

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



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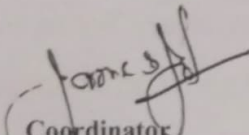
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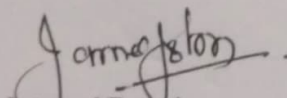
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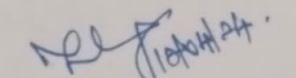
BONAFAIDE CERTIFICATE

This is to certify that this internship report is the bonafide work of T. VIGNESH who have done the project work as a team and carried out the training program at **VOLUNTARY HEALTH SERVICES ADYAR** and **LIONS BLOOD BANK AND RESEARCH FOUNDATION AMBATTUR** under our supervision from August 2023 to April 2024.

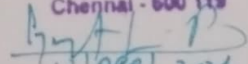
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DECLARATION

I, T. VIGNESH (41737022), hereby declare that the internship trainings done by me at **LIONS BLOOD BANK AND RESEARCH FOUNDATION** at Ambattur under the guidance of **Ms. D. JASMINE PRIYA** and "**VOLUNTARY HEALTH SERVICES** at **Adyar**" 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**.

DATE: 12/4/2024

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I wish to express my deep sense of gratitude and thanks to my internship guide **Dr. James john**, Assistant professor, Department of Medical Laboratory Technology and **Ms. D. Jasmine Priya**, Assistant professor, Department of Medical Laboratory Technology for their excellent guidance and strong support throughout the course of my study.

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

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INTRODUCTION:

Place of visit

1. VHS HOSPITAL, Adyar.



Figure-1

2. LIONS BLOOD BANK, Ambattur

I have got good experience of observing all kinds of tests done in Blood Bank and diagnostic laboratory. We have learnt the tests under the departments of Biochemistry, Microbiology, Hematology, Blood bank, Phlebotomy, Clinical pathology, Serology. Here I have prepared the report of my whole Internships.

BIOCHEMISTRY

Biochemistry, in simple terms, can be defined as a vast branch of science that combines both Biology and Chemistry. It is a study focussing on the life processes of living organisms at both biological and chemical levels.

AUTOANALYZER:

INTRODUCTION:

Sample analysis can be automated with an autoanalyzer, which is revolutionary for many industries, including medical. These devices perform repeated activities, such as measuring materials and samples precisely, combining them, and interpreting the outcome. This minimizes errors and frees up technicians. In addition, they handle hundreds of samples daily, which is faster than labor-intensive manual testing. Autoanalyzers, first developed in the 1950s, have evolved through time, utilizing a variety of methods. They are an essential tool in contemporary medicine, assisting physicians in making quick and precise diagnosis to improve patient care.

PROCEDURE:

- **Sample preparation:** Prepare patient samples (blood, urine, etc.) in accordance with guidelines. Perhaps centrifugation is required.
- **Load and Identify:** Fill the autoanalyzer's assigned trays and carousels with samples and controls. Each is identified by the system either manually or through barcodes.
- **Automated Analysis:** When the computer does the work:
Measures Materials And Reagents Precisely.
Blends Them According To Predetermined Guidelines.
Mixes And Then Incubates Or Warms Them As Needed.
Employs Light Or Other Detecting Techniques To Analyze Reactions.
- **Data Collection and Analysis:** Using pre-established settings, the autoanalyzer gathers and examines the data.
- **Results & Reporting:** Printouts or digital files with the results are produced for a medical practitioner to review.



Figure-2

TESTS DONE IN BIOCHEMISTRY:

BIOCHEMISTRY

- Blood Sugar Fasting
- PP/Random
- GTT/GCT
- Urea/BUN
- Creatinine
- Uric Acid
- Total Protein
- Albumin
- A.G. Ratio
- Billrubin- Total
- Bilirubin-Direct & Indirect
- S.G.O.T./AST
- S.G.P.T./ALT
- Alkaline Phosphatase
- GGT
- Total Cholesterol
- Triglycerides
- HDL

- LDL
- Calcium
- Phosphorus
- Magnesium
- HbA1c
- CK-NAC
- CK-MB
- Troponin

LIVER FUNCTION AND RENAL TEST:

LIVER FUNCTION TEST:

A series of blood tests known as liver function tests (LFTs) evaluate the condition of your liver.

Your liver is an essential organ that produces proteins, breaks down drugs, and filters pollutants from your blood, among many other functions.

