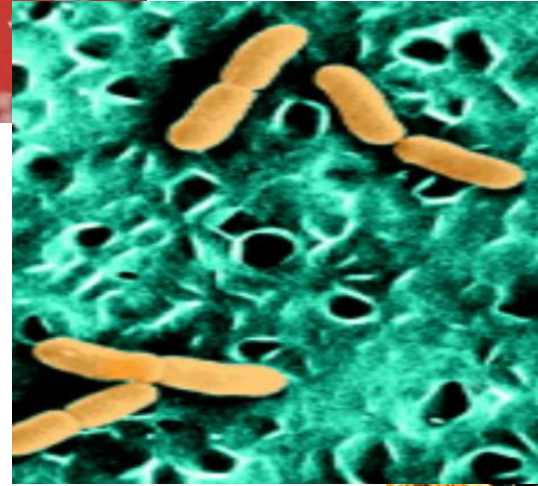
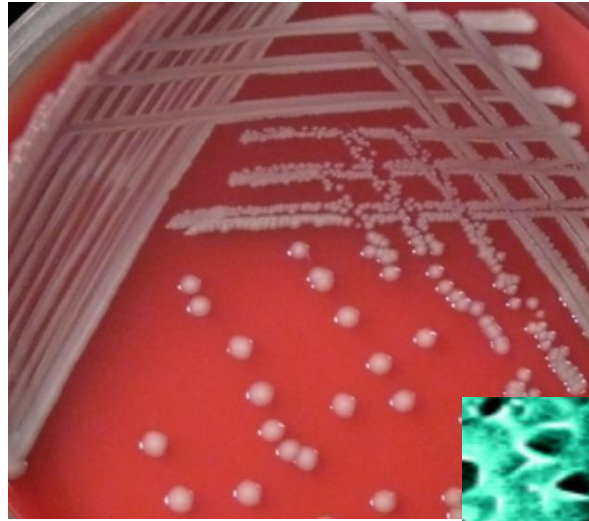


Microbiology of Urogenital system



Anas Abu-Humaidan
M.D. Ph.D.

Genital infections encompasses a variety of clinical entities, including :

- **Bacterial vaginosis**
- **Chancroid**
- **Gonorrhoea**
- **Chlamydia**
- **Syphilis**
- ***Mycoplasma genitalium***
- **Trichomoniasis**
- **Vulvovaginal candidiasis**
- **Genital warts**
- **Human immunodeficiency virus.**
- **Genital herpes**

SEXUALLY TRANSMITTED AND SEXUALLY TRANSMISSIBLE MICROORGANISMS		
BACTERIA	VIRUSES	OTHER ^a
Transmitted in Adults Predominantly by Sexual Intercourse		
Neisseria gonorrhoeae	HIV (types 1 and 2)	Trichomonas vaginalis
Chlamydia trachomatis	Human T cell lymphotropic virus type 1	Pthirus pubis
Treponema pallidum	Herpes simplex virus type 2	
Haemophilus ducreyi	Human papillomavirus (multiple genital genotypes)	
Klebsiella (Calymmatobacterium) granulomatis	Hepatitis B virus ^b	
Ureaplasma urealyticum	Molluscum contagiosum virus	
Mycoplasma genitalium		

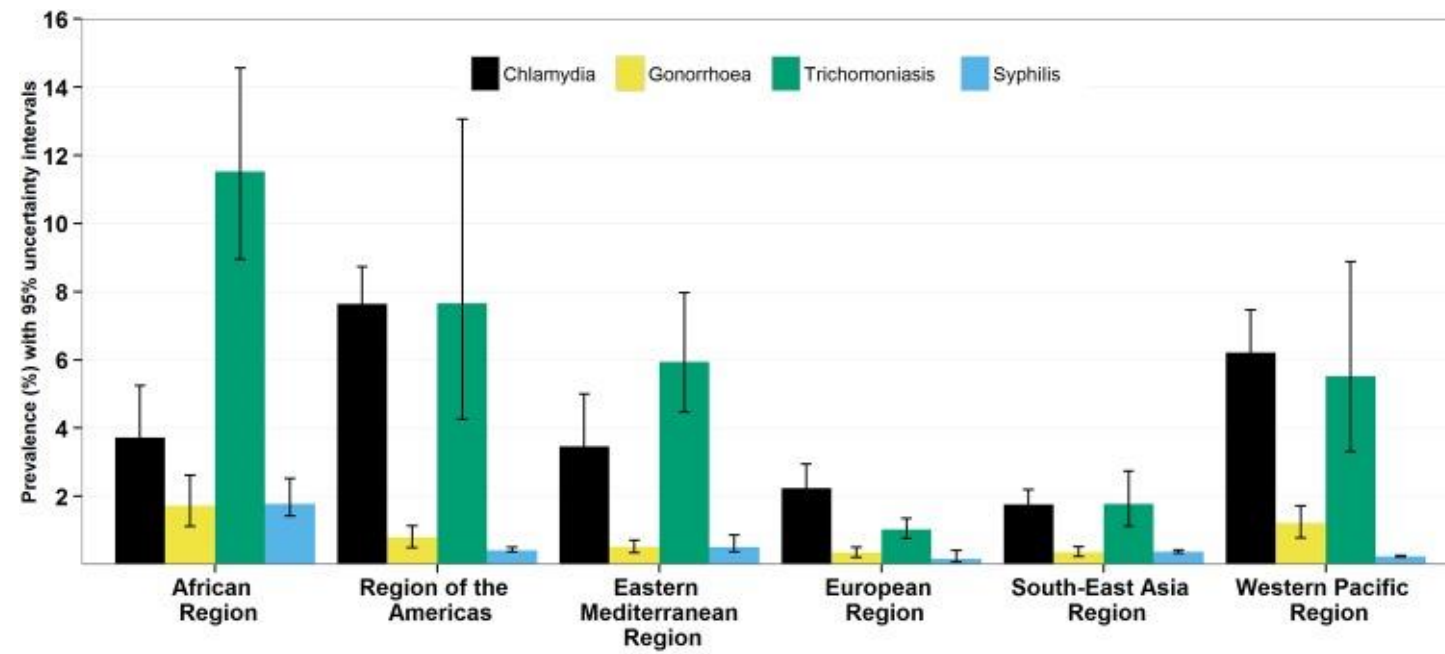
- Symptoms and signs of disease may include **vaginal discharge, penile discharge, ulcers** on or around the genitals, and **pelvic pain**. **Dysuria** and **dyspareunia** can also happen. Many STDs can be **asymptomatic**.
- Patients with one STI **should be assessed for the presence of others**, because of similar risk factors and vulnerability of an inflamed genital epithelium to other infections.
- **Risk factors** include:
 - The number of sexual partners and frequency of partner change
 - Failure to use barrier contraception,
 - Lower socioeconomic status,
 - Age <25 years
 - Symptomatic partner,
 - Sexual orientation (syphilis, gonorrhoea, HIV, and hepatitis B are more prevalent amongst MSM in the UK), and sexual practices (orogenital and anogenital contact).

WHO estimates of new cases of chlamydia, gonorrhoea, trichomoniasis, and syphilis among adults for 1995, 1999, 2005, and 2008 using various methods [4 –7].

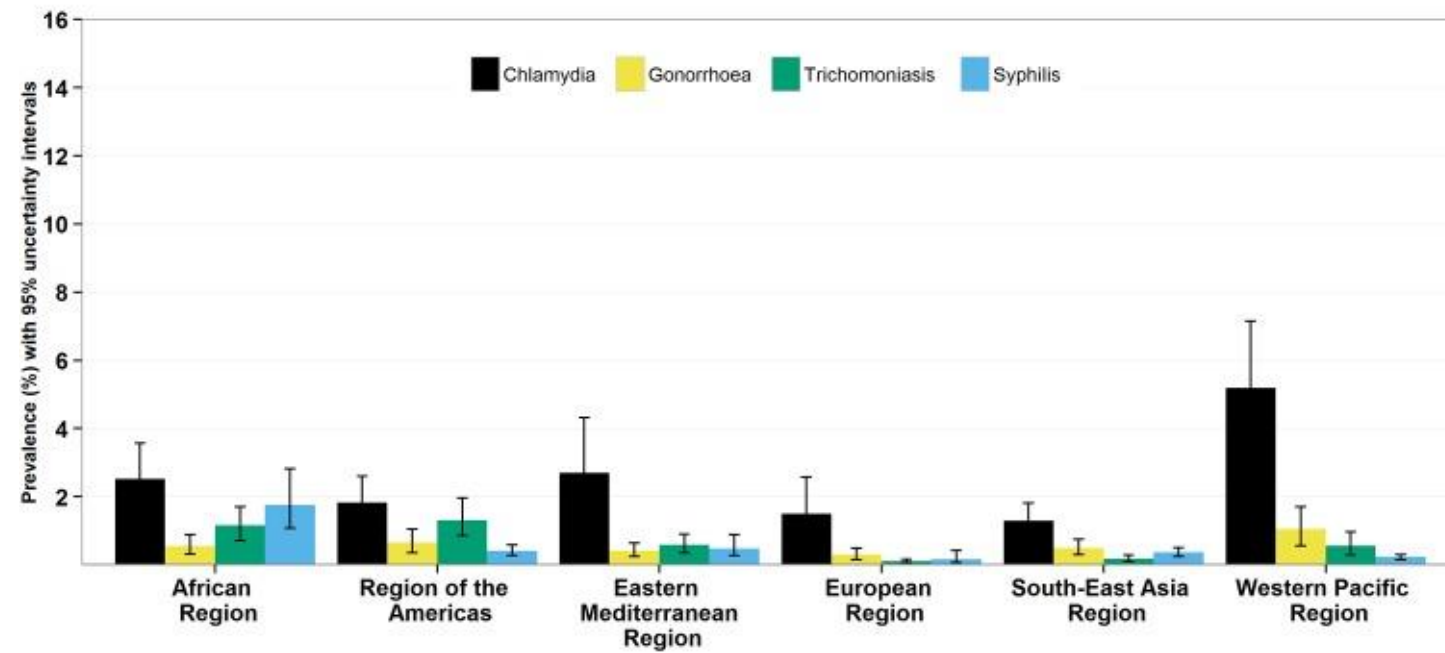
	Estimated number of new cases (millions)			
	1995	1999	2005	2008
Chlamydia	89	92	101	106
Gonorrhoea	62	62	88	106
Trichomoniasis	170	174	248	276
Syphilis	12	12	11	10

