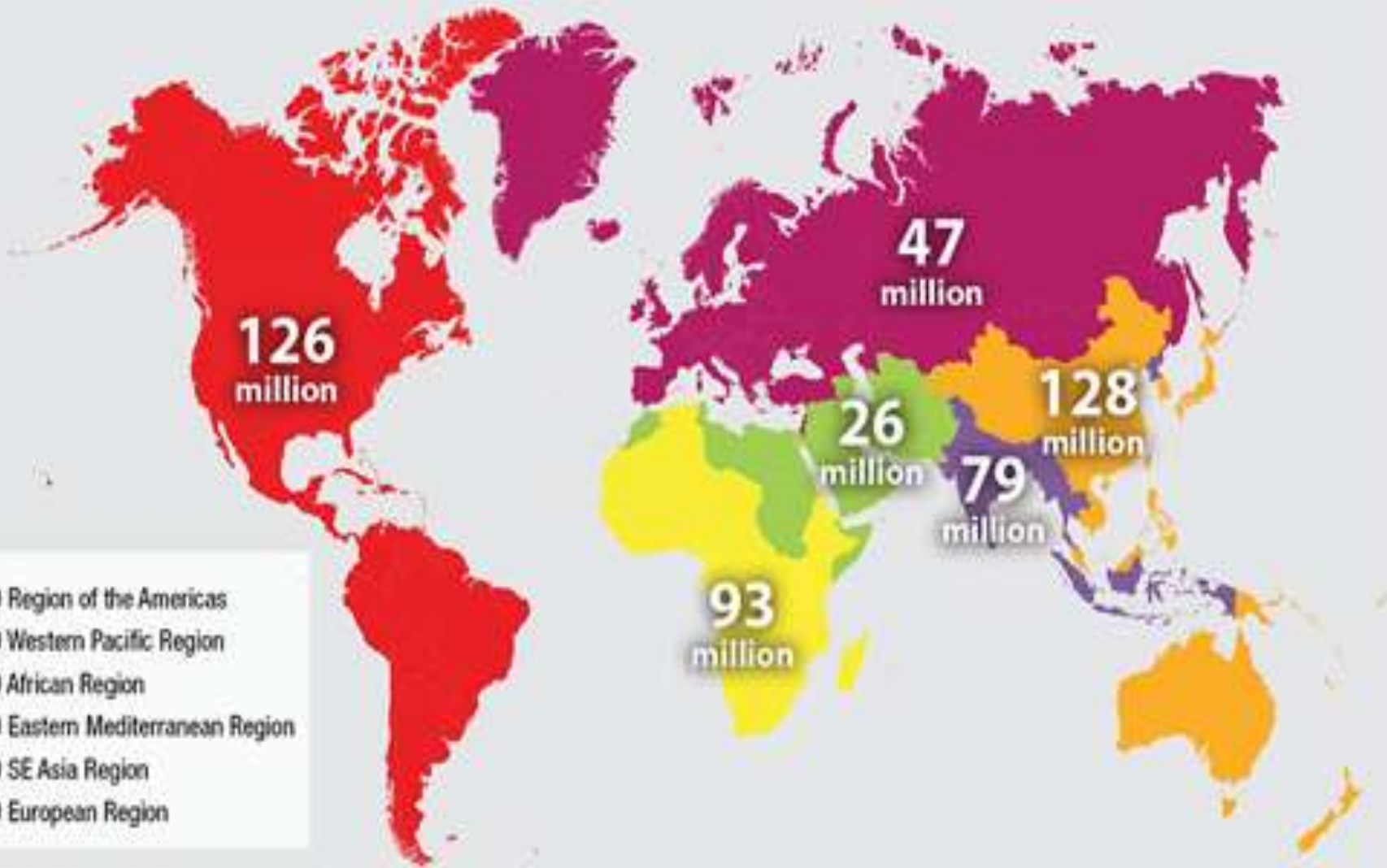
# Introduction

- 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

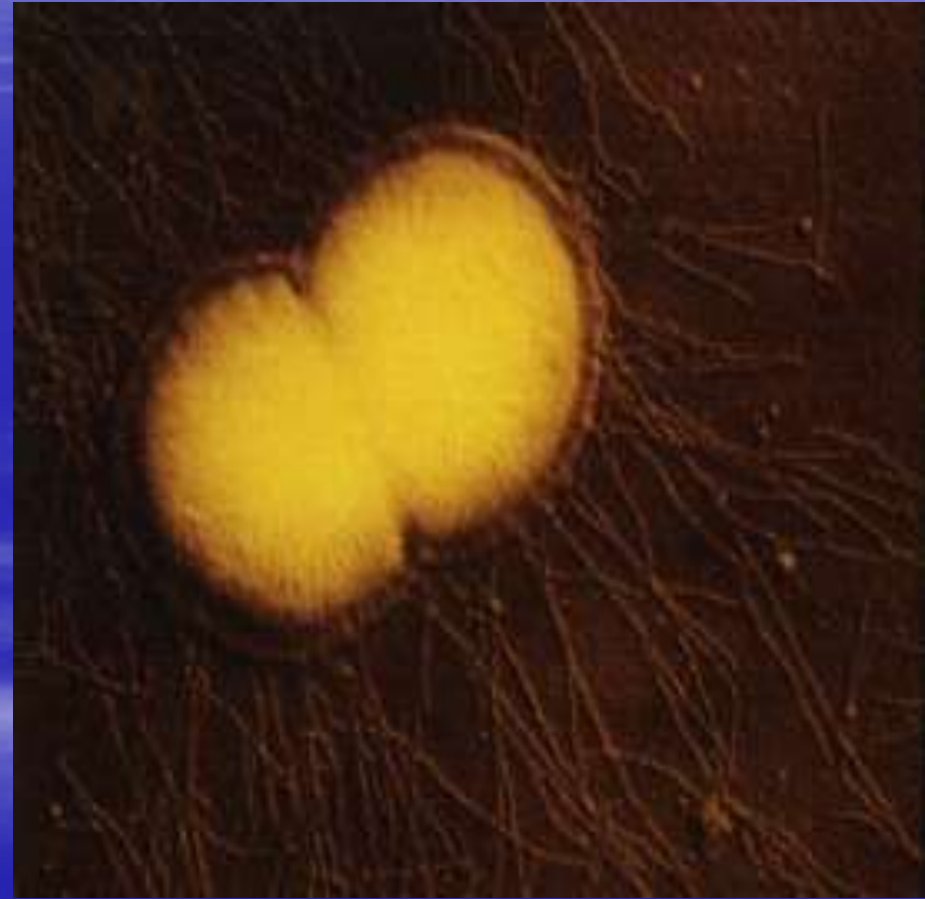
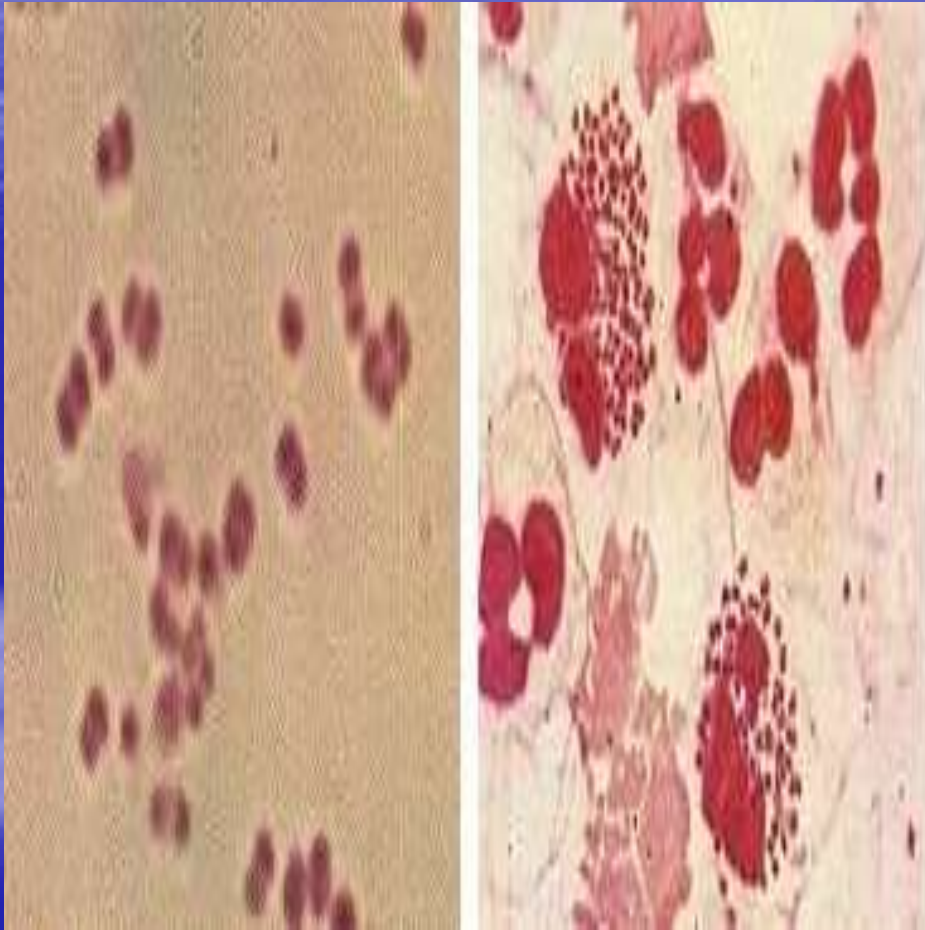
- *Neisseria gonorrhea*: Gonorrhea
