

INTERNSHIP REPORT

Submitted to

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

In partial Fulfilment for the Award of The Degree Of

BACHELOR OF SCIENCE

In

MEDICAL LABORATORY TECHNOLOGY

By

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DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY

SCHOOL OF ALLIED HEALTH SCIENCES

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A++" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

APRIL 2024



SATHYABAMA

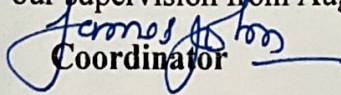
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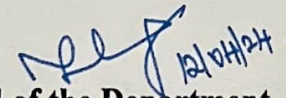
DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY

BONAFIDE CERTIFICATE

This is to certify that this internship report is the bonafide work of **SANTHOSH.P** who have done the internship work as a team and carried out the training program at **GERI CARE HOSPITAL at T NAGAR, LIONS BLOOD BANK at EGMORE GENERAL HOSPITAL** under our supervision from August 2023 to April 2024.


Coordinator

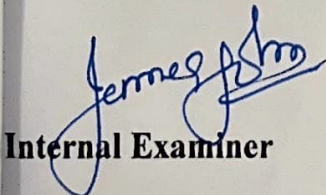
(Dr. James John)

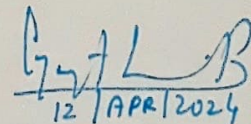

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DECLARATION

I, **SANTHOSH.P** hereby declare that the internship trainings done by me at **LIONS BLOOD BANK AND RESEARCH FOUNDATION at EGMORE** under the guidance of **Ms. D. JASMINE PRIYA** and **GERICARE HOSPITAL at T NAGAR** and **SATHYABAMA GENERAL HOSPITAL** under the guidance of **Dr. JAMES JOHN** at Sathyabama Institute of Science and Technology is submitted in partial fulfilment of the requirements for the award of Bachelor of science degree in **MEDICAL LABORATORY TECHNOLOGY**.

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ACKNOWLEDGEMENT

We are pleased to acknowledge our sincere thanks to **Board of Management** of **SATHYABAMA Institute of Science and Technology** for their kind encouragement in doing this internship program and for completing it successfully. We are grateful to them.

We would like to express our sincere and deep sense of gratitude to our Head of the Department **Dr. J. Premkumar** and Course Coordinator **Dr. James John** and the for their valuable guidance, suggestions and constant encouragement paved way for the successful completion of our internship report.

We wish to express our thanks to all Teaching and Non-teaching staff members of the Department of Biomedical Engineering who were helpful in many ways for the completion of the internship

We would like to express our thanks to our parents for their unwavering support to us during these years.

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INTRODUCTION

I have done my internship at Gericare Hospital, T Nagar during the period of 1st October 2023 to 31st October 2023.

I have done one week internship at Lions Blood Bank, Egmore from November 28, 2002 to December 03, 2022 and done routine blood bank work.

In the month of November 2023 I did my internship at Sathyabama General Hospital. In that I learned microbiology, biochemistry and electrophoretic technique and automated instrument. I have also practised my practical experiment and interacted with patient in my phlebotomy intern period.

WEEK: 01

PHLEBOTOMY

INTRODUCTION

Phlebotomy is the medical practice of drawing blood from patients for diagnostic, therapeutic, or donation purposes. It involves the skilled collection of blood samples through venipuncture (puncturing a vein with a needle) or other methods. Phlebotomy is essential in healthcare for obtaining blood specimens used in laboratory testing, blood transfusions, research, and various medical procedures. Phlebotomists are trained professionals responsible for performing blood draws safely and efficiently, ensuring patient comfort and specimen integrity.

VENUPUNCTURE

TYPES OF NEEDLE FOR VENUPUNCTURE

- 2 to 20ml syringe
- Vacutainer with needle
- Butterfly needle

TYPES OF VEIN PREFERRED FOR VENUPUNCTURE

- Median cubital vein
- Cephalic vein
- Basilic vein

ORDER OF DRAW

- Culture bottles
 - Aerobic
 - Anaerobic
- Sodium Citrate tube
- Serum tubes
 - Plain tube
 - Gel tube
- Heparin tube
- EDTA tube
- Sodium Fluoride tube

BLOOD COLLECTION PROCEDURE

- CONFIRM PATIENT IDENTITY
 - Name, unique ID no, age
- GATHER NECESSARY SUPPLIES
 - Determine which type of needle to be used
- PREPARE THE PATIENT
 - Explain the procedure to the patient and make them comfortable and stress-free.
- PERFORM HAND HYGIENE AND WEAR GLOVES
 - Sanitize your hands and put disposable gloves
- ASSEMBLE EQUIPMENTS
 - Syringe, cotton, tourniquet, alcohol swab, band-aid and tubes
- APPLY TOURNIQUET
 - Above elbow, it must be removed within 1 minute
- PERFORM VENUPUNCTURE
 - Vein identification
 - Clean the site with spirit
 - Puncture the vein at 30degree angle
 - File the tubes with correct order
 - Remove the needle carefully
 - Bandage the site
- MIX ANTICOAGULANTS (IF APPLICABLE)
 - Invert gently to mix the blood with additives.

- LABEL EACH TUBES
 - Stick barcode / label with name, age, gender, ID NO, test name and time of collection
- PROCESS THE SPECIMEN
 - Transport samples as soon as possible
- DISPOSE THE WASTE
 - Safely dispose the waste according to medical waste protocol.

PROCEDURE FOR NASAL/THROAT SWAB COLLECTION

Theses samples are collected for the tests like COVID / H1N1 Viruses.

- Examine the patient identity with the generated bill.
- Prepare necessary equipment's and always collect sample with necessary personal protective equipment's (PPE) like gown, gloves, mask, face shield and etc.
- Identify the patient and explain the procedure to the patient
- Have the patient open the mouth and relax the tongue by keeping outside.
- Press the tongue down using a tongue depressor.
- Gently rub the swab against both tonsils and the posterior pharynx.
- Place the swab in the culture medium, transport medium, or sterile test tube.



Figure 1.VTM kit

MICROBIOLOGY

MEDIA PREPARATION

UTI AGAR

UTI (urinary tract infection) agar is a selective and differential culture medium used for the isolation and presumptive identification of urinary tract pathogens, particularly *Escherichia coli* and other Enterobacteriaceae. The medium typically contains various ingredients that promote the growth of these bacteria while inhibiting the growth of unwanted organisms. Here's a general recipe for preparing UTI agar.

MATERIALS REQUIRED

- Peptone: 10 g
- Sodium chloride: 5 g
- Yeast extract: 5 g
- Dextrose: 1 g
- Lactose: 10 g
- Bromothymol blue: 0.025 g
- Agar: 15 g
- Distilled water: 1000 ml

PREPARATION

1. Dissolve peptone, sodium chloride, yeast extract, dextrose, and lactose in distilled water by heating and stirring until completely dissolved.
2. Adjust the pH to approximately 7.0 using a pH meter or pH indicator strips. You may need to use a few drops of 1N NaOH or 1N HCl to adjust the pH as needed.
3. Add bromothymol blue to the solution as a pH indicator. Bromothymol blue will turn the medium yellow at acidic pH and blue at alkaline pH.
4. Add agar to the solution and mix well.
5. Autoclave the medium at 121°C for 15 minutes to sterilize it.
6. After autoclaving, cool the medium to about 45-50°C.
7. Pour the medium into sterile Petri dishes or tubes to solidify.

MAC CONKEY AGAR

MacConkey agar is a selective and differential culture medium primarily used for the isolation and differentiation of gram-negative bacteria, especially members of the Enterobacteriaceae family.