LFTs measure several things:

- Enzymes released by liver cells: Abnormal levels can indicate liver damage or disease.
- Bilirubin: A waste product broken down by the liver. High levels can cause jaundice (yellowing of the skin and eyes).
- Proteins made by the liver: Albumin helps prevent fluid buildup in tissues, and clotting proteins are essential for blood clotting.

Abnormal LFT results may indicate:

- Liver damage or disease, such as hepatitis, cirrhosis, or fatty liver disease
- Need for further investigation to determine the cause of the abnormality

LFTs are routine for:

- General health checks to screen for liver problems
- Monitoring certain medications that can affect the liver.

RENAL FUNCTION TEST:

The kidneys filter waste materials and control electrolytes, which is a vital part of keeping the body in a state of equilibrium. Renal function tests (RFTs) offer a thorough evaluation of kidney function and are useful in the diagnosis, tracking, and prognosis of a number of different renal illnesses.

RFTs typically evaluate:

- **Waste product clearance:** Levels of creatinine, urea nitrogen, and uric acid indicate the kidneys' ability to eliminate waste.
- **Electrolyte balance:** Sodium, potassium, chloride, and other electrolytes are crucial for cellular function, and RFTs assess their proper regulation by the kidneys.
- **Glomerular filtration rate (GFR):** Estimated GFR reflects the kidneys' filtration capacity, a key indicator of overall function.

ROCHE- ELECTROLYTE :

The Roche Electrolyte Analyzer is a medical device designed to automate the analysis of electrolytes in various bodily fluids like blood, serum, plasma, and urine. These electrolytes, including sodium, potassium, calcium, and chloride, play a crucial role in maintaining vital bodily functions.

This analyzer is a workhorse in clinical settings, offering several benefits:

- **Speed and Efficiency:** It can process hundreds of samples per day, significantly faster than manual testing.
- **Accuracy and Consistency:** Automated measurements minimize human error and ensure consistent results.
- **Minimal Sample Volume:** The analyzer requires only a tiny sample volume (around 95 microliters), reducing patient discomfort.
- **Ease of Use:** A user-friendly interface with minimal maintenance needs simplifies operation.

- **Versatility:** It can be configured to measure different combinations of electrolytes to meet specific testing needs.

The Roche Electrolyte Analyzer utilizes electrochemical technologies (potentiometry and amperometry) to measure the electrical properties of the sample and determine electrolyte concentrations. This technology provides fast and reliable results, aiding healthcare professionals in:

- **Diagnosing electrolyte imbalances:** These imbalances can indicate various medical conditions such as dehydration, kidney problems, or hormonal disorders.
- **Monitoring treatment effectiveness:** The analyzer helps track response to treatment for conditions affecting electrolyte levels.

Figure-3

NORMAL RANGES

TESTS	RANGES
HDL (High-Density Lipoprotein)	60 mg/dL or higher
LDL (Low-Density Lipoprotein)	Less than 100 mg/dL
Total Cholesterol	Less than 200 mg/dL

Triglycerides	Less than 150 mg/dL
Fasting Blood Sugar	Less than 100 mg/dL
RFT (Renal Function Test): • Creatinine • Blood Urea Nitrogen (BUN) • eGFR (Estimated Glomerular Filtration Rate)	Men (0.84-1.3 mg/dL), Women (0.60-1.1 mg/dL) 7-20 mg/Dl >60 mL/min/1.73m ²
Albumin	3.4 and 5.4 (g/dL)
Uric acid	• Adult Males: 2.5 – 7.0 (mg/dL) • Adult Females (pre-menopausal): 1.5 – 6.0 mg/dL • Adult Females (post-menopausal): 2.7 – 7.3 mg/dL
Bilirubin- Total	• Adults and Children over 18: 0.1 to 1.2 (mg/dL) • Newborns: Levels can be higher in healthy newborns, ranging from 1.0 to 12.0 mg/dL.
Bilirubin- Direct and Indirect	• Total Bilirubin: 0.1 to 1.2 mg/dL (adults and children over 18) • Direct Bilirubin: 0.1 to 0.3 mg/dL (adults)
Total cholesterol	• Desirable: Less than 200 milligrams per deciliter (mg/dL) • Borderline High: 200-239 mg/dL • High: 240 mg/dL and above