- In 2012, among **women aged 15–49 years**, the estimated global prevalence of **chlamydia was 4.2%** (3.7–4.7%), **gonorrhoea 0.8%** (0.6–1.0%), **trichomoniasis 5.0%** (4.0–6.4%), and **syphilis 0.5%** (0.4–0.6%); among **men**, estimated **chlamydia** prevalence was **2.7%** (2.0–3.6%), **gonorrhoea 0.6%** (0.4–0.9%), **trichomoniasis 0.6%** (0.4–0.8%), and **syphilis 0.48%** (0.3–0.7%). **Prevalence and incidence estimates varied by region and sex.**
- **Nearly one million new infections with curable STI each day.**

Women



Men



[Sex Transm Dis.](#) 2008 Jun;35(6):607-10. doi: 10.1097/OLQ.0b013e3181676bbd.

Prevalence of sexually transmitted infections among sexually active Jordanian females.

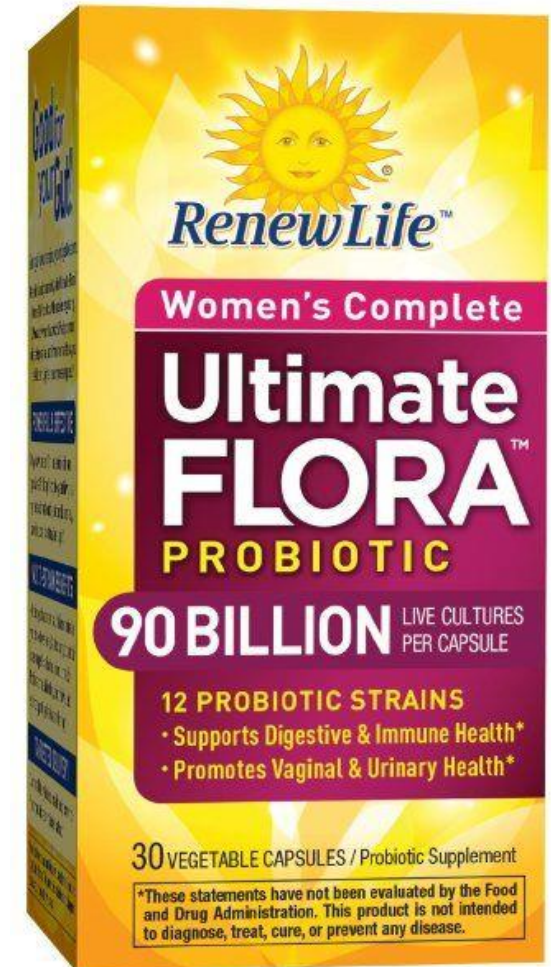
[Mahafzah AM](#)¹, [Al-Ramahi MQ](#), [Asa'd AM](#), [El-Khateeb MS](#).

RESULTS: The prevalence of *C. trachomatis* infection was 0.6% and 0.5%, among symptomatic and asymptomatic women respectively, that of *N. gonorrhoeae* was 0.9% and 2.2%, that of *T. pallidum* 0.0% and 0.0%, and that of *Tr. vaginalis* was 0.7% and 0.5%. These prevalence rates did not differ significantly between symptomatic and asymptomatic women.

CONCLUSIONS: Based on the low prevalence of sexually transmitted infections detected in this study among Jordanian women, the need for screening programs for such infections is questioned.

Bacterial vaginosis / etiology

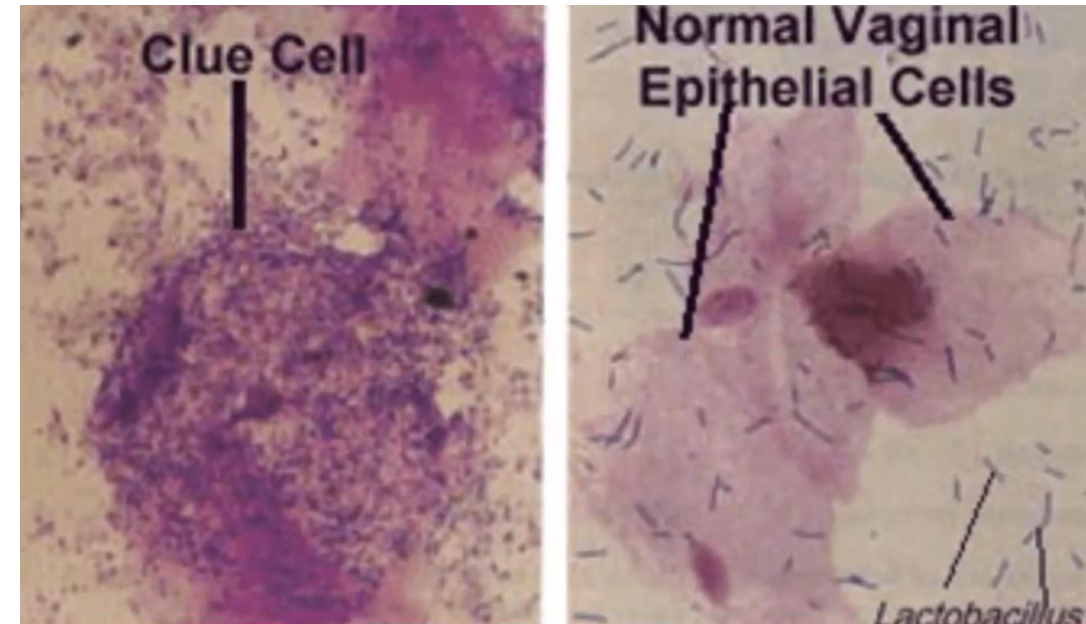
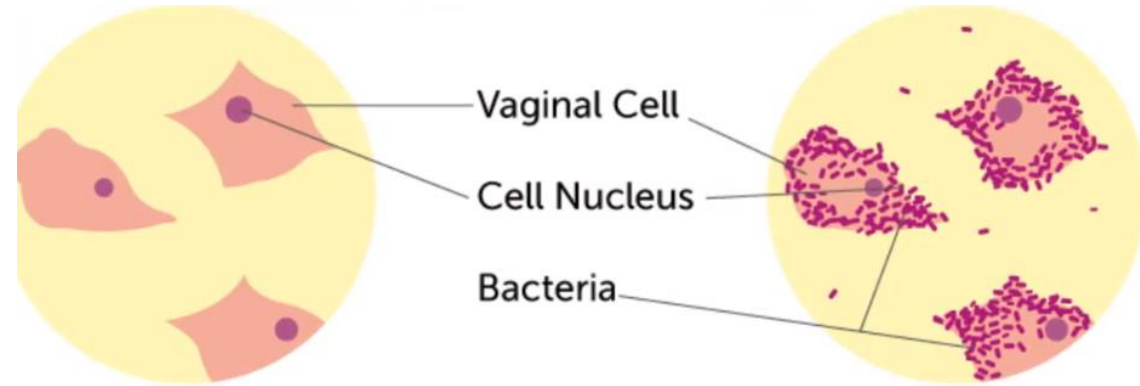
- Bacterial vaginosis (BV) is a common cause of unusual vaginal discharge. BV isn't a sexually transmitted infection (STI), but it can increase your risk of getting an STI such as chlamydia
- Normal **vaginal flora** appears dominated by one or two species of ***Lactobacillus***. Rather than being due to a single organism, **BV** is caused by **complex changes in the balance** of the microbiological flora.
- Lactobacilli produce H_2O_2 which lowers the pH— the loss of these organisms permits an increase in pH and overgrowth of vaginal anaerobes (e.g. *Bacteroides*, *Mobiluncus*) .
- The newly found bacterial species degrade vaginal peptides into offensive- smelling products and promote discharge and exfoliation of the epithelial layers.



- Worldwide prevalence ranges from 11% to 48% in women of childbearing age.
- Risk factors for acquisition— **new or multiple sexual partners**, vaginal **douching**, smoking. It can occur in women **who have never had vaginal intercourse**.
- 50 to 75% of cases are asymptomatic. In symptomatic cases, there is **thin, white, fishy smelling discharge**, most noticeable after intercourse.
- Pregnant women with BV have a higher rate of preterm delivery and pregnancy complications.
- BV also **increases the risk of contracting other STDs** like HIV.