MATERIALS REQUIRED

- Peptone: 17 g
- Proteose peptone: 3 g
- Lactose: 10 g
- Bile salts No. 3: 1.5 g
- Sodium chloride: 5 g
- Neutral red: 0.03 g
- Crystal violet: 0.001 g
- Agar: 13.5 g
- Distilled water: 1000 ml

PREPARATION

1. Dissolve peptone, proteose peptone, lactose, bile salts No. 3, and sodium chloride in distilled water by heating and stirring until completely dissolved.
2. Adjust the pH to approximately 7.1 ± 0.2 using a pH meter or pH indicator strips. You may need to use a few drops of 1N NaOH or 1N HCl to adjust the pH as needed.
3. Add neutral red and crystal violet to the solution. Neutral red is a pH indicator that turns red at acidic pH, and crystal violet is a selective agent that inhibits the growth of gram-positive bacteria.
4. Add agar to the solution and mix well.
5. Autoclave the medium at 121°C for 15 minutes to sterilize it.
6. After autoclaving, cool the medium to about 45-50°C.
7. Pour the medium into sterile Petri dishes or tubes to solidify

BLOOD AGAR

Blood agar is a nutrient-rich culture medium supplemented with blood, typically sheep or horse blood, which serves as an enriched medium for the growth of various microorganisms, particularly fastidious bacteria such as *Streptococcus* and *Haemophilus* species.

MATERIALS REQUIRED

- Trypticase soy agar (TSA) or nutrient agar: 20-25 g
- Defibrinated blood (sheep or horse): 5-10% (50-100 ml per liter of agar)
- Distilled water: 1000 ml

PREPARATION

1. Prepare the TSA or nutrient agar by dissolving it in distilled water by heating and stirring until completely dissolved.
2. Autoclave the agar at 121°C for 15 minutes to sterilize it.
3. After autoclaving, cool the agar to around 50°C.
4. Aseptically add the appropriate percentage of defibrinated blood (typically 5-10%) to the agar medium. Blood should be added at around 50°C to prevent hemolysis.
5. Mix the blood and agar thoroughly but gently to ensure even distribution.
6. Pour the agar-blood mixture into sterile Petri dishes or tubes.



Figure 2.UTI agar

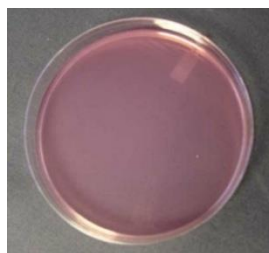


Figure 3. Mac conkey agar



Figure 4. Blood agar

GRAMSTAINING

PROCEDURE

STEP 1: Add crystal violet for 1 minute.

STEP 2: Wash the slides.

STEP 3: Add iodine for 1 minute.

STEP 4: Wash the slides.

STEP 5: Add decolourizer 1 drop and immediately wash it.

STEP 6: Add safranin for 2 minutes.

STEP 7: observe under microscope.

INFERENCE

Blue or purple = Gram positive

Pink = Gram negative

COMMON GRAM POSITIVE COCCI (GPC)

- *Staphylococcus aureus*
- *Streptococcus pyogenes*
- *Enterococcus* spp
- *Candida* spp

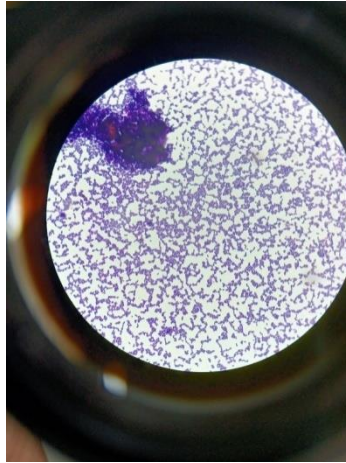


Figure 5. Gram positive cocci

GRAM NEGATIVE BACILLI (GNB)

- *Salmonella typhi*
- *Shigella Dysenterioe*
- *Klesiella pneumonia*
- *Pseudomonas aeruginose*
- *Virio cholera*
- *E.coli*
- *Proteus vulgaris*

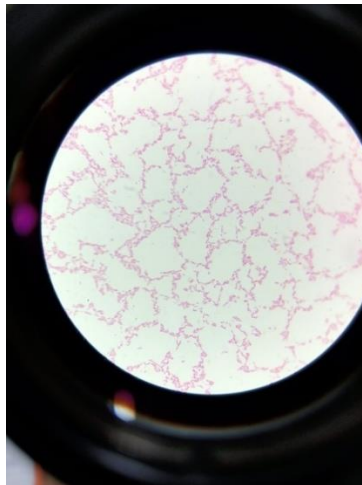


Figure 6. Gram negative bacilli

ACID-FAST STAINING

Acid-fast staining is a laboratory technique used to stain acid-fast bacteria from non-acid-fast bacteria. It's particularly useful for identifying *Mycobacterium* species, including *Mycobacterium tuberculosis*, the causative agent of tuberculosis. Here's a basic procedure for acid-fast staining.

MATERIALS

1. Heat-fixed bacterial smear on a glass slide
2. Carbol fuchsin solution
3. Acid-alcohol decolorizer (typically a 3% hydrochloric acid in 95% ethanol solution)
4. Methylene blue or malachite green counterstain
5. Water or distilled water
6. Microscope
7. Immersion oil (if using an oil immersion objective)

PROCEDURE

1. Prepare a heat-fixed bacterial smear on a clean glass slide. Ensure that the smear is thin and evenly spread.
2. Flood the smear with carbol fuchsin solution, covering the entire area. Carbol fuchsin is a primary stain that penetrates the cell wall of acid-fast bacteria.
3. Heat the slide gently over a Bunsen burner or slide warmer for 5-10 minutes. The heat helps the carbol fuchsin penetrate the cell wall of acid-fast bacteria, making them resistant to decolorization.
4. After heating, allow the slide to cool for a few minutes.
5. Rinse the slide with water to remove excess stain.
6. Decolorize the slide by flooding it with acid-alcohol decolorizer. Tilt the slide to allow the decolorizer to flow over the smear for about 15-30 seconds. Acid-fast bacteria will retain the carbol fuchsin stain and appear red or pink, while non-acid-fast bacteria will be decolorized and appear colorless.
7. Rinse the slide again with water to stop the decolorization process.
8. Counterstain the smear with methylene blue or malachite green for about 1 minute. This will stain any non-acid-fast bacteria that may have been decolorized during the previous step.
9. Rinse the slide with water and blot it dry with bibulous paper.
10. Examine the slide under a microscope using the oil immersion objective (if available) at 1000x magnification.

INFERENCE

- Acid-fast bacteria, such as Mycobacterium species, will appear red or pink due to retaining the carbol fuchsin stain even after decolorization.
- Non-acid-fast bacteria and other cellular material will appear blue or green due to the counterstain (methylene blue or malachite green).
- A positive acid-fast stain indicates the presence of acid-fast bacteria in the specimen, which may suggest infections such as tuberculosis or leprosy.
- A negative acid-fast stain suggests the absence of acid-fast bacteria in the specimen, but it does not rule out other bacterial infections or conditions.

SMEAR MAKING

PROCEDURE

1. Label the slide (patient Name, ID No, Date)
2. Add one drop of distilled water.
3. Add little amount of colony in it.
4. Mix well in a circular motion.
5. Wait until dry / Incubate.
6. Gram staining

IDENTIFICATION OF BACTERIA (ID /AST)

- ID- IDENTIFICATION
- AST- ANTIBODY SUSCEPTIBILITY TEST
- ANALYZER – Vitak -2 compact Biomerieux analyzer



Figure 7. Vitak -2 compact Biomerieux Analyzer

PREPARATION

- Take 2 test tube label as ID and AST.
- Add 3ml saline in each.
- Take small amount of colony in a sterilized loop (2mm) and mix it well in ID tube.
- Place it in GN-GP vitax device and it must be between 0.5 to 0.6.
- Take 145 ul of ID and add in AST.

Card used:

-PUS, Sputum, blood – N405

-Urine – N235

DENGUE PROFILE

- Ig G + - past infection
- Ig M + - Last 2 week infection – critical
- NS + - Current infection – critical

ANALYSER: ICHROMA MACHINE



Figure 8. ichromacogualtion analyzer

Kit – Buffer, Vial, Card

NS1

1. 100ul Buffer + 50ul sample
2. Mix & add 75Nl in kitcard
3. 12 minutes Inwbation
4. Note the reading

IgG, IgM

1. 150N1 Buffer + SP1 sample
2. 75Pi in kit
3. 12 minutes incuation
4. Note the reading

Normal Range – 0.9 -1.0 (>1.0 positive)

C REACTIVE PROTEIN TEST

Kit – Buffer, Card, Sample Collector

1. Sample Collector - Sample (10pl)
2. Injection Buffer and mix well
3. Discard 2 drops
4. Add 2 drops on cit
5. 3 mins incoation
6. Note the readings

Normal value =<6

RF Test

1. Add 3 drops
2. Inwate 5 minutes

Normal value = <15

BLOOD CULTURE – BACTI ALERT ANALYZER

- Sample collection – Blood culture bottle
- Examine generated Bill
- Check details (Name, ID) with the bill and label (site, Barcode) and note in the register.
- Press START icon
- Scan barcode, type necessary ID, Name
- Load sample
- No growth – 5th day
- Growth – less than 48 hours alert.
- If growth occur, the analyzer alert the slot and further process the culture by growing on culture plate.