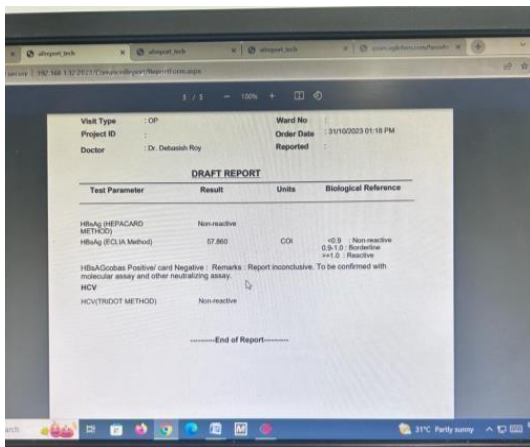


Figure-4



Figure-5

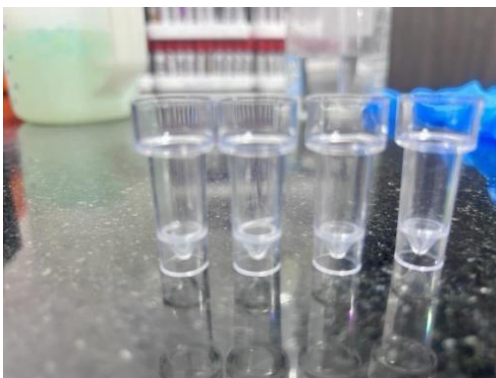


Figure-6



Figure-7

IMMUNOASSAY ANALYZER:



Figure-8

INTRODUCTION:

An immunoassay analyzer is a laboratory instrument used to detect and quantify specific molecules, such as proteins or hormones, in a sample using immunological reactions.

PRINCIPLE:

Immunoassay analyzers use antibody-antigen binding interactions for sensitive and specific detection and quantification of target substances.

PROCEDURE:

1. Sample preparation: The sample (e.g., blood, urine) is collected and prepared for analysis, often requiring dilution or pretreatment.
2. Incubation: The sample is incubated with specific antibodies or antigens, allowing for the formation of immune complexes.
3. Detection: A detection method is employed to quantify the immune complexes formed, such as fluorescence, chemiluminescence, or colorimetry.
4. Analysis: The signal generated is compared to a standard curve to determine the concentration of the target molecule in the sample.

TESTS:

- ELISA
- CLIA
- RIA
- FIA
- Immunoturbidimetric

BUFFERING REAGENT

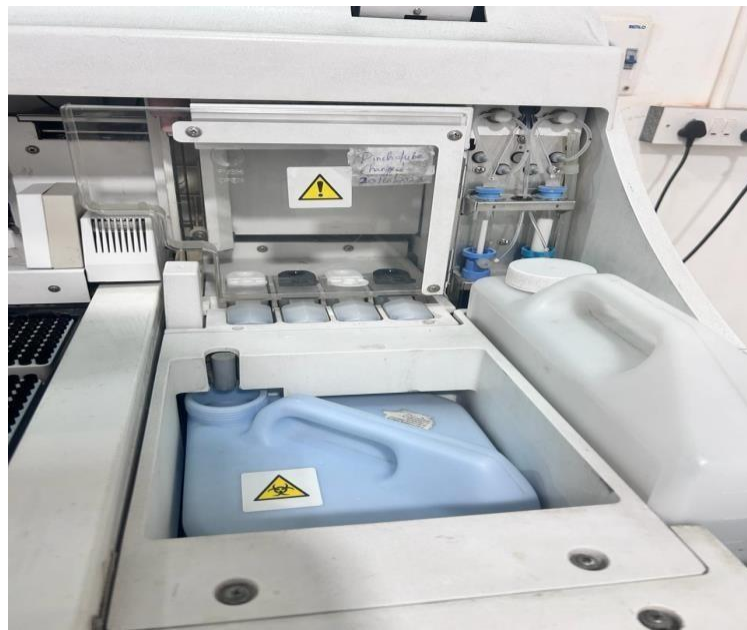


Figure-9
Buffering reagent is used for cleaning the sample

TIPPER TRACK



Figure-10

MEDICAL REFRIGERATOR



Figure-11

INTRODUCTION:

Vital for healthcare, storing vaccines, reagents, ATS and medicines safely, with precise temperature control and monitoring.

STORAGE INCLUDES:

- Blood samples
- HIV kits
- Urine samples
- Reagents
- Vaccines

TEMPERATURE:

36°F to 46°F (2°C to 8°C)

INTRODUCTION:

The BTS Machine offers precise glucose testing, advancing diabetic care.

