# BLOCK G OSPES

BY FATIMA HAIDER
KGMC

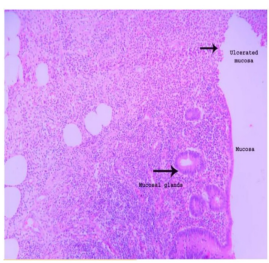
- A **37-year-old male** with no past medical history, presented to the emergency department (ED) with acute abdominal pain (right lower quadrant pain) as well as **fever**, followed by **nausea and vomiting**. He had no significant findings on laboratory workup except moderate **leukocytosis**.
- Physical examination r**evealed painful tender abdomen especially near peri-umbilical region.**
- **Ultrasound** revealed the presence of an **inflamed tubular structure**.

# ACUTE APPENDICITIS

ID points

Muscle splitting
Neutrophilic infiltration upto serosa
Mucosa is not intact
Sometimes obstructive element is visible

## ACUTE APPENDICITIS




- **Ulcerated mucosa...** with lamina propria showing benign glands, mixed inflammatory infiltrate and focal lymphoid aggregates

## COMPLICATIONS OF ACUTE APPENDICITIS

a. Acute suppurative appendicitis

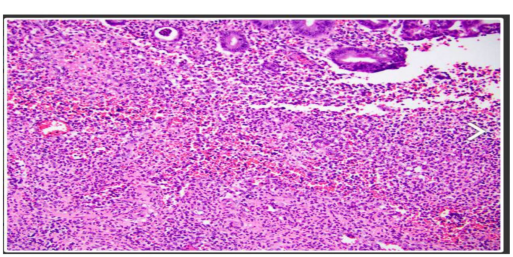
b. Gangrenous appendicitis

c. Perforation leading to peritonitis

d. Formation of peri-appendicular abscess/ mass

e. Rarely portal venous thrombosis, liver abscess and bacteremia.

## MARKED NEUTROPHILIC INFILTRATION



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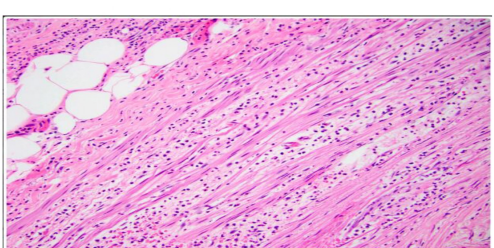
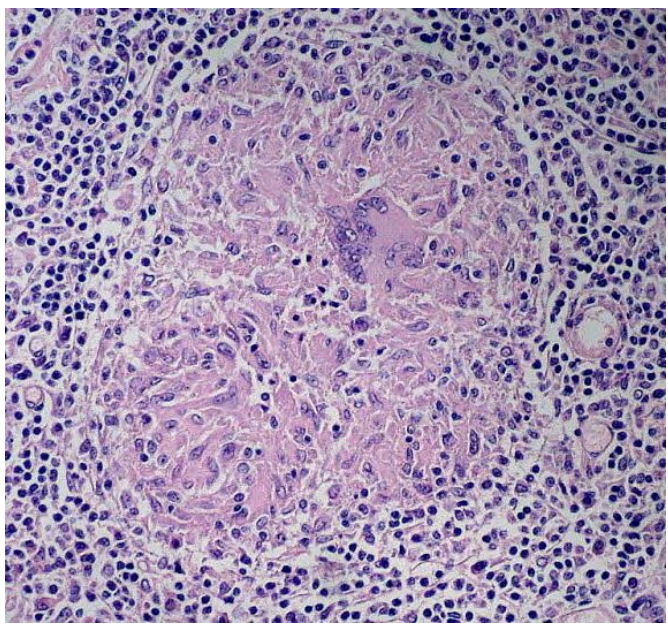
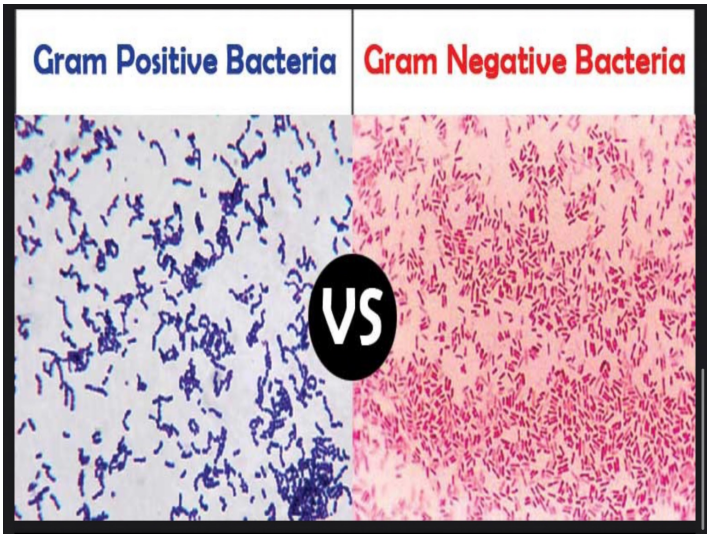


# GANULOMATOUS INFLAMMATION

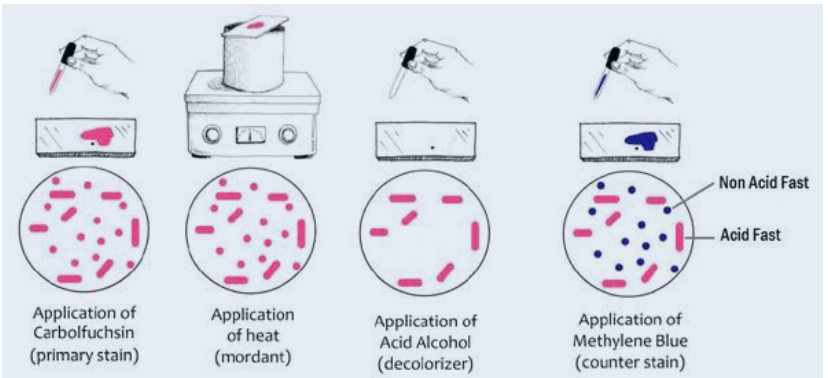
ID POINTS
Epitheloid cells (modified macrophages)
Giant cells
Caseous necrosis in centre
Lymphocyte and fibroblast at periphery

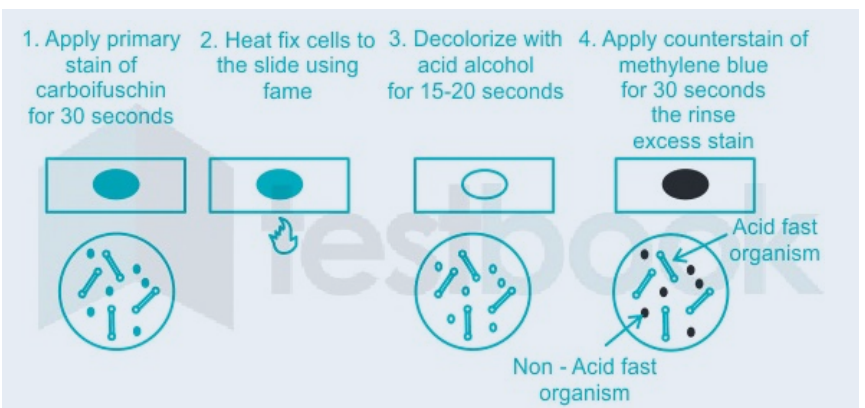





- Purple (blue) Gram Positive Bacteria.
- Pink (red) Gram Negative Bacteria.

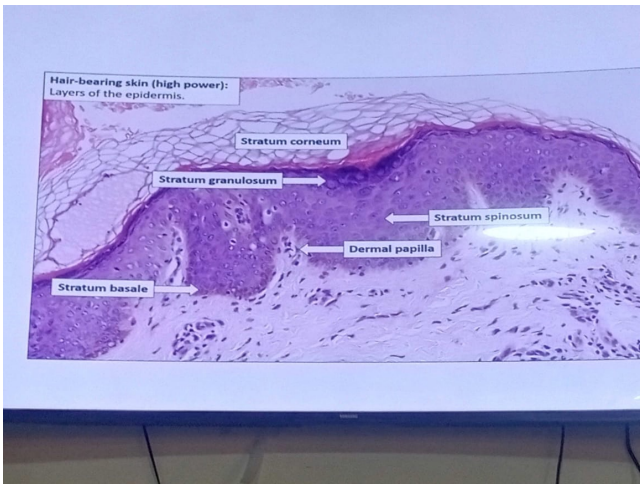
# ZN STAINING




## Reagents.

1. Carbol fuschin (basic dye).
2. 20% sulphuric acid (decolorizer).
3. Methylene blue (counter stain) or Malachite green.
4. Mordant-Fixator (heat).



# ANEURYSM ~ abnormal bulge in vessel

## SIGNS & SYMPTOMS

**Abdominal Aortic Aneurysms**

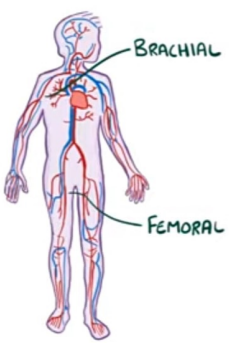
* severe left flank pain
  - abdomen
  - chest
  - lower back
  - groin
* pulsating mass with heartbeat
* hypotension

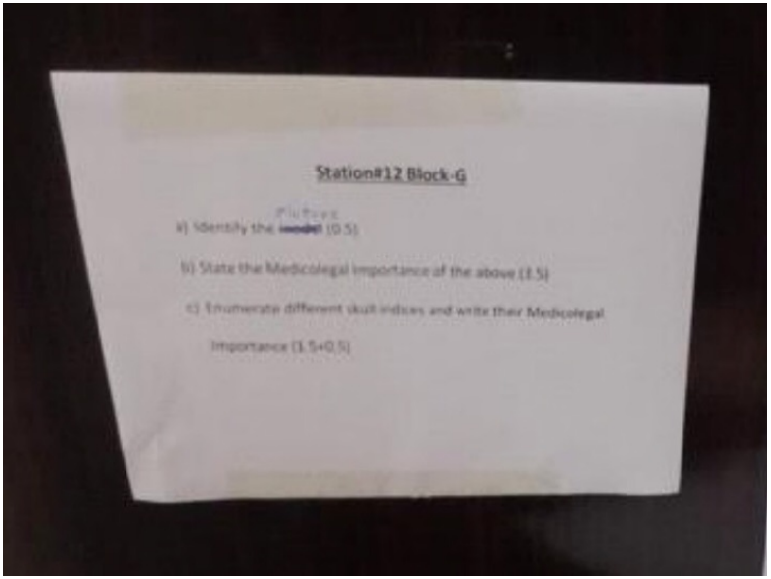
**Thoracic Aortic Aneurysms**

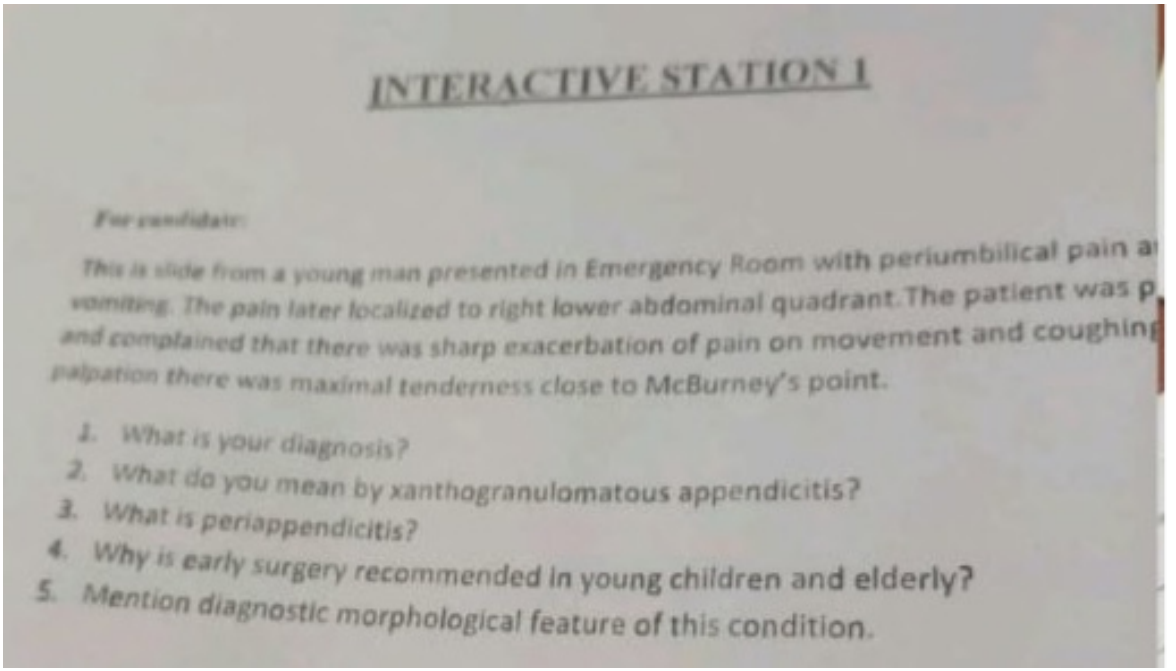
* usually no symptoms
* severe back & abdomi

## SYMPTOMS

- SHARP CHEST PAINS
  - RADIATE TO BACK
- WEAK PULSE IN DOWNSTREAM ARTERY
- DIFFERENCE IN BP BETWEEN LEFT & RIGHT ARMS
- HYPOTENSION
- SHOCK (IF THERE IS A RUPTURE)







# INTERACTIVE STATION 1

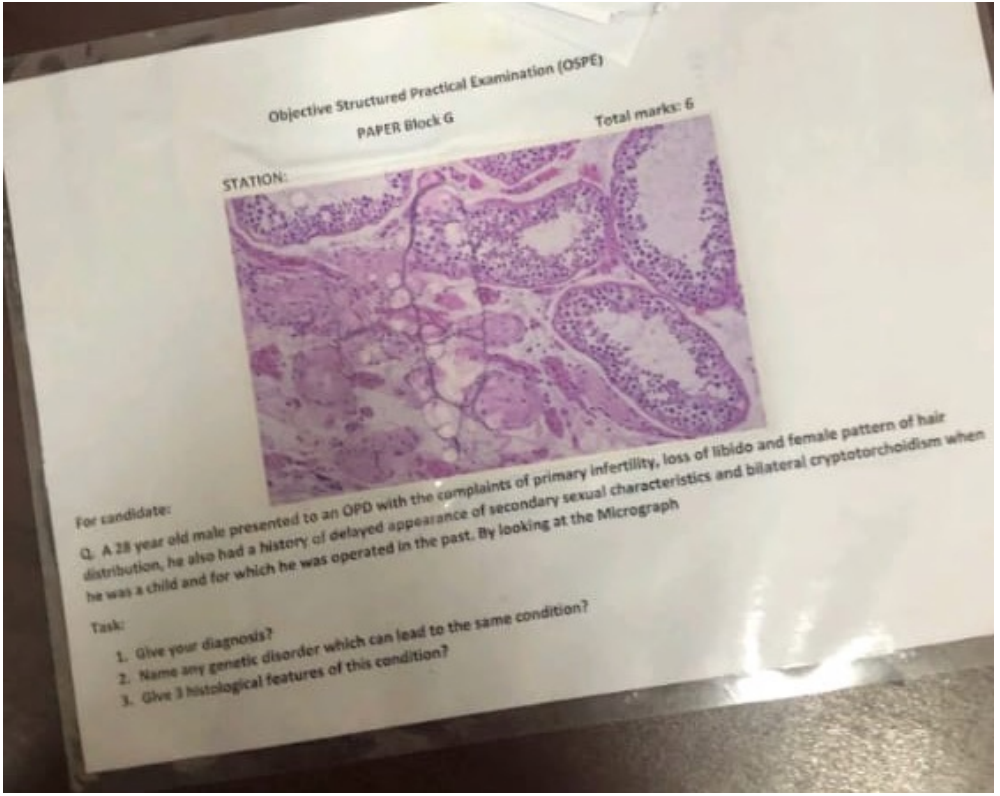
For candidate:

This is slide from a young man presented in Emergency Room with periumbilical pain a vomiting. The pain later localized to right lower abdominal quadrant.The patient was p and complained that there was sharp exacerbation of pain on movement and coughin palpation there was maximal tenderness close to McBurney's point.