Figure9.Biomeriuxbacti alert analyzer

URINE CULTURE

1. Always wear personal protection equipments (glove, mask) before culturing
2. Mix the urine sample well with sterile
3. Take a drop of sample and drop on the UIT Agar plate / Mac conkey Agar. (Note: The
4. plate must be labeled with patient ID, Name and date)
5. Streak the mother inoculum in a straight line and perform simple streaking (T streak)
6. Incubate for 24 hours. If growth not occur (partially occur incubate for 48 hours
7. After incubation look for colonies and report morphology and colony of each agar plate
8. Then prepare urine smear and observe microscopically
9. Now perform ID/AST detection and confirm the infecting bacteria and determine sensitive antibiotic (drug).

BLOOD/SPUTUM/STOOL CULTURE

1. Wear personal protection equipments
2. Receive sample (blood/sputum/stool) and check necessary information. (Name ID, T) also slides
3. Prepare necessary plates prior to culture plates must be determined by type of sample
4. Mix the sample and collect small amount using sterilized loop(4mm). place one drop on slide and plate.
5. Streak the mother inoculum in a circular motion and perform quadrant streaking.
6. Incubate for 24 hours . If no growth partial growth, incubate for 48 hours
7. Observe the colony.

CULTURAL CHARACTERISTIC OF MICROORGANISM

ON UTI AGAR

GRAM POSITIVE ORGANISM- Smaller Colonies

- *Enterococcus faecalis*
- *Candida albicans*
- *Candida tropicalis*
- *Enterococcus faecium*
- *Staphylococcus aureus*

GRAM NEGATIVE ORGANISM – Slightly larger

- *E.coli*– purple colony
- *Klebsiella pneumoniae* – mucoid blue
- *Citrobacter kosari*
- *Citrobacter freundii*
- *Pseudomonas aeruginosa*- Huorescent green spreaded colony
- *Pseudomonas strulzeri* - Huorescent green spreaded colony

ON MAC CONKEY AGAR

NON LACTOSE FERMENTING

- *Pseudomonas spp*
- *Salmonellaspp*
- *Proteus spp*
- *Shigellaspp*

LACTOSE FERMENTING

- Pale lactose fermenting
- Mucoid lactose fermenting
- *E.coli*
- *Klebsiella spp* – Mucoid lactose fermenting
- *Citrobacterspp* – Mucoid lactose fermenting

ON BLOOD AGAR

- Alpha hemolysis - *Streptococcus pneumoniae*
- Beta hemolysis – *Staphylococcus aureus*
- Gamma hemolysis – *Enterococcus faecalis*

CITRATE TEST

CITRATE POSITIVE ORGANISM

- *Klesbiella pnemnoniae*

- *Proteus mirabilis*
- *Salmonella typhi*
- *Citrobacter spp*
- *Enterobacter aerogenes*
- *Pseudomonas aeruginosa*

CITRATE NEGATIVE ORGANISMS

- *Escherichia coli*
- *Shigella dysenteriae*
- *Bordetella pertussis*

PREPARATION OF SIMMONS CITRATE AGAR

- Suspend 24.28 grams of simmons citrate agar in 1000 ml of distilled water.
- Boil to dissolve the medium completely.
- Mix well and dissolve in test tubes or erlenmeyer flasks.
- Sterilize autoclaving at 15 pressure (121°C).

COMPOSITION OF SIMMONS CITRATE AGAR FOR 1 LITRE

- Ammonium dihydrogen phosphate – 1.0g
- Dipotassium hydrogen phosphate – 1.0g
- Sodium chloride - 5.0g
- Sodium citrate - 2.0g
- Magnesium sulfate – 0.2g
- Bromothymol blue -0.08g
- Agar – Agar - 13.0g

TRIPLE SUGAR IRON TEST

PROCEDURE

1. Use a straight inoculating needle to pick up an isolated colony..
2. Incubate the TSI slant by first stabbing the butt down to the bottom, then withdraw the needle..
3. Streak the surface of the slant.

4. Use a loosely fitting closure to permit access of air.
5. Read result after incubation at 37 c for 24 hours.

INFERENCE

1. Acid/Acid (yellow slant / yellow butt)
 - Indicates the fermentation of dextrose, lactose / sucrose.
2. Alkaline / acid (red slant / yellow butt)
 - Indicate dextrose fermentation only
3. Alkaline /Alkaline (red slant / red butt)
 - Indicates absence of carbohydrate fermentation results.
4. Gas Positive - Gas production
5. H₂S production -sulphur reduction (blackening)



Figure 10. Biochemicals of *E. coli*



Figure 11. Biochemicals of *Klebsiella pneumoniae*



Figure 12. *Pseudomonas aeruginosa*

BIOCHEMISTRY

URINE ROUTINE

URINE ROUTINE / URINALYSIS

A test that determines the content of the urine. It is generally done using a device called urometer.

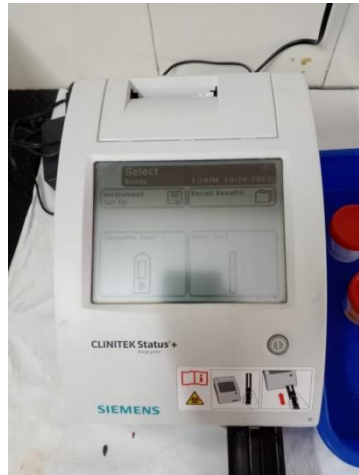


Figure 13. SIEMENS CLINITEK STATUS+ UROMETER

Urinalysis consists of the following components:

- Macroscopic Examination
- Chemical Analysis
- Microscopic Examination

MACROSCOPIC EXAMINATION

Looking at the physical properties of the urine.

COLOR

- Normal urine should be a shade of yellow ranging from a straw to amber color.
- Abnormal urine can be: colorless, dark yellow, orange, pink, red, green, brown, or black.

CLARITY (TRANSPARENCY)

- Normal urine should be clear.
- Abnormal urine can be: hazy, cloudy, or turbid.

CHEMICAL ANALYSIS

The chemical properties of urine, including pH, specific gravity, protein content, glucose content, ketone content, are tested.

Urine test strips are often used to detect the chemical properties of urine.

pH

- Test measures if urine is acidic, basic or neutral.
- Normal urine ranges from 4.6 to 8.0.

SPECIFIC GRAVITY

- Test measures the concentration of particles in the urine and evaluates the body's water balance.
- The more concentrated the urine, the higher the urine specific gravity.
- The most common increase in urine specific gravity is the result of dehydration...
- Normal urine ranges between 1.002 to 1.028

KETONES

- Test measures the presence or absence of ketones, the endpoint of rapid or excessive fat breakdown, in the urine.
- Normal urine does not contain ketones.

PROTEIN

- Normal urine levels of proteins (called albumin) are very small, usually approximately 0 to 8 mg/dl.

GLUCOSE

- The test measures the amount of sugar in a urine sample.
- Normal urine does not contain glucose.

