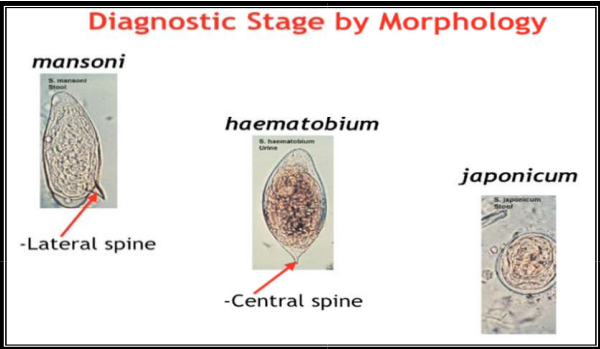
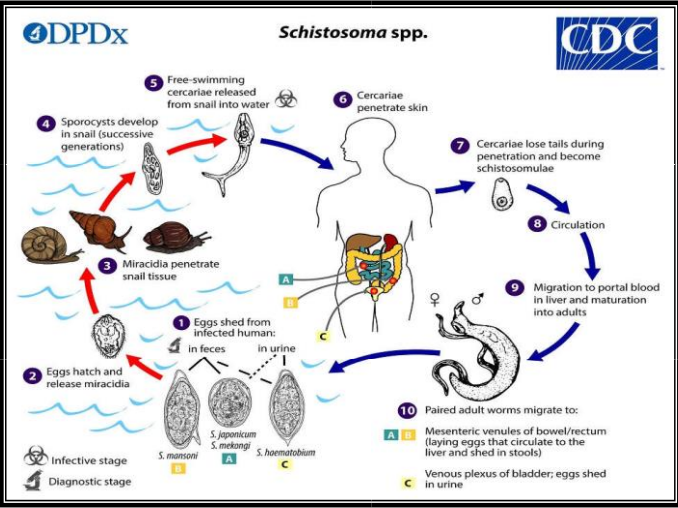




MICROBIOLOGY

DONE BY : Abdalkader Alshrouf

Schistosomiasis -Schistosoma haematobium (Blood flukes (schistosomes))

<p>Parasitology</p>	<ul style="list-style-type: none"> -The schistosomes are a group of closely related flukes that inhabit the portal vascular system of a number of animals. -Each pair deposits 300(S mansoni, S haematobium) to 3000 (S japonicum) eggs daily for the remainder of its 4- to 35-year life span. - S. japonicum enters the superior mesenteric vein. - S. mansoni and S. haematobium go to inferior mesenteric system. -Schistosoma japonicum—veins of small intestines -Schistosoma mansoni—portal veins of colon and rectum -Schistosoma haematobium—veins of bladder and pelvic organs -Excluding blood flukes, trematodes are hermaphroditic
	<p style="text-align: center;">Diagnostic Stage by Morphology</p>  <p style="text-align: center;"> <i>mansoni</i> <i>haematobium</i> <i>japonicum</i> -Lateral spine -Central spine </p>
<p>Life cycle</p>	<p>-Egg...miracidia.....snail..... cercariae....skin.... schistosomula.....circulation</p>  <p style="text-align: center;">Schistosoma spp.</p> <p>1 Eggs shed from infected humans: in feces (A) or in urine (C)</p> <p>2 Eggs hatch and release miracidia</p> <p>3 Miracidia penetrate snail tissue</p> <p>4 Sporocysts develop in snail (successive generations)</p> <p>5 Free-swimming cercariae released from snail into water</p> <p>6 Cercariae penetrate skin</p> <p>7 Cercariae lose tails during penetration and become schistosomulae</p> <p>8 Circulation</p> <p>9 Migration to portal blood in liver and maturation into adults</p> <p>10 Paired adult worms migrate to:</p> <ul style="list-style-type: none"> A Mesenteric venules of bowel/rectum (laying eggs that circulate to the liver and shed in stools) B Venous plexus of bladder; eggs shed in urine C <p>Legend: Infective stage (miracidia, sporocysts, cercariae, schistosomulae, adults), Diagnostic stage (eggs)</p>
<p>PATHOGENESIS</p>	<ul style="list-style-type: none"> -There are three major clinicopathologic stages in schistosomiasis. 1-The first stage is initiated by the migration of the schistosomula. 2-The second or intermediate stage begins with oviposition and is associated with a complex of clinical manifestations. 3-The third or chronic stage granuloma formation and eggs.
<p>S japonicum infection</p>	<p>Katayama Syndrome</p> <ul style="list-style-type: none"> -clinical manifestations of encephalitis. Typically, leukocytosis, marked peripheral eosinophilia, and elevated levels of IgM, IgG, and IgE immunoglobulins are present..