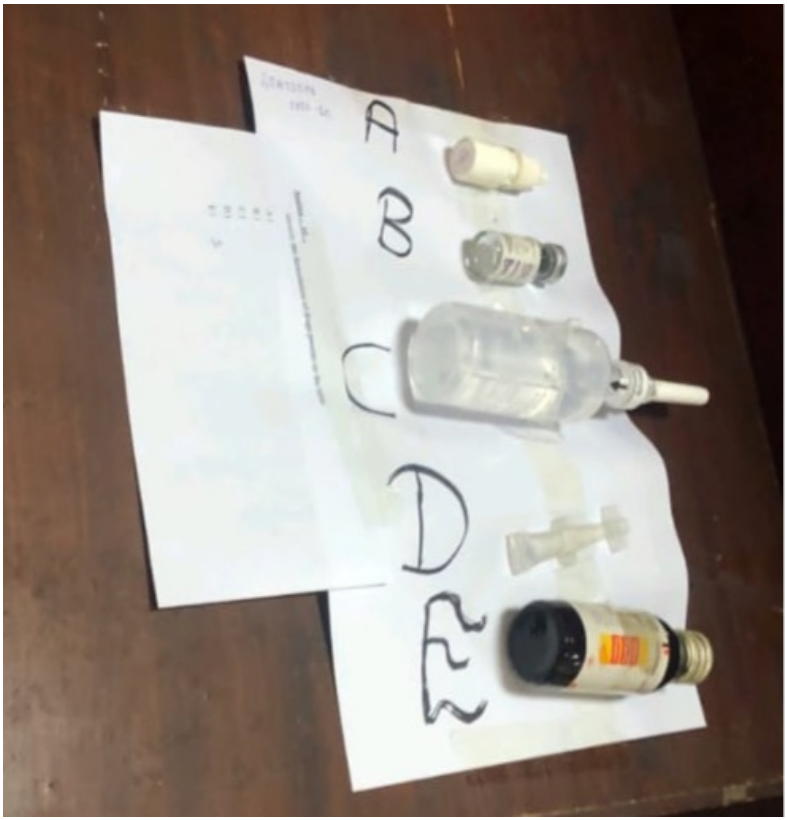
1. What is your diagnosis?
2. What do you mean by xanthogranulomatous appendicitis?
3. What is periappendicitis?
4. Why is early surgery recommended in young children and elderly?
5. Mention diagnostic morphological feature of this condition.

1. Acute appendicitis
2. Xanthogranulomatous inflammation is characterized histologically by a collection of lipid laden macrophages admixed with lymphocytes, plasma cells, neutrophils and other multinucleated giant cells with or without cholesterol clefts.
3. Peri appendicitis is appendiceal serosal inflammation without mucosal involvement
4. Prompt surgery is necessary to prevent disease progression which is associated with an increased risk of morbidity and mortality
5. Morphologic features

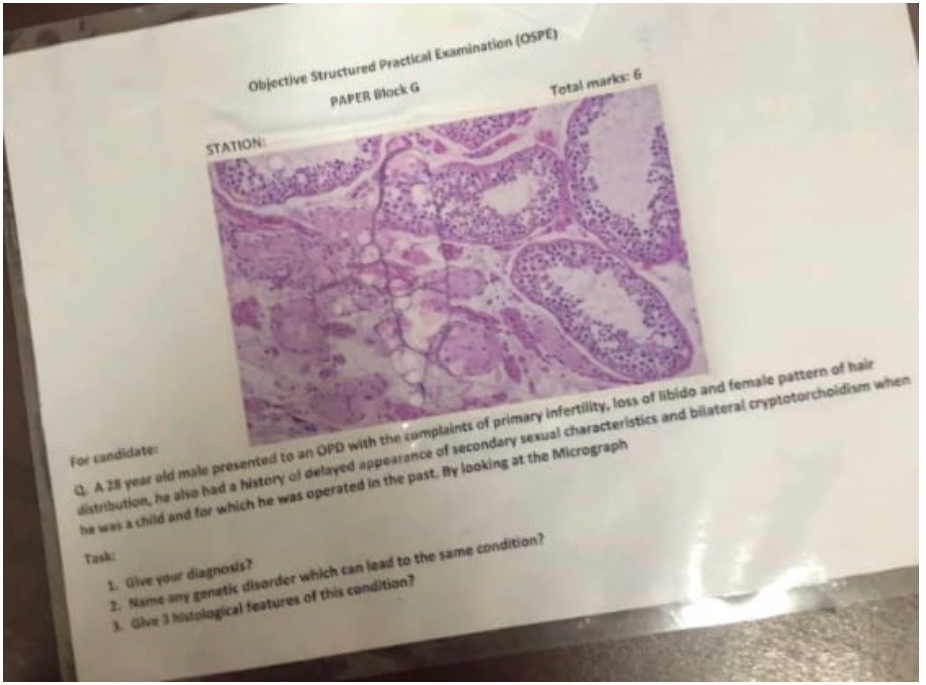
Neutrophils in muscularis
Congested vessels
Necrotic mucosa




1. Testicular atrophy
2. Klinefelter syndrome
3. Features: thickened basement membrane, interstitial hyperplasia, partial or complete loss of mature spermatids from lumen of seminiferous tubules




A. Drop
B. Vial
C. Enema
D. Nebulization solution
E. Syrup


Objective Structured Practical Examination (OSPE)

PAPER Block G

Total marks: 6

STATION:

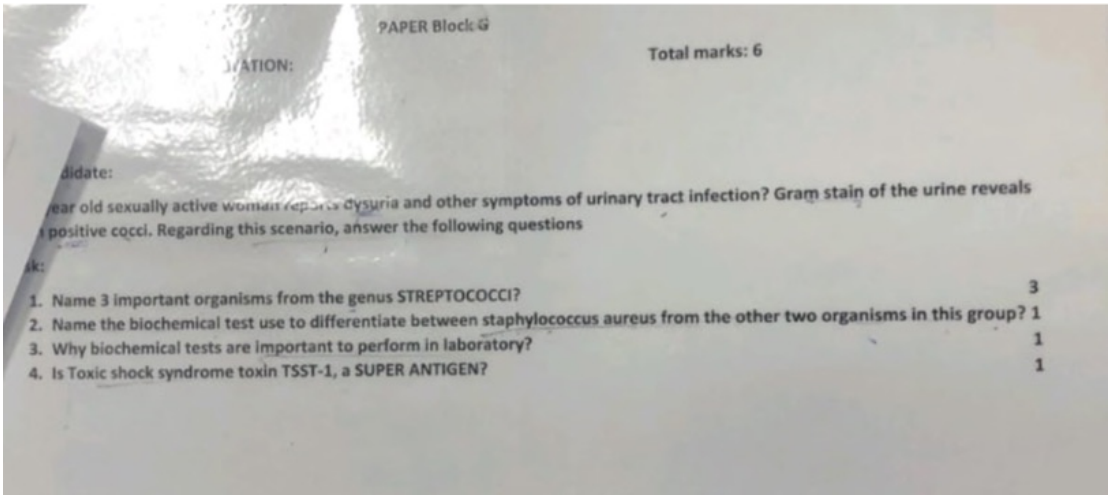
For candidate:

Q. A 28 year old male presented to an OPD with the complaints of primary infertility, loss of libido and female pattern of hair distribution, he also had a history of delayed appearance of secondary sexual characteristics and bilateral cryptotorchoidism when he was a child and for which he was operated in the past. By looking at the Micrograph

Task:

1. Give your diagnosis?
2. Name any genetic disorder which can lead to the same condition?
3. Give 3 histological features of this condition?

1. Testicular atrophy
2. Klinefelter syndrome, Down syndrome, Cryptorchidism
3. ID points: thickening of basement membrane, interstitial cell hyperplasia, hyalinized seminiferous tubule



PAPER Block G

ATION:

Total marks: 6

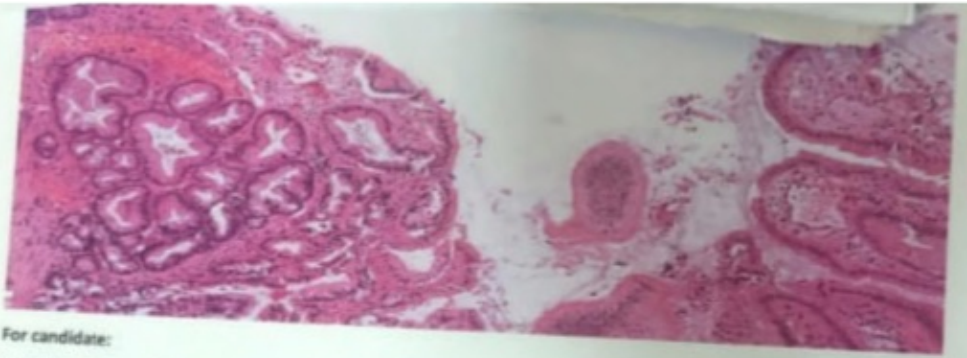
didate:

ear old sexually active woman reports dysuria and other symptoms of urinary tract infection? Gram stain of the urine reveals positive cocci. Regarding this scenario, answer the following questions

k:

1. Name 3 important organisms from the genus STREPTOCOCCI? 3
2. Name the biochemical test use to differentiate between staphylococcus aureus from the other two organisms in this group? 1
3. Why biochemical tests are important to perform in laboratory? 1
4. Is Toxic shock syndrome toxin TSST-1, a SUPER ANTIGEN? 1

1. Streptococcus pyogenes, viridians, agalactia
2. Coagulase test
3. Biochemical tests are important in laboratory to identify and classify microorganisms based on their metabolic activities, helping to determine the species and guide appropriate treatment
4. Yes



For candidate:

Q. A obese 40-year-old lady presented with complaints of bloating, flatulence, nausea vomiting and dull right upper abdominal pain that radiates around the waist to the mid back or right scapular tip. The pain is exacerbated by fatty food. Regarding this answer the following questions.

1. Identify the micrograph and the given lesion? 1
2. Write the identification points? 3
3. Write two complications? 2

1. Chronic cholecystitis
2. ID points: Wall thickening of gallbladder, Rokitansky Aschoff sinus, lymphocytes infiltration

3. Complications: Pancreatitis, cancer of gallbladder, gangrene, infection, enlarged gallbladder due to inflammation

**IMPORTANT MEDIA:**

**1. Nutrient Broth:**
It consists of peptone, NaCl, meat extract and distilled water. It is used for cultivating non fastigious bacteria and in preparation of enriched media like blood agar.

**2. Nutrient Agar:**
Nutrient broth + 2% agar. It is colourless to light yellow. A basic culture medium containing basic essentials required for growth of bacteria. Used for culture and growth of bacteria. Also used to observe the sensitivity of bacteria.

**3. Blood Agar:**
Nutrient agar + 5 – 10% animal blood. Its colour is red. It is used for most of pathogenic bacteria except a few one, when the specimen is faeces:

- To differentiate between streptococci on the basis of haemolysis.
- Used to grow gram positive organism e.g staphylococci.
- Can be made selective by adding chemicals, dyes or antibiotics.

**4. Chocolate agar:**
When blood agar is heated to 80°C for 10 min. It becomes chocolate agar. Its colour is chocolate brown. It is used for *N. meningitis*, *H. Influenzae, Streptococcus pneumoniae*, *Staphylococcus aureus* and mixed infections.