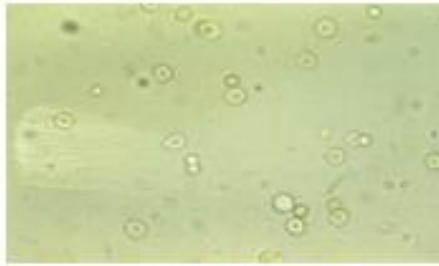


Figure 14Urometer test strip

MICROSCOPIC EXAMINATION

A variety of normal and abnormal cellular elements may be seen in urine when looked at under a microscope, including:

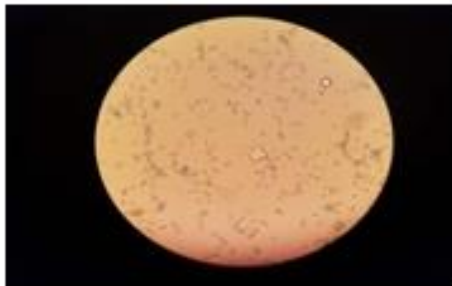
- Red blood cells
 - Red blood cells are not found in normal urine.
- White blood cells
 - White blood cells and bacteria, signs of infections, are not found in normal urine.
- Epithelial cells
 - Epithelial cells are found in urine as they are the cells that line the urinary tract
- Crystals
 - Common crystals seen even in healthy patients include calcium oxalate, triple phosphate crystals and amorphous phosphates.
 - A large number of crystals, or certain types of crystals, may mean kidney stones are present or there is a problem with how the body is using food
- Bacteria
 - Bacteria is not found on the normal healthy patients. They are found when the person is affected from bacterial infection.



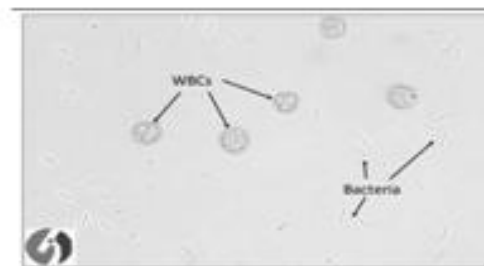
RBC in Urine



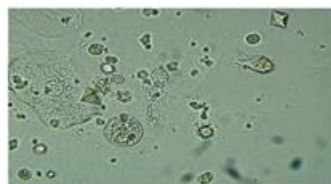
WBC in Urine



Calcium oxalate crystal in urine



White blood cells (WBC) and bacteria in urine as seen under a microscope.



Epithelial cells and crystals in urine



Pus cells

Figure 15. Microscopic examination

PROTHROMIN TIME

(KC 1 DELTA ANALYZER)

1. Place the cuvette with steel ball in the holder.
2. Add 50ul of sample.
3. Select the PT test and select 60secs as incuation period.
4. After 60secs immediately add 100ul of thromborel reagent and click start.
5. Note the readings in seconds.

PT NORMAL RANGE: 12-16 Seconds

ACTIVATED PARTIAL THROMBOPLASTIN TIME (APTT)

1. Place the cuvette with steel ball in the holder.
2. Add 50ul of sample.
3. Add 50ul of Actin reagent.
4. Select the APTT test and select 180 secs as incuationperiod and press start
5. After 180secs immediately add 100ul of Calcium reagent and click start.
6. Note the readings in seconds

APTT NORMAL RANGE: 26-36 Seconds.



Figure 16. KC 1 DELTA COAGULATION ANALYZER

NT PRO TEST

(QUALITATIVE) – ICHROMA ANALYZER

1. Add 150ul of buffer on vial and 10ul of sample.
2. Mix well
3. Add 75ul on the test card.
4. Incubate for 12minutes.
5. Input patient details on the analyzer and Start analyze and record the readings.

NT PRO NORMAL RANGE :<300pg/ml

D-DIMER TEST

(QUALITATIVE)

1. Add 10ul of sample containing buffer.
2. Mix it well
3. Add 75ul on the test card.
4. Incubate 12 minutes
5. Input patient details on the analyzer and Start analyze and record the readings

D-DIMER NORMAL RANGE :<500ng/ml



Figure 17. ICHROMA ANALYZER

AUTOMATED INSTRUMENTS

1. AUTOPACK 300 ANALYZER



Figure 18. autopack 300 biochrmistryanalyser

- **Biochemical analyzer:** autopack 300 analyzer
- **Tests dedected:** LFT, RFT, CRP
- **Samples dedected at once:** 100
- **Sample:** serum sample
- **Runtime:** 20-30 minutes
- **Department:** Biochemistry

2. LABLYTE ELECTROLYTE ANALYZER



Figure 19.Lablyte electrolyte analyzer

- ***Electrolyte analyzer:*** Lablyte electrolyte analyzer
- ***Tests detected:*** sodium , potassium, calcium, bicarbonate
- ***Samples detected at once:*** 01
- ***Sample:*** serum sample
- ***Department:*** Biochemistry

3. VITROS IMMUNOLOGY ANALYZER



Figure 20.vitros immunology analyser

- **Analyzer:** Vitros immunology analyzer
- **Tests detected:** T3,T4,TSH, Vitamin D, Vitamin B1, PCT, Progesterone, Ferritin, Testosterone, Bio -markers etc..
- **Samples detected at once:** 30
- **Sample:** serum sample
- **Runtime:** 20-30 minutes
- **Department:** Immunology

HEMATOLOGY AUTOMATED ANALYZER

1. SEIMENS ADVIA 560 HEMATOLOGY ANALYZER



Figure 21. ADVIA 560 hematogyanalyser

- ***Electrolyte analyzer:***Seimens ADVIA 560 Hematology analyzer
- ***Tests detected:***Complete Blood Count
- ***Samples dedected at once:***01
- ***Sample:***whole blood sample
- ***Runtime:***1 minute
- ***Department :*** Hematology

2. HLC-723GN ANALYZER



Figure 22. HLC-723GN Analyzer

- **Hematology analyzer:** HLC-723GN analyzer
- **Tests detected:** HbA1C
- **Samples detected at once:** 10
- **Sample:** Whole blood sample
- **Runtime:** 20-30 minute
- **Department :** Hematology

PERIPHERAL BLOOD SMEAR

- Collection of blood sample: Typically obtained through a venipuncture procedure.
- Preparation of peripheral blood smear slide: A drop of blood is placed on a slide, spread into a thin layer, and allowed to air dry. Tongue shape must be obtained.
- Fixation of slide: The slide is fixed by immersing it in a fixative solution, which helps preserve cellular structures.

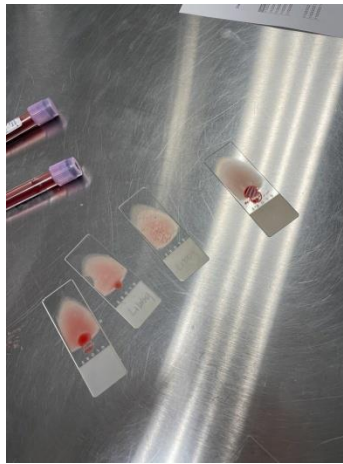


Figure 23. Tongue shaped blood smear

LEISHMAN'S STAINING

PROCEDURE

- Immerse the slide with leishman's stain for 3 minutes.
- Add the buffer solution completely and mix them gently using a dropper.
- Wait for 15 minutes and wash them in running tap water.

INFERENCE

- Red Blood Cells (RBCs)
 - Stain pink to pale pink.
 - Central pallor is visible in normal RBCs.
- White Blood Cells (WBCs)
 - Neutrophils: Stain pale pink with segmented nuclei.

- Lymphocytes: Stain dark purple with a large, round nucleus that occupies most of the cell.
- Monocytes: Stain pale blue-gray with a kidney-shaped nucleus.
- Eosinophils: Stain bright red-orange with segmented nuclei.
- Basophils: Stain deep purple with large, irregularly shaped granules.
- Platelets
 - Stain pale blue-purple with irregular shapes, often appearing as small dots or fragments.
- Parasites and Microorganisms
 - Leishmania parasites typically stain deep purple or blue within host cells, helping in their identification.
 - Other microorganisms may exhibit varying staining characteristics depending on their structure and composition.



