Micro summary

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Slides : 7 , 8 , 9

بسم الله الرحمن الرحيم

Our brilliant colleagues, these slides are the summary of DR.Asem's material after the mid-term exam .They are based on the sheets and Farah summary is based on the book. We would like to thank the sheets writers for their efforts but we came up with this idea because we don't have much time to study the whole sheets for the final material. Final Exams are coming, study well o betawfeeGGG☺.

Important: Don't forget the notes that the Dr already added under the slides in (type a note box) because they don't appear neither in the pdf copy nor the printed copy (there are many notes)

Writers

- Baha’ Al-Shraideh
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- Sheets : (17 to part of sheet29)
- Mycology slides are not summarized
- Slide 6 ……by Nada Al-shrief
- Slide 7 and 8 ……by Farah Bilal
- Slide number 9 …. by Baha al-shraydeh,Heba Al-Atrash and Aseel alkhateeb .
- Midterm Questions …. By Majida Al-foqara’
- We apologize for slides number 5 and 10 because their writers couldn’t have enough time to do them

Slide number 7
By Farah Bilal

1-Haemophilus Group

- Gram-negative cocco/large- thin bacilli.. Micro-aerophilic.. Requires growth factors (**V- X-factors**)..Red blood cells, Grow around hemolytic *Staphylococcus*, Rapid autolysis outside body. Hemophilus means it loves the blood so it needs a bloodmedium for growth.
- **Normal Flora**.. Human Upper Respt.Tract. There are Many species Haemophilus a,b,c,.. B is BAD
- opportunistic pathogens and have virulence factors like Endotoxin & Capsule and cause localized-invasive infections.

Continued

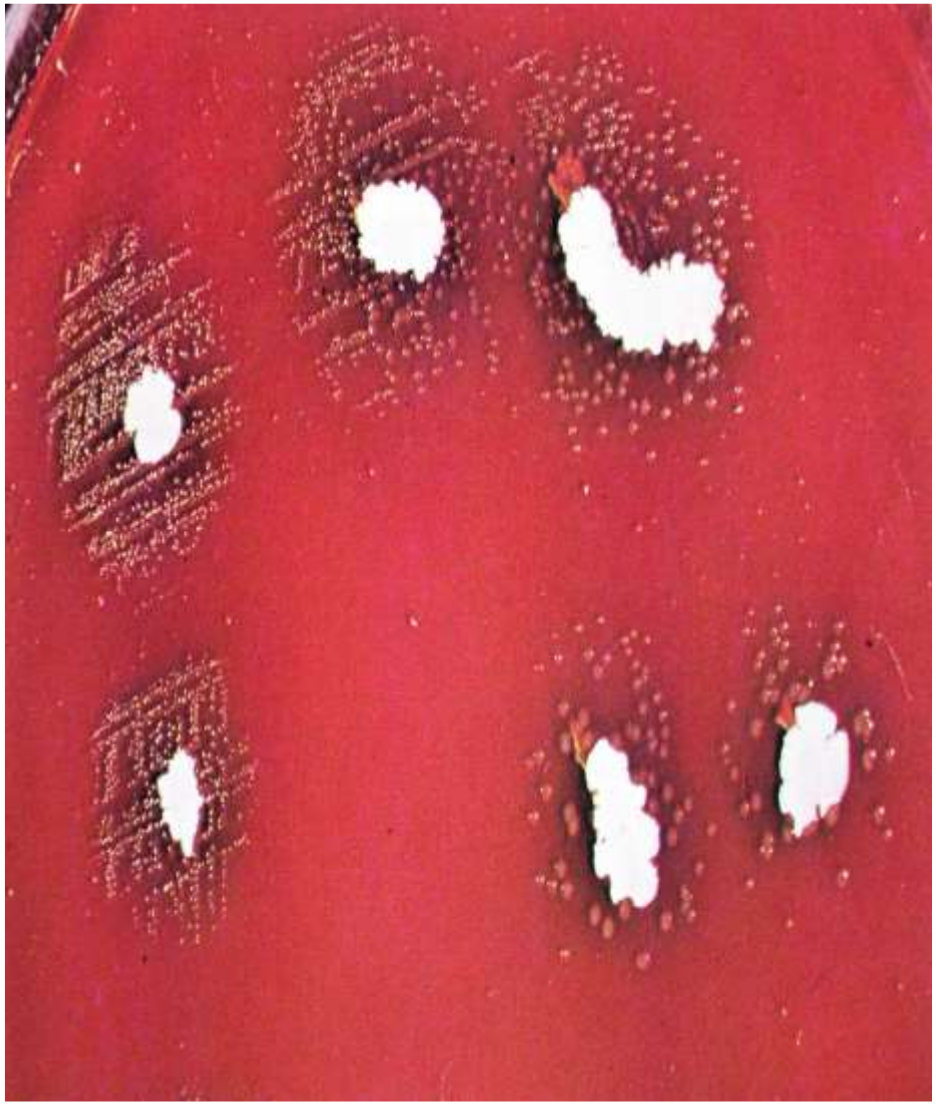
H. influnzae type b: Most common pathogenic species, capsulated, Causing Localized and Invasive Infection like Sore Throat, Otitis Media, Sinusitis, Conjunctivitis, Brochopneumonia, Septicemia & Meningitis for Children 6 Months-5 Years.

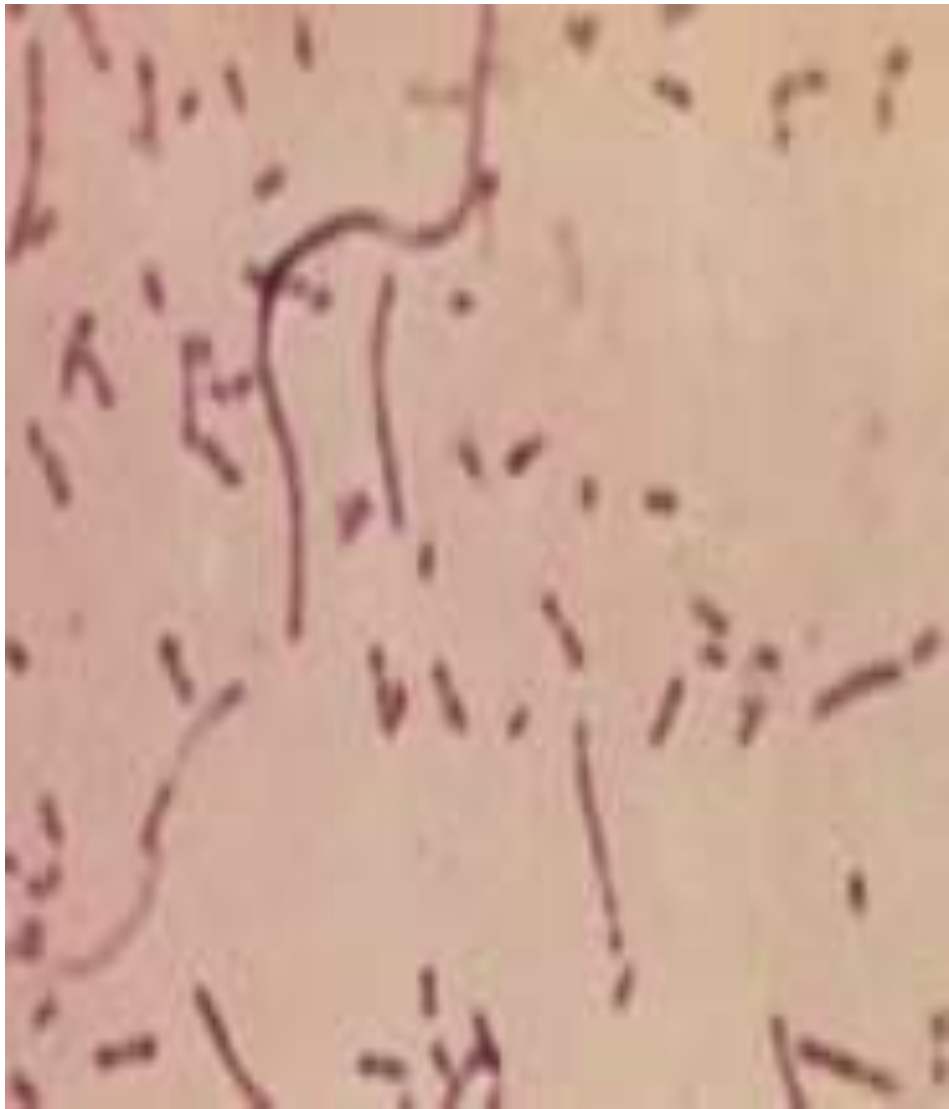
Treated by Antibiotics : Serious infection: Cefotaxime and Ceftriaxone and for Less serious Amoxicillin and Ampicillin

Lab Diagnosis: Blood, CerebroSpinalFluid & Others Culture.. Chocolate & blood agar included X & V Factors.. Hib-Vaccine for Infants > 2 months old. HIB HIIB HURRAY

- H.Influenza & Pertussis ARE COCCI-BACILLI
- Neisseria IS THE INLY PATHOGENIC GRAM-NEGATIVE COCCI

Haemophilus colonies growth surrounding Stapholococcus colonies





Bordetella pertussis

- Gram-negative coccbacilli.. Aerobic.. Highly in human Communicable agent: Droplets Infection or by close contact.
- Bacteria attach to lower respiratory tract mucosa. Incub. period 7-10 days causes Destruction for tracheal ciliated cells by releasing Pertussis toxin (cytotoxin).
- **Pertussis** start by mild coughing, sneezing then intense cough (Whooping / paroxysmal cough), vomiting and red eyes.
- Infants & Children are more susceptible to infection than adults, high fatal in Adults than in children.
- Antibiotics –erythromycine- are useful in first stage. **Prevention by** DTP vaccine within first 2 -4-6 Months
- **Diagnosis**: Clinical signs and Symptoms.. Less Culture & Lab tests.

Neisseriaceae is composed of 5 genera menhum: Neisseria & Moraxella Groups

- **Neisseria** spp and **Moraxella spp.:** Gram-negative diplococci –each cocci is kidney shaped and both of them stick togather from their concave sides forming a doughnut like, Facultative anaerobes, Oxidase & Catalase+ve, Highly susceptible to Low/High Tempt… Dryness, Rapid Autolysis.
- Lives at Room Tempt.
- Normal Flora Respiratory Tract.. Rare Non-pathogens (N. sicca, N. flava, M. Mucosa).
- Common Pathogens are : ***N. gonorrhea and N. meningitidites***.