**5. MacConkey Agar:**
It contains peptone, bile salt, lactose, neutral red (indicator), agar and distilled water. Its colour is light pink. Its uses are:

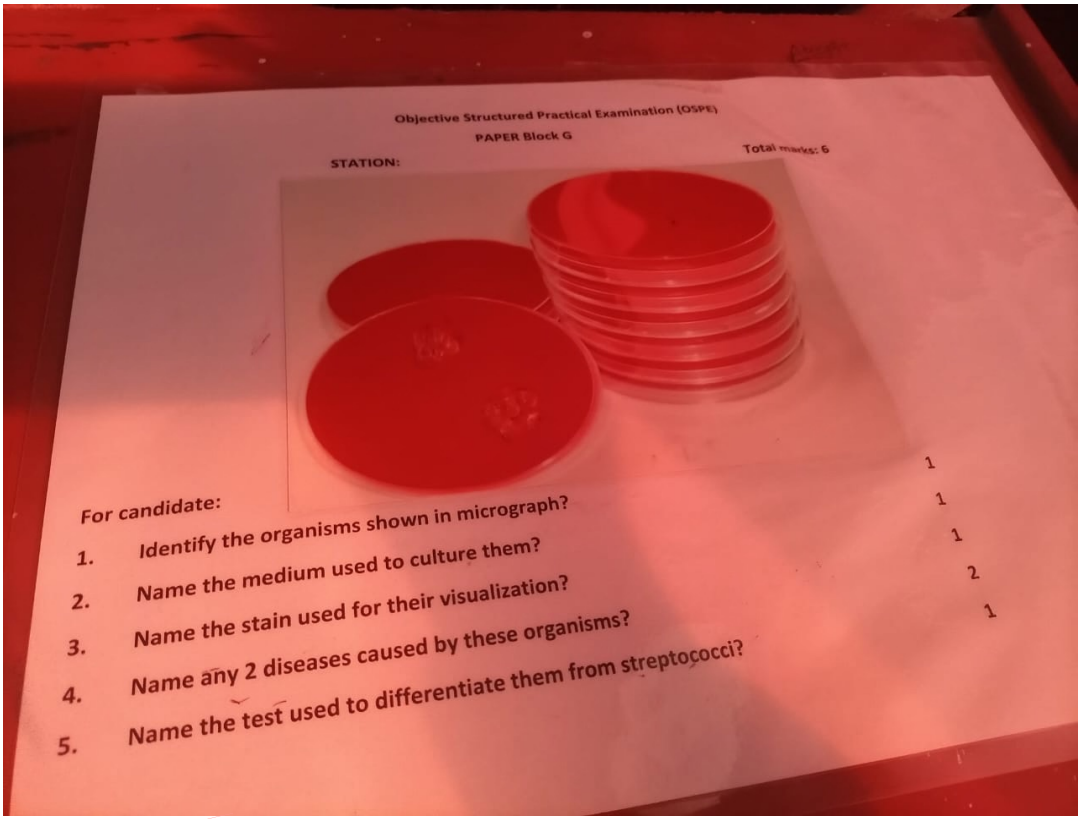
- Selective and differential medium
- To differentiate lastose fermentors from non lactose fermentors.
- Inhibitory to *Streptococcu pyogenes*, *S. pneumoniae,* viridans group of streptococci and pasteurella.

**6. Lowenstein Jenson Medium: (L.J Medium)**
Consist of asparagines, glycerol, malachite green, whole egg (instead of agar) which give solid consistency to the medium and mineral salts. It is selective medium present in screw capped bottle. Colour is light green and used for growth of *M. tuberculosis.*

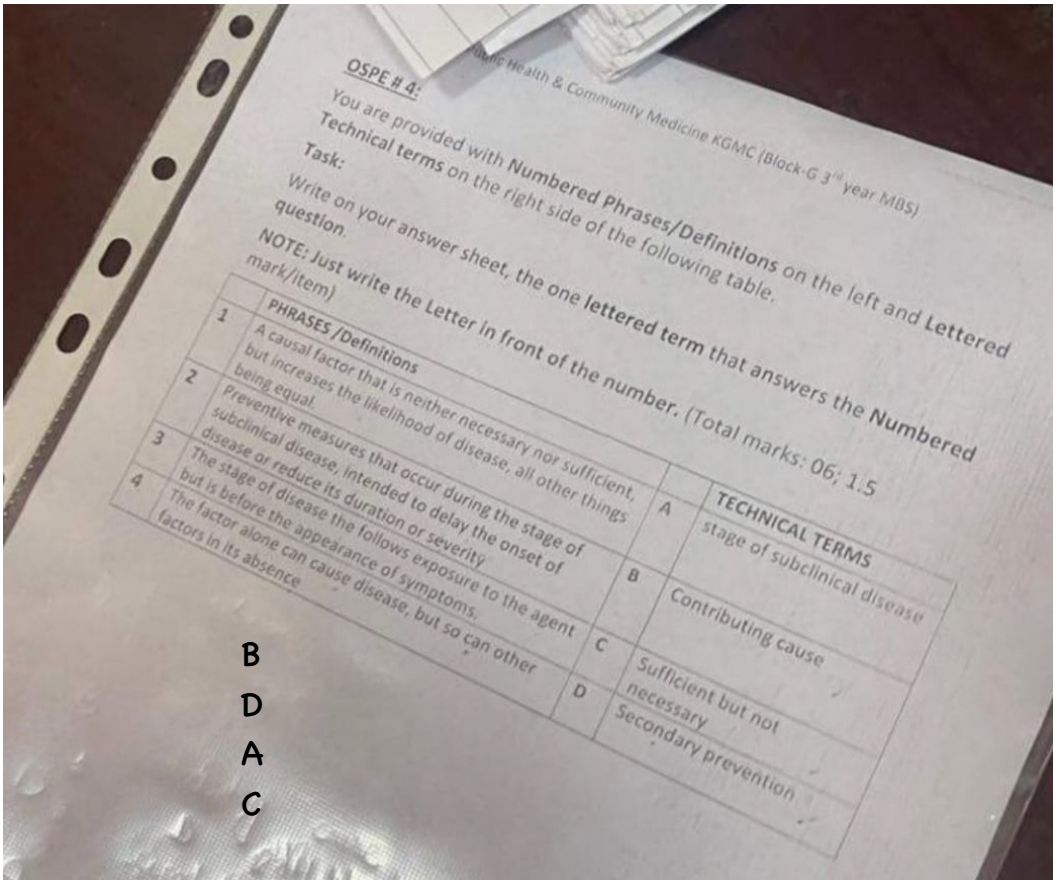
**7. Sugar Media:**
Sugar + peptone water. Different colour for different type of sugar. Glucose → Green, lactose → Red, sucrose → Blue, mennite → Mauve, maltose → Blue, dulicite → Pink. used for fermentation reaction i.e. Production of acid or gas is noted.

**8. Cystine Lactose Electrolyte Deficient Medium (Cled Medium):**

- Consist of cystine and lactose. It is transparent and light green in colour.
- It is non-inhibitory and differential medium mainly used for urine culture.




1. Staph aureus
2. Blood agar
3. Gram staining
4. Toxic shock syndrome, food poisoning, scalded skin disease
5. Catalase test



Health & Community Medicine KGMC (Block-G 3rd year MBS)

**OSPE # 4:**

You are provided with **Numbered Phrases/Definitions** on the left and **Lettered Technical terms** on the right side of the following table.

**Task:**

Write on your answer sheet, the one **lettered term** that answers the **Numbered question**.

**NOTE: Just write the Letter in front of the number.** (Total marks: 06; 1.5 mark/item)

| | PHRASES /Definitions | | TECHNICAL TERMS |
|---|---|---|---|
| 1 | A causal factor that is neither necessary nor sufficient, but increases the likelihood of disease, all other things being equal. | A | stage of subclinical disease |
| 2 | Preventive measures that occur during the stage of subclinical disease, intended to delay the onset of disease or reduce its duration or severity | B | Contributing cause |
| 3 | The stage of disease the follows exposure to the agent but is before the appearance of symptoms. | C | Sufficient but not necessary |
| 4 | The factor alone can cause disease, but so can other factors in its absence | D | Secondary prevention |

B
D
A
C

* Most common organism causing osteomyelitis

Staph aureus

* Most common organism causing osteomyelitis in sicke cell anemia

Salmonella

* Osteomyelitis in

IV Drug abusers - pseudomonas

Chronically ill patients - fungal infections

Sickle cell/ SLE/ Neonates - salmonella

Sexually active adults - Neisseria gonorrhea

* What is inheritance pattern of Duchenne muscular dystrophy

X linked recessive

* What is pannus

Pannus refers to synovial tissue proliferation, and has been considered a late, inactive and irreversible manifestation of rheumatoid arthritis

* Difference between gout and pseudo gout

| GOUT | PSEUDOGOUT |
| --- | --- |
| * URATE CRYSTALS in the joints<br>* Uric Acid crystals appear needle shape and blue<br>*MOST COMMON THE METATARSOPHALANGEAL joint of the BIG TOE=PODAGRA<br>* NEGATIVELY birefringent needle-shaped crystals<br>* X-Ray: show TOPHI as PUNCHED OUT radiolucent areas<br>* INDOMETHACIN 50mg tid x 1 week=First line), COLCHICINE or steroids to treat an ACUTE ATTACK.<br>* ALLOPURINOL=PROPHYLACTIC<br>* PROBENICID=CHRONIC GOUT | * CALCIUM PYROPHOSPHATE DIHYDRATE CRYSTALS in the synovial fluid<br>* Calcium Pyrophosphate is yellow with rhomboid shape<br>* most commonly affects the KNEE<br>* POSITIVELY BIREFRINGENT CRYSTALS<br>* Colchicine used to prevent acute attacks. |

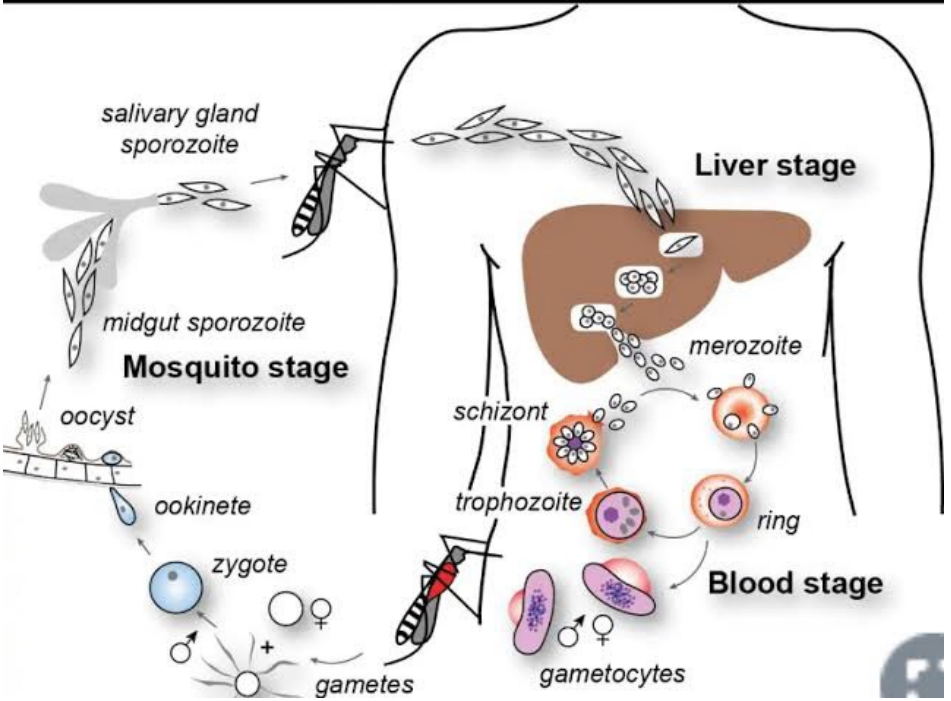
# * Difference between osteoarthritis and rheumatoid arthritis

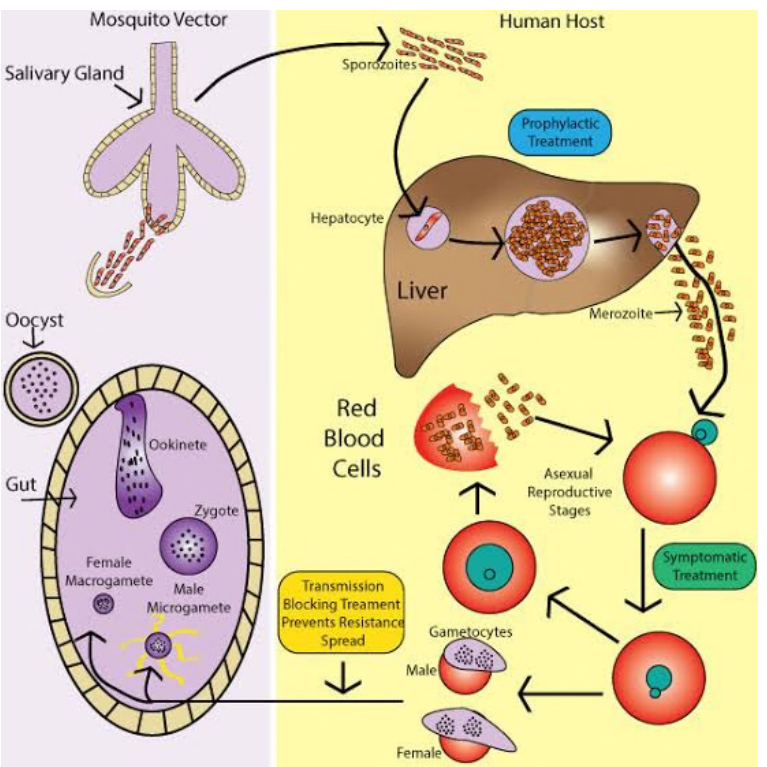
| Characteristics of rheumatoid arthritis and osteoarthritis (2) | | |
|---|---|---|
| **Characteristic** | **Rheumatoid arthritis** | **Osteoarthritis** |
| Age at which the condition starts | It may begin any time in life. | It usually begins later in life. |
| Speed of onset | Relatively rapid, over weeks to months | Slow, over years |
| Joint symptoms | Joints are painful, swollen, and stiff. | Joints ache and may be tender but have little or no swelling. |
| Pattern of joints that are affected | It often affects small and large joints on both sides of the body (symmetrical), such as both hands, both wrists or elbows, or the balls of bothfeet. | Symptoms often begin on one side of the body and may spread to the other side. Symptoms begin gradually and are often limited to one set of joints, usually the finger joints closest to the fingernails or the thumbs, large weight-bearing joints (hips, knees), or the spine. |
| Duration of morning stiffness | Morning stiffness lasts longer than 1 hour. | Morning stiffness lasts less than 1 hour. Stiffness returns at the end of the day or after periods of activity. |
| Presence of symptoms affecting the whole body (systemic) | Frequent fatigue and a general feeling of being ill are present. | Whole-body symptoms are not present. |

# GOUT

* It is a disorder caused by tissue accumulation of excessive amounts of uric acid, an end product of purine metabolism
* precipitation of monosodium urate crystals
* Stages of gout:

1. Asymptomatic hyperuricemia
2. Acute gouty arthritis
3. Intercritical gout
4. Chronic tophaceous gout



# Methotrexate

side effects

## Features

### Bone marrow:

bone marrow supression

### GIT:

nausea,vomiting,abdominal pain & discomfort

### Hair:

alopecia

### Uric acid:

lysis of tumor cells causes increase serum uric acid

### Anemia

megaloblastic anemia

### Liver

hepatotoxicity

Granulomatous inflammation seen in:
Tuberculosis
Leprosy
Syphilis
Cat scratch disease
Schistosomiasis
Temporal arteritis
Crohn disease
Sarcoidosis

Antibiotics against anaerobes
Carbapanems
Chloramphenicol
3rd gen cephs

✡ Most reliable method of identification is Dactylography (not DNA finger printy)

✡ Brachial Index = $\frac{\text{Radius Length}}{\text{Humerus Length}} \times 100$

✡ Crural Index = $\frac{\text{Tibial Length}}{\text{Femoral Length}} \times 100$

✡ Intermembral Index = $\frac{\text{Radius Length + Humerus Length}}{\text{Tibial Length + Femoral Length}} \times 100$

✡ Rule of Hasse
- Gestational age of fetus in first 5 months
- Gestational Age = $\sqrt{CHL}$

CRL = 2/3 CHL

✡ Rule of Morrison
- Gestational Age of fetus in next 5 months (6-10 months)
- Gestational Age = $\frac{CHL}{5}$

# Primary dentition

- **Primary tooth buds** formation → **6th week** of **prenatal** period
- Primary teeth begin to **erupt** → **6 mth**
- Eruption time for primary teeth → **6 mth – 3 yo**

| | Month | Length | Growth |
|---|---|---|---|
| | 1 | 1 | |
| Limbs | 2 | 4cm | Limb buds appear |
| | 3 | 9cm | Nails appear |
| Hair | 4 | 16cm | Lanugo hair |
| | 5 | 25cm | Scalp hair |
| Eyes | 6 | 30cm | Eyebrows, Eyelashes appear |
| | 7 | 35cm | Eyes open |
| Testis | 8 | 40cm | (L) Testis |
| | 9 | 45cm | (R) Testis |
| | 10 | 50cm | |

*By 16th week of Intra uterine Life → Sex can be recognized

* Ossification Centers
  - 1st center to appear ⟹ Clavicle
  - 5th month → Calcaneum
  - 7th month → Talus
  - 9th month → Lower end of femur
  - 10th month (Attem) → Upper end of tibia

## ✱ Ossification of Carpal Bones

(Mnemonic: She Looks Too Pretty, Try to Catch Her) → for Carpal Bones

Scaphoid
~~Forearm~~ Lunate
Triquetrum
Pisiform
Trapezium
Trapezoid
Capitate
Hamate

Ossification:

Capitate → 2 months
Hamate → 3 month – 1 year
Triquetrum → 3 yr (Tri = 3 yrs)
Lunate → 4 yrs
Scaphoid → 5 yr (S = 5)
Trapezium, Trapezoid → 6 yrs
Pisiform → 9-12 yrs

## ✱ X-Ray Pelvis

- Triradiate Cartilage → 13-15 yrs
- Iliac crest → 18-20 yrs
- Ischial Tuberosity → 21 yrs

## ✱ X Ray Elbow (centers Appearance)

Mnemonic: ~~CRITOE~~ CRITOE

- Capitulum → 1 yr
- Radial Head → 5 yr
- Inner (medial) epicondyle → 6 yr
- Trochlea → 9 yr
- Olecranon → 9 yr
- External Epicondyle → 11 yr

- If elbow joint is completely fused → Age = 16 yrs
- In females, ossification centers fuse 1 yr earlier than males

## Upper Limb Joints
- Shoulder → 18 yr
- Elbow → 16 yr
- Wrist → 18 yr

## Lower Limb Joints
- Hip joint → 17 yrs
- Knee → 18 yr
- Ankle → 17 yr

## Fontanelles Closure
- Lambda (Posterior) Fontanelle → 3 month
- Metopic suture → 9 month
- Bregma (Anterior) Fontanelle → 18 month

## Sutures Closure
- Sagittal Suture
  - Anterior 1/3rd → 40-50 yrs
  - middle 1/3rd → >50 yrs
  - Posterior 1/3rd → 30-40 yrs
- Coronal Suture
  - Lower half → 40-50 yr
  - Upper half → 50-60 yr

# PATHO ID POINTS

* Gram positive - purple/blue
* Gram negative - pink/red
* ZN staining for AFB - M.tuberculosis, M.leprae

AFB stain pink (straight or sloghtly curved rods), blue background

* Testicular atrophy

Thickened basement membrane
Interstitial hyperplasia

* Benign prostatic hyperplasia

Glands with papillary projections
Branched appearance of glands
Round secretions called corpora amylacea
Increased fibromuscular stroma

* Chronic cholecystitis

Wall thickening of gallbladder
Rokitansky's Aschoff sinus (RA sinus)
Lymphocytes infiltration

* Acute appendicitis

Neutrophils in muscularis
Congested vessels
Necrotic mucosa

* Granuloma
Giant cells
Rim of lymphocytes covering giant cells

* Granulation tissue
Fibroblasts
Neovascularization
Lymphocytes

* Hydatid cyst
Outer pericyst
Middle laminated membrane
Inner germinal layer

# MOA

* Penicillins, Cephalosporins, Imipenem, Aztreonam- bind penicillin binding proteins and inhibit transpeptidase that catalyze the final step in cell wall biosynthesis
* Vancomycin - inhibit cell wall synthesis by inhibiting transglycosylase enzyme
* Aminoglycosides, Linezolid - misreading of codon (incorporation of wrong amino acid)
* Tetracyclines, Dalfopristin/ Quinupristin - blocks attachment of aminocyl tRNA to acceptor site
* Chloramphenicol - inhibit activity of peptidyl transferase
* Macrolides, Clindamycin - inhibit translocation of peptidyl tRNA from acceptor to donor site
* Sulfonamides - bacterostatic, inhibit folate synthase competitively
* Trimethoprim, Pyrimethamine - inhibit dihydrofolate reductase
* Fluoroquinolones - inhibit tropoisomerase IV and DNA gyrase

**Types of Law:**

| | |
|---|---|
| 1. **Civil Law:** | It is code of behavior or dealing between individual meant for better society. |
| 2. **Criminal Law:** | It is law implemented by the government state meant for better government. |
| 3. **Common Law:** | Un-written law based on conventions and traditions of society. |
| 4. **Statutory Law:** | It is written law given by the parliament e.g., PPC, CPC (it is also called fortified law). |
| 5. **Islamic Law:** | It is based on teachings of Holy Quran and Sunnah. It is both civil and criminal. |

## Important Definitions

| | |
|---|---|
| **Oath / Affidavit:** | It is solemn affirmation for any declaration required by law to be made before public servant. Or it is a statement on oath before a person authorized to take oath. |
| **Crime:** | It is a social harm defined and made punishable by law. |
| **Deposition:** | It is a written statement on oath before judicial officer, in the presence of witness and signed by him and judicial officer. |
| **Complaint:** | It is an allegation made orally or in writing to a judicial authority. |
| **Offense:** | It is an act of commission or omission made punishable by law. |
| **Cognizable Offense:** | Offense for which police can arrest without warrant. |
| **Non-cognizable Offense:** | Offense for which police cannot arrest a person without warrant |
| **Conduct Money:** | Fee or money offered to a witness for attending courts.<br>• In civil cases the party summoning the case pays this fee to the witness<br>• In criminal cases court pays the fee. |
| **Suicide:** | Intentional self-slaughter / killing. |
| **Homicide:** | Killing of one human by another.<br>a) Culpable Homicide: deserves blame.<br>b) Non-Culpable Homicide: does not deserves blame. |
| **Murder:** | Unlawful killing of other person with malice (road accidents) afore thought. |
| **Court:** | Refers to all Judges, Magistrates and all persons except arbitrators, legally authorized to take evidence. |
| **Hurt:** | It is bodily pain, disease or infirmity caused to any person. |
| **Injury:** | It is any harm whatever illegally caused to any person, in body mind, reputation or property. |
| **Plaintiff:** | It is the person who brings the action in the court of law. |
| **Inquiry:** | It is referred to every inquiry other than a trial, conducted by a magistrate or court. |
| **Jury:** | It is body of persons sworn to render verdict in a court of justice. |
| **Warrant:** | It is a written authority under hand and seal. It is used for the arrest of the persons or for their forcible production in a court of law. |

* Inquest is legal and judicial inquiry into the cause of sudden death
* Types of inquest
1. Police inquest
2. Magistrate inquest
3. Coroner inquest (not in Pakistan)

* Evidence - All legal means which help to prove or disprove any matter of fact, the truth of which is submitted to judicial investigation. It can be documentary, oral or circumstantial

* Types of evidence
1. Oral evidence
A. Direct evidence
B. Indirect hearsay evidence
C. Circumstantial evidence

2. Documentary evidence
A. Primary evidence
B. Secondary evidence

* Witness is a person who gives sworn evidence in a court of law as regards facts and interference that can be drawn.

* Types of witness
1. Common or ordinary witness
2. Expert or skilled witness
3. Hostile witness

* Stages of evidence

1. Examination in chief
2. Cross examination
3. Re examination
4. Court questions

* Medical ethics - A code of behaviour accepted voluntarily within the profession as opposed to statuses and regulation imposed by official legislation
* Professional misconduct- The conduct on the part of a medical person during practice, which would reasonably be regarded as disgracedul by his professional brethren of good repute and competency.
* Medical negligence- The act of omission which a reasonable doctor would do or doing something which a reasonable doctor would not do.
* Types of medical negligence

1. Civil negligence
2. Criminal negligence
3. Contributary negligence
4. Third party negligence

* Consent - Voluntary agreement or permission for medical treatment
* Types of consent

1. Implied consent
2. Expressed consent - Oral expressed, written expressed
3. Blanket consent
4. Informed consent

* Contraindications of gastric lavage

1. Corrosive poisoning (except carbolic acid) for fear of rupture of stomach
2. Strychnine poisoning and convulsions
3. Kerosine or volatile poisons
4. Comatose conditions
5. Hypothermia

* Complications of gastric lavage

1. Aspiration pneumonia
2. Hypoxia or hypoxemia
3. Laryngospasm
4. Shortness of breath
5. Bradycardia
6. Mechanical injury

* Plasma half life - The amount of time required to reach half of the required concentration
* Minimum inhibitory concentration (MIC) - It is lowest con of antibiotic that inhibits bacterial growth
* Post antibiotic effect - Arrest of replication and growth of bacteria in body even when concentration of drug falls below MIC
* Cell injury - A state of biochemical or morphologic changes that occur when the state of homeostasis is disturbed
Cell injury can be reversible or irreversible
* Causes of atrophy
1. Atrophy of disuse
2. Denervation atrophy
3. Atrophy due to loss of trophic hormones
4. Senile atrophy
5. Pressure atrophy
* Atrophy - A pathway of cell death induced by a tightly regulated suicidal program, in which cells destined to die activate enzymes that degrade cells own nuclear DNA and nuclear, cytoplasmic proteins
* Classic changes in apoptosis
1. Cell shrinkage
2. Nuclear fragmentation
3. Chromatin condensation
4. Chromosomal DNA fragmentation
5. Formation of cytoplasmic blebs and apoptotic bodies
6. Phagocytosis
* Nuclear changes in necrosis
1. Pyknosis
2. Karrhyorhexis
3. Karyolysis

* Pathologic calcification- The deposition of calcium salts, together with smaller amounts of iron, magnesium, and other minerals in tissues other than bone or enamel.

It is of two types:

1. Dystrophic calcification
2. Metastatic calcification

* Inflammation- It is a rsponse of vascularised tissues that delivers leukocytes and other molecules to the sites of infection in order to eliminate the offending agents

* First order kinetics - When rate of elimination of drug is directly proportional to concentration of drug in plasma.

A constant fraction is eliminated per unit time.

* Zero order kinetics - A constant amount of drug is eliminated per unit time

* Phases of growth of bacteria

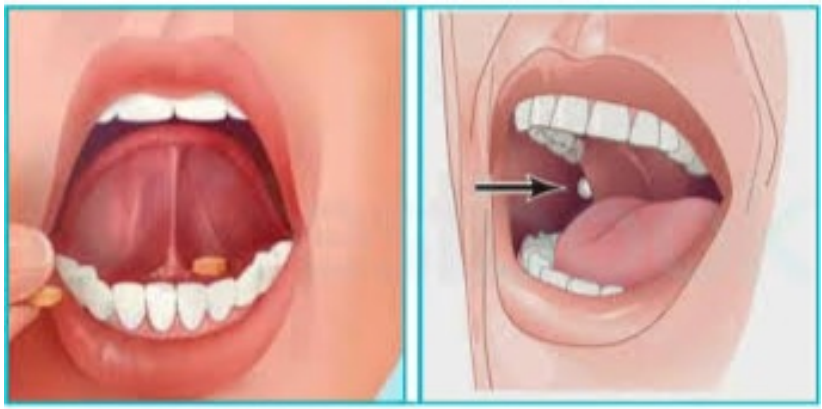
1. Lag phase
2. Exponential or Log phase
3. Stationary phase
4. Phase of decline or death

* Transduction - It is a process by which a virus transfers genetic material from one bacterium to another

* Transformation - It is the genetic alteration of a cell resulting from the direct uptake and incorporation of exogenous genetic material from its surrounding through the cell membrane

* Transfection - It is the process of introducing nucleic acids (DNA or RNA) into eukaryotic cells by non viral methods

* Bacterial conjugation - It is the transfer of genetic material between bacterial cells by direct cell-to-cell contact or by a bridge like connection between two cells. This takes place through a pilus. The mating process is controlled by an F plasmid, which carries the genes for the proteins required for conjugation. One of the most important protein is pilin, which forms sex pilus (conjugation tube).



Sublingual Route Buccal Route

BUCCAL/SUBLINGUAL ROUTE:- The two sites for oral mucosal delivery of drugs are:

- Sublingual route- the drug is placed under the tongue and allowed to dissolve.
- Buccal route- the medicament is placed between the cheek and the gum.