DIAGNOSIS	<ul style="list-style-type: none"> -Definitive diagnosis requires the recovery of the characteristic eggs in urine, or biopsy. filtering the urine through a membrane filter. -Cystoscopy with biopsy of the bladder mucosa may be required for the diagnosis of mild infection -Conventional serologic tests cannot distinguish active from inactive infection.
Treatment	<ul style="list-style-type: none"> -No specific therapy is available for treatment of schistosomal dermatitis. -Antihistamines and corticosteroids may be helpful in ameliorating their more severe manifestations -Several antihelmintic agents may be used. -Praziquantel, which is active against all three species of schistosomes, is the agent of choice, although there is increased resistance to this single mass therapy programs. (C/I pregnancy)

-Important notes:

1-intermediate host is snail, infective stage is cercaria and diagnostic stage is egg.

2-The 1 to 2 cm male possesses a deep ventral groove, or "schist.". Within this gynophore canal it carries the longer, slenderer female in lifelong copulatory embrace.

3-notes about stages:

a. Early Stage (within 24 hours):

– Penetrating the skin, immediate and delayed hypersensitivity, results in an intensely pruritic popular skin rash, As the viable schistosomula begin their migration to the liver, the rash disappears for 1 to 2 weeks.

b. Intermediate Stage (One to two months):

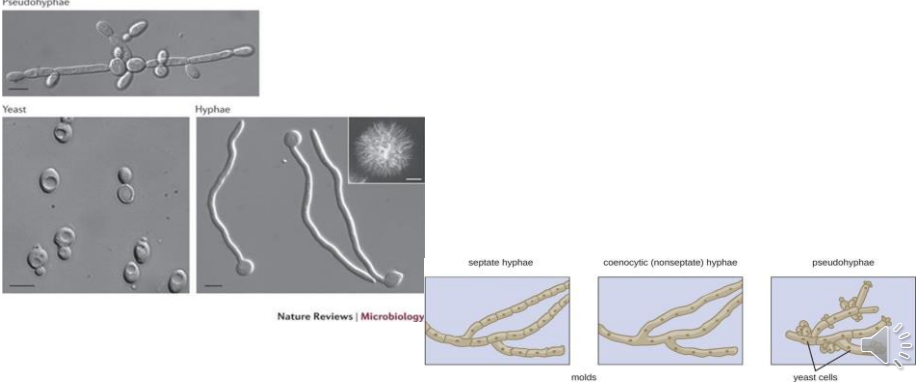
-an acute febrile illness that bears a striking resemblance to serum sickness. – fever and chills, – patients experience cough urticaria, arthralgia, splenomegaly, abdominal pain, and lymphadenopathy, splenomegaly diarrhea. – The onset of oviposition leads to a state of relative antigen excess, the formation of soluble immune complexes, and the deposition of these in the tissues of the host.

c. Chronic Stage:

-Soluble antigens excreted by the eggs stimulate the formation of T lymphocyte–mediated eosinophilic granulomas.

-Early in the infection, the inflammatory response is vigorous, producing lesions more than 100-fold larger than the inciting egg itself.