1. **N.gonorrhea:**virulence factors: (continued)

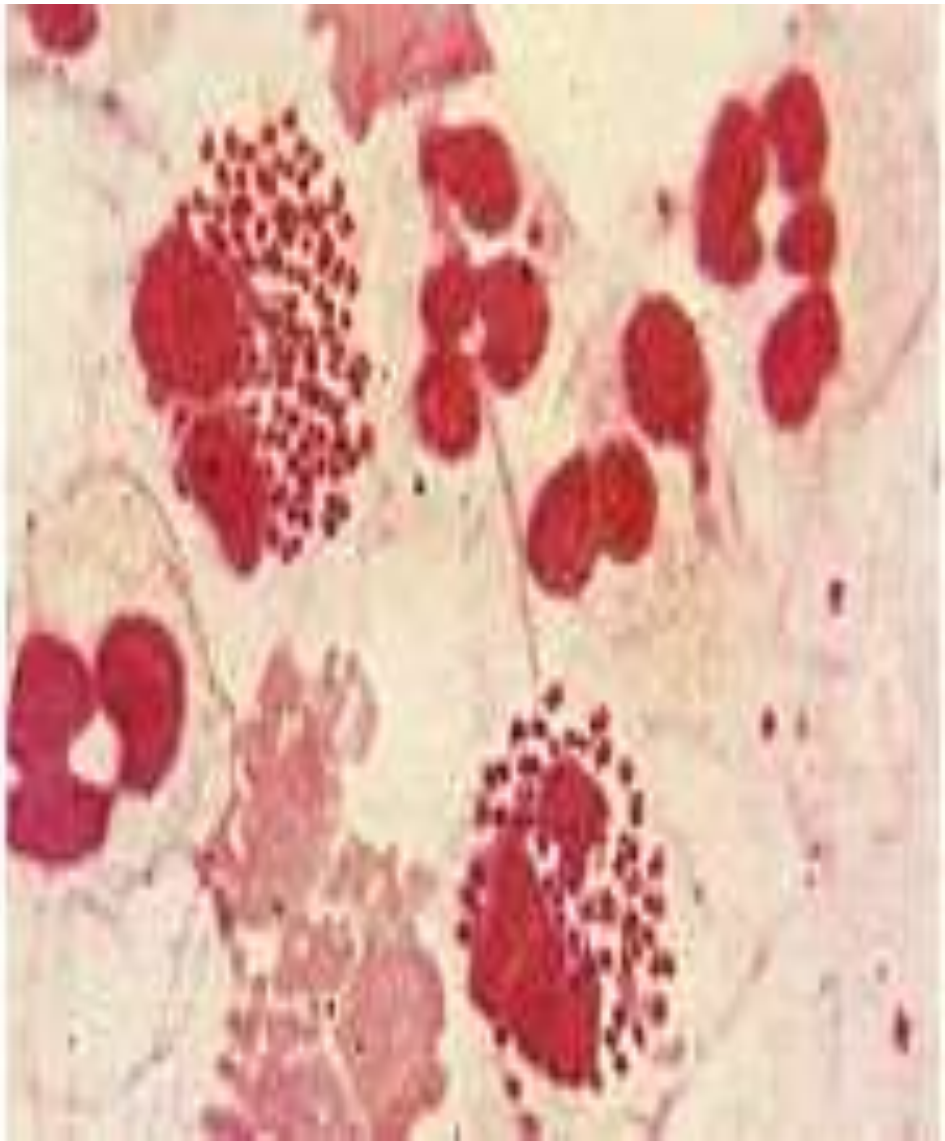
Pili helps in adhering to epithelium and protects it from antibodies and phagocytosis, IgA-Protease, LPS.

Colonization in Mucosa of UGT.. Invasion after destruction the epithelium and causing Inflammation in Genitourinary Tract, Rectum, Throat.

It's a Sexually Transmitted Disease:can be Acute/Subacute/Asymptomatic Infections..

Symptoms :Uretral/Vaginal Discharge, Urethritis, Cervicitis, Salpengitis.. Common Reinfection..

Neisseria Gramstain-Intracellular Presence in Urethral Discharge



- **Lab diagnosis**: Direct Gram-stain, Intracellular G-ve diplococci in WBCs (pus cells), Rapid Culture in Blood/chocolate Agar.
- Treated by Antibiotics, No Vaccine.

2- N. meningitidites: Virulence factors are:

1. Capsular Polysaccharides, has many Serotypes A,B,C,..
2. LPS .. Endotoxin that cause vessels destruction >hemorrhage>> sepsis
3. IgA-Protease.. Cleaves IgA in half.

- Invasive and causes Exogenous Infection in Respt.Tract, Sore Throat, Septicemia, Meningitis.
- Acute disease with high Mortality without treatment.
- Children (6-Months-5 years) more susceptible than adults. Epidemic outbreaks.
- Protective Vaccine is available.

3- M. catarrhalis: it's from other genera in neisseriaceae which is Moraxella

Part of normal Respiratory tract.. Opportunistic pathogen.

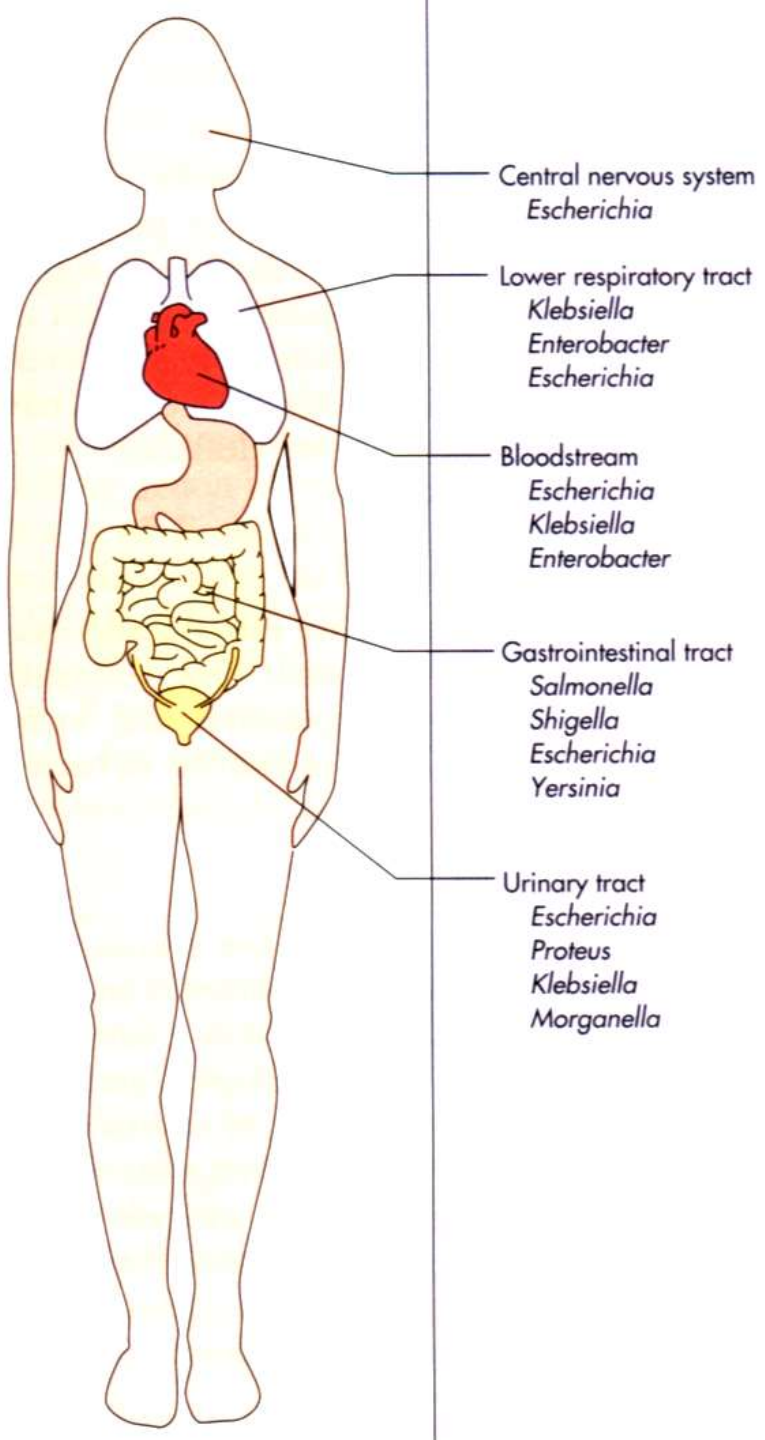
causes Pneumonia and Rarely Septicemia. In Compromised Lung/heavy smokers, like COPD and Emphysema. And also it's one of the causes for otitis media

Lab Diagnosis: Direct-Gram-stain, Culture Blood/ chocolate Agar, Biochemical tests, Antibiotics is used for treatment.

Slide number 8 by Farah Bilal

Enterobacteriaceae
E.coli -
Klebsiella-Enterobacter species -
Proteus-Providencia species -
Salmonella and Shigella -

Pseudomonas aeruginosa
Vibrio cholerae
Campylobacter
Helicobacter
Brucella



Enteric Bacteria (Escherichia, Klebsiella, Enterobacter, Proteus, Salmonella, Shigella, Yersinia)

- **General Characteristics**:

- Gram - ve bacilli,
- Facultative anaerobes,
- Intestinal normal flora..
- Humans, animals, birds..
- Found Commonly in waste water, natural water, soil, vegetation.
- Classified to : Lactose fermenters –E.coli- and Lactose non fermenters –Salmonella,Shigella,P.aurgionsa-
- Catalase +ve & Oxidase –ve

- **Opportunistic Pathogens & Obligate Pathogens**

- Causing all types of human infection and diarrhea, and they can be common nosocomial infections –hospital acquired pathogens-.