Effervescent tablet

Capsule


Lozenge

Pills


Granules

Emulsion


# Difference between syrup and suspension

## Syrup:

"Syrup is a solution of Sucrose in Purified Water. It contains a preservative unless it is used when freshly prepared"

USP



## Suspension

"Suspension is a liquid solution that may have some suspended particles of drug content in the medium. These are viscous liquids that can make a floppy layer on the surface. "

## *Difference between syrup and suspension*

| *Syrup* | *Suspension* |
|---|---|
| Completely dissolves into its solvent | Not completely dissolves in the solvent. |
| Not suitable for diabetic patient | Suitable for diabetic patient |
| Sweet in taste | May be unpleasant taste |
| No need to shake before use | Need to shake before use |
| Does not require labeling | Require labeling |

# Elixir

- Elixirs are clear sweetened, hydroalcohlic preparations intended for oral use and usually flavored for palatability.
- Alcoholic content vary from 10% to 12% and up to 40%.



Mouth wash


Linctus

Usually prescribed for relief of cough


Ointment


Oral drops


Lotion

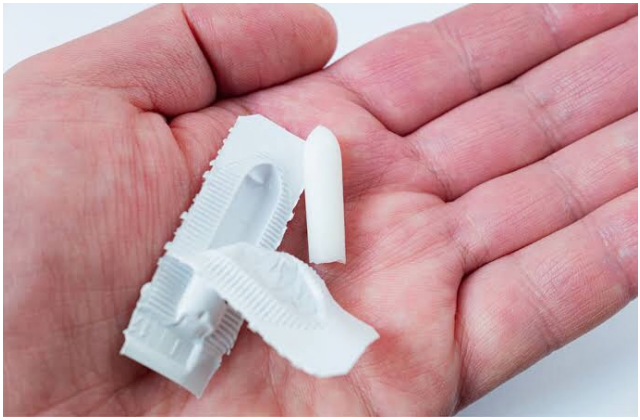
Cream

Insulin syringe


Gel



Inhaler

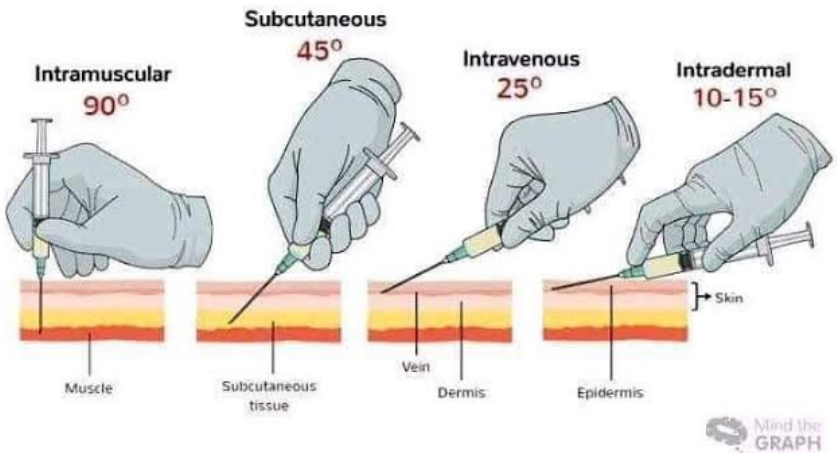
Suppository

Enema



Pessary

# Injection technique





Vial


Ampule

# PRESCRIPTION

* Acute tonsillitis
Amoxicillin 625
Paracetamol 500
Loratidine 10

* Acute bacterial meningitis
Inj Ceftriaxone 3g IV OD
Inj Paracetamol 1g IV (stat) then SOS
Inf N/Saline + Inj Dimenhydranate 50mg IV stat

* Cerebral anemia
Inj quinine sulphate 900mg in 100ml D/Water I/V stat
Inj 25% dextrose IV stat

Inj quinine 600 ml in 100ml D/W I/V TDS + inj 25% dextrose 25ml (3 days)
Inf paracetamol 100ml I/V stat, then SOS

Tab quinine 300 mg
Cap. Doxycycline 100mg

* Acute malaria
Tab artemessinin 80mg
Tab paracetamol 500mg
Tab domperidone 10mg

Date:

Dr. XYZ
MBBS, FCPS
HMC Peshawar
Ph#

Patient Name: Age: Sex:
Adress: weight: Date:

Dx:

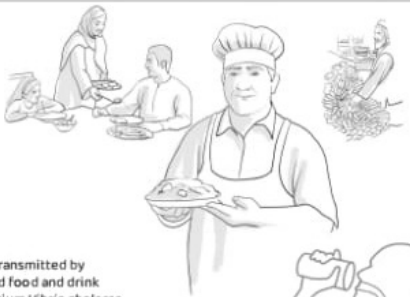
Rx:

ہدایات

Signature

# Cholera

## Information for food handlers



## Sources of infection

Foodborne and waterborne, transmitted by consumption of contaminated food and drink contaminated with the bacterium *Vibrio cholerae*.

## Types of exposure & prevention

**Direct contact with bacterium in water or food. It can spread very quickly, especially in conditions created by emergencies. Cholera can be fatal.**

**If you are buying or selling food, prevent cholera by:**

- Washing hands before touching food and after using the toilet
- Washing utensils, food ingredients and cutlery with soap and clean water
- Cooking food well and keeping it at a safe temperature
- Not allowing sick people to prepare or handle food
- Using latrines or burying your feces
- Sanitizing shared washrooms of restaurants or warehouses

## Symptoms

Diarrhea that looks like "rice water" in large amounts

Vomiting

Leg cramps

Weakness

Dehydration

## Actions to take in case of symptoms:

If you are experiencing symptoms of cholera, seek medical advice immediately.Avoid cooking and serving food to others, as doing so will lead to more infections.

# Typhoid fever

Information for the general public

## Source of infection

Typhoid is a life-threatening systemic infection. It is transmitted through ingesting contaminated food or water.



## Types of exposure & prevention

Poor sanitation and lack of clean drinking-water. Climate change has increased the burden of typhoid. Increased antibiotic resistance is making treatment a challenge. Prevention and vaccination are key.

Get vaccinated as typhoid is becoming resistant to antibiotics

Wash hands with soap and clean water specially after using toilet and before eating food

Infected patients should avoid preparing or serving food to other people

Sanitation and clean drinking water must be ensured even if you are vaccinated

## Signs & symptoms

In case of following symptoms, quickly see a doctor for treatment. Symptoms include:

Prolonged high fever

Fatigue, headache and nausea

Abdominal pain

Constipation or diarrhoea

Rose spots usually occur between the second and fourth week of illness

Groups of 5–15 pink blanching papules (little bumps) appear on the anterior trunk

**Actions to take in case of symptoms:**

Seek immediate medical advice .

World Health Organization

Eastern Mediterranean

# SYMPTOMS

Lorem ipsum dolor sit amet, consectetur adipisicing elit, sed do eiusmod tempor incididunt ut labore et dolore magna aliqua. Ut enim ad minim veniam, quis nostrud exercitation ullamco laboris nisi ut aliquip ex ea commodo consequat.

FIVER HEADACHE RASH FATIGUE COUGH

# PREVENTIONS / TREATMENT


HANDS WASH WEARING MASK VACCINE

PATIENT SCREENING

VACCINATION

# PROTECT YOURSELF AGAINST MUMPS


## MMR VACCINATION IS THE BEST WAY TO PREVENT MUMPS!

THERE IS NO TREATMENT FOR MUMPS IF YOU GET IT

## KEEP FROM SPREADING MUMPS

Don't share things that have saliva on them

Cover your coughs and sneezes

Stay home when you are sick


Wash your hands often with soap and water

Clean and disinfect surfaces

## SIGNS AND SYMPTOMS OF MUMPS

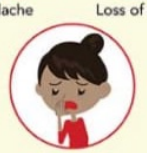
Mumps is best known for the puffy cheeks and swollen jaw that it causes.

Fever

Headache

Loss of appetite

Muscle aches



Tiredness

## VACCINATION ALSO HELPS PREVENT MUMPS COMPLICATIONS

**Complications** can include swelling of the:

- testicles
- ovaries
- breasts
- pancreas
- brain
- spinal cord tissue

**IF YOU HAVE SYMPTOMS, STAY HOME AND AWAY FROM OTHERS. CONTACT YOUR DOCTOR OR HEALTH SERVICES AT YOUR INSTITUTION.**

CDC

Complications of communicable diseases

1 ***Measles:***
- Pneumonia
- Encephalitis

1 ***Rubella:***
- Birth defects if contracted during pregnancy

1 ***Mumps:***
- Orchitis (inflammation of testicles in males)
- Meningitis

1 ***Hepatitis:***
- Cirrhosis
- Liver failure

1 ***Cholera:***
- Dehydration
- Electrolyte imbalance

1 ***Dengue:***
- Severe bleeding (Dengue Hemorrhagic Fever)
- Organ failure

1 ***Malaria:***
- Anemia
- Organ failure

# DIPHTHERIA

Diphtheria is a **bacterial illness** that **makes it hard to breathe.**

*Diphtheria attacks the nose and throat*

- Thick layer of dead cells covers the throat, cutting off breathing
- Runny nose
- Sore throat, hoarseness
- Swollen neck glands
- Bluish skin
- Fever and chills
- Less common skin diphtheria causes sores, blisters

## DIPHTHERIA STILL KILLS 5-10% OF INFECTED PATIENTS

**Children younger than 5 and people older than 40 are most at risk. Before treatment was available, diphtheria killed about half of all patients with the illness.**

### HOW IT SPREADS

- Contact with infected mucus or saliva
- Coughing and sneezing
- Sharing drinks

### COMPLICATIONS

- Heart swelling, heart failure
- Painful swelling of the nerves
- Inability to move (paralysis)
- Death

### TREATMENTS

- Antibiotics destroy the bacteria
- Antitoxin fights the poisons released by the bacteria

## BE WISE — IMMUNIZE

- Vaccination is the best prevention.
- The U.S. has four vaccines that fight diphtheria. Doses vary for each vaccine.
- Ask your doctor which is best.

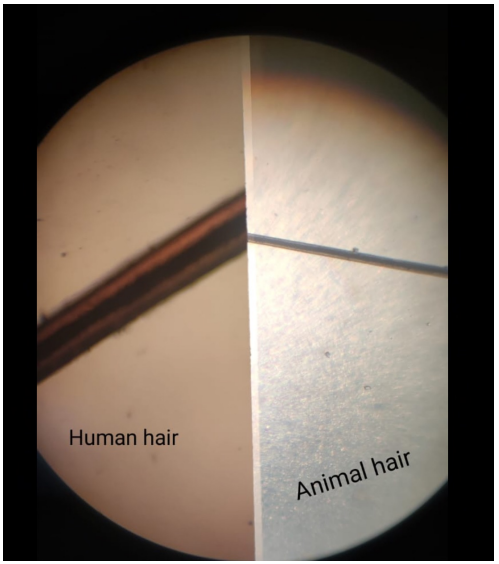
Texas Medical Association

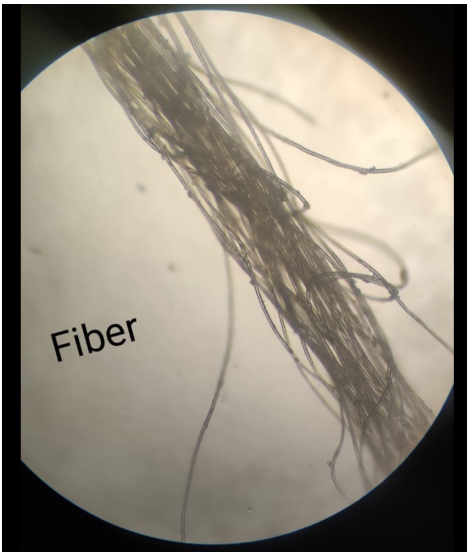
Be Wise — Immunize℠

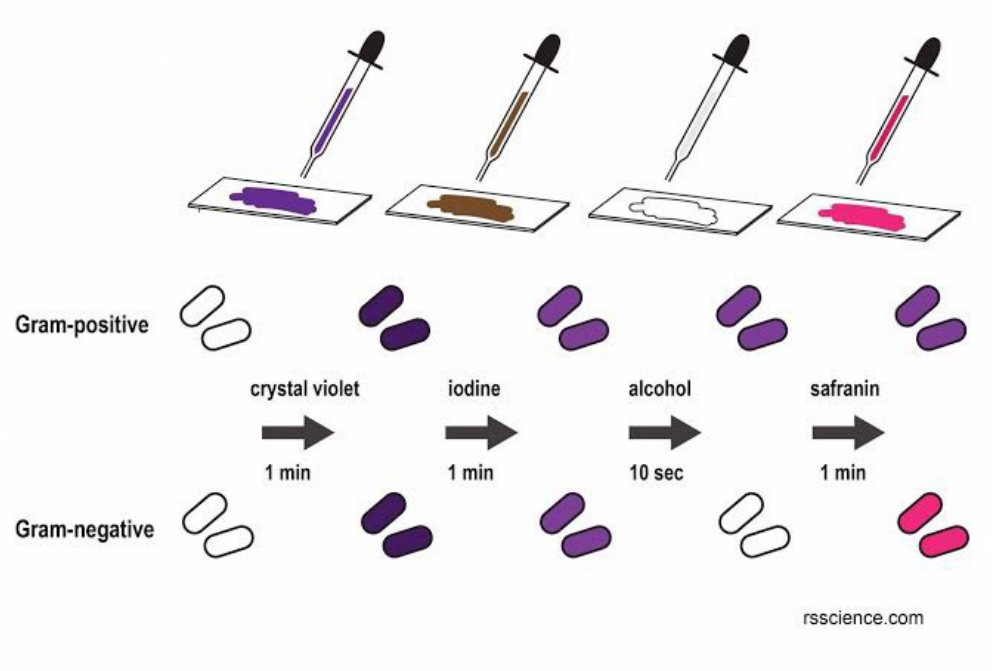
Physicians Caring for Texans

Sources: Centers for Disease Control and Prevention; World Health Organization; New York State Department of Health; Mayo Clinic; The College of Physicians of Philadelphia

*Be Wise — Immunize℠ is a joint initiative led by TMA physicians and medical students, and the TMA Alliance. It is funded by the TMA Foundation thanks to major gifts from H-E-B, TMF Health Quality Institute, Pfizer Inc., and contributions from physicians and their families. Be Wise — Immunize is a service mark of the Texas Medical Association.* www.texmed.org/bewise. 