PRINCIPLE:

Electrochemical sensor measures glucose levels in blood for accurate diagnostics.

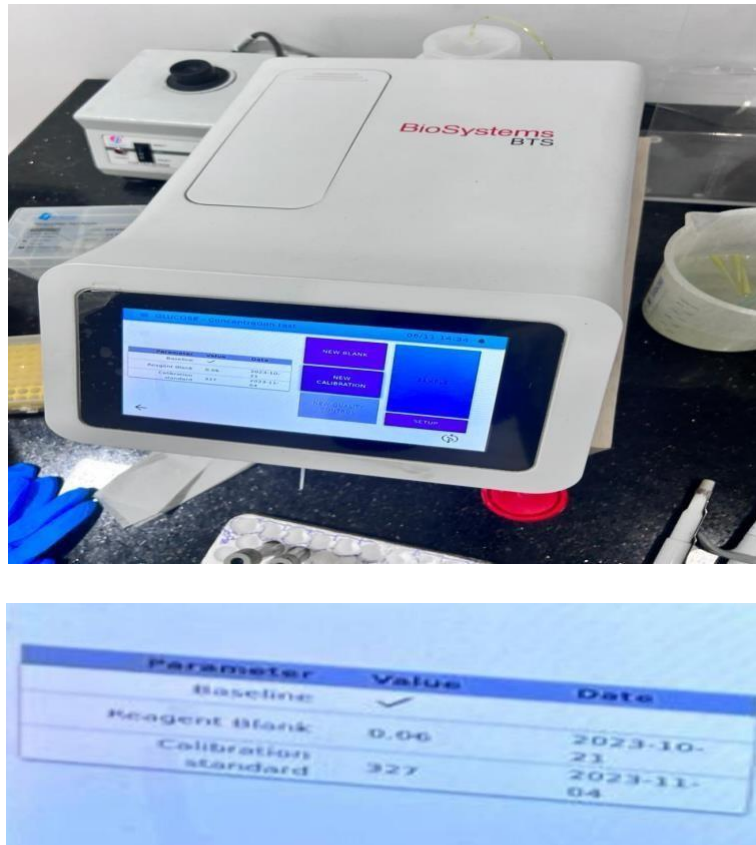


Figure-12

PROCEDURE:

1. Prepare the Device: Insert a test strip into the BTS machine according to the manufacturer's instructions.
2. Prepare the Lancet Device: Load a lancet into the lancing device.
3. Clean the Finger: Clean your finger with an alcohol swab and let it dry.
4. Prick the Finger: Use the lancing device to prick the side of your fingertip.
5. Apply Blood to Test Strip: Gently squeeze your finger to produce a small drop of blood. Touch the edge of the test strip to the blood drop until the strip fills.
6. Wait for Results: The BTS machine will display your blood glucose level after a few seconds.

Record and Interpret Results: Note the reading and follow any recommendations

7. provided by your healthcare provider based on the results.
8. Dispose of Lancet and Test Strip: Safely discard the lancet and used test strip according to local regulations.

NORMAL RANGE:Fasting glucose: (70 to 99 mg/dL)

PHLEBOTOMY

INTRODUCTION:

Phlebotomy is the process of drawing blood from a patient for various medical purposes, such as testing, transfusions, or donations.

PROCEDURE:

- Verify patient identity.
- Explain the procedure to the patient.
- Position patient comfortably.
- Apply a tourniquet to the upper arm.
- Cleanse the venipuncture site with alcohol.
- Insert a sterile needle into the vein.
- Collect blood into vacutainer tubes.
- Release the tourniquet once blood flow is established.
- Remove the needle and apply pressure to the site.
- Secure with a bandage.
- Label blood tubes accurately.
- Dispose of used equipment safely.
- Document the procedure in patient records.
- Monitor patient post-procedure for any adverse reactions.

Observed Phlebotomy process and procedures also general instructions during my visit.

SEROLOGY:

Serology is the study of serum and bodily fluids to detect antibodies and antigens, aiding in diagnosing infections.

Serology example samples include: • Blood serum • Plasma • Cerebrospinal fluid • Synovial fluid • Saliva

TESTS: ➤ ELISA ➤ WESTERN BLOT ➤ RAPID DIAGNOSTIC TESTS

1. ELISA (Enzyme-Linked Immunosorbent Assay)

Principle: ELISA detects and quantifies specific antibodies (or antigens) in a sample by using enzyme-conjugated secondary antibodies that produce a color change when they bind to the target antigen-antibody complex.