The diagnosis of BV is usually based on **Amsel criteria**. The first three findings are sometimes also present in patients with trichomoniasis;

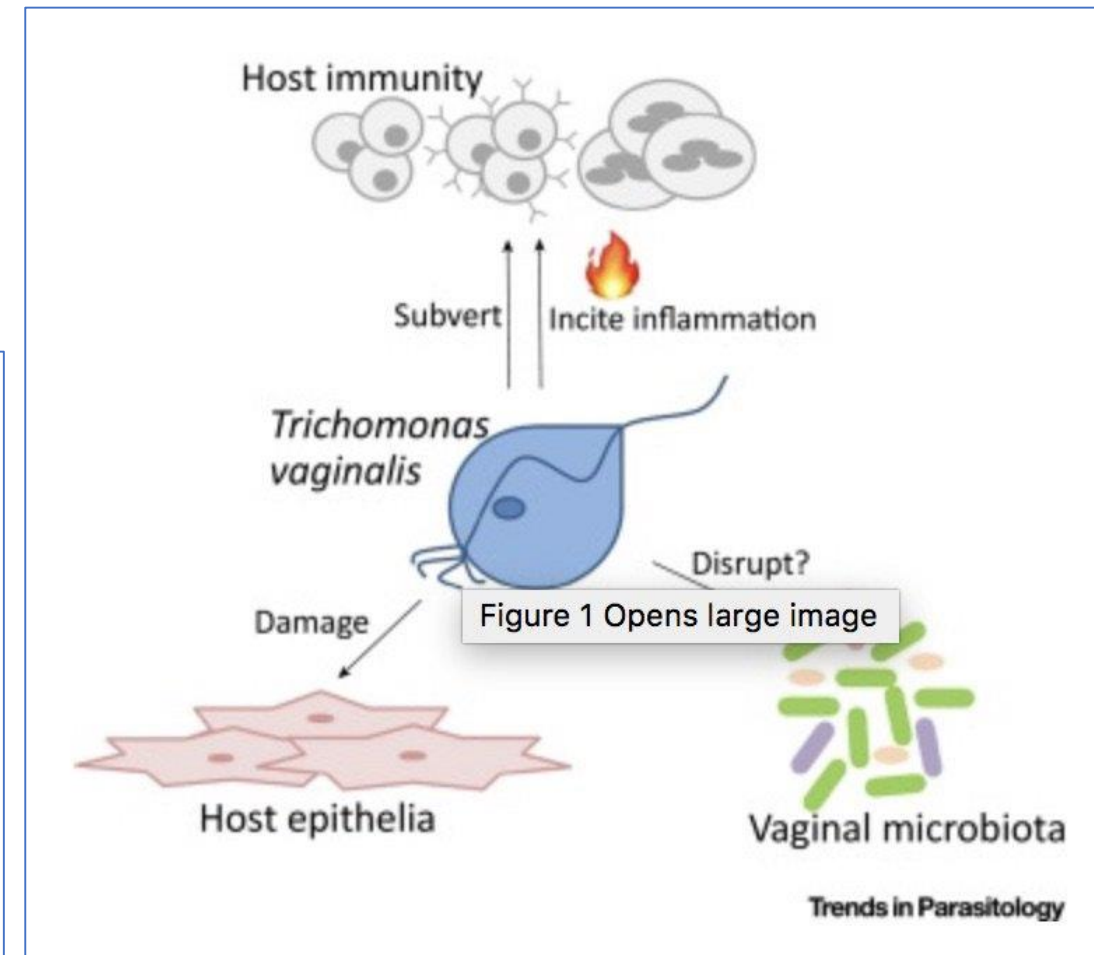
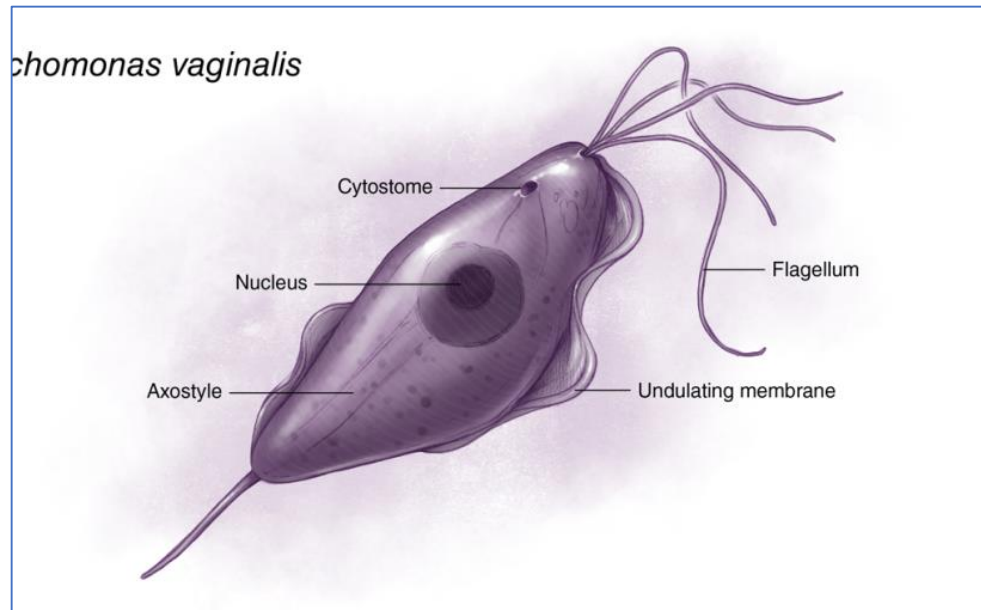
- homogeneous, **watery, white- grey discharge** coating the vaginal walls;
- **vaginal pH > 4.5**;
- positive amine test— add 10% KOH to a sample of discharge— positive if produces a **fishy odour**;
- the presence of '**clue cells**' (epithelial cells studded with adherent coccobacilli) on a saline wet mount— the single best predictor of BV.



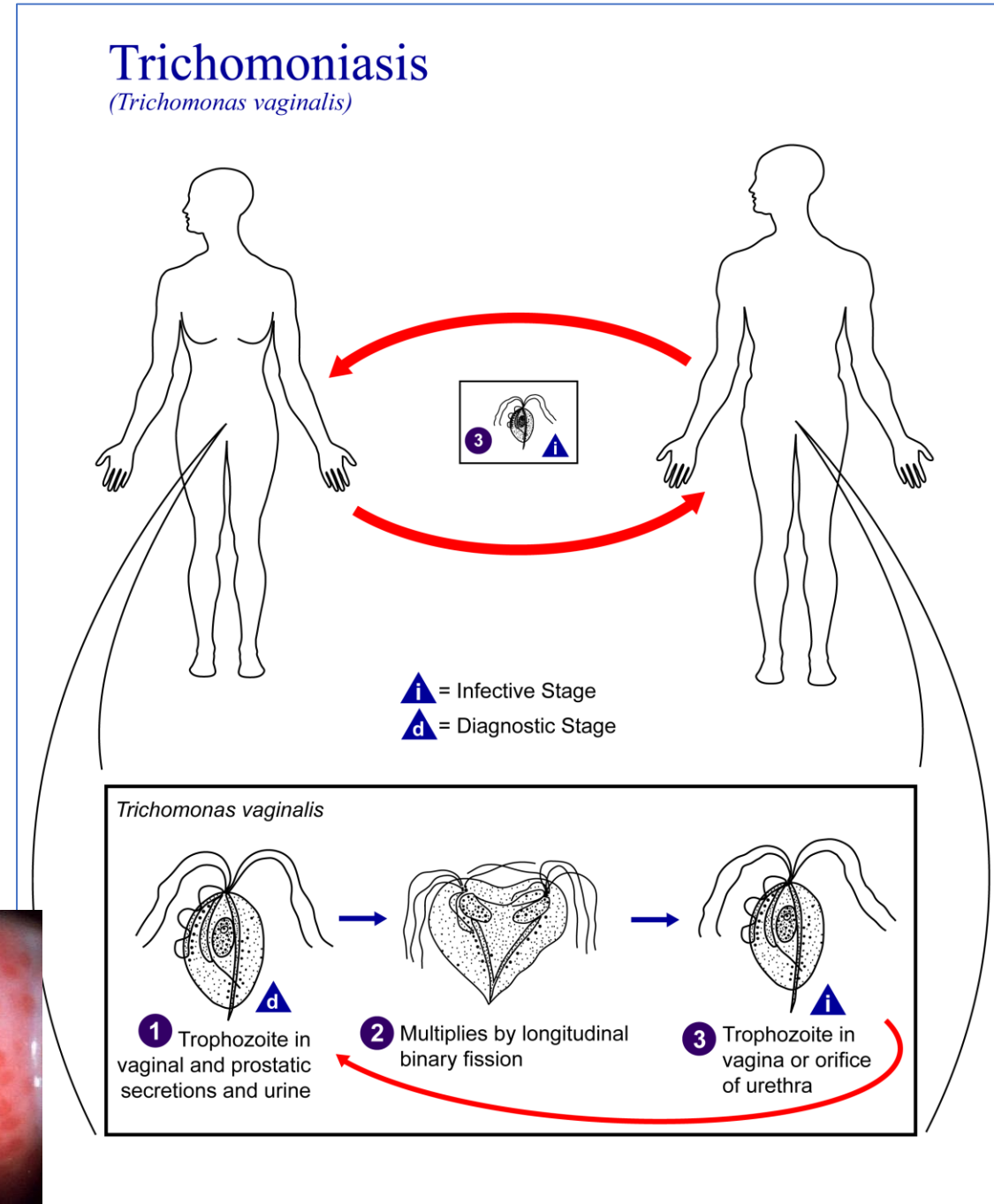
- Infection **resolves spontaneously** in **one- third** of cases.
- Treatment may **reduce the risk of acquiring other STDs**. And includes:
metronidazole— 500mg bd PO for 7 days or **clindamycin**— 300mg bd PO for 7 days
- Thirty per cent of **patients experience recurrence** within 3 months. A prolonged (e.g. 14 days) or alternative treatment course should be used in such patients.