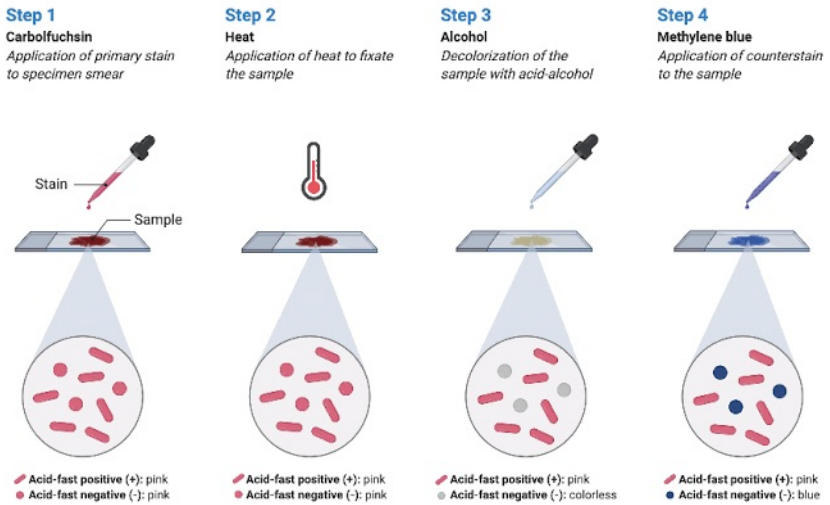





Gram staining

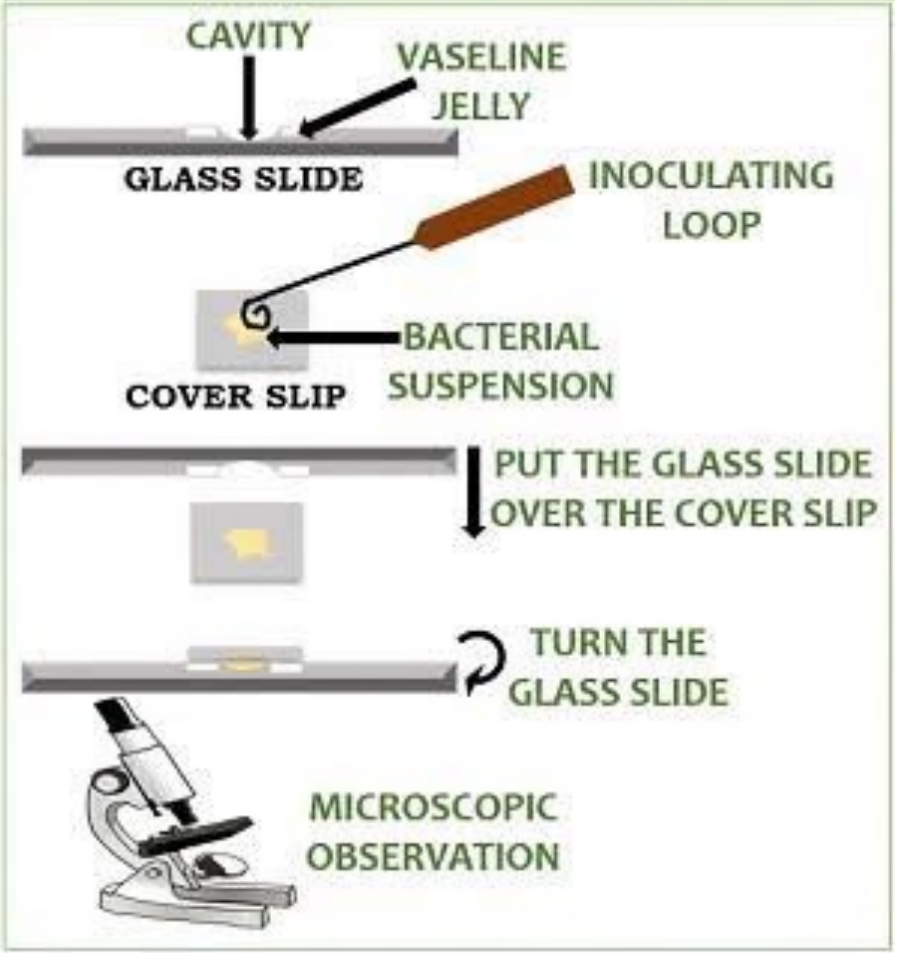
- Alcohol - Decolorizer
- Iodine - mordant

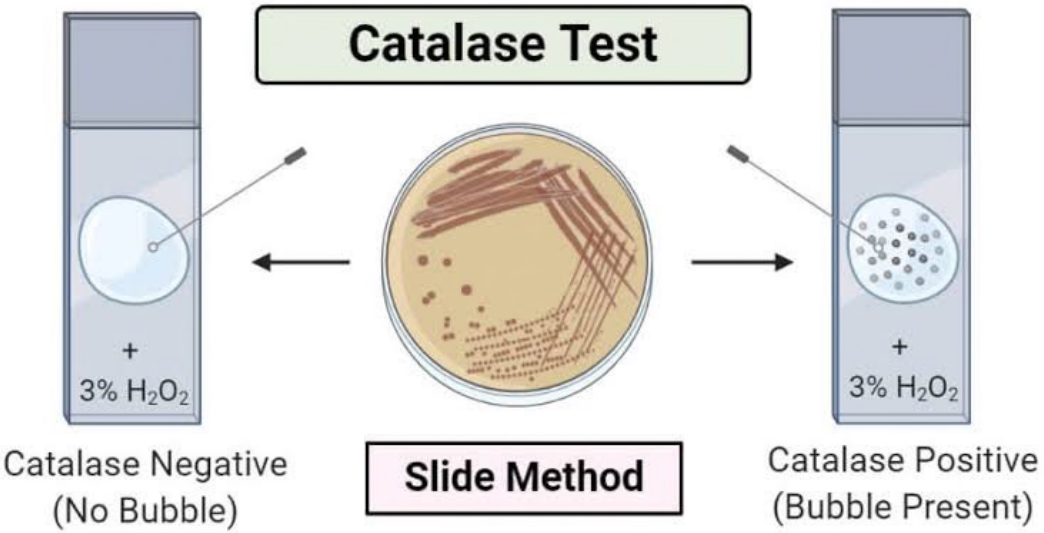



ZN staining

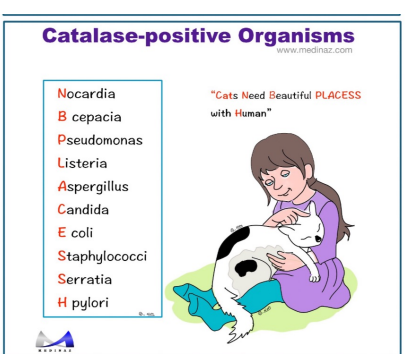
Examine under oil immersion lens

# HANGING DROP SLIDE TEST



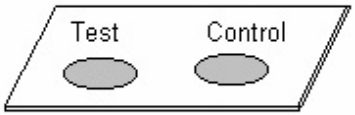



1. Take a slide and add a drop of sterile water
2. Pick colony and add it to one slide
3. Put 3-4 drops of H2O2
4. Bubble formation occurs in 20s

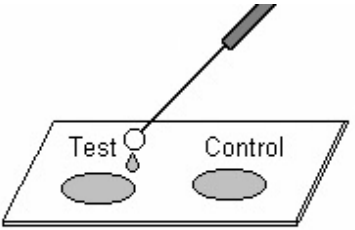


## SLIDE COAGULASE TEST

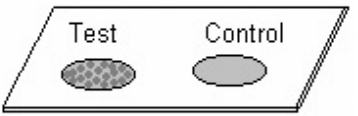




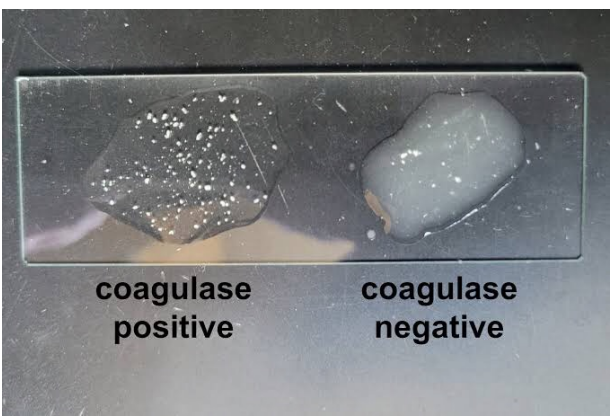

Dense suspensions of test are made on slide




One loopful of plasma is added to test and mixed



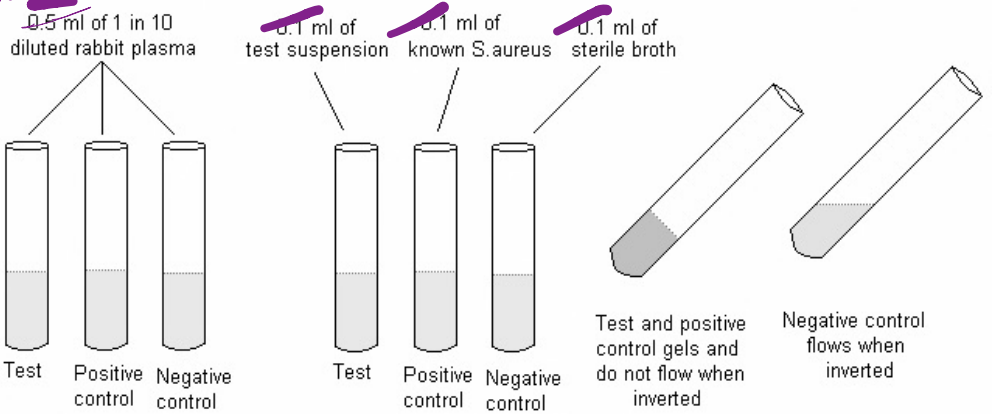

Clumping occurs in test, indicating it is S.aureus



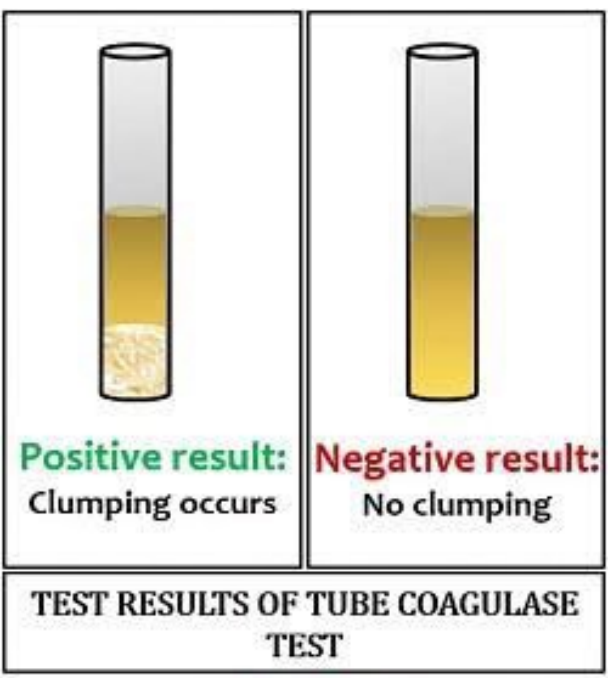
0.2 0.8

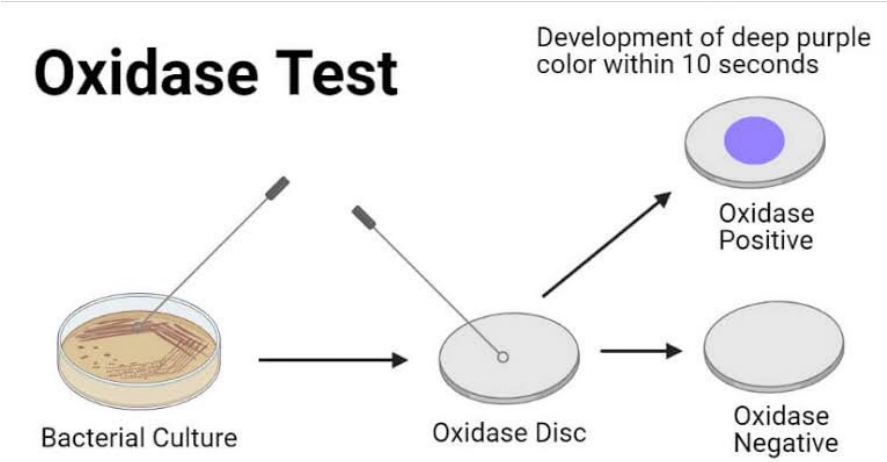
**TUBE COAGULASE TEST**

©Sridhar Rao

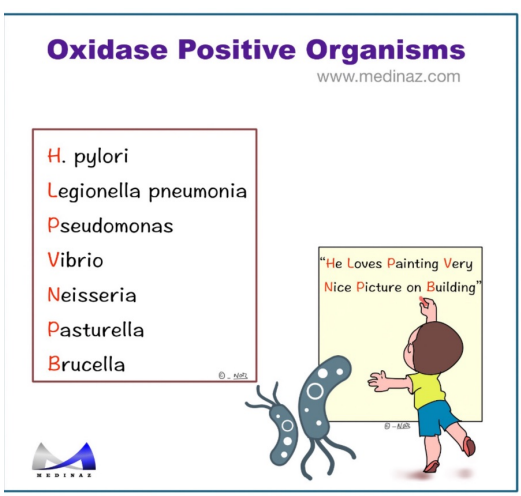



Mix, incubate at 35-37°C for 1hr






1. Pick up a portion of colony to be tested
2. Smear it on filter paper impregnated with oxidase reagent
3. Immediate development of a deep purple color indicate positive test