Pathogenicity: •

Various Enterotoxins, -

Endotoxins -

Capsule, K-antigen -

Flagella, H-antigen -

O-antigen, the most Out antigen. All of the O-H-K-Antigens. -

Develop specific antibodies following blood infections

-

1. ***Escherichia coli***: Causes :

Common Urinary Tract Infection (40-80%). .1

Septicemia,Wounds. .2

Neonatal Meningitis-3 causes this : E.coli,Listeria, group B .3 Streptococcos-

Diarrheagenic E. coli Types

6 major types causing diarrhea: 3 Common types depend on what virulence factors E.coli possesses.

1- Enteropathogenic (EPEC)

- Caused by Numerous strains (mostly infants 1-6 months),Watery diarrhea, less Vomiting.
- Chronic cases/ fatal.

2-Enterotoxigenic (ETEC): 'like rice water'

- Virulence factors are: Heat-labile and heat-stable enterotoxins, these inhibit the reabsorption of Na+ and stimulate secreting of Cl- and HCO3- and water follows the osmotic pull of these ions ending up with a severe watery diarrhea. Happens in Children more than adults, and called Traveler's diarrhea.

- It happens because of fecal water contamination /vegetables / fresh food so it's an Indicator standard of hygiene,

-Self-limited diarrhea and no antibiotics treatment.

3 Enterohaemorrhagic (EHEC): caused by a strain called E.coli O157:H7, virulence factor is chiga-like toxin which is similar to that found in shigella and also called Verotoxins. These toxins are inhibiting protein synthesis in the epithelium so leading to intestinal cell death.

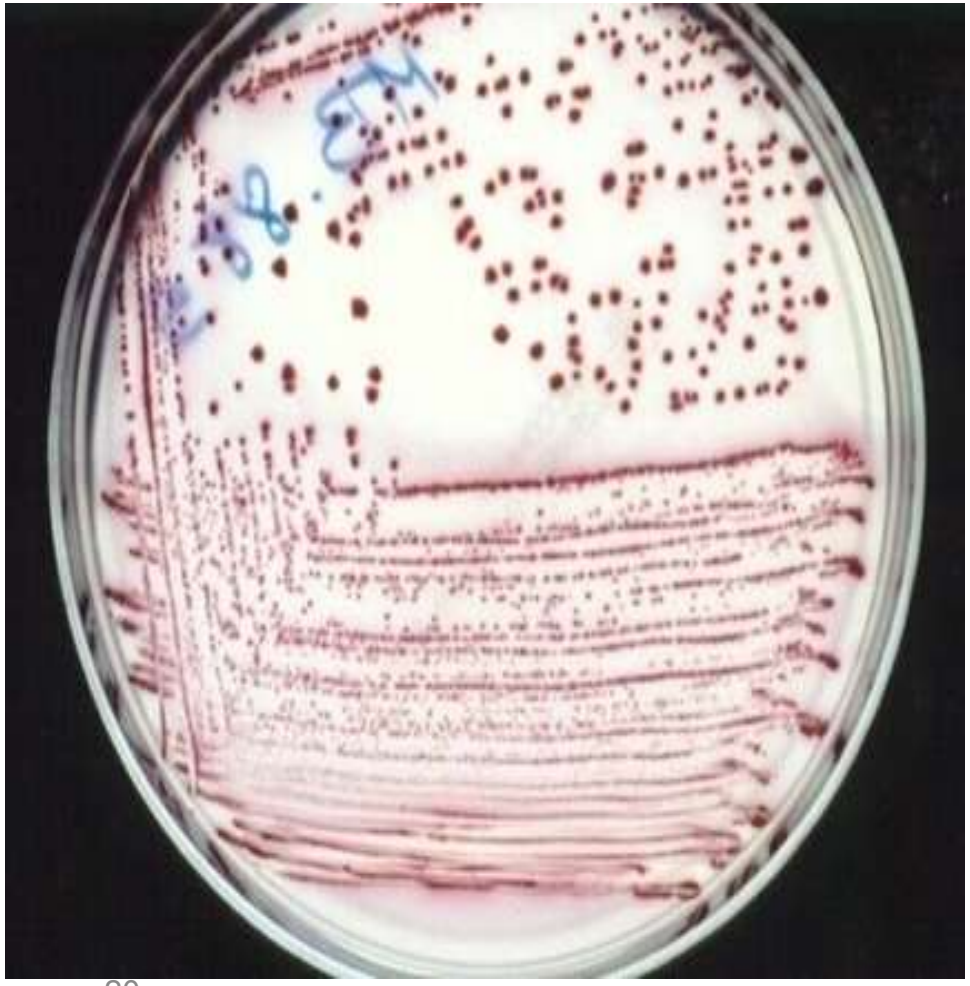
Common in intestinal Cattle.

Contamination Ground meat/Hamburger, Dairy products

Results in bloody diarrhea, Haemolytic-uremic syndrome (HUS) -uremia and anemia, ...-.

fatal.

E. coli Culture – Red color on MacConkey agar indicates Lactose positive & Gram-stain



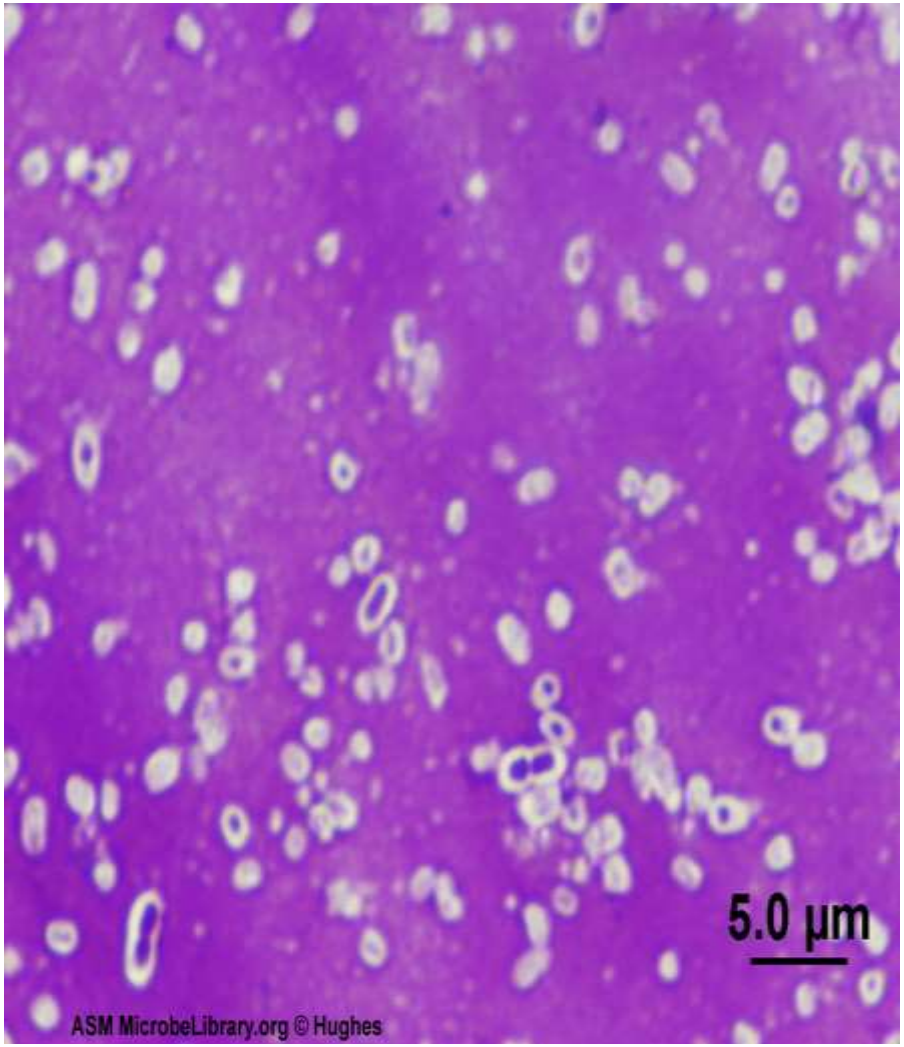
2. ***Klebsiella - Enterobacter species*** :

- Causes UTI, Septicemia-second cause after E.coli-, Wounds.
- Rarely cause Meningitis.
- Common in Hospitalized patients.
- Encapsulated *K. pneumoniae –k antigen- causes* Nosocomial infections and Pneumonia.

3. ***Proteus-Providencia species***:

- common cause of UTI and hospital acquired infections -nosocomial- and causes Septicemia, Wounds.
- Proteus causes renal stones. Urease positive –it is able to break down urea and examination of urine will reveal an alkaline pH because of Urease activity-.

E. coli- Flagella- Fimbriae - Pili
Klebsiella pneumonia-Capsule



3. Pseudomonas group

Pseudomonas species :

- Gram-ve bacilli.
- Facultative anaerobe.
- oxidase+ve and Lactose-ve.
- Found in soil, water, plants , animals.
- Survive under harsh condition, including Alcohol used in aseptic procedure. More than 20 pseudomonal species can cause human infections.
- ***P. aeruginosa*** : is an opportunistic pathogen –it won't infect a healthy person, only sick and immunocompromised patients.-
- Colonize in URT & intestine humans.

Produce blue-green pigmention / pyocyanin-the blue one's name- and fluorescein.
Release many enzymes.
It is the most common species causes a clinically significant infection.'you will hear so much about this bugthatyou'll wish god had never conjured it up'
often causing nosocomial infections, serious and often life-threatening diseases.
Wound-burn wounds-, blood sepsis, pneumonia, External ear infection, Urinary catheters, endotracheal tubes. Common in intravenous [IV] line abusers.
BE PSEUDO : Burns > Endotracheal tubes > Pneumonia > Sepsis > External otitis media > Uti > Diabetic psteomyyelitis
Innate resistance to many antibiotics and Develop rapidly resistance to antimicrobial agents. Resistant to almost every antibiotic

4. Shigella group

Common serotypes: **S. *Sonnei, S.boydii, S. dysenteriae***

- Gram -ve, Lactose-ve and doesn't produce H2S with S-S agar.
- Susceptible to dryness, acidity, Low-High Temperature.
- Fecal-Oral infection through contaminated Water and fresh Vegetations.
- Few serotypes.
- Infect only humans. Incubation 1-2 Days

Pathogenicity:

- Endo/Enterotoxins released in intestine –like EHEC inhibit protein synthesis so killing the cells by shiga toxins- causing Purulent-Bloody-Diarrhea. (bacillary dysentery) with abdominal pain, fever, not invasive.
- No chronic or healthy carriers.
- Sanitation & hygiene food and Foodhandlers.