Candidiasis & Candida albicans

<p>-General inf:</p>	<p>The <i>C. albicans</i> cell wall is made up of:</p> <ul style="list-style-type: none"> – a mixture of the polysaccharides mannan, glucan, and chitin alone or in complexes with protein. -The exact composition of the cell wall and surface components varies under different growth and morphologic conditions. <p>Hyphae</p> <ul style="list-style-type: none"> – secrete proteinases and phospholipases that are able to digest epithelial cells and facilitate invasion. -<i>C. albicans</i> has protein surface receptors that bind the C3 component of complement in an anti opsonic manner.
<p>-Shapes of hyphe</p>	 <p>The image displays various morphological forms of <i>Candida albicans</i>. At the top, a micrograph shows 'Pseudohyphae' as long, thin, branched chains of cells. Below this, two panels show 'Yeast' (individual round cells) and 'Hyphae' (long, thin, branching structures). At the bottom, three diagrams illustrate different hyphal types: 'septate hyphae' (molds), 'coenocytic (nonseptate) hyphae' (molds), and 'pseudohyphae' (yeast cells).</p>
<p>EPIDEMIOLOGY</p>	<ul style="list-style-type: none"> -<i>C. albicans</i> is a common member of the oropharyngeal, gastrointestinal, and female genital flora (30-50% of healthy person). -Infections are endogenous except in cases of direct mucosal contact with lesions in others (e.g., through sexual intercourse). -Although <i>C. albicans</i> is a common cause of nosocomial infections, the fungi are also derived more frequently from the patient's own flora.
<p>PATHOGENESIS</p>	<ul style="list-style-type: none"> -Because <i>C. albicans</i> is regularly present on mucosal surfaces, disease implies a change in the organism, the host, or both. -Shift from yeast to hyphae is associated with enhanced pathogenic potential of <i>C. albicans</i> (invasion) -<i>C. albicans</i> hyphae have the capacity to form strong attachments to human epithelial cells, mediated by a surface mannoproteins; hyphal wall protein (Hwp1) found only on surface of germ tubes and hyphae & extracellular matrix.
<p>MANIFESTATIONS</p>	<ol style="list-style-type: none"> 1-Superficial invasion of the m. membranes produces a usually painless, white, cheesy plaque called thrush that is loosely adherent to the mucosal surface 2--Vaginal candidiasis (vulvovaginitis) produces a thick, curd-like discharge and itching of the vulva. Vaginitis may be recurrent. 3-Chronic mucocutaneous candidiasis is associated with specific T-cell defects. Inflammatory patches similar to thrush may develop in the esophagus and intestine with or without associated oral candidiasis. <ul style="list-style-type: none"> -Painful swallowing and substernal chest pain are the most common symptoms Urinary tract infections are ascending or hematogenous may produce cystitis, pyelonephritis, abscesses, or expanding fungus ball lesions in the renal pelvis.

	4-Endophthalmitis appears as white cotton on the retina. Endophthalmitis and infections of other eye structures can lead to blindness.
DIAGNOSIS	-KOH and Gram smears of superficial lesions show budding yeast and hyphae. -Cultures from specimens such as sputum run the risk of contamination from the normal flora or a superficial mucous membrane lesion. -Lung involvement requires a direct aspirate, biopsy, or bronchoalveolar lavage
TREATMENT	C. albicans is usually susceptible to: – nystatin, amphotericin B, flucytosine, and the azoles.

-Important note:

- The most common opportunistic infections are caused by the yeast *Candida albicans*
- a common inhabitant of the gastrointestinal and genital floras

Gonorrhoea

General:	<ul style="list-style-type: none"> -Similar risk factors -Multiple sexual partner \Unprotected sex \Highest rate in Female 15-19 and male 20-24 - 50% of infected women are asymptomatic • 95% of infected men have symptoms
Properties:	<ul style="list-style-type: none"> -Neisseria are gram-negative diplococci (Bean or kidney shaped). -Non motile, non-spore forming -Incubation period 1-14 days -Humans are only reservoir, not part of normal flora -It attaches via pili and penetrates within 1-2 days -There is a neutrophilic response which creates a purulent discharge -Gonococci are very sensitive to heating or drying. Cultures must be plated rapidly. -Causes disease only in humans. -Killed by drying that's why transmitted sexually. -Non-sexual transmission is extremely rare.
Clinical Findings:	<ul style="list-style-type: none"> -N. gonorrhoea causes following infections: 1. Genitourinary tract infections (Gonorrhoea) stream. 2. Rectal infections. 3. Pharyngitis 4. Ophthalmia neonatorum 5. Disseminated infection via spread through blood
Symptoms:	<ul style="list-style-type: none"> -In men: -The first noticeable symptom in men is often a burning or painful sensation during urination. Other symptoms may include: -Frequency or urgency of urination -a pus-like discharge (or drip) from the penis (white, yellow, beige, or greenish) -swelling or redness at the opening of the penis -swelling or pain in the testicles -Symptom begins 2-7 day -Many men experience acute symptoms (95%) -in women: -Discharge from the vagina -Pain or burning sensation while urinating -The need to urinate more frequently -Pain upon engaging in sexual intercourse -Sharp pain in the lower abdomen -Fever -Symptoms are often mild, but some women (50%) have no symptoms at all -Even when symptoms do occur, they are often mistaken for a bladder or vaginal infection - The most frequent complication is ascending infection to the uterine tubes (salpingitis) which can lead to sterility or ectopic pregnancy
-Complications of gonococcal infection:	<ul style="list-style-type: none"> -in males: Acute: 1-Urethral stricture. 2. Infertility (scarring and block sperm passage). chronic: 1-Infection of the glands. 2. Ascending infection (prostatitis, cystitis, epididymitis). 3. Infection of adjoining structures (periurethral abscess and infection of median raphe). -Complications in Women: -Accessory gland infection