Trichomoniasis / etiology

- An STI caused by the flagellated protozoan *T. vaginalis* (TV).
- TV pathogenesis include damage to host tissue mediated by parasite **killing of host cells**, **disruption** of steady-state **vaginal microbial ecology**, and eliciting inflammation by **activating the host immune response**.

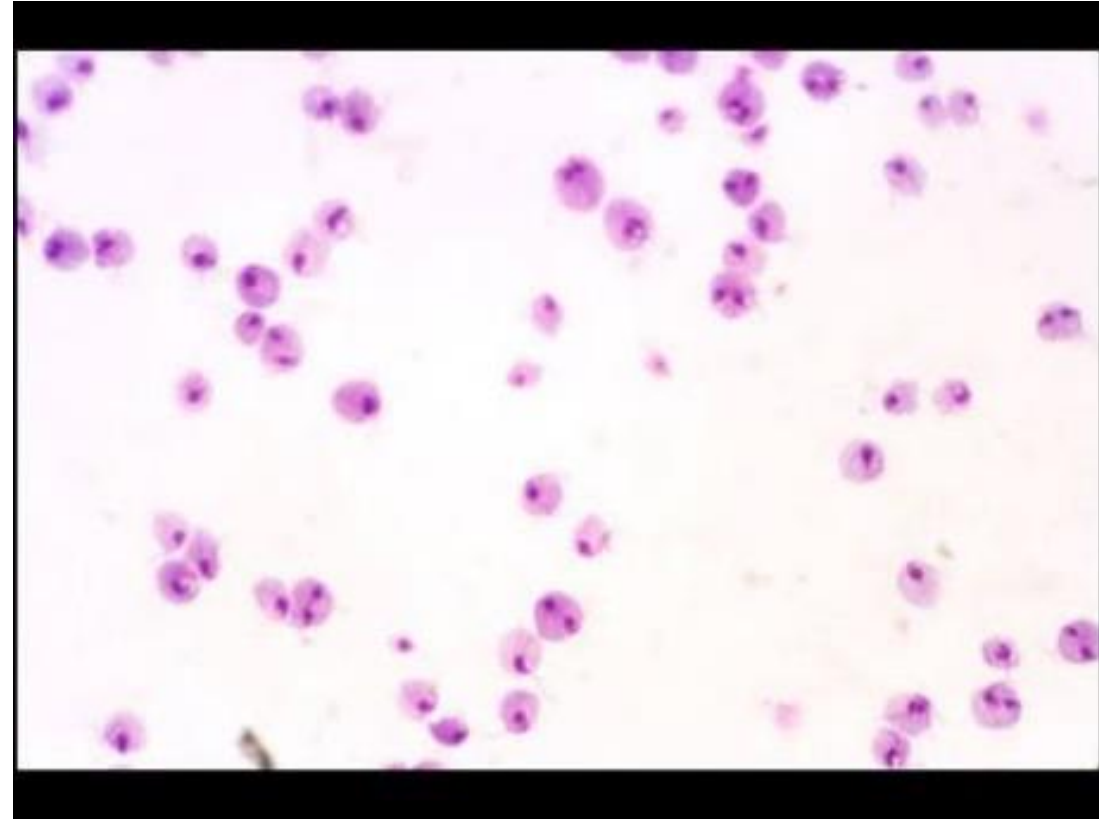


- Transmission is by sexual contact, and its incidence is highest in women with multiple sexual partners and those with other STIs.
- Infection is asymptomatic in 10– 50% of women and 15– 50% of men
- Symptoms include frothy, yellow **vaginal discharge** (may be **itchy** and **smelly**), **dyspareunia**, **dysuria**, and lower abdominal pain.
- punctate haemorrhages on the cervix ('**strawberry cervix**') in 2% of patients
- Can lead to **urethritis** in men.



Bacterial vaginosis / diagnosis and treatment

- **Microscopy**— phase- contrast or dark- ground microscopy of wet preparation of genital specimens will demonstrate the **motile flagellated protozoans** in 48– 80% of infected women and 50– 90% of infected men.
- Point- of- care tests, e.g. OSOMR *Trichomonas* rapid test has a sensitivity of 80– 94% and a specificity of >95%.
- **NAATs** offer the highest sensitivity and are becoming the gold standard
- **Metronidazole** 2g stat dose or tinidazole 2g stat dose. Partners and asymptomatic individuals should be treated



Syphilis / etiology

- Spirochetes are **thin**, helical **gram-negative** bacteria. The most important treponemal species that causes human disease is ***Treponema pallidum*, the causative agent for Syphilis**
- *T. pallidum* **has not been cultured** regularly in vitro because they are **dependent on host cells** for many metabolites (e.g. purines, pyrimidines, amino acids). Moreover, they're extremely **sensitive to oxygen** (microaerophilic or **anaerobic**).

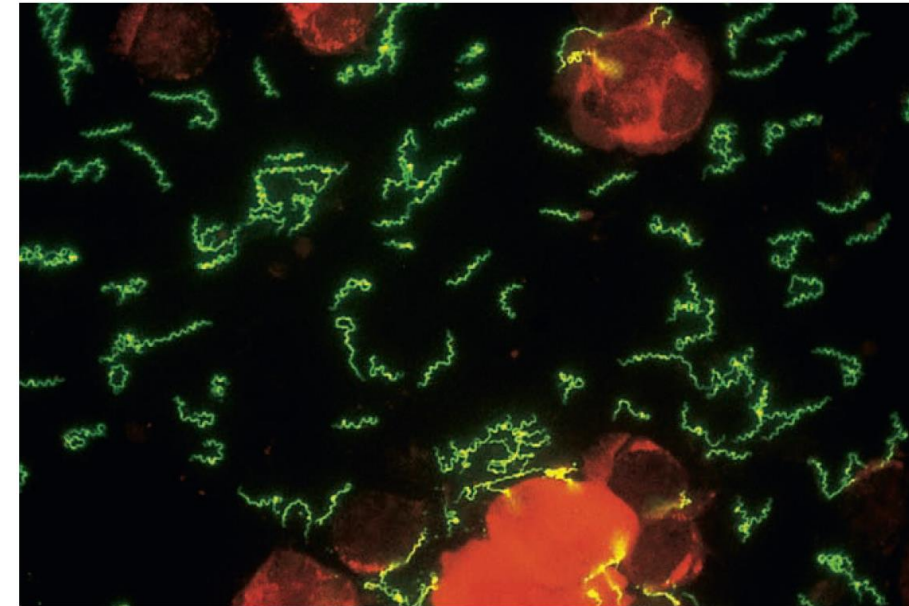
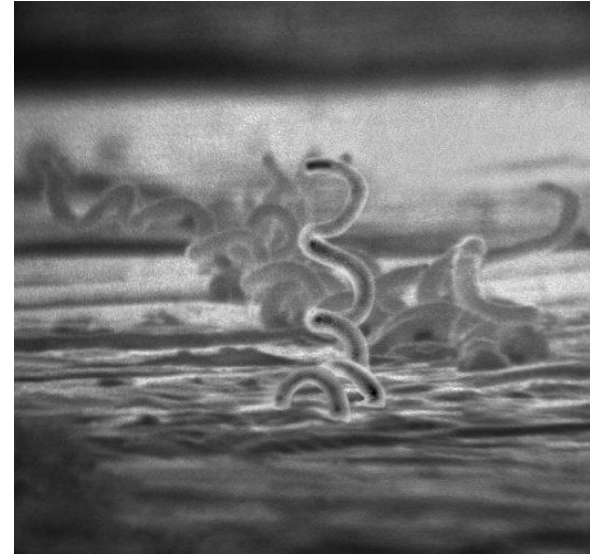


FIGURE 32-3 *Treponema pallidum* in the direct fluorescent antibody test for *T. pallidum*. (From Morse SA, Ballard RC, Holmes KK,

Syphilis / epidemiology

- Between 2000 and 2012, the incidence of newly acquired disease has **increased** each year.
- Patients infected with syphilis are at **increased risk for transmitting and acquiring HIV** when genital lesions are present
- Syphilis **cannot be spread through contact with inanimate objects** such as toilet seats (since the bacteria is very labile to drying and disinfectants) . The most common route of spread is by **direct sexual contact**.
- Other routes include **congenitally** (from an infected mother) or by **transfusion** with contaminated blood.



The face of a newborn infant displaying snuffles indicative of congenital syphilis



Portrait of Gerard de Lairesse by Rembrandt van Rijn, circa 1665–67, oil on canvas - De Lairesse, himself a painter and art theorist, had congenital syphilis that deformed his face and eventually blinded him.^[54]



Secondary stage rash on the palms of the hands.

Syphilis / signs and symptoms

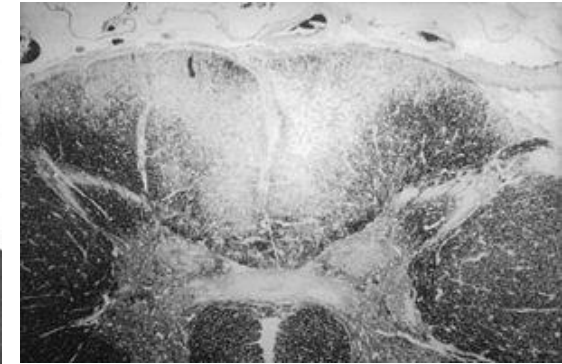
- The clinical course of syphilis evolves through three phases. If the patient is not treated, syphilis cause **systemic devastating damage**.



primary phase is characterized by skin lesions (**chancres**) at the site where the spirochete penetrated



In the **secondary phase**, the clinical signs of disseminated disease appear, (e.g. **skin lesions** over the entire body, fever, headache). Symptoms resolve within weeks.