Continued

S. dysenteriae (Shiga type toxins) •

- Enterotoxin /Neurocytotoxin, causes Severe intestinal Necrosis, Fever, Severe Purulent-Bloody-Diarrhea, Abdominal Cramps, CNS. Rare Septicemia.. Can be fatal without treatment.

Lab Diagnosis:

Rapid culture Feces/rectal swabs on S-S Agar, Hektoen –Enteric Agar.. Recommended Antimicrobials Treatment.. Prevention through Control

5. Salmonella group

- Gram-ve bacilli.
- Facultative anaerobes.
- Lactose-non fermenters.
- Virulence factors like (Endotoxin / LPS).
- Common in Nature (water and soil), Humans, Animals, Birds.
- They are not part of the normal human flora.-according to the book this is not really true exept for salmonella typhi, because it's part of the normal GI animals flora and transmitted to us through contaminated food or uncooked eggs! Only typhi ones are found only in human – not zoonotic-.
- O/H Antigens with specific antibodies. –O is protection it from antibodies and H is for motile 'like salmon'-
- Pathogenic when ingested causing enteritis-gastroenterotitis-, systemic infections and enteric fever.
- Types : 1- S.typhi 2-S.enterecia 'non typhi'

- **1. *S. enterica/enteritidis* : causes Nontyphoidal Salmonellosis / Gastroenteritis fom Food-poisoning.**
- This group contains almost 2000 Serotypes.
- Zoonotic –infectious disease of animals that can be transmitted to man-.
- Common in Birds, Farm Chickens, Pets, Reptiles.
- Food borne disease: Contamination in fresh food, Chicken, Meat-Eggs, Dairy products.
- Large number of Salmonella cells causing diarrhea, Mild-severe watery-bloody diarrhea, Vomiting, Fever.–mostly watery and caused by cholera like toxin-
- Incubation 8-24 h.
- Self-Limiting in healthy persons, but infect Immunocompromised patients.
- Rarely Septicemia - Meningitis Infant / young Children..
- Human healthy carriers: Short periods. Animals carriers: Long period.

■ **Lab Diagnosis**

Culture Feces or Food.

Prevention and Control through Sanitation & hygiene in restaurants & slaughter houses and food-handlers.

Treatment : no antibiotics only fluid and electrolyte replacement.

Typhoidal Salmonella

2- **Typhoidal Salmonella:** (Human Enteric Fever)

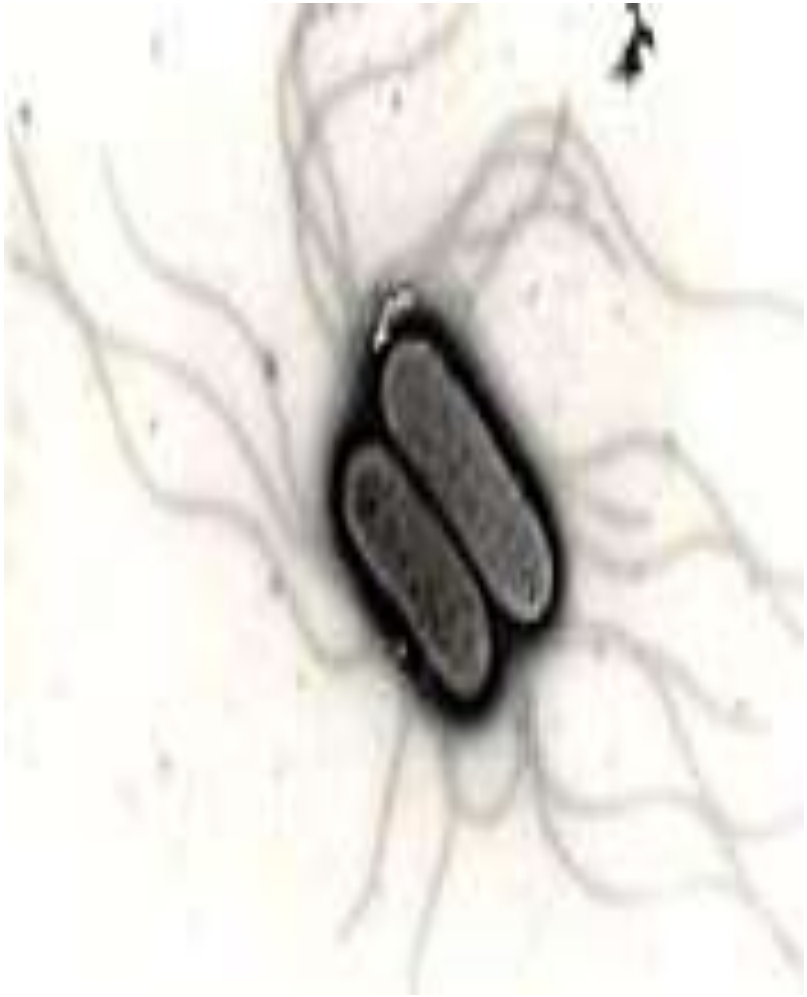
- ***Serotypes: Salmonella enterica /typhi & paratyphi*** A, B, C.
- Few cells Invasive, Only infect human.
- transmitted Fecally –Orally through Water and Food.
- Incubation:1-3 Weeks
- High continuous fever, Bloody Diarrhea and constipation, Septicemia, Meningitis, osteomyelitis, Hepatosplenomegaly, Intestinal perforation.
- Healthy Carriers: in Gallbladder, Intestine, Short period or Life Long .
- Human Healthy Carriers are mostly women in Gallbladder (1-3%)

- **Lab Diagnosis:** Culture Feces, blood, Urine, CSF, Bone marrow, Selective Media: S-S Agar**,** Hektoen-enteric.

and Serological **Widal Test –from serum-** for detection of specific antibodies against O & H antigens (Titer > 160)

Antibiotics –ciproflaxin and ceftriaxone-, Human vaccine is available.

Salmonella/ Flagella



Hektoen–Enteric agar: ***Salmonella*** transparent colonies, +H_2s Lactose-ve. ***Shigella*** : transparent,lactose-ve

E. coli : orange colonies, Lactose-*ve*

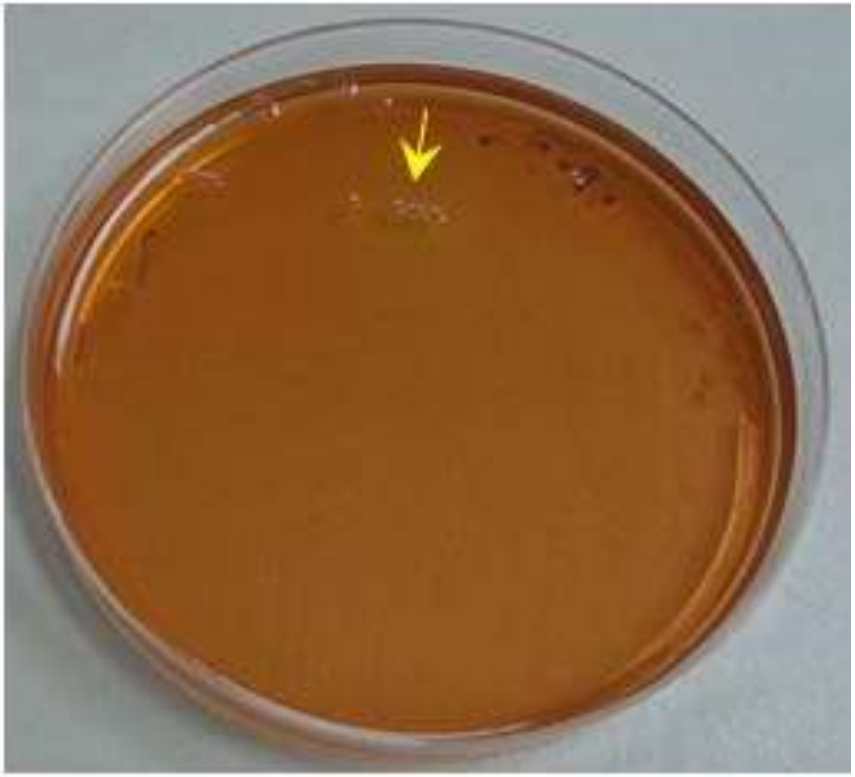
to distinguis between E.coli and Shigella "lactose fermenters'

between Shigella and Salmonella "H2S"

SS agar for Salmonella & Shigella

Salmonella..Transparent colonies+H_2s.. Ohers fecal flora will be inhibited to 98%