	<ul style="list-style-type: none"> -Bartholin's glands -Skene's glands -Pelvic Inflammatory Disease (PID) -Fitz-Hugh-Curtis Syndrome -Perihepatitis
DIAGNOSIS:	<p>-LABORATORY:</p> <p>a.Specimens collected:</p> <ul style="list-style-type: none"> -In men: <ul style="list-style-type: none"> •Urethral exudate •Urethral scraping(loop r special swab) -In women: •Cervical swabs -In the male, the finding of numerous neutrophils containing gram negative diplococci in a smear of urethral exudate provides a diagnosis of gonococcal infection. -Diagnostic if gram negative diplococci are seen within polymorphonuclear leukocytes (95% sensitivity) -n the female a positive culture is also needed. <p>b.Culture:</p> <ul style="list-style-type: none"> - N. gonorrhoeae grows best under aerobic conditions, and most strains require CO2 also. <p>c.Media used:</p> <ul style="list-style-type: none"> a) Non selective media: Chocolate agar, Mueller-Hinton agar. b) Selective media: Thayer Martin medium (e.g. Martin Lewis agar) with antibiotics (Vancomycin, Colistin & Nystatin). <p>d.biochemical reactions: 1) Oxidase test: Positive 2) Ferments only glucose but not maltose</p> <p>e.DNA probes</p> <ul style="list-style-type: none"> -High sensitivity and specificity -Concurrently test for N. gonorrhoea and C. trachomatis with a single specimen -More widely used than cultures... and cost is similar
TREATMENT	<ul style="list-style-type: none"> -All recommended therapies are given as a single dose -Should be given to symptomatic patients at the time of testing -Single dose (ceftriaxone\Cefixime (suprax)) + chlamydia coverages (Azithromycin or Doxycycline)
Prevention	<ul style="list-style-type: none"> -The prevention of gonorrhoea involves the use of safety measures and the immediate treatment of symptomatic patients and their contacts. a.Condom provide high degree of protection b.spermicide, vaginal foam: not reliable protection

-Important notes:

- 2 nd most common STIs
- Chlamydia is the most common STIs
- Gonorrhoea is spread through contact with the penis, vagina, mouth, or anus.
- Ejaculation does not have to occur for infection to occur. •An infected mother may transmit gonorrhoea to her newborn during childbirth, a condition known as ophthalmia neonatorum
- This may cause blindness, joint infection, or a life-threatening blood infection in the baby.

Chlamydia trachomatis

<p>general</p>	<p>-round cells between 0.3 depending on the replicative stage. -lack the peptidoglycan layer -obligate intracellular parasites 3 and 1 µm in diameter</p>
<p>REPLICATIVE CYCLE</p>	<p>-Involves two forms of the organism: a. Elementary body (EB): a small, hardy metabolically inert infectious form b. the Reticulate body (RB): larger fragile intracellular replicative form -steps: -The EB attaches to unknown plasma membrane (usually columnar or transitional epithelial cells). -It then enters the cell in an and begins the process of replicative RB. attaches to unknown receptors on the usually columnar or transitional epithelial cells). -the cell in an endocytotic vacuole and begins the process of converting to the replicative RB. -As the RBs increase in number, the membrane expands by fusing Golgi apparatus eventually inclusion body. After 24 reverses and the RBs reorganize yield multiple EBs. -in number, the endosomal fusing with lipids of the eventually forming a large 24 to 72 hours, the process RBs reorganize and condense to yield multiple EBs.</p>
<p>EPIDEMIOLGY</p>	<p>-C. trachomatis causes disease in several sites, including the conjunctiva -It is the most common sexually transmitted disease. -Humans are the sole reservoir. -Neonatal conjunctivitis maternal genital infection newborn infants). -causes disease in several sites, conjunctiva and genital tract. -It is the most common sexually transmitted sole reservoir. Neonatal conjunctivitis contracted from maternal genital infection (2 to 6 % of newborn infants)</p>
<p>PATHOGENESIS</p>	<p>Chlamydiae: -endocervix and upper genital tract -the urethra, rectum and conjunct. IMMUNITY: C. trachomatis infections do in protection against reinfection upper genital tract of women, conjunct. of both sexes. infections do not reliably result</p>
<p>CLINICAL ASPECTS</p>	<p>1-Genital Infections: -The clinical spectrum of sexually transmitted infections with C. trachomatis is similar to that of Neisseria gonorrhoeae, C. trachomatis. -cause urethritis and epididymitis in mens -cervicitis, salpingitis, and a urethral syndrome in womens 2-Conjunctivitis(trachoma) 3-Infective arthritis 4-Reactive arthritis (Ab attack the joint): -Reiter's syndrome • You cannot see • You cannot pee • You cannot climb a tree</p>
<p>DIAGNOSIS</p>	<p>-Epithelial cells from the site of infection required for detection. -For genital infections cervical specimens are preferred in females and urethral scrapings in males.</p>