- Late syphilis severely damages organs involved (e.g., **neurosyphilis**, tabis dorsalis, cardiovascular syphilis) leading to various symptoms (e.g. **dementia** or **blindness**,)

The Stages of Syphilis

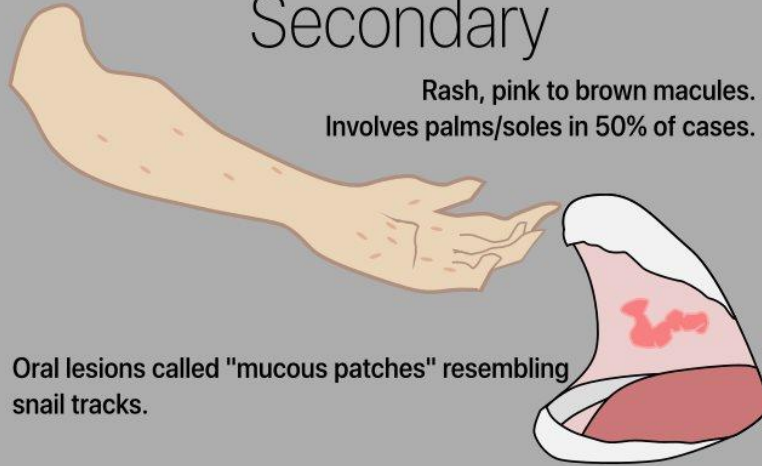
Primary



The chancre lesion is the hallmark of primary syphilis. It may appear 10-90 days after exposure. Common sites include penis and labia. Other sites include anus, oral mucosa. Without treatment, chancre disappears in 2-8 weeks.

Secondary

Rash, pink to brown macules. Involves palms/soles in 50% of cases.

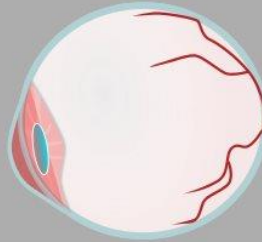


Oral lesions called "mucous patches" resembling snail tracks.



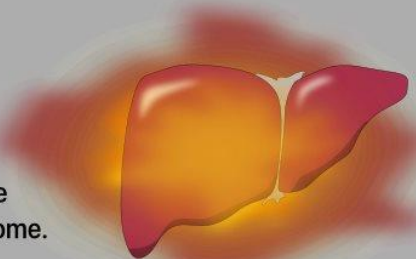
Ocular syphilis manifestations including anterior or posterior uveitis.

Symptomatic early neurosyphilis, cranial nerve deficits and/or aseptic meningitis presentation.



Genito-inguinal rashes, including tinea-mimicker or heaped-up wart-like lesions called condyloma lata.

Less common internal organ manifestations including acute hepatitis and nephrotic syndrome.



Latent

Latent syphilis refers to asymptomatic infection after the period of primary and secondary syphilis (noticed or unnoticed) has passed.

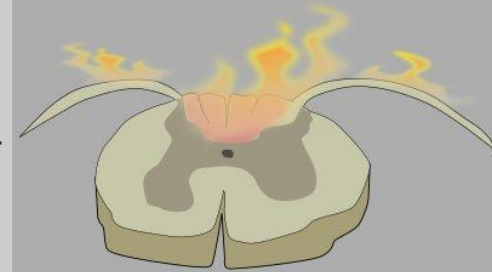
Early Latent

Early latent refers to asymptomatic patients with positive testing, in whom history can confirm exposure to or symptoms of primary or secondary syphilis within the last year. This group may receive single-dose penicillin like primary or secondary.

Late Latent

Late latent patients have positive serology but do not meet criteria for early. Thus, multiple doses of penicillin.

Late (Tertiary)

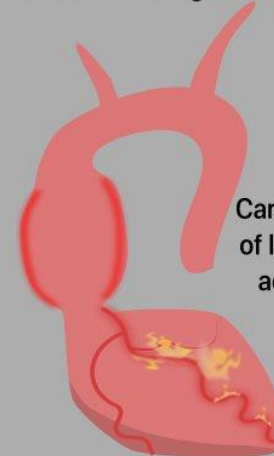


Late Neurosyphilis, including tabes dorsalis, gait impairments, and dementia. Tabes dorsalis damages the dorsal columns and sensory nerve roots, causing a syndrome of pain and sensory deficits similar to those of B12 deficiency.

Gumma are ulcerating granulomas on skin, bone, and internal organs.



Cardiovascular effects of late syphilis include aortic aneurysm and coronary arteritis.



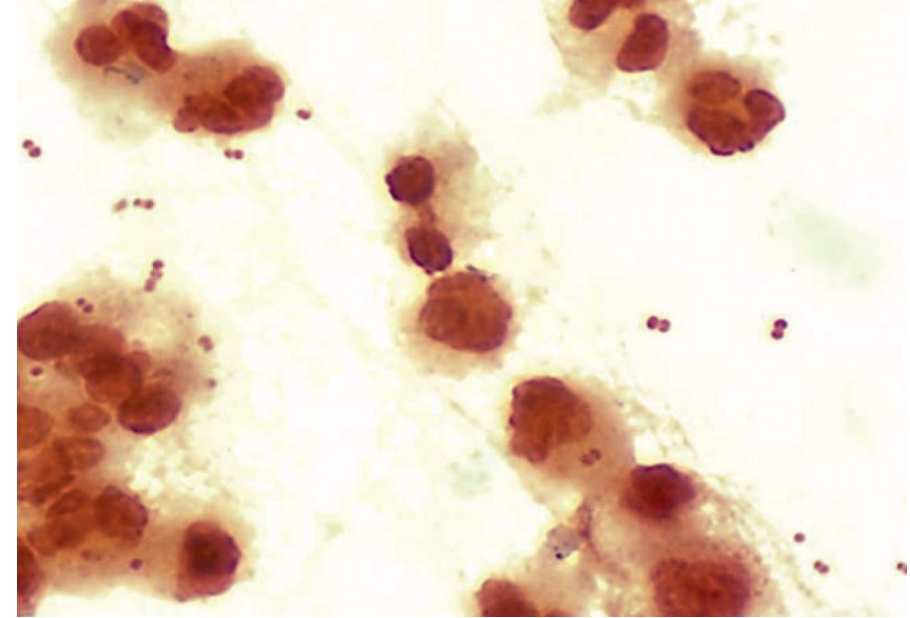
- **Darkfield microscopy, immuno-fluorescent stains, or PCR** can be used on immediate samples (from a chancre) for visualization and diagnosis.
- Serology is the most important tool;

non- treponemal/ cardiolipin tests, e.g. venereal disease research laboratory (VDRL)/ Rapid plasma regain test (RPR). A quantitative test should be done to **screen**, stage the disease and monitor treatment.

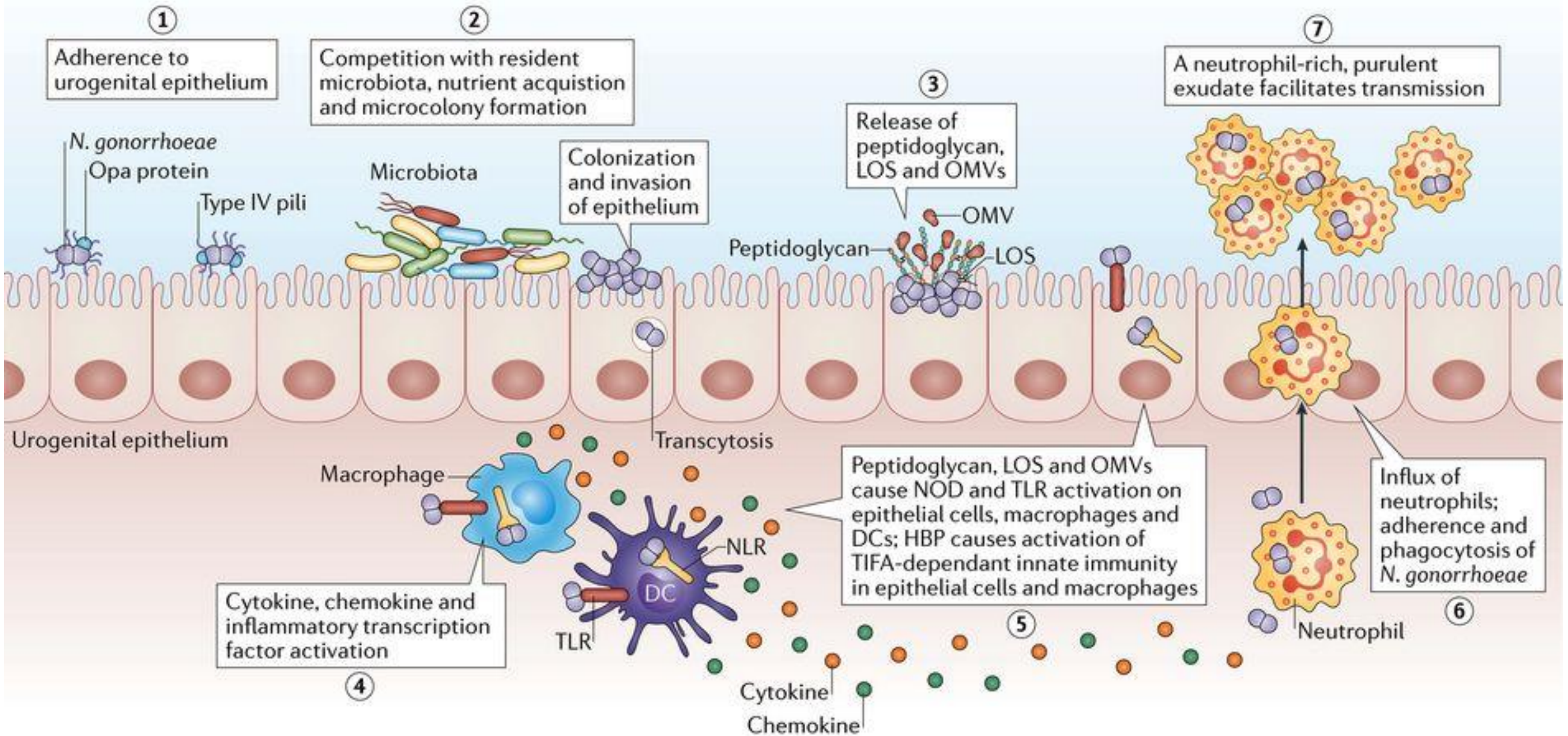
specific treponemal tests *Treponema pallidum* particle agglutination (**TP-PA**) test can be used for **diagnosis**