- *Chlamydia trachomatis*, *Mycoplasma genitalium* / *Ureaplasma urealyticum*.. causing nonspecific urethritis, vaginitis, salpingitis, pelvic inflammatory disease by one or more organisms.
- *Treponema pallidum* : Syphilis
- *Haemophilus ducryi* : Chancroid
- *Gardenella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



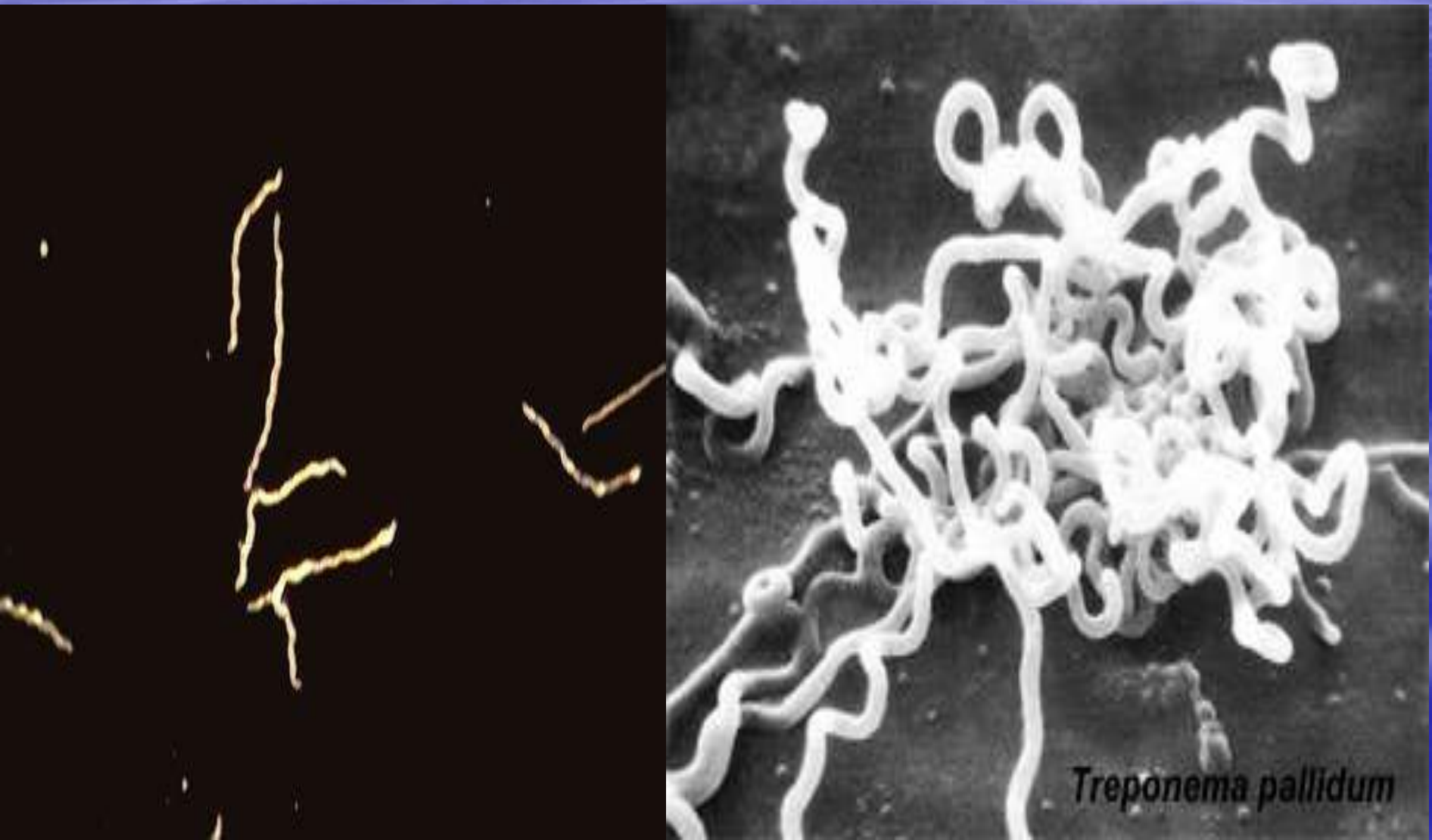
# DIAGNOSIS & TREATMENT

- 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



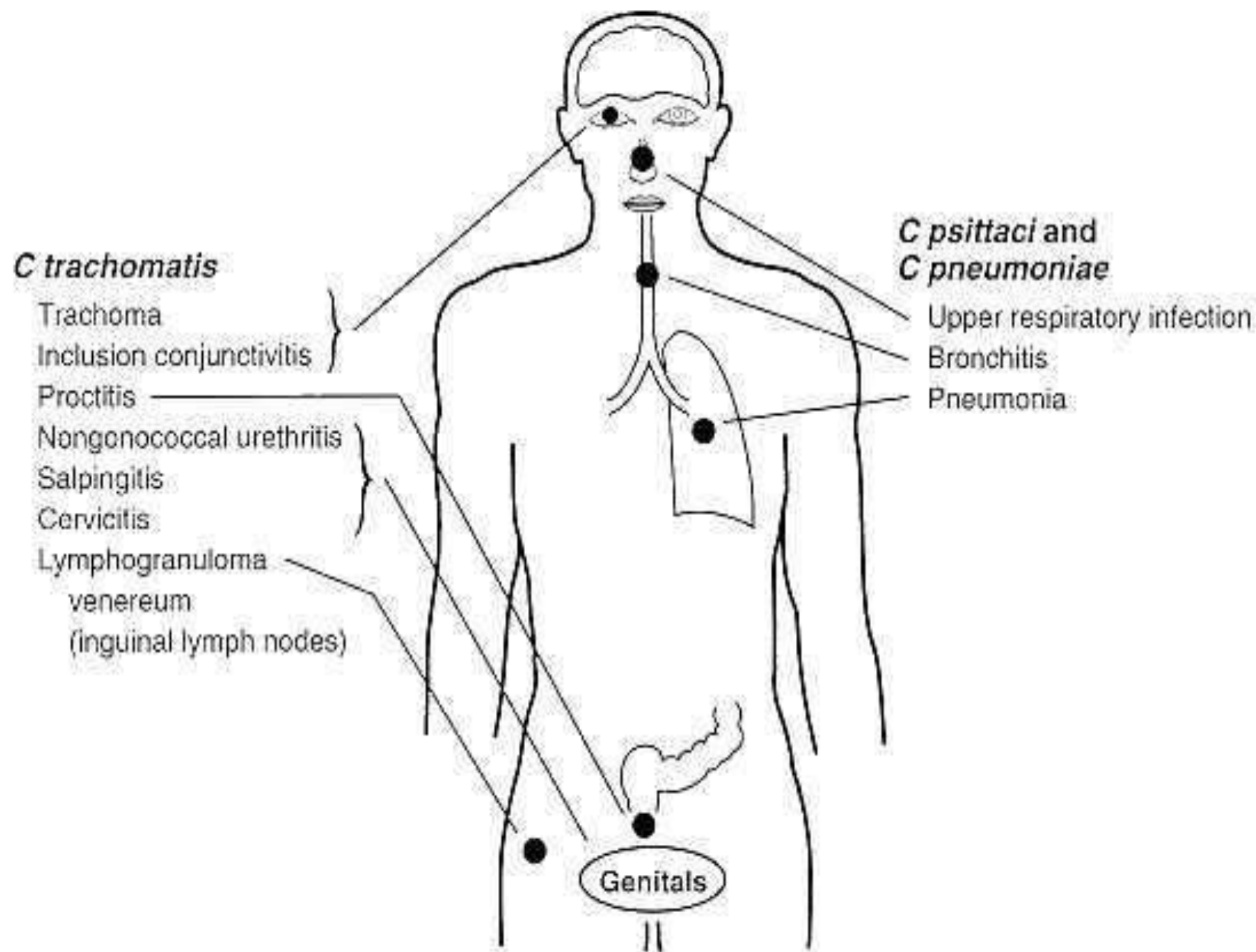