	<p>-Isolation of <i>C. trachomatis</i> has been the “gold standard” for diagnosis. .It is achieved in cell culture.</p> <p>-Ligase chain reaction (LCR) or polymerase chain reaction (PCR): the most sensitive, most specific methods of diagnosis.</p>
Treatment	<p>1-non-LGV <i>C. trachomatis</i> infection: Azithromycin</p> <p>2-pregnant women and infants: Erythromycin</p> <p>3-drug of choice for treating LGV: doxycycline</p> <p>-tetracyclines, macrolides and some fluoroquinolones doxycycline</p>

Important note:

- is the most important human pathogen as a major cause of genital infection and conjunctivitis.
- trachoma, is the leading preventable cause of blindness in the world.
- Transmission direct contact.
- C. trachomatis* urethritis: dysuria, a thin creamy urethral discharge
- Infections of the uterine cervix may produce vaginal discharge, usually asymptomatic.
- Ascending infection in the form of and pelvic inflammatory disease estimated estimated 5 to 30% of infected women
- The scarring produced by chronic or repeated infection is an important cause of sterility and ectopic pregnancy.
- three strains of *C. trachomatis* cause Lymphogranuloma venereum LGV: L1, L2, or L3.**
- It is characterized by – transient genital lesions – followed by multilocular suppurative involvement of the inguinal lymph nodes.
- The primary genital lesion is usually a small painless ulcer or papule, which heals in a few days. Abscesses, strictures, fistulas if chronic.
- More than 50% of all infants born to mothers excreting *C. trachomatis* during labor show evidence of infection during the first year of life.
- Most develop inclusion conjunctivitis but 5 -10% develop infant pneumonia syndrome.

Ureaplasma urealyticum

general	<ul style="list-style-type: none"> -lacks a cell wall. -the smallest of free-living microorganism. -cause genitourinary tract infections. -highly pleomorphic, – may appear as coccoid bodies, filaments, and large multinucleoid forms. -contains sterols. -Ureaplasma is distinguished from Mycoplasma by its production of urease
EPIDEMIOLOGY	-The main reservoir of human strains is the genital tract of sexually active men and women.
MANIFESTATIONS	<ul style="list-style-type: none"> -One half of cases of nongonococcal nonchlamydial urethritis by U. urealyticum. -In women, Ureaplasma cause has been shown to chorioamnionitis and postpartum fever -The organism has been isolated from 10% of women with the latter syndrome.
DIAGNOSIS AND TREATMENT	-Tetracycline is the treatment of choice because it is also active against Chlamydia

Gardnerella vaginalis

General	<ul style="list-style-type: none"> -facultatively anaerobic -gram-variable rod. -one of the organisms responsible for vaginosis. -Most common vaginal infection -It is overgrowth Gardnerella vaginalis one of the organisms responsible for bacterial
PATHOGENESIS	<ul style="list-style-type: none"> -Bacterial vaginosis (BV): -formerly known as nonspecific vaginitis was named because bacteria are the etiologic agent in this infection and an associated inflammatory response -BV is the most common is cause of vaginitis. -BV is known to be a synergistic polymicrobial infection. Some of the associated bacteria include Lactobacillus species and anaerobes. -Vaginal flora becomes altered, causing an increase in the local pH. -This may result from a reduction in the H₂O₂ producing lactobacilli.
notes	<ul style="list-style-type: none"> It is associated microscopically with clue cells (epithelial cells covered in bacteria.) -Although BV is not considered a sexually transmitted disease. -sexual activity has been linked to development of this infection.
DIAGNOSIS	<ul style="list-style-type: none"> -A wet mount preparation of physiologic saline mixed with vaginal secretions examined under low- and high objectives. -The characteristic "clue cells" are identified as numerous stippled or

	granulated epithelial cells. -Cultures are seldom necessary to establish a diagnosis
TREATMENT	Metronidazole The drug is contra-indicated during early pregnancy and lactation

important:

- Symptoms of infection typically include a gray thin, and homogeneous thin, adherent to the vaginal mucosa, associated with a "musty" or "fishy" odor.
- there is little vulvar or vaginal irritation associated with this infection,
- the pungent odor is usually the chief complaint.