Salmonella



Shigella

6- Vibrio cholerae

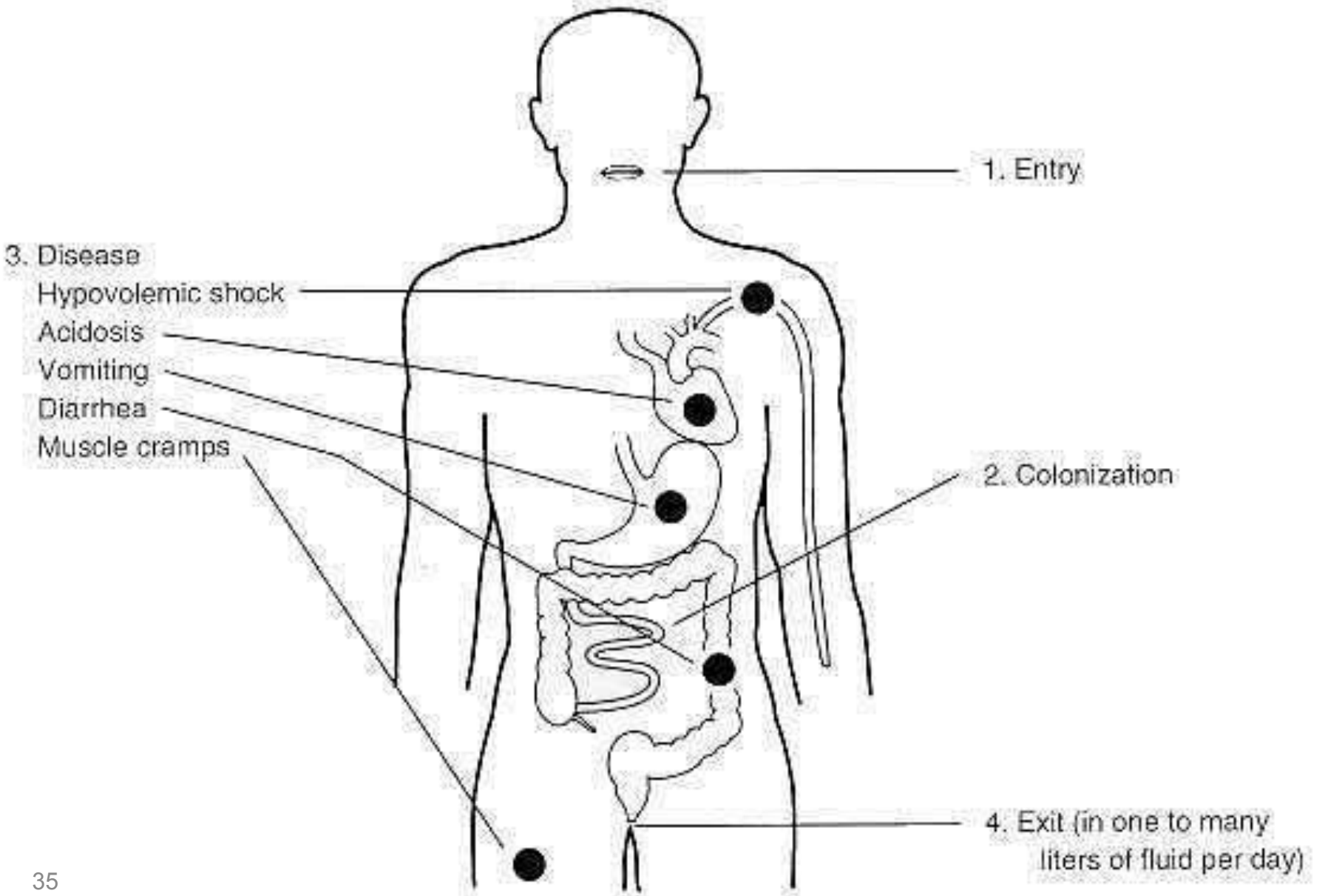
- Gram-ve Vibrios ’comma shaped’ like a hilal with tale**,** motile by flagellum.
- Lactose-ve, oxidase positive**.**
- Aerobic Growth and alkaline medium (pH >8-9) “infect intestin”.
- Transmitted through contaminated Water,Fresh Food and Reservoir contaminated water/Raw Sea. And it’s a Salt tolerant.
- Endemic In India/Bangladish but epidemic Disease, causing human Outbreaks.
- Asymptomatic/symptomatic person
- **V. cholerae-01**: Type El-Tor.. ???!!
- Only Human is infected through Fecal-oral infection.
- Small Intestine Infect.

Contin…….

- Produce Cholera toxin- enterotoxin which do like ETEC-, Heat labile toxin
- Incubation 8-48 h.
- Results in Severe water diarrhea (rice water stool), Severe dehydration, Blood acidosis which can lead –if the patient is not rehydrated- to Shock, Death within hours.
- No invasion.

- **Lab Diagnosis:** Feces Culture and Selective TCBS agar.
- Treatment: Rapid replacement fluids & electrolytes with Antibiotic –doxycyclin- to shorten the illness duration.
- Control through :Public Heath sanitation measurements and Human Vaccine.

Cholera


1. Entry
3. Disease
Hypovolemic shock
Acidosis
Vomiting
Diarrhea
Muscle cramps
2. Colonization
4. Exit (in one to many liters of fluid per day)

TCBS agar for isolation of *V. cholerae*

7- Brucella species

Brucellosis/Malta Fever

- Gram-ve coccobacilli, Microaerophilic.
- Produce Endotoxins and it's highly infectious.
- Primarily pathogens of animals (Zoonosis), causes Localized Infection in animal reproductive Organs, Sepsis and Abortions for cows.

- ***Species: B. abortus*** **(Cattle-causes abortion for cows),** ***B. melitensis*** **(infect Goats/Sheep), and there are** Rare other species in Jordan & Arab countries.
- Transmitted to Humans:

The bacteria are transmitted from animals to humans by ingestion infected food products (Dairy), direct contact with an infected animal or by inhalation of aerosols.

Pathogenicity:

Enter through GI, skin abrasions, eye or via inhalation/Droplets.

then it's phagocytosed and lives Intracellular (macrophages).

Incubation:1-6 Weeks.

Symptoms: Intermittent fever-elevated in night and then slowly returns too normal by morning-, headaches, fatigue, joint and bone pain, GI Symptoms, Sweats, septicemia, meningitis, chronic disease with complication on CNS.

Lab Diagnosis: from Blood, CSF, Bone marrow cultures.

Brucella :1-4 weeks culture incubation.

Test for : agglutination Test, Specific Antibodies (IgM and IgG).

Treatment: 6-8 Weeks with Antimicrobial drugs.

8- Campylobacter Species

- **Many species.. Most human infection *C. jejuni, C. infantis***
- Microaerophilic, Optimal Growth 42 C.
- Gram-negative thin- curved, Motile Bacilli/Bipolar flagella.
- Grow slowly over 3-6 days in vitro culture.
- This bacterium became important enteric pathogen since 1976.
- **Diagnosis:** Stool culture .. Selective Campylobacter Media including 3 antibiotics/ biochemical tests.. Or direct detection of bacteria by PCR.

Widely spread in small animals, dogs, cats, birds. It is primarily an animal pathogen causing abortion and enteritis in **sheep and cattle.**

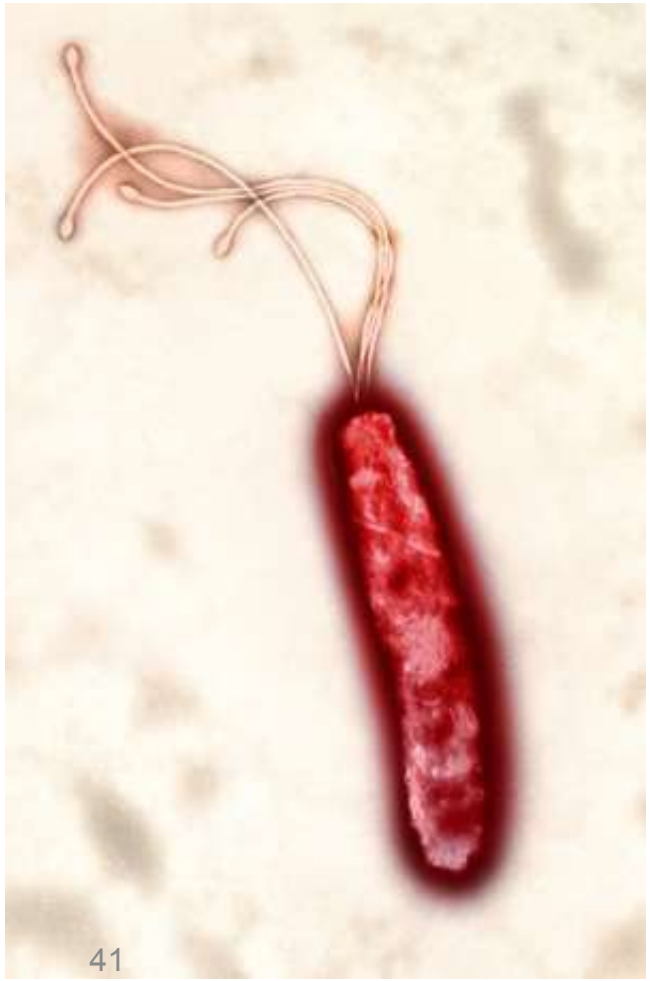
- **Human illness** usually occurs 2-5 days after ingestion of the contaminated Chicken meat, Milk, fresh food , water.

-Multiply in the small intestine → invade the epithelium → produce mild inflammation → cause bloody-watery/ mild-moderate diarrhea. And Few fecal leukocytes found in feces.

-causes occasionally blood sepsis in children

-Other symptoms often present are fever, abdominal pain, nausea, headache and muscle pain and Infection may be associated with arthritis

Flagella of *Helicobacter pylori* & *Campylobacter jejuni* , Modified G-stain



9- Helicobacter Species

- ***Helicobacter pylori***

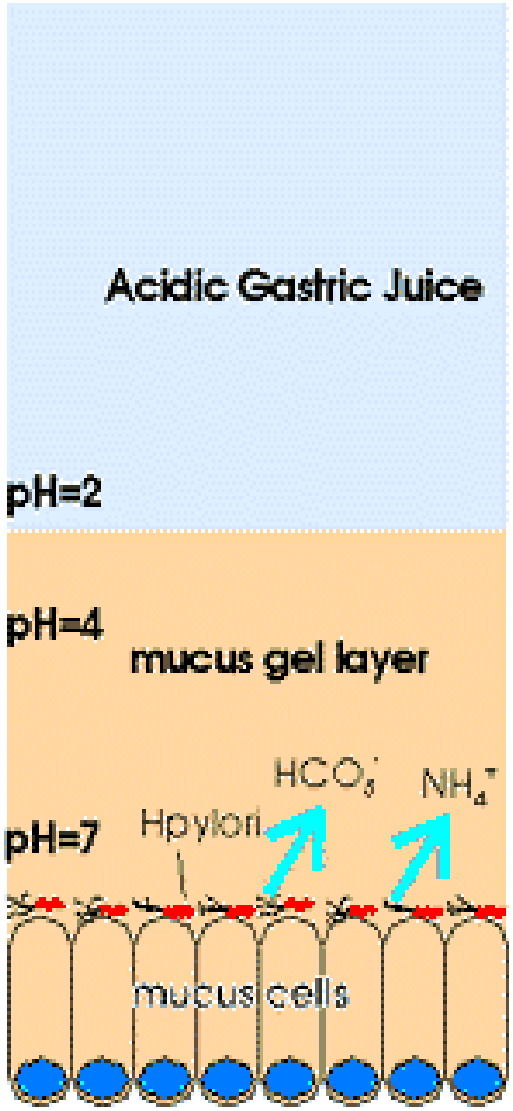
- Spiral shaped bacterium with multiple flagella.
- Lives in the mucus lining stomach & duodenum causes chronic inflammation their like **Gastritis and Ulcers.**
- Only pathogenic in human
- Release urease which convert urea into CO_2/bicarbonate & ammonia →neutralize stomach acidity and protects its colonies.