***C trachomatis***

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

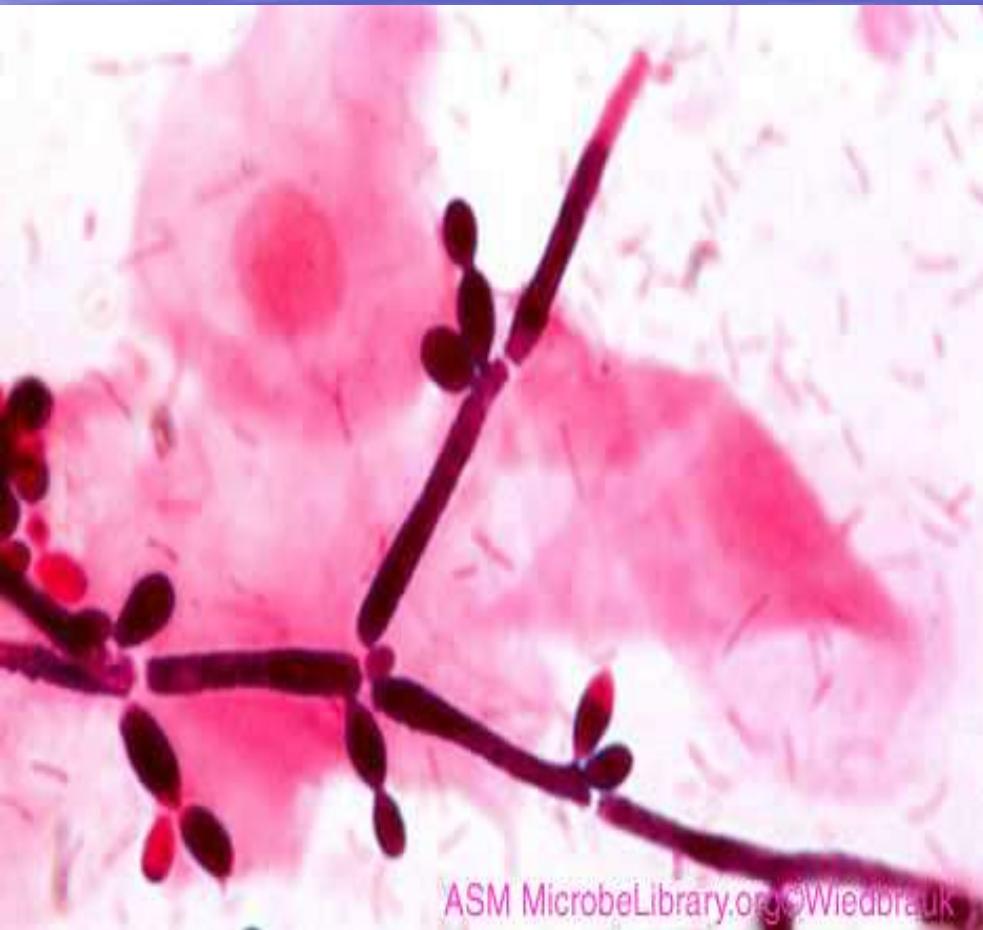
- **Bacterial vaginosis** (BV).. Mixed bacteria is the most common cause of vaginitis.
- ***Gardnerella vaginalis***: Part of vaginal flora.. may cause in association with anaerobic or other bacteria vaginosis.
- **Diagnosis**: Direct Gram-stain..presence of numerous "clue cells" (cells from the vaginal 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.