- Syphilis be controlled only through the practice of **safe-sex** techniques and adequate **treatment with antibiotics**
- **Penicillin is the drug of choice. (Benzathine benzylpenicillin / Penicillin G) .**

- A **purulent infection** of mucous membranes (e.g. urethra, rectum, cervix, conjunctiva, pharynx) caused by ***N. gonorrhoeae***.
- *Neisseria* species are aerobic **gram-negative** bacteria, typically coccoid shaped arranged in pairs (**diplococci**)
- The presence of ***N. gonorrhoeae*** in a clinical specimen is **always considered significant**. In contrast, strains of ***N. meningitidis*** can **colonize the nasopharynx of healthy people** without producing disease.
- *N. gonorrhoeae* is *fastidious* and only grows on enriched **chocolate agar** and other supplemented media.



It is the second commonest STI in the UK, affecting predominantly young people (peaking in males aged 20– 24 years and females aged 16– 19 years). The recent increase in incidence and **growing prevalence of antimicrobial resistance** have made it a major public health concern.



Gonorrhoea / signs and symptoms

- Genital infection in men is primarily restricted to the **urethra**. A purulent urethral discharge and dysuria develop after a 2- to 5-day incubation period. **Virtually all infected men have acute symptoms.**
- As many as half of all infected women have mild or **asymptomatic** infections.
- Retrograde spread may occur, causing **salpingitis/ endometritis, PID**, and **tubo-ovarian abscesses** in up to 20% of women with cervicitis.

Neisseria gonorrhoeae

Gonorrhea: characterized by purulent discharge for involved site (e.g., urethra, cervix, epididymis, prostate, rectum) after 2- to 5-day incubation period

Disseminated infections: spread of infection from genitourinary tract through blood to skin or joints; characterized by pustular rash with erythematous base and suppurative arthritis in involved joints

Ophthalmia neonatorum: purulent ocular infection acquired by neonate at birth



MALE

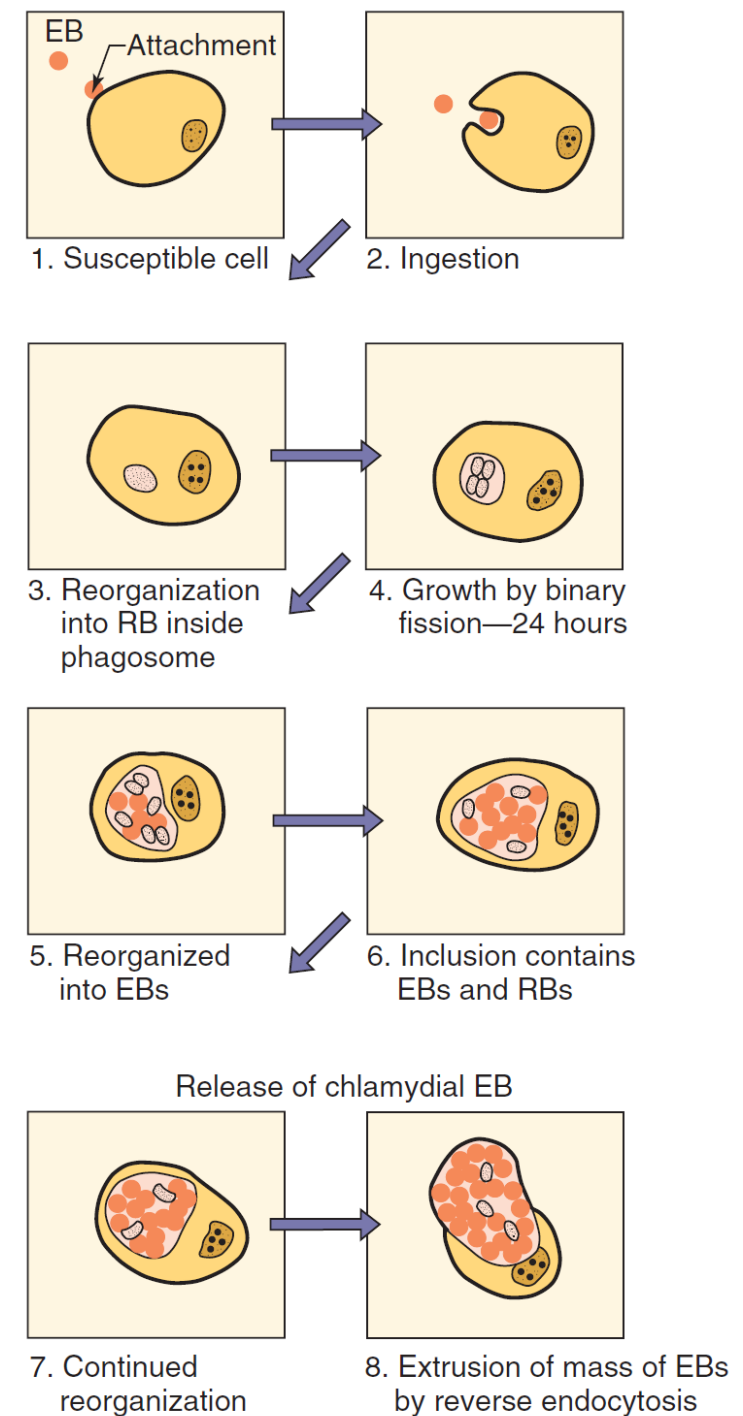


FEMALE

- Samples include **Exudates** (by a swab into urethra), **urine**, **cervical or throat swabs**
- **Microscopy**— provides rapid, near- patient diagnosis in symptomatic patients and shows **Gram- negative diplococci** within polymorphonuclear cells.
- **Culture**— all infected areas should be swabbed and plated onto selective media, both to confirm diagnosis and to provide antibiotic susceptibility data.
- **Nucleic acid amplification tests** (NAATs)— these have become the screening test of choice for asymptomatic individuals with urethral and endocervical infection, and for rectal and pharyngeal infection in MSMs.
- Treatment should include **patient and sexual partner/s**.
- First- line therapy is **ceftriaxone** 500mg IM single dose plus **azithromycin** 1g PO single dose

Chlamydia / etiology

- A common STD caused by ***Chlamydia trachomatis***. An **obligate intracellular parasites**, 0.3 microm in diameter, with a unique life cycle.
- Infects epithelial cells, which are found on the mucous membranes of **the urethra, endocervix, endometrium, fallopian tubes, anorectum, respiratory tract, and conjunctivae**
- Metabolically inactive **infectious** forms (**elementary bodies [EBs]**) and metabolically active **noninfectious** forms (**reticulate bodies [RBs]**).



- Chlamydia infections are the **most common bacterial sexually transmitted diseases** in humans and are **the leading cause of infectious blindness** worldwide
- Other than **sexual transmission**, **eye-to-eye transmission** of trachoma is by **droplet, hands, contaminated clothing**, and flies that transmit ocular discharges from the eyes of infected children to the eyes of uninfected children.
- **Trachoma** is the **leading cause of preventable blindness**. Infections occur predominantly in children, who are the chief reservoir of ***C. trachomatis*** in endemic areas.

Chlamydia / signs and symptoms

- Most genital tract infections in **women** are **asymptomatic** (as many as 80%) while most in **men** are **symptomatic**, as many as 25% of the infections will be inapparent.
- infection may **persist** for many years if untreated, infection can spread to the upper genital tract in women causing **pelvic inflammatory disease** which may result in future infertility or ectopic pregnancy
- It can cause **cervicitis** in women and **urethritis** and **proctitis** in both men and women.
- Other presentations— **Lymphogranuloma venereum** LGV (the cause of 10% of genital ulcers in tropical countries)



Inflammation of the cervix in a female from chlamydia infection characterized by mucopurulent cervical discharge, redness, and inflammation.