- ***H.pylori***

- Found worldwide, up to 10% of children - 80% of adults can have evidence of an *H. pylori* colonization/ mild infection - usually without having any clinical signs or symptoms..

- Transmission route:

- Close personal contact.



Helicobacter Species-2

- **Common symptoms**:
- Gastritis /Peptic ulcer, Painful sores or ulcers in Stomach or duodenum (Duodenal ulcers), Nausea, Vomiting.
- Persistence of ulcers → increased risk of stomach cancer and Lymphoma.
- ***H. pylori*** can be successfully eradicated (95%) using a combination of certain antibiotics and medicines that suppress stomach acid production.
- Common Re-occurrence within few weeks - months.
- No vaccine
- **Diagnosis:**
- Urea Breath test, Culture biopsy stomach.
- Selective Medium with 3 antibiotics.
- Incubation 37C, 4-6 days.
- Serological test: *H. pylori* antibodies not significant for clinical diagnosis alone.

10- Acinetobacter group

- Many species.. Pleomorphic aerobic gram-negative bacillus –they change their appearance to cocci or diploid like Neisseria-, aerobic.
- Catalase +, Oxidase-ve, lactose-ve.
- Commonly found in water, moist hospital environment –nosocomial infection-.
- contaminate irrigating solutions and intravenous solutions and respiratory equipments, catheters -because it can survive for extended periods on surfaces so they're easily transmitted-.
- Asymptomatic skin carriage, nasopharyngeal carriage.
- Commensal, low virulence.(**Opportunistic pathogen)**

A. baumannii :

- Common species of Acinobacter.
- often represent colonization rather than infection
- Found in skin, urine, wound & sputum hospitalized patients.
- **Nosocomial infections:** in Immunodeficient patients & others ICUs Patients .
- **Infections:** Pneumonia, Bloodstream Wound, Meningitis.
- Develop rapidly resistance to most used antibiotics, it's a Multidrug-resistant.
- ***A.baumannii*** is a new emerging pathogen in hospitals worldwide with high mortality.

Slide number 9

- By:
- Baha Al-shraydeh
- Hiba Al-atrash
- Aseel Alkhateeb

Slide # 9 : MYCOBACTRIA

Prof. Dr. Asem Shehabi

Faculty of Medicine

University of Jordan

In this slide :

1) **Mycobacteria**
2) **Chlamydia**
3) **Mycoplasam**
4) **Legionella**
5) **Spirochetes**

1) Mycobacteria

Aerobic bacteria

By : Hiba Al-Atrash

Biological features

A. **Cell wall** is composed of :

1) special specific proteins and polysaccharides.
2) High amount of Lipids :

- Mycolic acid (long chain fatty acid)
- Phospholipid
- Waxes

Mycobacteria
Cause
NECROSIS

Biological features

B. Staining :
We use the acid fast stain AFS.
"that's why mycobacteria are called **Acid-Fast Bacilli**

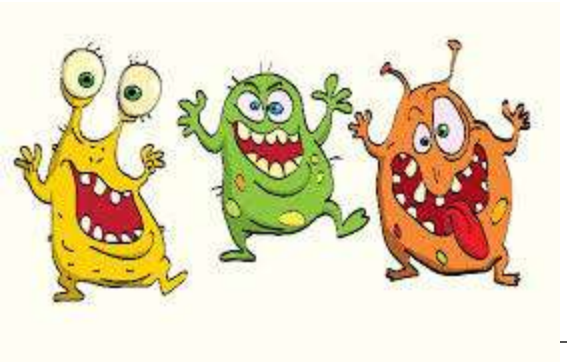
- Mycobacteria cannot be stained with gram positive or negative stain .

C**. Resistant to :**

- Low concentrations of acidity
- Dryness
- Alcohol (read the next slide to understand this point)
- Detergent

*D***. *Susceptible to:***

- *UV light*
- *Heat*



Mycobacteria are Bacilli (rod)

ADDITIONAL SLIDE

- **<u>This slide from MRS book you don't have to memorize it .. Just read it to undrestand</u>**

- In the **acid-fast stain**, a smear of sputum, for example, is covered with the red stain carbolfuchsin and heated to aid dye penetration. Acid alcohol (95% ethanol and 3% HCl) is poured over the smear, and then a counter-stain of methylene blue is applied. The cell wall lipids of **<u>the</u>** ***<u>Mycobacterium do not dissolve when the</u>*** **<u>acid alcohol is applied</u>**, and thus the red stain does not wash off. So acid-fast organisms resist decolorization with acid alcohol, holding **fast to their red stain, while** bacteria that are not acid-fast lose the red stain and take on the blue.

Biological features

E. **Present in :**

- Human
- Domestic animal
- Birds
- Environment

#Only *Mycobacterium bovis* can produce infection in both , animals and humans .
 # it can contaminate dairy product & in the case of animal infection .

Human/animals Pathogens..

Slow growth in vitro culture (2-6 weeks)

None pathogenic species ..

Rapid growth (3 – 7 days)

Classification

- **M**ycobacteria are found in human as :

❑ Obligate pathogens

- *M. tuberculosis*
- *M. bovis*
- *Atypical Mycobacteria*
- Intestinal tuberculosis

Kill 3-5 Million yearly ….

❑ Part of our normal flora (non pathogens):

SMEGMATIS ⟶ in genital tract & skin

⟶ rapid growth (3 – 7 days)

SMEGMATIS may produce skin lesions

M. Tuberculosis

1. Pulmonary Tuberculosis

Asymptomatic infection

Exudative type

- easily transmitted by **droplet**

☆ By coughing and spitting of sputum drops

☆ TB can spread easily , especially to people who haven't had asymptomatic infections previously (aren't immune).

☆ Mostly Children (90%)

- **Slow** INTRAcellular growth in lung tissue..

- Incubation time **1-12** <u>months</u> !

➢ Can produce ***Primarily mild Lung lesion***

➢ Rarely active lesions..

" EXTRA NOTE " **Tuberculin sensetivity test :**

•Screaning tool for TB .

•This test is done by : Intradermal injection of antigenic protein particles (PPT : **P**urified **P**rotein **D**erivative)

•Localized skin swelling and redness , THAT MEANS YOU HAVE BEEN IN CONTACT WITH TUBERCLE BACILLI ..

(Positive skin tuberculin test)

- Hypersensivity Immunity..
- Recovery..
- Asymptomatic infection is not necessary result in Disease

هاي الجملة من السلايد ..

A +ve reaction does ***NOT*** mean active disease

2. Active-Productive type:

Active-Productive type:

- Adult infection..
- Reactivation of old tuberculosis lesions..
- may present in any Body site :
  - Intestinal tract
  - Kidney
  - Bones
- **Meningitis** common in children.
- Person who has infected , has one or more lesions in his lungs ….

Lung lesion:

❖ ***Signs & symptoms***

➔ Cough

➔ Bloody sputum

➔ night sweats

➔ weight loss

❖ ***Diagnosis***

- X-ray
- positive tuberculin test (Larger reaction)

Lab Diagnosis:

- **To get a good culture :** we use direct

I. AFS (**A**cid **F**ast **B**acilli **S**tain)

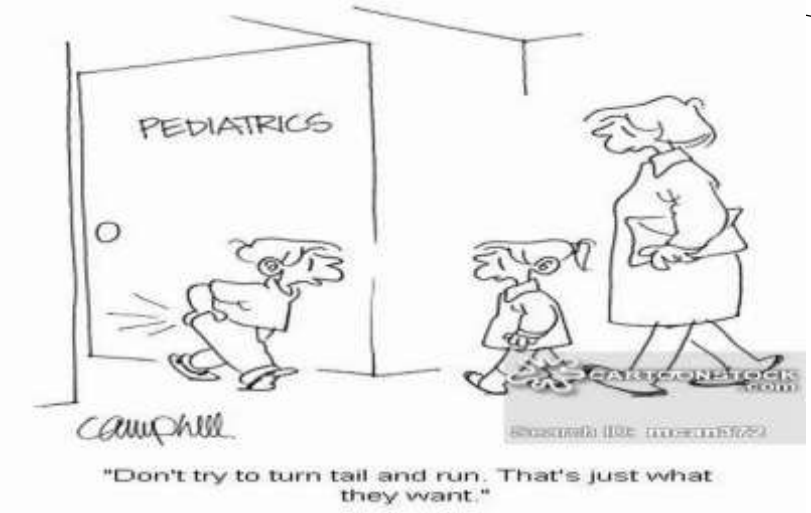
II. *Ziehl-Neelsen* **stain**

- The *growth medium* is :

Lowenstein –Jensen

- We can take sample (**Biopsy**) from :

1) Sputum
2) Urine
3) Pleural fluid
4) CSF (cerebrospinal fluid)



- *Combination* of **Anti-tuberculosis** drugs .

- FOR :

6-24 months …

Prevention

➔**BCG vaccine**

➔ (**B**acilli **C**alemtte **G**uerin)

➔It should be given better for **children** aged less than 10 years to be effective .

Atypical Mycobacteria

Atypical Mycobacteria

- Classified to :

I. Pigmented
II. Non pigmented

- Common in environment .

- Rarely associated with lung TB .

Chlamydia group

- Chlamydia Cell.. Small Gram-ve wall, few amount of liposaccharides & peptidoglycan layers.(it's not easily detected by using the Gram Stain)

- obligate intracellular tissue cultures ..Dimorphic growth.. Infectious stage.. Elementary bodies/ Infectious (its small cocci structure) .. responsible for attaching to the host mucosa cell and promoting its entry.. Develop Inclusion bodies/Reticulate bodies (produce non-infectious) ..replication.. after rupture of these inclusions they release again the elementary bodies.