Procedure: • Coating: Microplate wells are coated with the antigen of interest.

- **Blocking:** Non-specific binding sites on the plate are blocked to prevent false positive results.
- **Incubation:** Patient serum (or sample) is added to the wells; if specific antibodies are present, they bind to the coated antigen.
- **Washing:** Unbound materials are washed away.
- **Secondary Antibody Addition:** Enzyme-linked secondary antibody (e.g., anti-IgG conjugated with horseradish peroxidase) is added and binds to the antigen-antibody complex.
- **Substrate Addition:** Enzyme substrate is added, leading to a color change if the specific antibody is present.
- **Reading:** The optical density of the color change is measured spectrophotometrically.

Interpretation

- : • **Positive Result:** A positive result indicates the presence of specific antibodies (IgM, IgG, IgA) against the tested antigen.
- **Negative Result:** A negative result suggests the absence of detectable antibodies against the antigen.
 - **Quantitative Interpretation:** The optical density (OD) value of the color change correlates with antibody concentration; higher OD values indicate higher antibody levels.

2. Western Blot

Principle: Western blot detects specific proteins (antigens) and antibodies in a sample by using electrophoresis to separate proteins based on size, followed by transfer to a membrane and antibody detection.

Procedure:

1. **Protein Separation:** Proteins in the sample are separated by gel electrophoresis based on size.
2. **Transfer:** Proteins are transferred ("blotted") onto a membrane (e.g., nitrocellulose).
3. **Blocking:** Non-specific binding sites on the membrane are blocked.
4. **Primary Antibody Incubation:** Patient serum (or sample) containing antibodies is added to the membrane.
5. **Washing:** Unbound antibodies are washed away.
6. **Secondary Antibody Addition:** Enzyme-linked secondary antibody (e.g., anti-human IgG) is added and binds to the primary antibody.
7. **Substrate Addition:** Enzyme substrate is added, resulting in a color change or chemiluminescence where the antigen-antibody complex is present.

Interpretation:

- **Positive Result:** Presence of bands corresponding to specific antigen-antibody interactions confirms

the presence of specific antibodies against particular antigens.

- **Negative Result:** Absence of bands indicates the absence of specific antibodies against the tested antigens.
- **Confirmation of Diagnosis:** Positive bands at specific molecular weights can confirm diagnosis in conjunction with clinical findings.

3. Rapid Diagnostic Tests (Lateral Flow Immunoassays)

Principle:

Rapid tests detect specific antigens or antibodies in a sample through capillary action along a membrane, where the target binds to immobilized antibodies.

Procedure:

1. **Sample Application:** Patient sample (e.g., blood, saliva) is applied to the sample pad.
2. **Migration:** The sample migrates along the membrane through capillary action.
3. **Antigen-Antibody Binding:** If the target (antigen or antibody) is present, it binds to capture antibodies immobilized on the test line.
4. **Result Interpretation:** A visible line appears on the test strip (test line) if the target is present, indicating a positive result.

Interpretation:

- **Positive Result:** Presence of a visible line at the test line indicates the presence of the target antigen or antibodies.
- **Negative Result:** Absence of a line at the test line indicates the absence of the target antigen or antibodies.
- **Control Line:** Presence of a line at the control line confirms the validity of the test

CLINICAL PATHOLOGY

I have gained knowledge about procedures for urine routine and physical examination of stool samples, including urine strip, urine deposit, wet mount for stool, physical examination of stool, and occult blood.

OCCULT BLOOD:

The faecal occult blood test (FOBT) is a simple, inexpensive and most frequently performed chemical screening test on faeces. It is done for the detection of blood in the stool that is not visible.

Principle:

The principle of chemical tests to detect occult blood is based on the fact that haemoglobin and its derivatives react in a similar way to peroxidase enzymes by catalysing the transfer of an oxygen atom from the peroxide to a chromogen such as benzidine, o-toluidine, guaiac or aminophenazone.

Procedure:

- Collect a stool sample- The first step in testing for occult blood is to collect a small sample of stool. This can be done at home using a special collection kit provided by your healthcare provider.
- The test is performed on a paper slide that contains paper squares coated with **guaiac**, a chemical derived from tree resin. A small portion of stool(faecal) specimen is applied to the paper.
- A developer solution containing hydrogen peroxide is added to the paper.
- If the blood is present in the specimen, the iron (Fe) in the haemoglobin catalyses the reaction between guaiac in the paper and the hydrogen peroxide. The completed reaction forms a blue color.