Chlamydia trachomatis

Trachoma: chronic inflammatory granulomatous process of eye surface, leading to corneal ulceration, scarring, pannus formation, and blindness

Adult inclusion conjunctivitis: acute process with mucopurulent discharge, dermatitis, corneal infiltrates, and corneal vascularization in chronic disease

Neonatal conjunctivitis: acute process characterized by a mucopurulent discharge

Infant pneumonia: after a 2- to 3-week incubation period, the infant develops rhinitis, followed by bronchitis with a characteristic dry cough

Urogenital infections: acute process involving the genitourinary tract with characteristic mucopurulent discharge; asymptomatic infections common in women

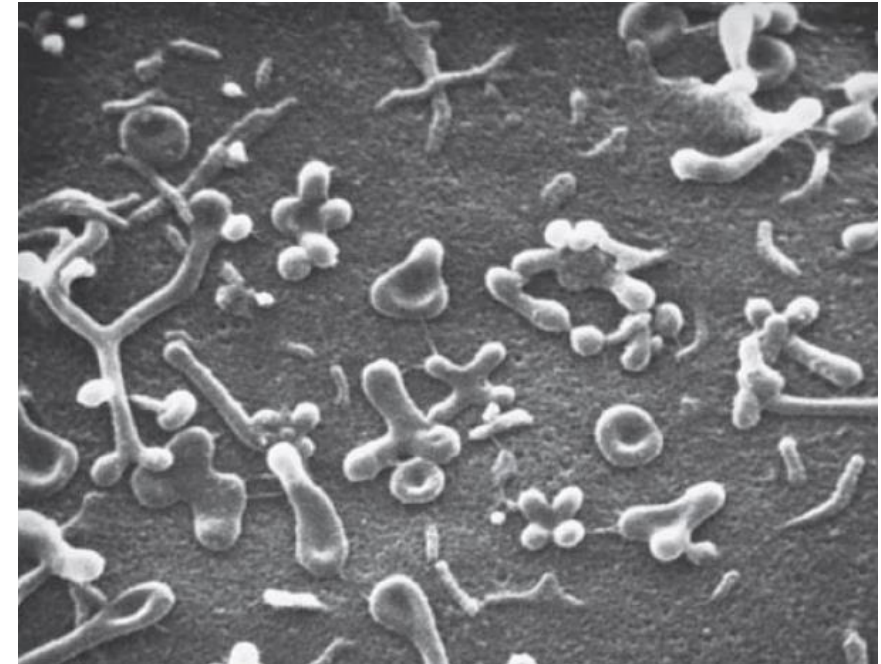
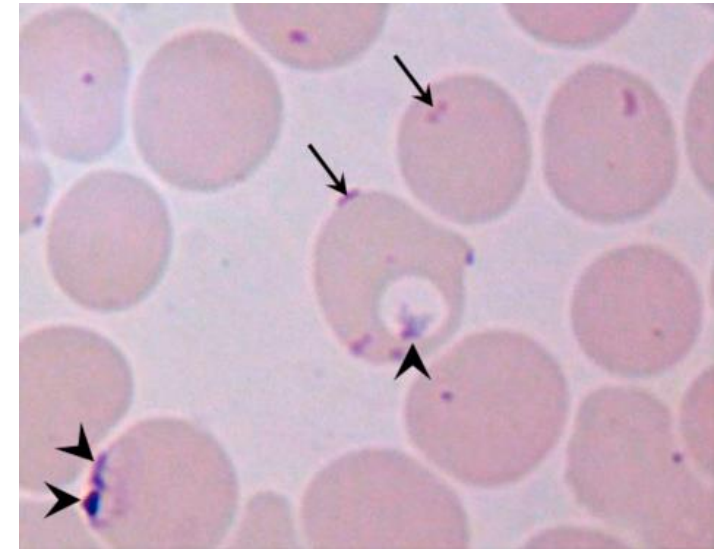
Lymphogranuloma venereum: a painless ulcer develops at the site of infection that spontaneously heals, followed by inflammation and swelling of lymph nodes draining the area, then progression to systemic symptoms

Chlamydia / diagnosis and treatment

- Samples include **Exudates** (by a swab into urethra), **first catch urine**, **cervical or throat swabs**
- **Culture**— not routinely recommended, with low sensitivity and expensive.
- **Nucleic acid amplification tests** (NAATs)— these have become the diagnostic test of choice, as they are highly sensitive (90– 95%).
- Treatment should include **patient and sexual partner/s**.
- The drug of choice for reasons of compliance is **doxycycline** 100mg bd PO for 7 days or **azithromycin** 1g single dose

Nongonococcal urethritis caused by Mycoplasma

- ***Mycoplasma*** and ***Ureaplasma*** organisms are the **smallest free-living bacteria**. They are unique among bacteria because they **do not have a cell wall** and their cell membrane contains **sterols**.
- ***M. genitalium*** and ***Ureaplasma urealyticum*** can cause **nongonococcal urethritis (NGU)** and **pelvic inflammatory disease**.



Nongonococcal urethritis caused by Mycoplasma

- The most sensitive diagnostic tests are **PCR amplification** tests of species-specific gene targets.
- Absence of the cell wall renders the mycoplasmas resistant antibiotics that interfere with synthesis of the cell wall (e.g. Penicellins).
- Rising incidence and emerging antimicrobial resistance are a major concern these days.
- The poor clinical outcomes with **doxycycline** therapy led to the use of **azithromycin** as the primary drug of choice

Organism	Site	Human Disease
<i>Mycoplasma genitalium</i>	Genitourinary tract	Nongonococcal urethritis, pelvic inflammatory disease
<i>Ureaplasma urealyticum</i>	Respiratory tract, genitourinary tract	Nongonococcal urethritis, pyelonephritis, spontaneous abortion, premature birth

Vulvovaginal candidiasis / etiology

- Candidiasis is an infection caused by **Candida albicans**, which is an opportunistic pathogenic yeast that is a common member of the human **gut flora**.
- *Candida* spp. may be found in the lower genital tract of 10– 20% of asymptomatic women.
- 29– 49% of premenopausal women reporting at least one episode of candidiasis.
- Candidal infection is uncommon in prepubertal women



Vulvovaginal candidiasis

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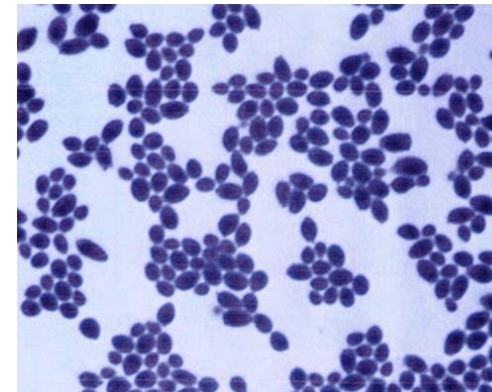
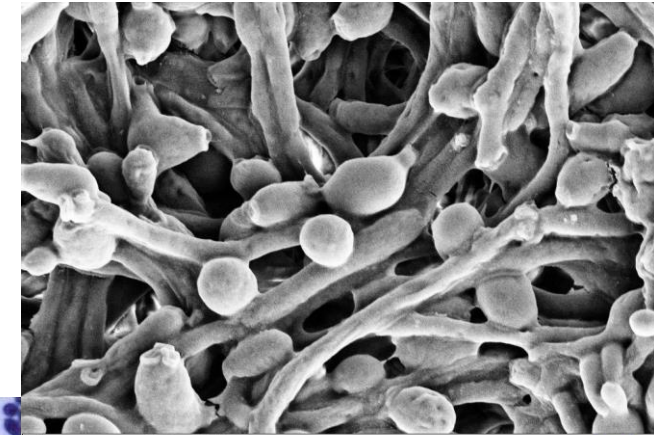


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Vulvovaginal candidiasis / signs and symptoms

- ***C. albicans* is the cause of 80– 92% of cases**, but the incidence of other *Candida* spp., such as *C. glabrata* can occur.
- **Recurrent infection**—defined as ≥ 4 episodes a year and seen in 5–8% of women. susceptibility seems to be largely determined **genetically**.