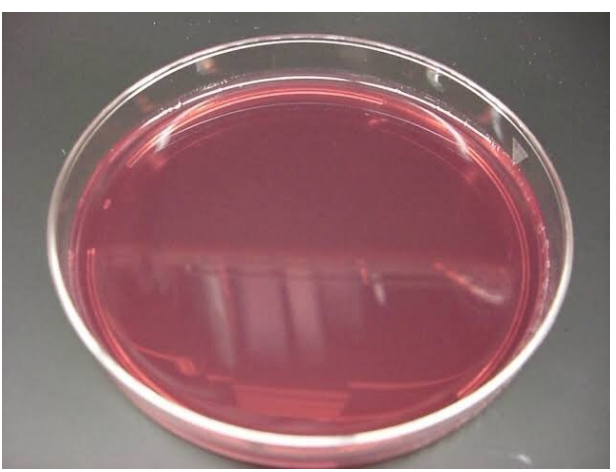
Blood agar:
-Nutrient agar + 5-10% animal blood
-to differentiate between streptococci on basis of hemolysis
-to grow +ve organisms e.g staphylococci

Staph aureus colonies on blood agar


Nutrient agar is basic culture medium containing basic essentials required for growth of bacteria.
It has nutrient broth + 2% agar

Nutrient broth consist of peptone, NaCl, meat extract and distilled water


-when blood agar is heated at 80 degee C
-used for Neisseria, H.influenza, Streptococcus pneumonia, staph aureus



McConkey agar
-contains peptone, bile salt, lactose, neutral red (indicator), agar and distilled water
-color is light pink
-to differentiate lactose fermenters from non lactose fermenters

Lowenstein Jensen medium

-consist of asparginase, glycerols, malachite green, whole egg which give solid consistency to the medium and mineral salts

-selective medium present in screw capped bottle

-light green in color

-used for growth of mycobacterium tuberculosis

-consist of cystine and lactose
-transparent and light green in color
-non inhibitory and differential medium
mainly used for wine culture

Cled agar

**Appearance of some urinary pathogens on CLED agar**

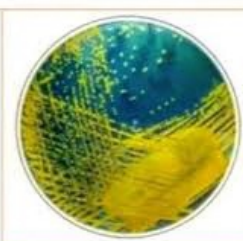
- ***E. coli***: Yellow (lactose-fermenting) colonies often with slightly deeper colored centre.
- ***Klebsiella species***: Large mucoid yellow or yellow-white colonies.
- ***Proteus species***: Translucent blue-grey colonies.
- ***P. aeruginosa***: Green colonies with rough periphery (characteristic color).
- ***E. faecalis***: Small yellow colonies.
- ***S. aureus***: Deep yellow colonies of uniform color.
- ***S. saprophyticus*** and other coagulase negative staphylococci: Yellow to white colonies.



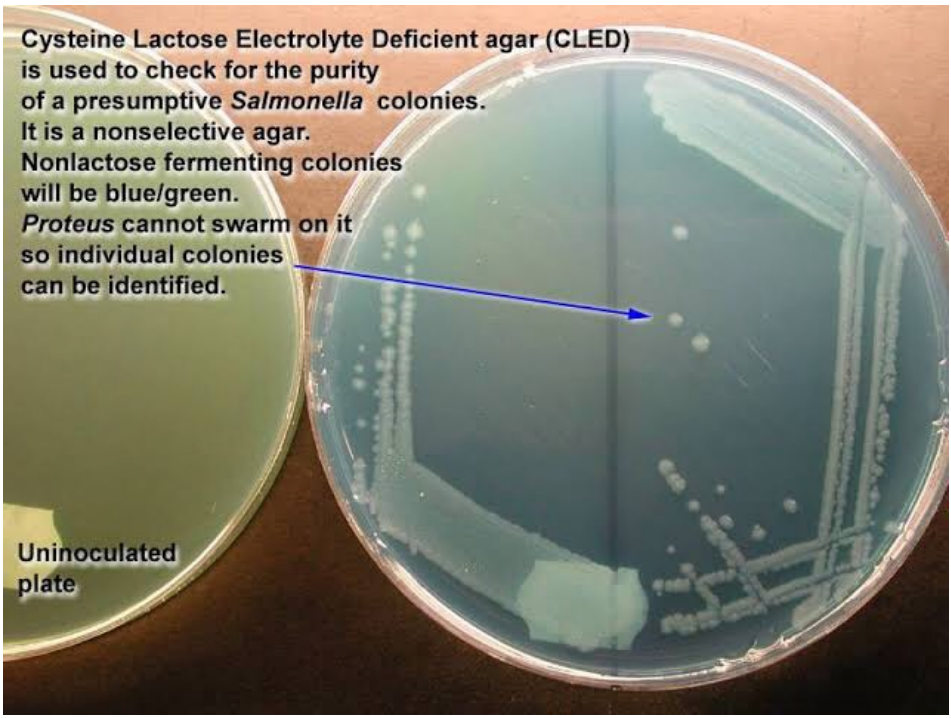
E.coli (Non-Mucoid Yellow Colonies)

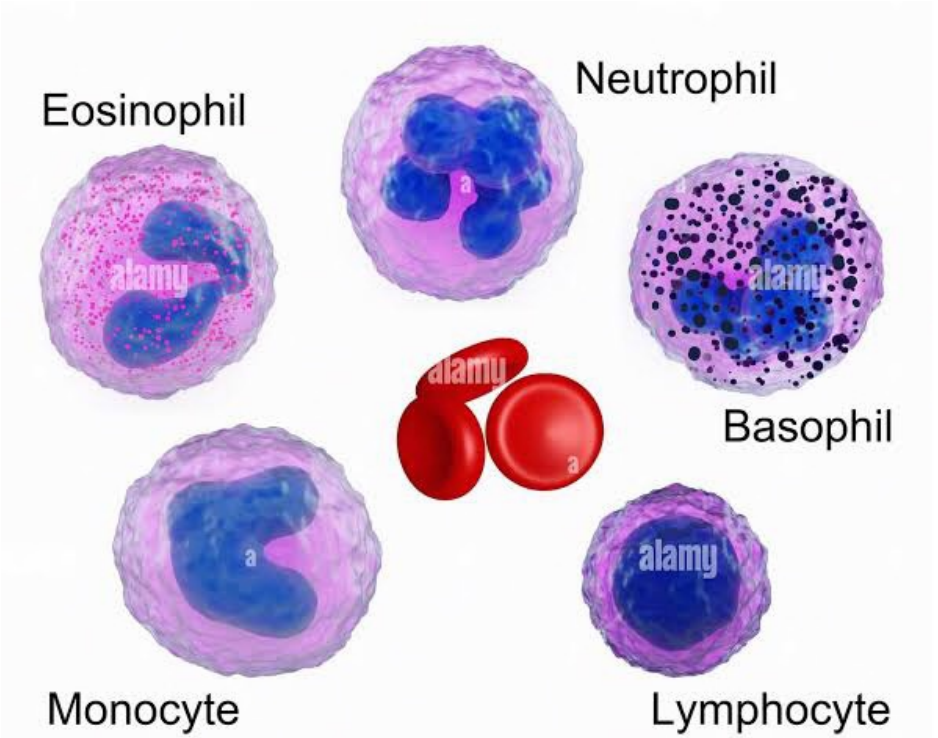
Klebsiella (Mucoid Yellow Colonies)

Serratia (Mucoid Red Colonies)



Staph. aureus (Deep yellow)






Cells of inflammation

Chief Complainant
Fever

(DPO-GAR)

Duration
Pattern
Onset
Grade
Association
Rigor and chills

**CNS:**
Any headache and neck rigidity. (meningitis).

**ENT:**
Sore throat and pus from ear.

**Thyroid (Thyrotoxicosis):**
Heat intolerance and Tremors in hands?

**Respiratory system:**
Cough with sputum?
Positive Family history or close contact with Tb person and weight loss?

**CVS:**
Chest pain, shortness of breath, palpitations?
(for Infective Endocarditis)

Don't forget to ask
Mosquito
Pets
Animals

Date: Dr. Iftikhar.

## Fever DDs.

1) with evening rise = Tuberculosis
2) with rigors & chills = Acute pyelonephritis, cholangitis, Endocarditis lobar pneumonia, lung abscess, Septicemia.
3) rigors & chills that subside with sweating ⇒ malaria.
4) with unconciousness ⇒ Cerebral malaria, meningoencephalitis, pontine Hemorrh
5) with Neck rigidity ⇒ Meningitis, encephalitis
6) with drenching night sweats ⇒ Tuberculosis, lymphoma.
7) with myalgias ⇒ Viral infections (Dengue, Influenza)
8) Step ladder fever ⇒ Enteric fever.

8) Step ladder fever ⇒ Enteric fever.
9) double / tripple rise = Kalazar.
10) Relapsing fever = malaria, Borreliosis ⇒ Recurrent feve
11) pel-Ebstein/undulant fever. = Hodgkin lymphoma.
12) With Rash (Very Sick patient must take double eggs)

| | | |
|---|---|---|
| VIRAL | 1st day | = Varicella (chicken pox) |
| Bacterial | 2nd day | = Scarlet fever |
| L 1) | 3rd day | = POX (Small pox) |
| IRAL 2) | 4th day | = Measles / Rubbela. |
| Bacte | 5th day | = Typus |
| Mosquito | 6th day | = Dengue |

# Appendicitis

PACE HOSPITALS

## Symptoms

Signs and symptoms of appendicitis include:

- Generalised or peri umbilical abdominal pain at the right lower quadrant
- Fever between 99°C to 102°C (experienced by 40% of patients)
- Rebound tenderness
- Nausea or vomiting
- Diarrhoea (watery or loose stools)
- Urinary frequency or urgency
- Generalised weakness
- Anorexia (fear of gaining weight)
- Loss of appetite and more

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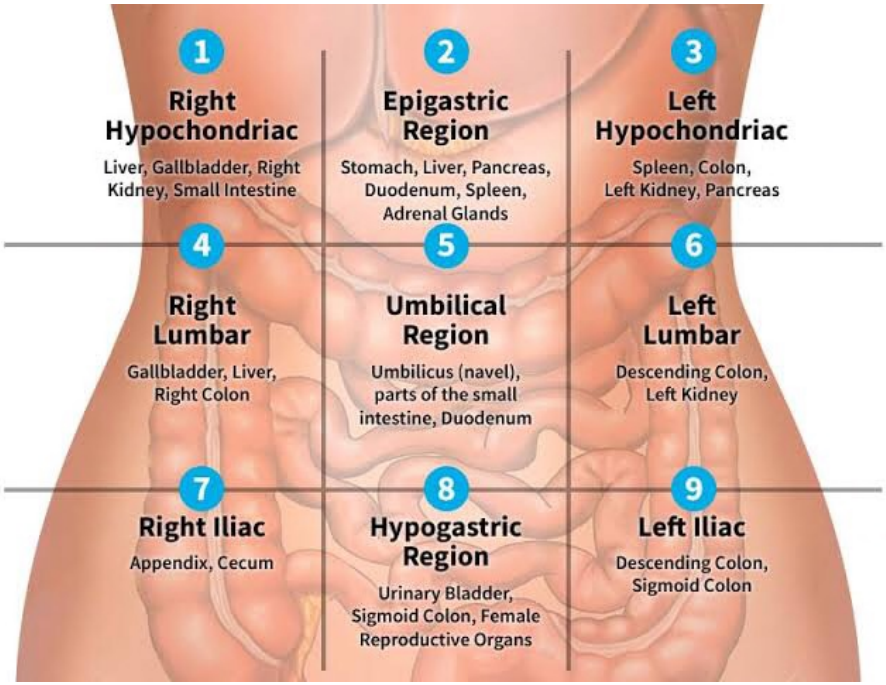
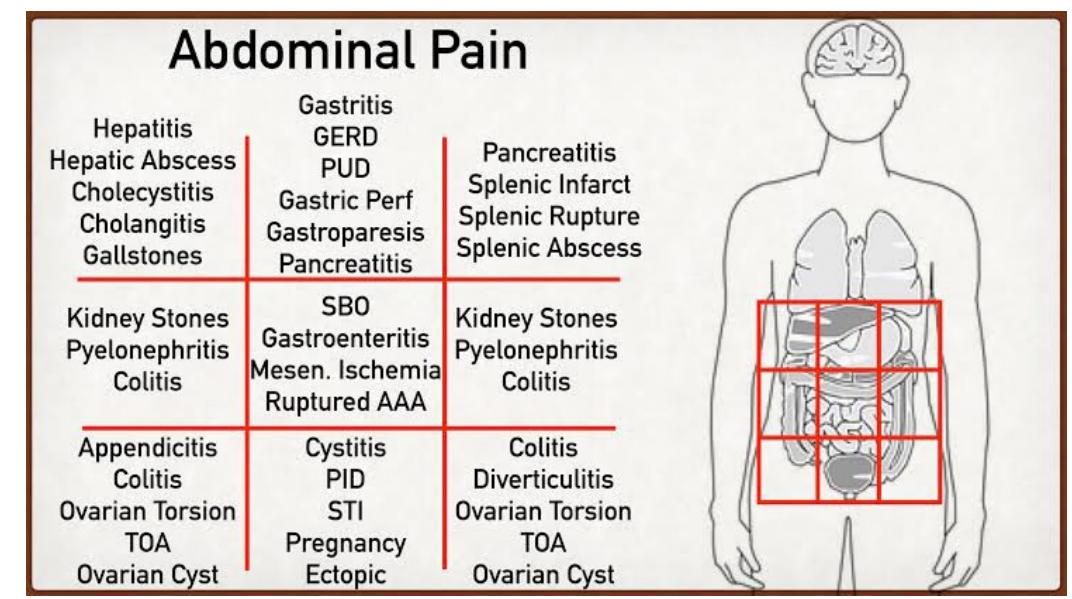
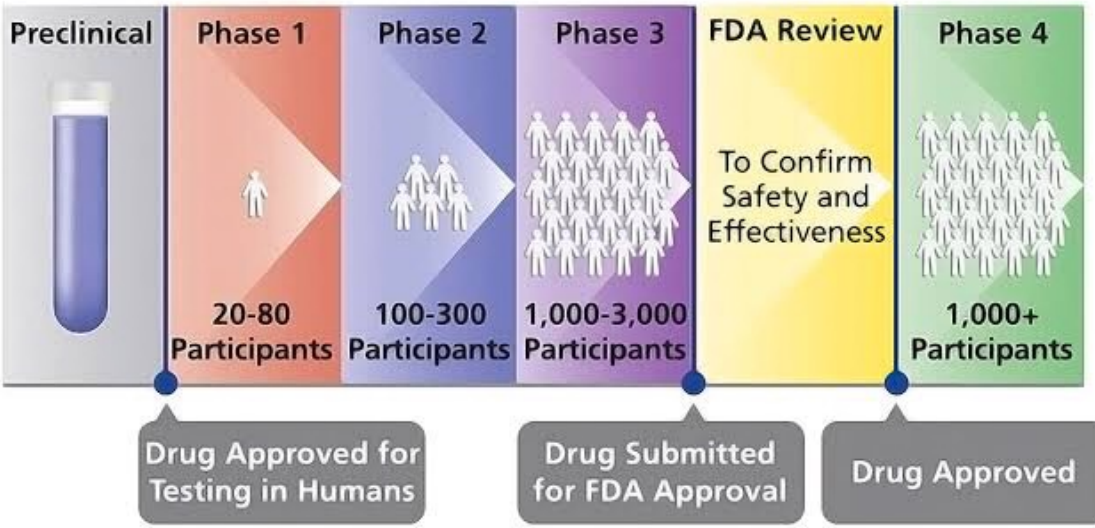