WET MOUNT:

Wet mount slide is a slide that is prepared with some type of liquid placed at the center of the slide that will serve as the medium through which the specimen will move or interact with

during microscopic observation.

Procedure:

- Prepare a wet mount slide by placing a drop of physiological saline or tap water on a clean microscope slide.
- Using a clean applicator stick, transfer a small amount of the stool sample onto the drop of water and mix it gently to form a homogenous mixture.
- Carefully place a coverslip over the stool sample to avoid trapping air bubbles.
- Examine the wet mount preparation under a microscope using low power (10x) and high power (40x) objective lenses to observe any parasites present.
- Dispose of the slide and coverslip appropriately following standard biohazard disposal protocols.

URINE ROUTINE:

Urine routine tests are among the most commonly scheduled tests. The routine consists of tests designed to assess the physical, chemical, and microscopical properties of urine. It aids in evaluating general health and serves as an early warning sign of illnesses such as kidney disease, urinary tract infection and liver disease

Urine routine includes:

- Urine strip
- Urine deposit.

Procedure for Sample collection:

- Instruct the patient to collect a clean, mid-stream urine sample in a sterile container.
- Ensure the date and time of collection are recorded on the container.
- Seal the container tightly to prevent leakage.
- Send the sample to a laboratory for analysis within 2 hours.
- The laboratory will visually examine the urine, measure its volume, and test for pH, protein, glucose, ketones, blood, and nitrites.
- The results will be interpreted to diagnose any underlying illnesses or monitor treatment progress.

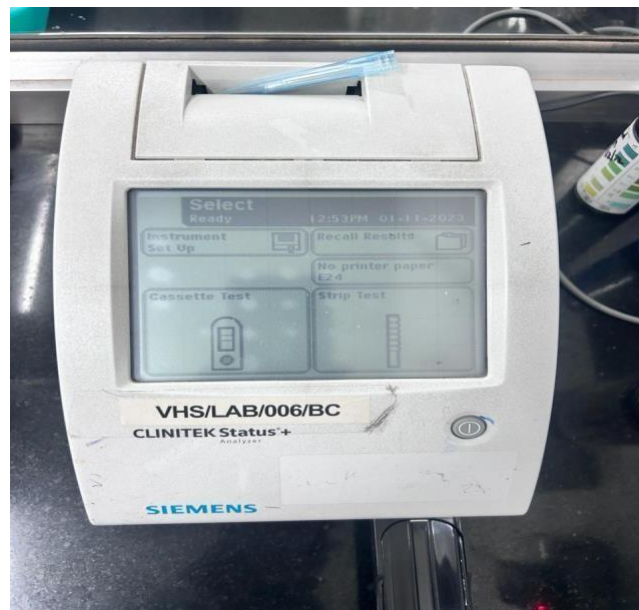


Figure-13

Urine strip

Procedure:

- Collect a fresh urine sample in a clean container.
- Immerse the urine strip into the urine sample, ensuring all reagent pads are covered.
- Remove the strip after the specified time (typically 1 minute).
- Shake off excess urine from the strip using Kim wipes.
- Compare the reagent pad colours to the provided color chart or use a urine strip analyzer to detect substances like glucose, protein, blood, ketones, and pH levels.

- Record the result using the analyzer.
- Dispose of the urine strip and sample according to waste disposal guidelines.

Urine deposit:

Urine deposit refers to the identification of mucus, RBC or any other bacterial substance.

Procedure:

- Transfer the urine from the container into a centrifuge tube
- Centrifuge the urine at 1500 rpm for 10 minutes.
- Remove the supernatant and collect the deposit using a dropper.
- Place a coverslip over the deposit and examine it under a microscope.

STOOL EXAMINATION:

Stool examination helps to diagnose certain conditions that affect the digestive tract. These conditions may include infection, poor nutrient absorption or cancer. It involves collecting a sample of stool and observing its consistency, color, odor and any abnormal substances.