Figure 24. STAINED SMEAR

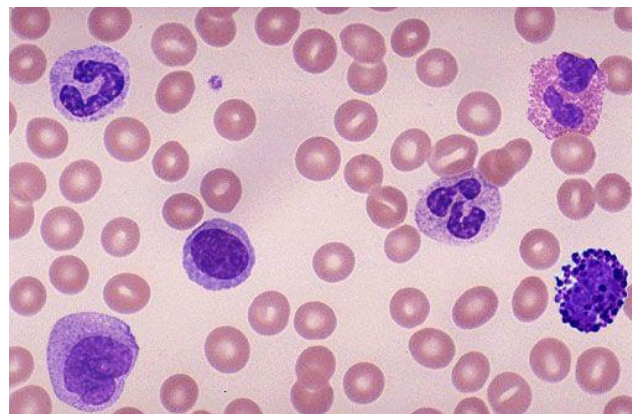


Figure 25. STAINED RBC and WBC

LIONS BLOOD BANK INTERNSHIP

BLOOD DONAR

BLOOD DONOR SELECTION

- Age between 18 and 60 years.
- Hemoglobin - not less than 12.5 g/Dl.
- Pulse - between 50 and 100/minute with no irregularities.
- Blood Pressure -Systolic 100-180 mm Hg
- Diastolic 50 - 100 mm Hg.
- Weight >50

BLOOD DONOR REJECTION

- Age <18
- Hemoglobin - less than 12.5 g/Dl.
- Weight <50
- Low and High blood pressure
- Consumption of alcohol
- Medicated drugs

BLOOD BAG

BLOOD BAG TYPES

SINGLE BLOOD BAG

- Used for collection, preservation and transfusion of human blood.
- The primary bag contains CPDA-1 anticoagulant solution.



Figure 26. blood bag

DOUBLE BLOOD BAG

- Double Blood Bag is designed for the collection and separation of whole blood into two different blood components, plasma and red cells
- Separates red blood cells and plasma. It includes a primary bag and a satellite bag.



Figure 27. double bag

TRIPLE BLOOD BAG

- Red Triple Blood Bags are used for collection, preservation, and transfusion of Packed Blood Cells (PRBC) Platelets (PLT) and Plasma (FFP).
- This system separates red blood cells, plasma and buffy coat (includes leucocytes and platelets).



Figure 28. triple bag

BLOOD DONATION

Whole blood donation is the most common type of blood donation. During this donation, you donate about a pint (about half a liter) of whole blood. The blood is then separated into its components — red cells, plasma and sometimes platelets.

BLOOD DONATION PROCEDURE

BEFORE DONATION

Before you can donate blood, you will be asked to fill out a confidential medical history. It includes questions about behaviors known to carry a higher risk of bloodborne infections. You will also have a brief physical exam. The exam includes checking your blood pressure, pulse and temperature. A small sample of blood is taken from a finger prick and is used to check the oxygen-carrying part of your blood (hemoglobin level). If your hemoglobin concentration is within a healthy range, and you've met all the other screening requirements, you can donate blood.

DURING DONATION

You lie or sit in a reclining chair with your arm extended on an armrest. If you have a preference for which arm or vein is used, tell the person who is collecting your blood. A blood pressure cuff or tourniquet is placed around your upper arm to fill your veins with more blood. This makes the veins easier to see and easier to insert the needle into. It also helps fill the blood bag more quickly. Then the skin on the inside of your elbow is cleaned with spirit or alcohol.

A new, sterile needle is inserted into a vein in your arm. This needle is attached to a thin, plastic tube and a blood bag. Once the needle is in place, you tighten your fist several times to help the blood flow from the vein. First, blood is collected into tubes for testing. Then blood is allowed to fill the bag, about a pint (about half a liter). The needle is usually in place about 10 minutes. When your donation is finished, the needle is removed, a small bandage is placed on the needle site and a dressing is wrapped around your arm.

AFTER DONATION

After donating, you sit in an observation area, where you rest and eat a light snack. After 15 minutes, you can leave. After your blood donation:

- Drink extra fluids.
- Avoid strenuous physical activity or heavy lifting for about five hours.
- If you feel lightheaded, lie down with your feet up until the feeling passes.
- Keep your bandage on and dry for the next five hours.
- If you have bleeding after removing the bandage, put pressure on the site and raise your arm until the bleeding stops
- If bruising occurs, apply a cold pack to the area periodically during the first 24 hours.
- Consider adding iron-rich foods to your diet to replace the iron lost with blood donation.



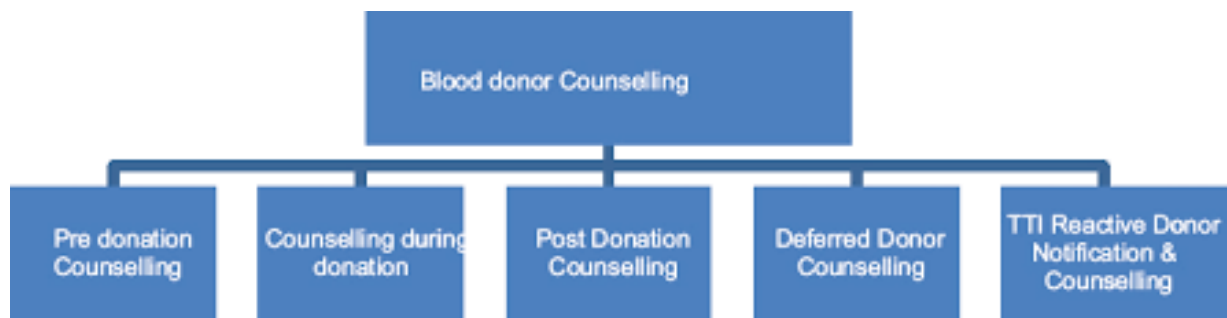
Figure 31. blood donor

DONOR COUNSELLING

Blood donor counselling is a confidential dialogue between a blood donor and a trained counsellor about issues related to the donor's health and the donation process; it may be provided before, during and after blood donation. There are benefits for both the Blood transfusion service and the wider health system in implementing blood donor counselling. It minimizes the unnecessary loss of suitable donors while maximizing the retention of donors, including those who are temporarily deferred.

Counselling may also reduce adverse donor reactions.

Improve donor perceptions of the Blood Transfusion Service (BTS). Encourage donors to recommend blood donation to friends and family and, most importantly increase the likelihood of returning for future donation.



BLOOD GROUPING

- Blood grouping, classification of blood based on inherited differences (polymorphism) in antigens on the surfaces of the red blood cells (erythrocytes).
- The human blood consists of 4 main components, the red blood cells, the white blood cells, the plasma and the platelets.
- The red blood cells are the components that help *in* determining a person's blood *type*.
- The ABO system is the main blood grouping system behind the principle that helps classify people into one of the following four groups, i.e., A, B, AB or O.
- The blood groups are classified based on the presence or absence of a particular antigen.
- When the antigen A is present on the red blood cells, then the person is said to have Type A Blood.
- A person having antigen B on the red blood cells is considered to have Type B Blood.
- When both antigens, A and B are present on the red blood cells, then the person's blood type is classified as Type AB Blood.
- When neither antigens, A nor B are present, the person is said to have Type O Blood.

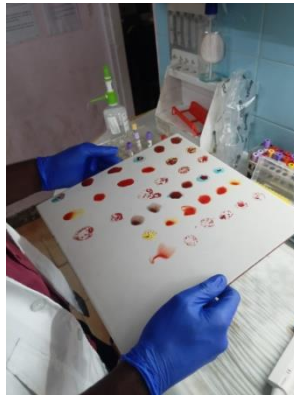


figure 32. Blood grouping

ABO BLOOD GROUPING TECHNIQUE

The ABO blood group of a person depends on whether his red blood cells contain one, both, or neither of the 2 blood group antigens A and B, and therefore the human blood groups are differentiated as type A, type B, type AB, or O as mentioned earlier. Antibodies for the antigens A and B exist naturally in the plasma and these are referred to as anti-A and anti-B. The matching antibody and antigen are never found in the same individual as they form antigen-antibody complexes when mixed, causing agglutination in the blood.

ABO BLOOD GROUPING PROCEDURE

1. A clean slide is taken, and one end of the slide is labeled as 'Anti-A,' and the other end is labeled as 'Anti-B.'
2. A drop of Anti-A test serum is dropped on the end of the slide marked 'Anti-A,' and a drop of Anti-B test serum is added to the end marked 'Anti-B.'
3. One drop of blood of the person, whose blood type is to be tested, is added to each end of the slide and mixed well using small wooden sticks.
4. The results can be read directly from the slide. Tilt the slide and leave the test for 2 minutes at room temperature (22°-24°C). Then rock again and look for agglutination.