-

Continued

Chlamydia trachomatis:
A common cause of STD worldwide ..
asymptomatic infection …Nonspecific urethritis.
It mainly infects the genital tract :. -Prostatitis (more easily detected),
-Vagnitis.. Cervicitis,(if reached fallopian tube) will cause infertility…

Pregnant mothers transmit the disease to her fetus specially in the delivery , may reach the lungs of the newborn causing fatal pneumonia. (rarely).

Newborns with chlamydial conjunctivitis: have mild to severe eyes redness, swollen eyelids, discharge from the eyes which can be thin and watery or thick and yellow..
Trachoma .. Blindness if not treated.

-Chlamydia Trachomatis in pregnancy should be treated with anti-microbial drugs or a drop of antimicrobial solution drugs usually should inoculated in the eyes of the new born baby.

***Chlamydia pneumoniae**.. Attached to Tracheal Epithelial cells acute bronchitis (infects the **upper respiratory)**.. Atypical pneumonia.. Mild-severe pulmonary infection..mild-sever cough, Common in children.. It affects All ages.

**Diagnosis & treatment :
-Clinical features & serological test
-They can be detected by special immunoflourescence technique with immunoflourescence microscopy
- Specific antibodies→developed after infection 4-8 weeks
- McCoy tissue culture.
-PCR test..

TREATMENT: Antibiotics.. No Vaccine

Chlamydia inclusion bodies/Acid-Fast Mycobacteria

Mycoplasma group

- The smallest Bacteria a “Gram Negative-like” ..
- Lack Cell Wall (cant be demonstrated by the gram stain) .. Lipid bi-layer Membrane.. Aerobic.. Respiratory/Urinary Mucosa.. Human, Animals, Birds.
- Mycoplasma can be cultured on artificial- mediac .

- There is only one growth pattern like other bacteria by: **Binary Fission.**

Continued

1-Mycoplasma. pneumoniae: Human pathogens.. (atypical form of pneumonia) Infection Pharyngitis, Bronchitis, Pneumonia.. Dry cough.. Fever, Common in old children & Young adults.. Less Elderly... Common infection in Fall-Winter.

-Serological test : to distinguish between Mycoplasma or Chlamydia to give the right antibody

-Found in outbreaks (e.g.: in school children/university students/militaries)

2-M.hominis : Part of oral- cause, addition to certain type of bacteria leads to **ulcerations in the oral cavity**

3-M.genitalium genital flora asymptomatic condition … association with other STDs like N.gonorrhea or Chlamydia the presence of **symptoms** mainly in form cause Nonspecific Urethritis, Vaginitis, Cervicitis. Considered STD .

Diagnosis & treatment: Sputum, Urine Culture, Cold-Agglutination Test, ELSA Specific antibodies, PCR, Antibiotics.. No Vaccine.

Legionella pneumonphila

- **Legionnaires' disease** (infection of old soldiers) -1976 USA Thin G-ve Coccobacilli-Filments.. Facultative Anaerobes.. Survive 0-80 C.. Cold/Hot Water.. Air Condition, Wet Soil, Droplet infection ..Aerosols, Fine sprays , Respiratory Mucosa Lung.. an atypical form of pneumonia ... **Intracellular..** multiplies in **Monocyte-Macrophage..** Extracellular growth,Not contagious disease.
- Clinical Features: High Fever, dry Cough, vomiting, and stomach discomfort, Diarrhea. Other common symptoms include headaches, muscle aches, chest pain, and shortness of breath, Pneumonia, Renal Failure, Death..
- Infects : **Old/ Immumodeficient / heavy Smoking Persons.**

- Diagnosis & treatment: Special Culture Media, Blood-sputum culture, Detection by Specific antibodies, PCR, Antibiotics.. No Vaccine.

Spirochetes Group-1

- *This group is mentioned aslo in sheet 29 ,so u will find many slides for it with new notes (in Aseel Alkhateeb)*

- Gram-ve.. Spiral forms.. Long.. which have long helically coiled cells (5-20um) ..Common Human, Animals, Arthropodes ...Nonpathogenic /Pathogenic.

-This bacteria lacks a cell wall and has a layer of lipoproteins with phosphate instead.

-This protects the protein and allows it to “coil”, the number of coils varies among species. - There is also a sheet that is wrapped around the cell body, responsible of attachment along with inflammatory reactions.

- 1- ***Treponema species***: Nonpathogenic.. Oral cavity.

- affects fetus, organ damage in the oral cavity & CNS

Continued

2-Treponema palldium: Syphilis.. Veneral Disease.. Sexual Contact.. entering the host via breaches in squamous or columnar epithelium.

- Its highly susceptible to environmental factors, meaning that it can't live outside the body for more than a few minutes→
- the reason its STD.

It gains access to host's blood and lymph systems through tissue and mucus membranes.

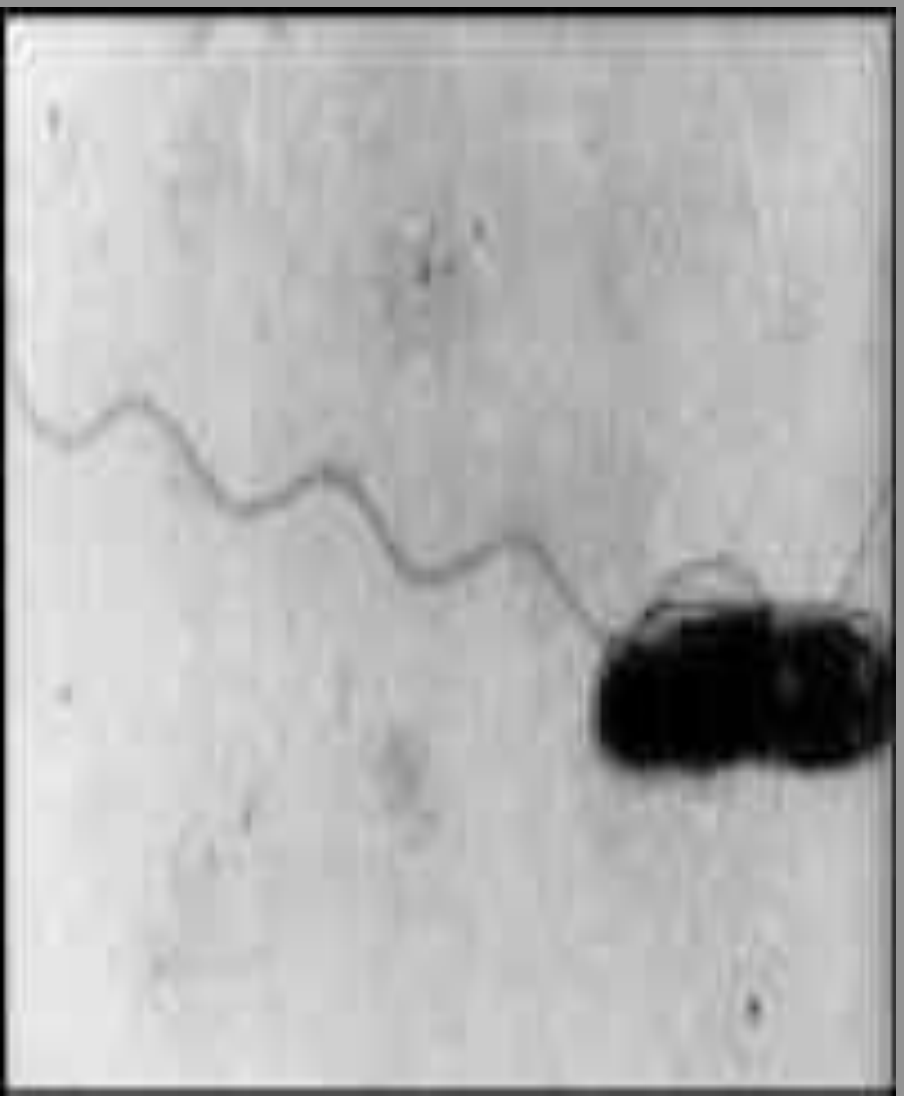
Stages of infection:-

*(primary Syphilis): Incub. 2-week-Few Months: Acute-Chronic Infection.. Mucosa/Skin Lesions-**Chancre** on Genitalia, Anal area/Mouth(highly contagious)

**(second Syphilis): reaches the blood stream.

Primary and Secondary syphilis can cause Congenital Syphilis..in Pregnancy,

Legionella- Spirochete Cells



Spirochetes Group-2

- ***Tertiary syphilis:- Systemic Disease.. Affect Any Body Organ.. Meningitis, Hepatitis, Nephritis, Granulomatous lesions. This stage cant be cured.

Things might اعجق you

*Atypical pneumonia are: generally mild in the beginning, associated with a dry cough, possible fever, abdominal pain, andsome GI symptoms

*Typical pneumonia are associated with a chronic form of allergic reactions Complications like; productive cough; there is spelling of sputum (restless)

Atypical pneumonia : causes

-Chlamydia pneumonia

-Mycoplasma pneumonia

-Mycoplasma Legionella

-Chlamydia trachomatis (rarely in newborn)

* Specific urethritis : *Neisseria gonorrhoeae*

** *Non* specific urethritis : *Chlamydia trachomatis & Mycoplasim genitolium*

pneumophilia different from Chlamydia and Mycoplasma?

- Chlaydia and Mycoplasma *might be found in the respiratory tract or* the genital tract without causing any disease
- Legionella survives mainly in hot water or in cold tempreture *cannot be part of* the respiratory tract flora

This is the last part of slide 9 in sheet 29 by Aseel Al-khateeb

Spirochetes Group-1

- Gram-ve, Spiral, coiled form of bacteria. Long.. which have long helically coiled cells (5-20um).. Commonly related to humans or animals, Arthropodes.. Can be Nonpathogenic /Pathogenic.
- Lacks a cell wall, has a special layer of lipoproteins with phosphate instead, this protects the protein and allows it to recoil, number of coils varies between species, this part is responsible for the inflammatory reponse.
- There are three types of spirochetes : Treponema, Borrelia and Leptospira
- 1- ***Treponema species***: some are Nonpathogenic and part of Oral cavity. (Normal oral flora) ,others (Treponema palldium) can cause Syphilis (an STD) when found in the genital tract, transmitted by sexual Contact.. entering the host via breaches in squamous or columnar epithelium.
- Accidental contamination can cause lesions in oral cavity
- Organism highly susceptible to environmental factors

Incub. 2-week-Few Months: Acute-Chronic Infection.. Mucosa/Skin Lesions-**Chancre** on Genitalia, Anal area/Mouth..