Procedure:

- **Stool Collection:** Patients are instructed to collect a small, uncontaminated sample in a clean container, ensuring no urine or water mixes with it.
- **Color Inspection:** The color of the stool, typically brown, provides insight into digestive health. Abnormal colours like red (indicating blood), black (from upper gastrointestinal bleeding), or pale (suggesting liver or bile duct issues) should be noted.
- **Consistency Assessment:** Stool consistency, such as watery (diarrhea) or hard (constipation), offers diagnostic clues.
- **Odor Examination:** The smell of stool can indicate gastrointestinal disorders like malabsorption or bacterial overgrowth.
- **Detection of Abnormal Substances:** The stool sample is examined for mucus, pus,

parasites, undigested food, and other abnormal substances.

- **Occult Blood Testing:** A guaiac test may be used to detect occult (hidden) blood in a small stool sample, indicating potential gastrointestinal bleeding.

MICRO BIOLOGY:

INTRODUCTION:

Study of microorganisms causing disease, aiding diagnosis and treatment through identification, culture, and susceptibility testing.

VITEK2 COMPACT:



PRINCIPLE:

The VITEK 2 Compact is an automated system used for microbial identification and antimicrobial susceptibility testing. It's designed to streamline and standardize these processes, reducing manual labor and improving efficiency in clinical microbiology laboratories.

PROCEDURE:

1. **Sample Preparation:** Start by obtaining a pure culture of the microorganism from a clinical specimen (e.g., blood, urine, sputum). Inoculate the VITEK 2 cards or cassettes with the isolated microorganism.
2. **Loading the Instrument:** Place the inoculated VITEK 2 cards into the instrument. Ensure the cards are securely loaded according to the instrument's specifications.
3. **Incubation:** The VITEK 2 Compact system automatically incubates the cards at the required temperature and atmospheric conditions for microbial growth (e.g., 35-37°C for bacteria, 30°C for yeast).
4. **Data Collection:** During incubation, the system monitors the microbial growth and metabolic activity. It detects and interprets the biochemical reactions occurring within the microorganisms.
5. **Microbial Identification:** Based on the detected reactions, the VITEK 2 system identifies the microorganism species. It compares the observed metabolic profile against a database of known profiles for accurate identification.
6. **Antimicrobial Susceptibility Testing (AST):** After identification, the system tests the microorganism's susceptibility to various antibiotics. It measures the growth of microorganisms in the presence of different concentrations of antimicrobial agents.
7. **Data Analysis:** The VITEK 2 system analyzes the results to determine the susceptibility profile of the microorganism. It categorizes the microorganism's response to each antibiotic as susceptible, intermediate, or resistant based on predefined criteria.
8. **Result Interpretation:** Once the testing is complete, the system generates a detailed report. This report includes the identified microorganism(s) and their susceptibility profile to antibiotics.
9. **Quality Control:** Regularly perform quality control checks to ensure the accuracy and reliability of the system. This involves using control strains and verifying the

performance of the instrument.

10. Result Review: Microbiologists review the generated reports to make informed decisions regarding patient treatment. The susceptibility data guides the selection of appropriate antibiotics for effective therapy.

ANTI-BIOTIC SENSITIVITY TEST:

INTRODUCTION:

The antibiotic sensitivity test, also known as the antibiotic susceptibility test or antibiogram, is a laboratory method used to determine the effectiveness of specific antibiotics against bacteria or fungi isolated from a patient's sample. This test helps guide clinicians in selecting the most appropriate antibiotic treatment for infections.

PRINCIPLE:

The principle behind the antibiotic sensitivity test involves exposing the isolated microorganism to a panel of antibiotics and observing its growth response in the presence of these antibiotics. The test assesses the ability of each antibiotic to inhibit or kill the target organism.

PROCEDURE:

1. Isolation of the Organism: The first step is isolating the bacteria or fungi from the clinical specimen (such as blood, urine, sputum, or wound swab) through culturing on appropriate media.
2. Preparing the Inoculum: A pure culture of the organism is then prepared to achieve a standardized concentration of bacteria or fungi.
3. Inoculation onto Agar Plate: The inoculum is spread or streaked onto the surface of an agar plate using a sterile swab or loop.
4. Application of Antibiotic Discs or Strips: Small discs or strips containing different antibiotics are placed on the agar surface.
5. Incubation: The plates are then incubated at the optimal temperature for the specific organism to allow growth.
6. Observation and Interpretation: After incubation, the plates are examined for zones of inhibition around each antibiotic disc or strip. A clear zone around a disc indicates that

the organism is susceptible to that antibiotic, whereas no zone or a very small zone indicates resistance.