Figure 33. grouping kit

SCREENING TEST

- The objective of blood screening is to detect markers of infection in order to prevent the release of infected blood and blood components for clinical use. Blood screening strategies are designed to assure the safety of blood units, but should not be used for notifying blood donors of reactive test results.
- You have to transfuse blood only when the screening results shows negative.

MADRAS EGMORE
ANTIBODY SCREENING
IMMUCOR
Date: Thursday, April 22, 2021

Sample N°	Assay	Result	Reaction
LD1265713	Pool_Cell	Negative	-
LD1265714	Pool_Cell	Negative	-
LD1265715	Pool_Cell	Negative	-
LD1267408	Pool_Cell	Negative	-
LD1267409	Pool_Cell	Negative	-
LD1267410	Pool_Cell	Negative	-
LD1267421	Pool_Cell	Negative	-
LD1267422	Pool_Cell	Negative	-
LD1267426	Pool_Cell	Negative	-
LD1267427	Pool_Cell	Negative	-
LD1267428	Pool_Cell	Negative	-
LD1269407	Pool_Cell	Negative	-
LD1269408	Pool_Cell	Negative	-
LD1269416	Pool_Cell	Negative	-
LD1269417	Pool_Cell	Negative	-
LD1269418	Pool_Cell	Negative	-
LD1270467	Pool_Cell	Negative	-
LD1270468	Pool_Cell	Negative	-
LD1270469	Pool_Cell	Negative	-
LD1270577	Pool_Cell	Negative	-
LD1270578	Pool_Cell	Negative	-
LD1270579	Pool_Cell	Negative	-
LD1270580	Pool_Cell	Negative	-
LD1270581	Pool_Cell	Negative	-
LD1270582	Pool_Cell	Negative	-

Printed by (Initials): _____

Figure 34. Antibody screening record

SCREENING REGISTER

Sample N°	Assay	Result	Reaction
LD1265713	Pool_Cell	Negative	-
LD1265714	Pool_Cell	Negative	-
LD1265715	Pool_Cell	Negative	-
LD1267408	Pool_Cell	Negative	-
LD1267409	Pool_Cell	Negative	-
LD1267410	Pool_Cell	Negative	-
LD1267421	Pool_Cell	Negative	-
LD1267422	Pool_Cell	Negative	-
LD1267426	Pool_Cell	Negative	-
LD1267427	Pool_Cell	Negative	-
LD1267428	Pool_Cell	Negative	-
LD1269407	Pool_Cell	Negative	-
LD1269408	Pool_Cell	Negative	-
LD1269416	Pool_Cell	Negative	-
LD1269417	Pool_Cell	Negative	-
LD1269418	Pool_Cell	Negative	-
LD1270467	Pool_Cell	Negative	-
LD1270468	Pool_Cell	Negative	-
LD1270469	Pool_Cell	Negative	-
LD1270577	Pool_Cell	Negative	-
LD1270578	Pool_Cell	Negative	-
LD1270579	Pool_Cell	Negative	-
LD1270580	Pool_Cell	Negative	-
LD1270581	Pool_Cell	Negative	-
LD1270582	Pool_Cell	Negative	-

figure 35. Viral Screening record

Blood donations should be screened for infections prior to use. Screening for

- HIV
- HCV
- HBV
- VDRL
- Malaria

SCREENING TECHNIQUES

RAPID TEST KITS

- DETERMINE (Inverness Medical Japan Co. Ltd) is an immunochromatographic test for the qualitative detection of antibodies to HIV-1 and HIV-2.

- UNIGOLD (by Trinity Biotech Plc, Ireland) is a single reagent assay for the detection of antibodies to HIV-1 and 2 in serum, plasma or whole blood.
- ACON (ACON Laboratories, Inc, San Diego, USA) is a qualitative, solid phase, two-site sandwich immuno-assay for the detection of HBsAg in whole blood, serum or plasma.
- DIASPOT (Reagent by USA) is also a qualitative, membrane based immunoassay for the detection of antibody to HCV in serum or plasma.



Figure 36.ELISA reader



RAPID TEST CARD



RAPID TEST KIT

Figure 37. rapid kit

ELISA TEST KITS

GENSCREEN PLUS HIV Ag-Ab (Bio-Rad, Raymond Poincare 92430, Marnes Coquettes and France) is an enzyme immunoassay for the detection of HIV infection, based on the detection of antibodies to HIV 1 and 2 and the HIV 1 Ag in human serum or plasma.

MONOLISA HBsAg ULTRA (Bio-Rad, Raymond Poincare 92430, Marnes Coquette, France) is a one-step enzyme immunoassay based on the principle of the sandwich type using monoclonal antibodies and polyclonal antibodies selected for their ability to bind themselves to the various subtypes of HBsAg now recognized by WHO and the most part of variant HBV strains.



Figure 38.VDRL SCREENING by ELISA



figure 39.MICROTITREPLATE



Figure 40.SEMI AUTOANALYZER

COMPONENT SEPARATION

The whole blood which is a mixture of cells, colloids and crystalloids can be separated into different blood components namely packed red blood cell (PRBC) concentrate, platelet concentrate, fresh frozen plasma and cryoprecipitate.



Figure 41. Component separation

COMPONENT SEPARATION TECHNIQUES

By using centrifuge whole blood is separated into several components. Namely,

PACKED RED BLOOD CELLS

Packed red blood cells from a donation of 450 ml of whole blood are obtained after centrifugation and plasma removal; the red cells are then suspended in a nutritive solution.

FRESH FROZEN PLASMA

- Fresh frozen plasma is obtained after centrifugation of whole blood and red cell removal, or through direct separation (plasmapheresis).
- The plasma must be frozen within 8 hours after collection in order to preserve coagulation factors and other plasma proteins.
- Because plasma can be stored for a long time, plasma is kept in quarantine until the donor comes back for a new donation so that he can be tested again for the infectious disease markers. This gives optimal security because (early) infections undetectable at the moment of donation have now become apparent.
- Plasma can also be fractionated and processed into stable blood products, such as albumin, immunoglobulins, coagulation factors.



Figure 42.fresh frozen plasma

PLATELETS

Platelets are mainly obtained through Thrombopheresis. Platelet products formerly obtained from a mix of more than 10 buffy coats can now be obtained from a single Thrombopheresis of about 40 minutes.



Figure 43.platelet rich plasma

CRYOPRECIPITATE (CRYO)

- Cryoprecipitate is prepared from plasma and contains fibrinogen, factor VIII, von Willebrand factor, factor XIII and fibronectin. It is stored frozen and must be transfused within 6 hours of thawing or 4 hours of pooling.
- Cryo is indicated for bleeding or immediately prior to an invasive procedure in patients with significant hypofibrinogenemia ($<100 \text{ mg/dL}$).



Figure 43. Cryoprecipitated plasma

STORAGE AND SHELF LIFE

PACKED RED BLOOD CELLS (PRBCS)

STORAGE / SHELF LIFE

PRBCs are stored in a Blood Bank refrigerator at a temp of 1-6°C until issue. The shelf life is 42 days from the date of collection. The expiration date is located on the unit(s).

RETURNS

If the transfusion cannot be initiated within a time frame that would allow for completion within 4 hours of time issued, return the component to the Blood Bank.

EXCEPTION

- Blood can be stored in a Blood Bank validated cooler for up to 6 hours. The cooler must be returned to the Blood Bank prior to the 6-hour cooler expiration time. The cooler will then be repacked and reissued if the blood products are still needed.
- The cooler expiration time is noted on the outside of the cooler.



Figure 44 refrigerator for packed cells

PLASMA (FROZEN & THAWED)

STORAGE / SHELF LIFE

- Frozen Plasma is maintained in the Blood Bank freezer at a temp $\leq -18^{\circ}\text{C}$ until it is thawed. Once thawed, it is stored in a Blood Bank refrigerator at a temp of $1-6^{\circ}\text{C}$ until issue.
 - ***Frozen Plasma*** - The shelf life is 1 year from the date of collection.
 - ***Thawed Plasma*** - The shelf life of thawed plasma is either 24 hours or 5 days, depending on the plasma product. The expiration date is located on the unit(s).