* Bio Data
  Name  Age  Gender  Adress
  MoA  DOA  Marital status  Profession
C/C  Chronological Order
HOPI  SOCRATES
Past Medical
Past Surgical
Family Hx
Personal Hx :  Sleep
  Appetite  Bowel  Micturition
  Addiction
Medication Hx
Social Hx

* Tachyphylaxis - Repeated use of certain drug at short intervals may result in rapid decrease in pharmacological response called tachyphylaxis
* Steady state concentration - When rate of elimination of drug becomes exactly equal to rate of administration

# Clinical Trials




ALL ABOUT

# Clinical Trial Phases

1

**Purpose**: Safety & Dosage
***Participants**: 20 – 100 healthy volunteers or patients with condition or disorder
**Length:** Several months

2

**Purpose**: Efficacy & Side Effects
***Participants**: Up to several hundred patients with disorder or condition
**Length:** Several months to 2 years

3

**Purpose**: Efficacy & Monitoring
***Participants**: 300 to 3,000 patients with disorder or condition
**Length:** 1 - 4 years

*In rare diseases like EB, the FDA accepts lower numbers of participants to represent the affected population.

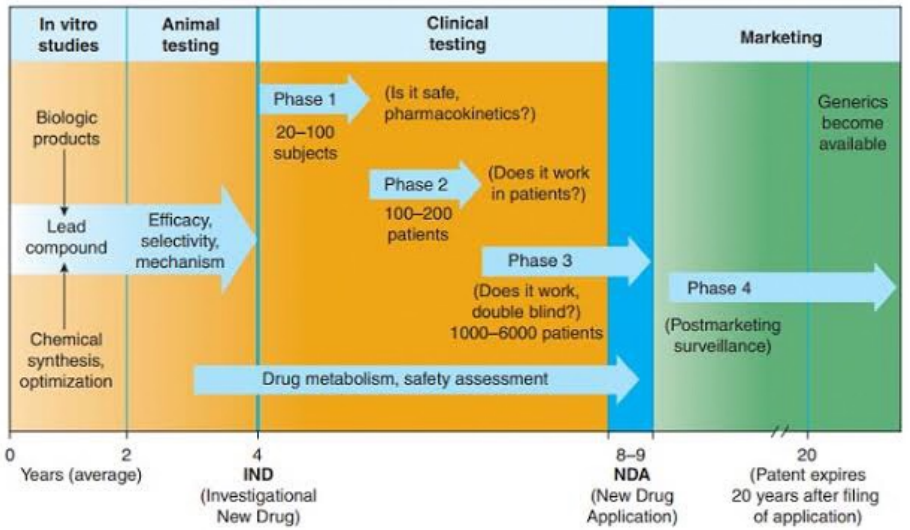



**FIGURE 5–1** The development and testing process required to bring a drug to market in the USA. Some of the requirements may be different for drugs used in life-threatening diseases (see text).

**Notice IND and NDA**

# Classifications

## Typical

- Typical pneumonia usually is caused by bacteria
- *Strept. Pneumoniae*
  - *(lobar pneumonia)*
- *Haemophilus influenzae*
- Gram-negative organisms
- *Moraxella catarrhalis*
- *S. aureus*

## Atypical

- Atypical': not detectable on gram stain; won't grow on standard media
- *Mycoplasma pneumoniae*
- *Chlamydophilla pneumoniae*
- *Legionella pneumophila*
- *Influenza virus*
- *Adenovirus*
- TB
- Fungi

* Portal of entry of infectious agent

1. Skin and mucus membrane (direct contact, wound contamination)
2. By injection
3. By ingestion
4. By inhalation

* Bacterial inflammation is of two types

1. Pyogenic - neutrophils predominate
2. Granulomatous - macrophages and T cells predominate

* Typical stages of an infectious disease

1. Incubation period
2. Prodromal period - non specific symptoms appear such as fever, malaise, loss of appetite
3. Specific illness period - specific symptoms appear
4. Recovery period/ Convalescence period

* Immunization - It is a simple, safe and effective way to protect against infectious diseases that may cause serious illness, permanent damage or even death

| Traits | Male | Female |
|---|---|---|
| Size | Big | Small |
| Architecture of skull | Rugged | Smooth |
| Cranial mass | Deeper | Less deeper |
| Temporal ridge | More prominent | Less prominent |
| Supraorbital margin | Round and dull | Sharper |
| Zygomatic bone | More pronounced | Less pronounced |
| Mandible | Squared | Rounded |
| Superciliary arch | Large and pronounced | Smaller |
| Gonian | Flared | Less flared |
| Teeth | Larger | Smaller |
| Mastoid | Medium-large | Small-medium |
| Nasal aperture | High, thin sharp margins | Lower, wider rounded margins |
| Mandible gonial angle | Less obtuse | More obtuse |

* Recording of medical evidence in court

1. Oath
2. Examination in chief
3. Cross examination
4. Re examination
5. Court questions

* Leading question - A question that suggests its own amswer
* Medical ethics- Rules and principles based on moral values to guide medical professionals in their conduct towards their patients, other members of the profession, and state

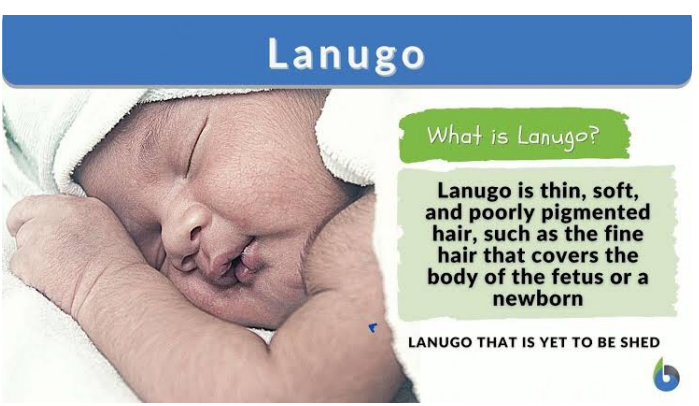
## Parameters of Age Determination

a. **Intrauterine Life:** For determination of fetal age, we have 4 parameters

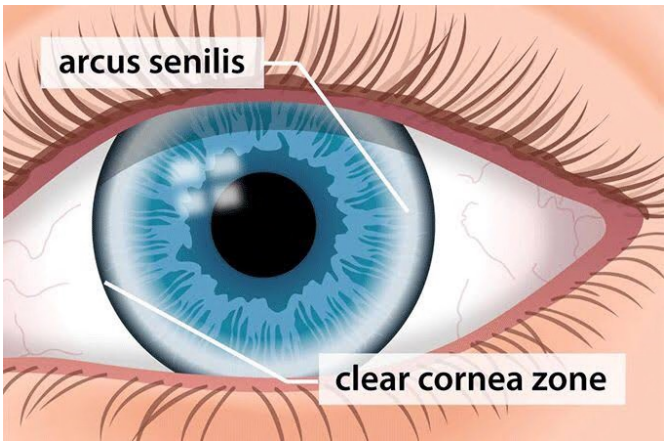
1. ***General Appearance:***

| | |
|---|---|
| From 1-3 weeks | • Crown rump length is about 1-3cm at 3rd week<br>• There are 1-3 somites on 1st day<br>• There are 40-42 somites on 30th day |
| In embryonic Stage (organogenesis) | • Length is about 1 -4 cm<br>• Weight is about 10-15 gm<br>• Pharyngeal arches appear<br>• Limb buds appear<br>• Ossification center for skull, mandible, clavicle and vertebrae appear |
| At 5th month | • Vernix caseosa<br>• Lanugo hair<br>• Eyebrows<br>• Testicles start descending |
| At 7th month | • Nails at finger tips<br>• Eye lids open<br>• Pupillary membrane disappears |
| At 9th month | • Lanugo hair absent<br>• Vernix caseosa at joints<br>• Nails grow beyond tips<br>• Testicles in scrotum |

2. Length of Fetus:

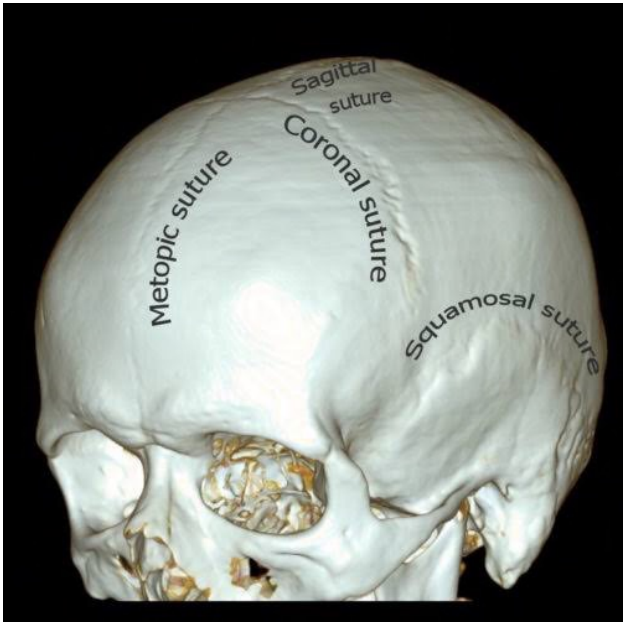


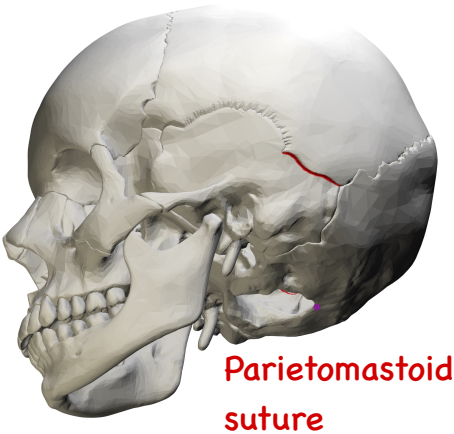
Ring of opacity in peripheral zone of cornea




Appears in about 40yrs of age

Is completed at about 60 yrs

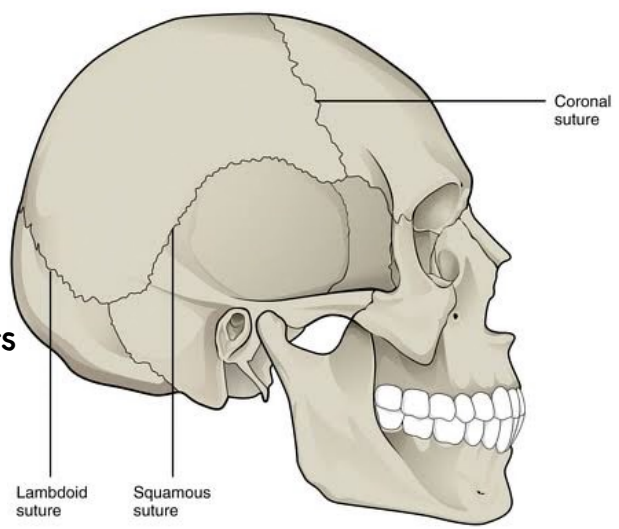


Parietomastoid suture

Closure of sutures

* Metopic suture 2 years
* Sagittal suture 30-35 years
* Coronal suture 35-40 years
* Lambdoid suture 45-50 yrs
* Parieto mastoid suture 55-60
* Sphenoid parietal suture 70 yrs



* Inter sex states

1. Gonadal agenesis - no development of sexual organs
2. Gonadal Dysgenesis - external secual structures are present but testes or ovaries fail to develop at puberty e.g. Klinefelter syndrome, Turner's syndrome
3. True hermaphroditism - external genitalia of both sexes, internal,ay consist of ovaries or testes or ovotestes
4. Pseudo hermaphroditism - lack of clear cut differentiation

* Health - A state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity
* Determinants of health
1. Biological factors - genetic heritage
2. Behavioral and social factors
3. Environmental factors
4. Socioeconomic factors
* Levels of prevention
1. Primordial prevention - prevention of risk factors
2. Primary prevention- prevention of disease e.g. immunization
3. Secondary prevention- prevention of disease progression
4. Tertiary prevention - rehabilitation and special education services
* Health indicators - A characteristic of an individual, population or environment which is subject to measurement and can be used to describe one or more aspect of health of an individual or population
1. Mortality indicators
2. Morbidity indicators
3. Disability rates
4. Nutritional status indicators
5. Health care delivery indicators
6. Indicators of social and mental health
7. Environmental indicators
8. Socioeconomic indicators

# Colour Coding for Biomedical Waste Management in Hospitals

## Segregate Waste in Colour Coded Bins

| RED BAGS | BLUE BAGS | YELLOW BAGS | BLACK BAGS |
|---|---|---|---|
| Plastics waste such as catheters, injections, syringes, tubings i.v, bottels | All type of glass bottels and articles, outdated & discarded medicines | Infectious waste, bandages,gauzes, cotton or any other things in contect with body fluids, human body parts,placenta | Needles without syringes, blades, sharps and all metal articals |

* Hallmark of reversible injury is cellular swelling
* Hallmark of irreversible injury is membrane damage
* Hallmark of cell death is pyknosis, karrrorhexis, karrholysis
* Transmigration of leukocytes

1. Margination
2. Rolling
3. Adhesion
4. Transmigration