Infection has 3 stages:

- Primary Syphilis: formation of extra genital lesions in the superficial layers of the skin, recognized as an inflammatory reaction in the subcoetaneous tissue of the skin. Persists for 1-2 weeks then disappears. (transmission of the sickness is very high, through sexual contact)
- Secondary Syphilis: occurs when primary syphilis is left untreated, more of the organism is present in the genital tract and then it reaches the blood stream by gaining access to host's blood and lymph systems through tissue and mucus membranes

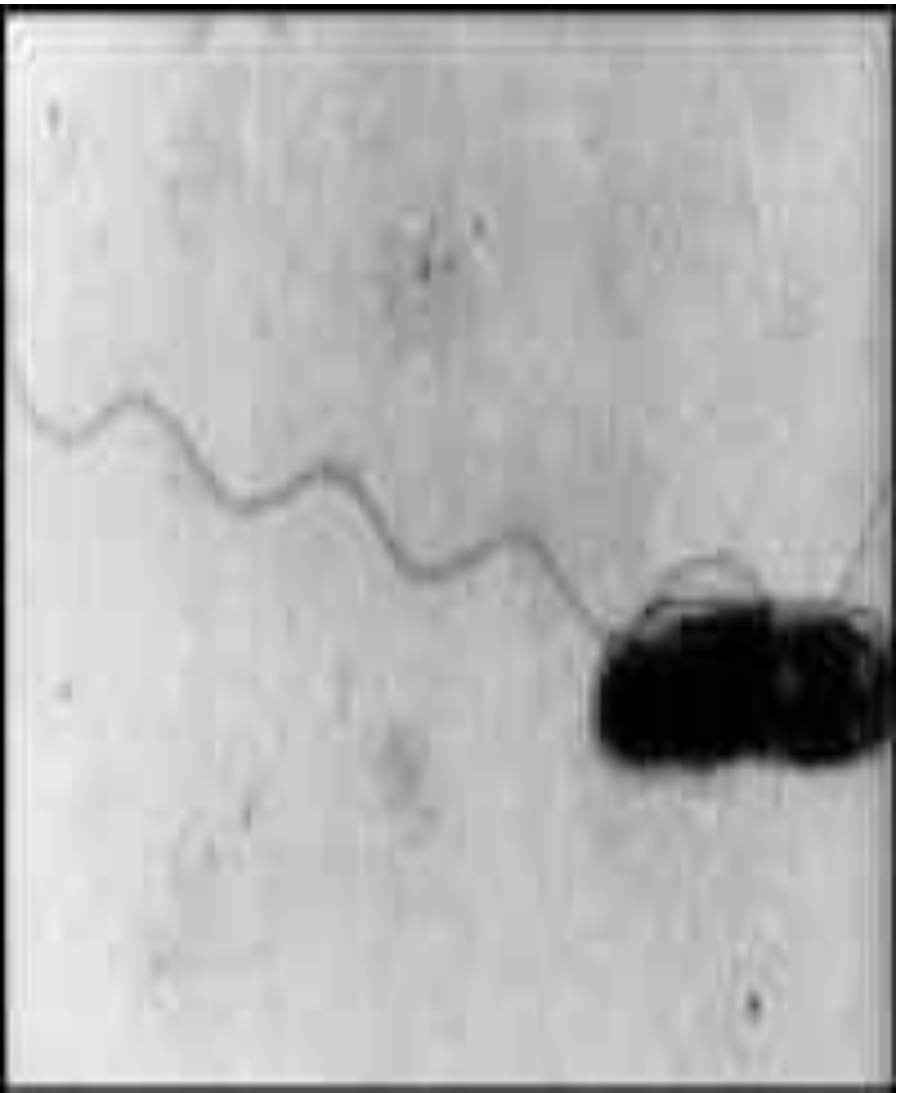
-Primary and Secondary syphilis in pregnant women can cause congenital Syphilis, the child will suffer from organ damage in the oral cavity & CNS.

- Tertiary syphilis: occurs when secondary syphilis is left untreated ,the patient will suffer from more immunological reactions affecting any Body Organ.. Meningitis, Hepatitis, Nephritis, Granulomatous lesions.

Diagnosis: First recognize the extra genital lesions(easier to be seen in men than women) then detect spirochetes using Direct Dark-field Microscopy.. Serological Test used to detect antibodies after 4 weeks of infection.. VDRL also used to detect the disease which can be confirmed by Fluorescent Trep. Antibody-Test (FTA).. Or by syphilis agglutination test.

No Culture.. Antibiotics

Legionella- Spirochete Cells



Spirochetes Group-2

- ***2 types of Borrelia :***
- ***1 - Borrelia Burgdorferi*: can cause** Lyme Disease.. Found mainly in Wild Animals, Rodents, Birds … Common in USA and can trasmit to humans by insect bites (ticks), insects colonize on skin of animals, mainly bite neck and arms
- Incub. Few Weeks- Months
- Treatment: first stage antimicrobial drugs for successful results, autoimmune response might develop in late stage.

Lyme disease has two stages:

- first stage: easily recognized by the presence of inflammatory lesions on the skin/an allergic reaction = redness of widespread lesions on the skin.
- One or more lesions found which can presist or disappear

Second stage : lesions disappear, blood stream and organs reached .. Septicemia from released antigens which may give a clinical picture of viral infection or rhematic fever, nephritis might occur.

CNS.. **Cardiac Abnormalities**.

- 2- *Borrelia species*: Worldwide found in nature, can cause Epidemic/Endemic **Relapsing Fever**.. Biting Insects (Human Lice/ Animal Ticks).. Septicemia.. Low-High Fever, Chills, Severe Headache, Common Relapses.
- Infected animals can contaminate water

- **3rd type of Spirochaete: Leptospira,**
- can cause Leptospiral diseases: Zoonosis, mild-severe fatal systemic .. **Weils's disease** ..high (enteric) Fever, Jaundice, vasculitis , severe Bleeding due to damage of blood vessels. Nephtritis. Present in contaminated water from infected animals urine. Weil's disease infection produced
- **Diagnosis:** First stage has too many various clinical signs thus cant be diagnosed correctly , Serological Tests to detect antibodies , Special fluid culture methods, its hard isolate from infected person and hard to culture in lab
- The treatment is by antimicrobial drugs.

Lyme Disease/ Tick Erythematic lesions

Midterm QS …

1] which of the following is not associated with facultative anerobic bacteria:-

1] Heterotrophic
2] heavy growth within 8-24 hours
3] common in the intestine
4] optimum pH = 6.5.

2] The most common cause of sore throat among children:-

1] staphylococcus pyogen
2] streptococcus pneumonia
3] streptococcus B

3] one of the following inhibits folic acid synthesis:

1] sufonamides 2] chloramphinicol

4] one of the following inhibits DNA Gyraze:-

1] Rifamycin
2] Ofloxacin.
3] Nitrofuranation.

Press shift+F5 for a better view

Answers:
Q1- answer is 4) the ph is 6.5

20] The most common type of bacteria in the intestine:-

1] facultative anaerobic
2] anaerobic bacteria
3] anaerobic gram +ve

21] Flagella is mainly composed of

1] poly saccharide
2] proteins
3] A+b

22] Transformation of Bacteria:-

1] associated with toxic materials sometimes
2] virulent factors
3] A+B
4] Mainly in gram +ve
5] all of the above

23] The most common method of developing Resistance in our intestine:-

1] Conjugative plasmid
2] transformation
3] all of above

* The common body flora among the following.

1] Staphylococcus gyrase -ve
2] Streptococcus B
3] Streptococcus pneumonia
4] all of the above

* Ionizing radiation is used to steralize:

1] plastic objects
2] pharm--- product
3] Saline solutions
4] A→B
5] all of the above

* What are the mismatched --- here:-

1] Reovirus / helical symmetry

* the virus that doesn't replicate in nucleus:

* pox
* polio
* parvo
* adeno

* which of the following is associated with capsid:

1] DNA dependent RNA polymerase
2] RNA // // //
3] Reverse transcriptase
4] any of the above
6] non of the above

اسئلة مكررة

16] one of the following is common antiseptic:

1] 70% alcohol
2] 90% alcohol
3] 2% hypochlorite
4] all of the above

17] which of the following is associated staph aureus:
1] Coagulase +ve
2] Catalase +ve
3] in the culture the color (orange-yellow)
4] all of above
5] 1+2

18] one of the following is a Macrolide:-

1] erythromycin.

19] attached to 30S ribosomes and inhibit protein synthesis:-

1] chloramphenicol
2] Aminoglycosides
3] Tetracyclins
4] 2+3
5] all of above.

11] one of the following has a ss dNA:

1] papilloma
2] Reo virus
3] parvo
4] pox

12] which of the following is not - ssRNA:-

1] Bunya
2] Arena
3] Corona
4] paramyoxviride

13] one of the following is not +RNA virus

1] Polio
2] Retro
3] Hepe
4] orthomyxoviride

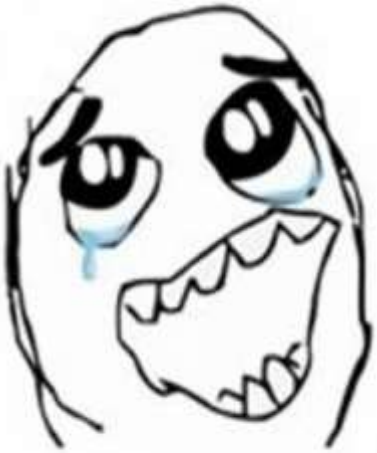
14] all of the following statements about virus are true except:

1] composed of DNA & RNA

15] The right thing about Lag phase:-

* the virus loose its infectivity.

There was a Q about the function of fimbriae and the answer was not adherence and transmisson of gens the correct answer is : adherence only



الله يعوض علينا ... باللي يفرح عنينا :D

فراقك يا المـــــــايكرو عيـــــــد

Da3watkum
Insha'llah elfekra kant mnee7a!
Good luck!
Majida Mhmoud