RETURNS: Same as PRBC's.



Figure 45. frozen plasma / Thawed plasma

PLATELETS

STORAGE SHELF / LIFE

- All platelets are stored at room temperature ($20-24^{\circ}\text{C}$) with gentle agitation until issue.
- The shelf life is 5 days from the date of collection.
- Pooled Platelets expire 4 hours from the time of preparation (*pooling if required*) pooling.
- The expiration date is located on the unit(s).

RETURNS

Return as soon as possible if the component is not able to be transfused.



Figure 46.Storage for platelet

CRYOPRECIPITATE

STORAGE / SHELF LIFE

- Cryoprecipitate is stored in the Blood Bank freezer at a temp of $\leq 18^{\circ}\text{C}$ until thawing. After thawing, it should be maintained at room temperature ($20 - 24^{\circ}\text{C}$). It should never be refrigerated or placed in a blood cooler.
- Frozen Cryoprecipitate - The shelf life is 1 year from the date of collection.
- Single units expire 6 hours from time of thawing.
- The expiration date is located on the unit(s).

RETURNS

Return as soon as possible if the component is not able to be transfused.

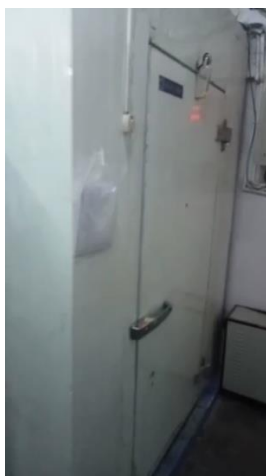


Figure 47. cryorefridgerator(plasma)

BLOOD GROUPING

The goal of blood typing is to find a blood type for transfusion. The results of blood grouping of patient and donor's blood will tell you if you are type A, B, AB, or O and if you are Rh negative or positive.

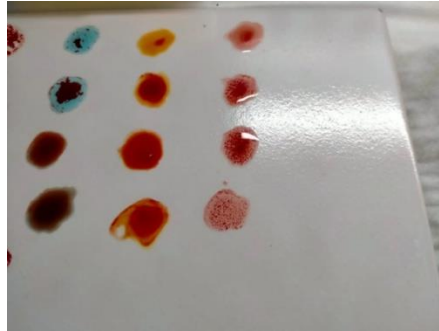


Figure 48

CROSSMATCHING

A crossmatch is performed prior to administration of blood or blood products (e.g. packed red blood cells). The purpose of the crossmatch is to detect the presence of antibodies in the recipient against the red blood cells of the donor. These antibodies attach to the red blood cells of the donor after transfusion.



Figure 49

MAJOR CROSS MATCH

- Donor and recipient's blood sample
- Donor's red cells and recipient's serum/plasma
- 3-5% saline cell suspension of red cells.
- Test tube

TECHNIQUE

MAJOR CROSS MATCH

1. Prepare donor and recipient's blood sample: Donor's red cells and recipient's serum/plasma.
2. Prepare 3-5% saline cell suspension of red cells.
3. Label a test tube.
4. Add two drops of recipient's serum and one drop of donor cell suspension.
5. Mix and incubate the tubes at 37 degrees Celsius for about 60 minutes.
6. Decant the serum completely and wash the cells three times in saline.
7. Add two drops of Anti-human Globulin (AHG) and mix. Allow to stand at room temperature for 5 minutes.
8. Centrifuge at 1500 rpm for 1 minute.



Figure50. INCUBATOR



Figure 51. CENTRIFUGE

OSERVATION

Observe macroscopically and microscopically for agglutination.

If macroscopic agglutination is not observed, transfer a small amount onto a glass slide and examine for microscopic agglutination. Rouleaux is not an indication of incompatibility.

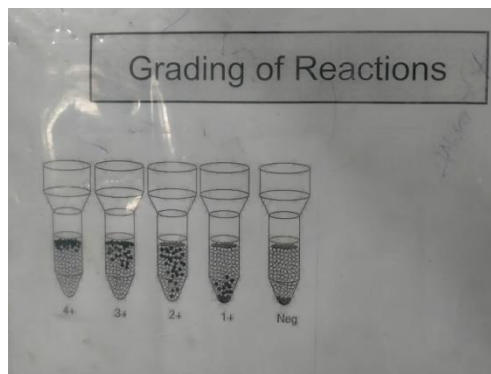


Figure 52

RESULT

Compatible donor and recipient blood should show no agglutination in cross match. Blood which shows incompatibility in major cross match should never be transfused, because the large plasma volume of the recipient blood containing antibodies can destroy the donor's red cells easily.



Figure 53. Cross matching

BLOOD BANKING RECORDS

- Systematic procedure by which the records of an organization are created, captured, maintained and disposed of.
- This system also ensures their preservation for evidential purposes, accurate and efficient updating, timely availability and control of access to them only by authorized personnel.
- Records stating evidence of activities performed and results achieved.
- Records involve every aspect of blood banking i.e., donor recruitment, donor selection, donor recall, blood collection, blood components processing, storage, transportation of blood and blood components, screening of blood.

TYPES OF RECORDS

- Technician record
- Donor record
- Reception record
- Sample storage record
- Discarding record
- Test record
- Equipment maintenance record

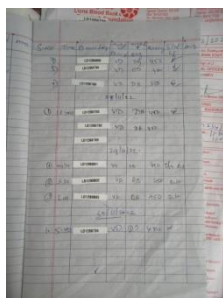


Figure 54. Patient records

SATHYABAMA UNIVERSITY INTERNSHIP

BIOCHEMICAL TEST FOR MICROORGANISMS

PROCEDURE

- Take 24 hours inoculated culture plate.
- Take a tube containing broth solution and inoculate loopful of colonies into it and incubate at 36°C for 6 hours
- After incubation period take the readymade biochem kit and streak the microorganism broth in it.
- Incubate for 18 to 24 hours

OBSERVATION

Observe the colour and determine the results

1.BIOCHEMICAL TEST RESULT FOR E.COLI

- Indole - Positive
- Methyl Red (MR) - Positive
- Voges proskauer (VP) - Negative
- Citrate - Negative
- Glucose - Positive
- Adonitol - Negative
- Arabinose - Positive
- Lactose – Positive
- Sorbitol - Negative

- Maltose - Positive
- Rhamnose - Positive
- Sucrose –Positive



Figure 55..BIOCHEMICAL TEST RESULT FOR *E.coli*

2.BIOCHEMICAL TEST RESLUT FOR *Pseudomonas auruginosa*

- Indole - Negative
- Methyl Red (MR) - Positive
- Voges proskauer (VP) - NegativeCitrate – Negative
- Glucose - Positive
- Adonitol - Negative
- Arabinose - Positive
- Lactose - Negative
- Sorbitol - Negative
- Maltose - Positive
- Rhamnose - Negative
- Sucrose – Negative



Figure 56. BIOCHEMICAL TEST RESLUT FOR *Pseudomonas aeruginosa*

SDS PAGE ELECTROPHORESIS

INTRODUCTION

SDS-PAGE involves running an electric current through a gel matrix containing polyacrylamide. SDS, a detergent, is used to denature the proteins and give them a negative charge, effectively disrupting their native structure and rendering them linear. The proteins are then separated based on their molecular weight as they migrate through the gel towards the positive electrode.

PROCEDURE

1. Preparation of Gel: Prepare a polyacrylamide gel with a desired percentage of acrylamide/bis-acrylamide. Higher percentages are used for resolving smaller proteins.
2. Sample Preparation: Mix the protein sample with SDS and a reducing agent (e.g., β -mercaptoethanol) to break disulfide bonds.
3. Loading: Load the prepared samples into wells on the gel.
4. Electrophoresis: Run the gel at a constant voltage. The proteins will migrate through the gel at rates inversely proportional to their molecular weights.
5. Staining: After electrophoresis, stain the gel with a dye like Coomassie Blue to visualize the separated proteins.
6. Analysis: Compare the bands of separated proteins against a molecular weight marker to estimate their sizes.

CONCLUSION

The DNA bands determine the sizes and relative quantities of the separated protein bands.