Vulvovaginal Candidiasis



Risk factors

- Diabetes
- HIV
- Recent antibiotic use
- Pregnancy

Clinical

- Pruritus
- Dysuria
- Dyspareunia

Discharge

- White, cottage cheese-like
- pH < 4.5
- KOH odor neg
- Pseudohyphae, spores

Vulvovaginal candidiasis / diagnosis and treatment

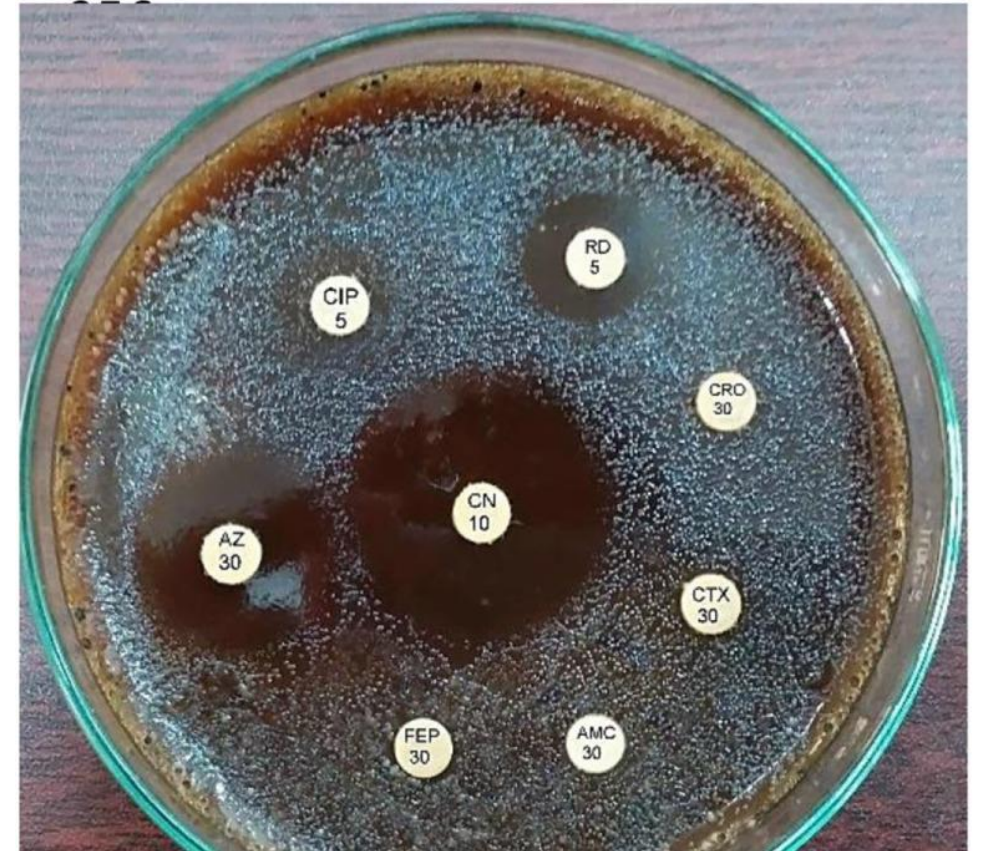
- wet mount of the discharge with 10% KOH may allow recognition of yeast and hyphae, but microscopy is negative in around 50%.
- Self- diagnosis unreliable— one study demonstrated that only 34% of those women self-diagnosing candidal infection actually had it.
- Vaginal pH is around 4– 4.5 (unlike trichomonal infection or BV).
- Perform culture in patients with persistent discharge or recurrent symptoms unresponsive to azole treatment

- **90% of cases represent uncomplicated infections** (healthy, non- pregnant women with mild/moderate symptoms, infrequent episodes and infection with *C. albicans*).
- Oral and topical treatments are similarly effective, with topical therapy relieving symptoms more rapidly, but oral being preferred by women, e.g. PO **fluconazole**.
- The immunosuppressed and those with severe symptoms are unlikely to respond to short treatment courses— 7– 14 days of topical therapy is recommended
- **Pregnancy**— treat only for symptoms using a **topical imidazole** for 7– 14 days (e.g. clotrimazole). Oral azoles are contraindicated in pregnancy

A 26-year-old male patient came to the dermatology clinic of Tanta University hospital complaining from severe burning sensation during urination and dysuria for 4 days. Additionally, he was suffering from penile discharge and testicular tenderness. He had a history of multiple heterosexual relationships with a last contact 8 days ago. On physical examination, vital signs showed: blood pressure 110/79, pulse 75, and temperature 37.6°C. There was mucopurulent cloudy discharge from urethra. Swollen testicles were also observed. When the patient asked about any other symptoms, he mentioned feeling fatigue with pain in the knee joints and ankles 2 weeks ago but he did not receive any medical remedy until the appearance of severe irritation, redness in the eye, as well as edema in the eyelid with the presence of copious discharge (conjunctivitis). These symptoms seem to be unrelated to a degree that may obscure the diagnosis.

Following counseling, urethral and ocular swabs, and blood sample were aseptically obtained and streaked immediately on Thayer Martin and chocolate agar plates then incubated overnight at 37°C in the presence of 5% CO₂. Following the incubation period, Grayish white, transparent to opaque, slightly raised colonies with 1–2 mm diameter were observed. After Gram-staining, pink to red diplococci with coffee bean-shaped cells opposing each other on the concave sides. This result was sufficient for the presumptive identification of *N. gonorrhoeae*. Furthermore, numerous polymorphonuclear cells with intracellular diplococci, were

The results of susceptibility testing were interpreted according to CLSI. It revealed multiple drug resistance to ampicillin, ampicillin/clavulanic acid, cephadrine, cefotaxime, cefepime, cefuroxime, ceftriaxone, ciprofloxacin, chloramphenicol, sulfamethoxazole, trimethoprim, tetracycline, doxycycline, and spectinomycin. Only gentamicin, rifampicin, and azithromycin were active against the test pathogen



History

- 17-year-old white female
- College student
- Seeking advice about contraception
- Shy talking about her sexual practices
- Has never had a pelvic exam
- Has had two sex partners in past six months
- Does not use condoms or any other contraceptives
- Her periods have been regular, but she has recently noted some spotting between periods. Last menstrual period was 4 weeks ago.
- Denies vaginal discharge, dyspareunia, genital lesions, or sores

Physical examination

- Vital signs: blood pressure 118/68, pulse 74, respiration 18, temperature 37.1° C
- Breast, thyroid and abdominal exam within normal limits
- The genital exam reveals normal vulva and vagina
- The cervix appears inflamed, bleeds easily with swab insertion for diagnostic testing, and there is a purulent discharge coming from the cervical os.
- The bimanual exam is normal without cervical motion pain, uterine or adnexal tenderness.

3. Which laboratory tests should be ordered or performed?

- ☐ Pregnancy test
- ☐ Test for *Chlamydia trachomatis*
- ☐ Test for *Neisseria gonorrhoeae*
- ☐ Syphilis screen with RPR or VDRL
- ☐ Saline wet mount, pH and KOH preparation of vaginal secretions
- ☐ Counseling and testing for HIV

Laboratory Test Results for Suzy Jones

- NAAT for *Chlamydia trachomatis*: positive
- NAAT for *Neisseria gonorrhoeae*: negative RPR: non-reactive
- Wet mount: pH 4.2, no clue cells or trichomonads but numerous white blood cells (WBCs)
- KOH preparation: negative for "whiff test"
- HIV antibody test: negative
- Pregnancy test: negative

A 39-year-old man presented to the emergency department reporting several weeks of generalized weakness, headache, nausea, and migratory arthralgia. The patient had exclusively had sex with men, had participated in condomless anal insertive and receptive intercourse, and had been in a monogamous relationship during the past 6 months.

Physical examination revealed a painful ulcerated plaque on the upper lip, a macular rash with three crater-like scarred painless lesions (considered to be healing chancres) on the glans, a nonpruritic hyperkeratotic maculopapular palmar rash and bilateral submandibular lymphadenopathy. No alopecia, gummas, neurologic deficits or ocular or cardiovascular abnormalities were noted.

Ulcerated plaque on the upper lip. Results of laboratory testing included a positive reactive syphilis immunoglobulin G (IgG) enzyme immunoassay and a positive rapid plasma reagin (RPR) test (titer 1:256). Human immunodeficiency virus (HIV) testing was negative, and serologic testing demonstrated prior immunization to hepatitis B virus. Given the clinical presentation and laboratory findings, secondary syphilis was considered the most probable diagnosis.

The patient was treated with benzathine penicillin G 2.4 million units intramuscularly.





Clinical Case 23-1 Gonococcal Arthritis

Gonococcal arthritis is a common presentation of disseminated *Neisseria gonorrhoeae* infection. Fam and associates (*Can Med Assoc J* 108:319–325, 1973) described six patients with this disease, including the following patient, who has a typical presentation. A 17-year-old girl was admitted to the hospital with a 4-day history of fever, chills, malaise, sore throat, skin rash, and polyarthralgia. She reported being sexually active and having a 5-week history of a profuse yellowish vaginal discharge that was untreated. Upon presentation, she had erythematous maculopapular skin lesions over her forearm, thigh, and ankle, and her metacarpophalangeal joint, wrist, knee, ankle, and midtarsal joints were acutely inflamed. She had an elevated leukocyte count and sedimentation rate. Cultures of her cervix were positive for *N. gonorrhoeae*, but blood specimens, exudates for the skin lesions, and synovial fluid were all sterile. The diagnosis of disseminated gonorrhea with polyarthrititis was made, and she was successfully treated with penicillin G for 2 weeks. This case illustrates the limitations of culture in disseminated infections and the value of a careful history.

History

Tanya Walters is a 24-year-old single female who presented at her clinic with complaints of a smelly, yellow vaginal discharge and slight dysuria for one week.

- Denies vulvar itching, pelvic pain, or fever
- Has had 2 sex partners over the past 6 months—did not use condoms with these partners—on oral contraceptives for birth control
- No history of sexually transmitted diseases, except for trichomoniasis one year ago
- Last check-up one year ago

Physical Exam

- Vital signs: blood pressure 112/78, pulse 72, respiration 15, temperature 37.3° C
- Cooperative, good historian
- Chest, heart, breast, musculoskeletal, and abdominal exams within normal limits
- No flank pain on percussion
- Normal external genitalia with a few excoriations near the introitus, but no other lesions
- Speculum exam reveals a moderate amount of frothy, yellowish, malodorous discharge, without visible cervical mucopus or easily induced cervical bleeding
- Bimanual examination was normal without uterine or adnexal tenderness

Laboratory Results

Vaginal pH—6.0

Saline wet mount of vaginal secretions—numerous motile trichomonads and no clue cells

KOH wet mount—negative for budding yeast and pseudohyphae

A patient has been diagnosed with primary syphilis (Stage I). When assessing the patient, which of these findings will the healthcare provider anticipate?

Choose 1 answer:

☐ A Reddish rash on the palms of the hands

☐ B Firm and painless genital ulcers

☐ C Sore throat and swollen lymph glands

☐ D Muscle weakness and visual changes

Further reading:

- Oxford handbook of infectious diseases and microbiology-
Part4: Clinical syndroms
Chapter 18: Sexually transmitted infections
- Harrison's Infectious Diseases 3rd Edition
SECTION III Infections in organ systems
Chapter 35