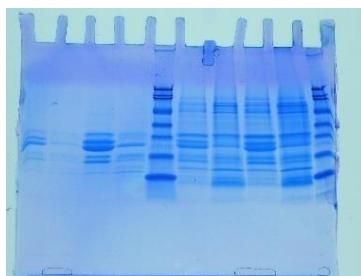


Figure 57. SDS PAGE Electropohoresis

DNA EXTRACTION

MATERIALS REQUIRED

- Fresh whole blood - 500 μ L
- Lysis buffer - 200 μ L
- Protein precipitation solution - 200 μ L
- Isopropanol -200 μ L
- TE buffer -100 μ L
- Microcentrifuge tubes
- Vortex mixer
- Centrifuge
- Disposable pipettes
- Alcohol wipes

REAGENTS

- - Isopropanol
- -70% ethanol
- -TE buffer
- -Lysis buffer

PROCEDURE

- : 1. Collect 500 μ L of fresh whole blood into a 1.5 mL microcentrifuge tube.
2. Add 200 μ L of lysis buffer to the blood sample.
3. Vortex the sample for 10 seconds.
4. Incubate the sample at room temperature for 5 minutes.
5. Add 200 μ L of protein precipitation solution to the sample.
6. Vortex the sample for 10 seconds.
7. Incubate the sample at room temperature for 10 minutes.
8. Centrifuge the sample at 12,000 rpm for 10 minutes.

9. Transfer the supernatant to a new microcentrifuge tube.
10. Add 200 μ L of isopropanol to the supernatant.
11. Vortex the sample for 10 seconds.
12. Incubate the sample at room temperature for 10 minutes.
13. Centrifuge the sample at 12,000 rpm for 10 minutes.
14. Carefully remove the supernatant without disturbing the DNA pellet.
15. Wash the DNA pellet with 70% ethanol.
16. Centrifuge the sample at 750 rpm for 1 minute.
17. Remove the ethanol and air dry the DNA pellet.
18. Resuspend the DNA pellet in 100 μ L of TE buffer.

The DNA is now ready for downstream applications such as PCR, sequencing, and Southern blotting.

RESULT

Gel electrophoresis is made with 1% agarose gel to visualise the DNA bands.

DOT ELISA

Materials Required for Dot ELISA:

- Nitrocellulose membrane or other suitable solid support
- Antigen or antibody solution
- Blocking buffer (e.g., BSA or milk)
- Primary antibody (conjugated with enzyme)
- Substrate solution for enzyme detection
- Washing buffer
- Pipettes and tips
- Incubation trays or containers
- Microscope or imaging system for result analysis

PROCEDURE

1. Prepare the nitrocellulose membrane or solid support by cutting it into appropriate sizes.
2. Coat the membrane with the antigen or antibody solution, ensuring an even distribution.
3. Incubate the coated membrane with blocking buffer to prevent nonspecific binding.
4. Wash the membrane with washing buffer to remove any unbound molecules.
5. Incubate the membrane with the primary antibody conjugated with an enzyme, allowing it to bind to the target antigen.
6. Wash the membrane again to remove any unbound primary antibody-enzyme conjugate.
7. Add the substrate solution onto the membrane and allow the enzymatic reaction to occur.
8. Observe the appearance of colored dots on the membrane, indicating the presence of the target antigen.
9. Analyze the results using a microscope or imaging system.

RESULT

Positive Result: The appearance of colored dots on the membrane indicates the presence of the target antigen, suggesting a positive reaction.

Negative Result: Absence of colored dots on the membrane indicates the absence of the target antigen, suggesting a negative reaction.



Figure 58. Dot ELISA

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Ref No: HR/C/42/2023

01-11-2023

INTERNSHIP COMPLETION LETTER

This is to certify that Mr P Santhosh a bonafide BSc. Medical Laboratory Technology student of the Sathyabama institute of science and technology Chennai -600119, has successfully completed Internship with the Laboratory Services Department of our hospital.

Duration : 1st October 2023 to 31st October 2023

SEMINAR PRESENTED: 1. Order of draw
2. Biomedical waste
3. Urinalysis

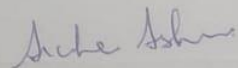
He has learnt to do routine work under supervision and has been aware of basic lab procedures.

He is well behaved and has maintained a cordial professional rapport with lab staff.

We wish him all the best in all his future endeavours.

Best Regards,

For Geri Home Care Services Private Limited,



Dr. Archana Ashwin
Consultant & Laboratory Head
Geri Care hospitals
Chennai



Siddharth B
Head - HR

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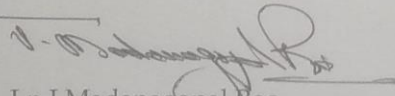
Date: 12th Dec 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr. Santhosh. P, BSc, 2nd year of Sathyabama Institute of Science and Technology, Chennai -119, undergone Internship training in Madras Egmore Lions Blood Bank & Research Foundation, Egmore, Chennai - 08. He has been observed blood bank procedures including Bleeding the Donors, Bloodgrouping, Cross-matching, Component separation, TTI screening and attend Blood donation camp for the Period from 28th Nov 2022 to 3rd Dec 2022.

During him internship, performance was good and he was able to complete the project on time.

We wish him all the best for his upcoming career.


Ln.J.Madanagopal Rao
Chairman



This project made possible through the co-operation of Lions Club International Foundation, Clubs in the District 324 - A1, A5 & A6 and well wishers - sponsored by Lions Club of Madras Egmore

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Chennai - 600 008. Mob : 9941917505
Tel : 28414949 / 4959 / 5959
Web : www.lionsbloodbank.net
AMBATTUR : C-15, A.T.C. Road,
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Chennai - 600 058. Tel : 48504959
Mob : 99419 17505
E-mail : info@lionsbloodbank.net

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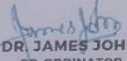


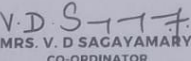
CERTIFICATE OF INTERNSHIP

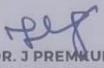
This Internship program certificate is awarded to

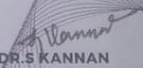
Mr. SANTHOSH P

for his outstanding completion of Internship Program on Exploration of Diagnostic Laboratory Techniques at Sathyabama General Hospital during 01.11.2023 to 30.11.2023. He has learned to do routine lab work and has been aware of basic laboratory procedures.


DR. JAMES JOHN
CO-ORDINATOR
MEDICAL LABORATORY TECHNOLOGY


MRS. V. D. SAGAYAMARY
CO-ORDINATOR
MEDICAL LABORATORY TECHNOLOGY


DR. J. PREMKUMAR
HEAD OF THE DEPARTMENT
MEDICAL LABORATORY TECHNOLOGY


DR. S. KANNAN
MEDICAL SUPERINTENDENT
SATHYABAMA GENERAL HOSPITAL

CONCLUSION

- ❖ In Gericare hospital, I done routine Hospital Laboratory works and done hands on training on patients samples .
- ❖ I also presented several topics every week to the Doctor and the staffs. That is,
 - ✓ Order of Draw
 - ✓ Biochemical waste
 - ✓ Urinalysis
- ❖ In blood bank, I used to learn a lot day-to-day by observing work in blood bank.
- ❖ On my final day at blood bank, I learned a lot by going to Blood Donation camp in Paris, CHENNAI. I learned how to treat donors and done some vein puncture techniques and also learned to check donor HB level.
- ❖ general Hospital, I have Done several routine Laboratory works . That is
 - ✓ Blood collection
 - ✓ Urine Routine
 - ✓ Smear study
 - ✓ Differential cell count
 - ✓ Biochemical Analyser handling
 - ✓ Hematology analyser handling
 - ✓ Widal/CRP/MP Rapid Test kit method
- ❖ In AHS and Biomedical Laboratory I have learned about,
 - ✓ Media preparation
 - ✓ Microorganisms inoculation
 - ✓ Antibiotics sensitivity
 - ✓ Biochemical test
 - ✓ Section cutting
 - ✓ Sandwich Elisa
- ❖ During this periods I done hands on training on the above works and it is helpful in develop my practical skills and I'm thankful for the Staffs who has organised and taught us during this internship.