INTERPRETATION:

Interpretation of the results is based on the diameter of the zones of inhibition and guidelines provided by organizations such as the Clinical and Laboratory Standards Institute (CLSI) or the European Committee on Antimicrobial Susceptibility Testing (EUCAST). The breakpoints categorize organisms as susceptible, intermediate, or resistant to each antibiotic tested.

- Susceptible (S): The organism is likely to respond to therapy with the antibiotic.
- Intermediate (I): The antibiotic may be effective depending on the site of infection and other factors.
- Resistant (R): The organism is not inhibited by the antibiotic and alternative treatments should be considered.

ITEK RACK:



Figure-15

VITEK CHORD GT/AT:



Figure-18

Culture plates (Solid medium)

Place a drop of water into the circle that has been created on the slide. Using a sterilized and cooled inoculation loop, obtain a very small sample of a bacterial colony from the culture plate.. Gently mix the bacteria into the water drop.

Suspension is accomplished by spreading the cells in a circular motion in the drop of water with the loop. This helps to avoid cell clumping.

The finished smear should occupy an area about the size of a nickel and should appear as a translucent, or semitransparent, whitish film

Step 1: Preparation of the glass slide:

- Clean, grease free slides are needed for smear preparation.
- Grease or oil from the fingers on slides must be removed by washing the slides with soap and water

Finally rinse the slide with 95% alcohol and dry it.

- Hold the slide by their edge.

PREPARATION OF SMEAR AND HEAT FIXING

1. Take 1-2 loops full of water on to the middle of a glass slide
2. Take a small colony of bacteria from a plate or liquid culture and mix with water
3. Mix with the loop for at least 2 minutes so as to separate the cells from one-another
4. Heat fix the thin smear on Bunsen burner far away from it as not to kill the cells
5. Use proper stains as demonstrated by the Instructor or protocols.

PROCEDURE FOR SIMPLE STAINING

- (1) A bacterial smear is stained with methylene blue for one minute.
- (2) Stain is briefly washed off slide with water,
- (3) Water drops are carefully blotted off slide with bibulous paper.
- (4) Microscopic observation

MICROBIOLOGY

BLOOD CULTURE:



Figure-19

A blood culture is a laboratory test used to diagnose infections in the bloodstream. It is a critical tool for physicians, as bloodstream infections, also known as bacteremia or fungemia, can be serious and life-threatening.

Test Procedure:

Collect the urine sample in a clean and dry container, preferably first early morning urine sample after missed period. Bring the test pouch to room temperature and open the pouch just before testing and place it on a flat surface. Take the urine sample with dropper and add about 2 drops into the sample well(S). Do not add urine sample in window marked as C and T. Wait for the colored line(s) to appear. Read the results within 5 minutes as below.

Blood culture collection procedure

1- Wash hands, cleanse the site of veni-puncture using one step method (one minute), if Chlorhexidine gluconate in 70% alcohol is not available then use the two step method (2 minutes)

* In case of allergy, use 70% Isopropyl alcohol.

* Chlorhexidine should not be used in children under the age of 2 months.

2- Prepare the site for culture

3- After the vessel site is selected, a 5 cm area of skin shall be disinfected, in a circular movement outwards. Let air dry for 30 seconds. Do not palpate the skin again

4- Remove the plastic cap of each blood culture bottle, and the rubber stopper should be decontaminated with 70% Isopropyl alcohol and allowed to dry for 30 seconds.

5- Put on sterile gloves.

6- Blood shall be drawn into a syringe or directly into a culture bottle by using the vacutainer system.

7- Each veni-puncture attempt: a new withdrawal device should be used.

8- If blood is drawn into a syringe, the blood shall be discharged into the culture vials without changing needles.

9- Blood collected for blood cultures shall not be used for any other purposes before

inoculating blood culture bottles

10- All bottles shall be labelled at the bedside, all samples should be kept at room temperature until sent to the lab.

11- Procedure will be documented in the patient's medical record

BLOOD CULTURE INCUBATOR:



Figure-20

INCUBATOR

To control the temperature and humidity when growing micro-organisms on petri dishes, scientists use a piece of equipment called an incubator. An incubator is an insulated enclosure where temperature, humidity—and sometimes other environmental conditions like oxygen levels—can be controlled precisely.

Place each petri dish inside a zip lock bag to prevent drying out and to control odors. Turn the plates upside down and put them in a warm place. The ideal temperature for incubation is 32° C or 90° F. Bacterial growth should start to become visible in about 2 -3 days.

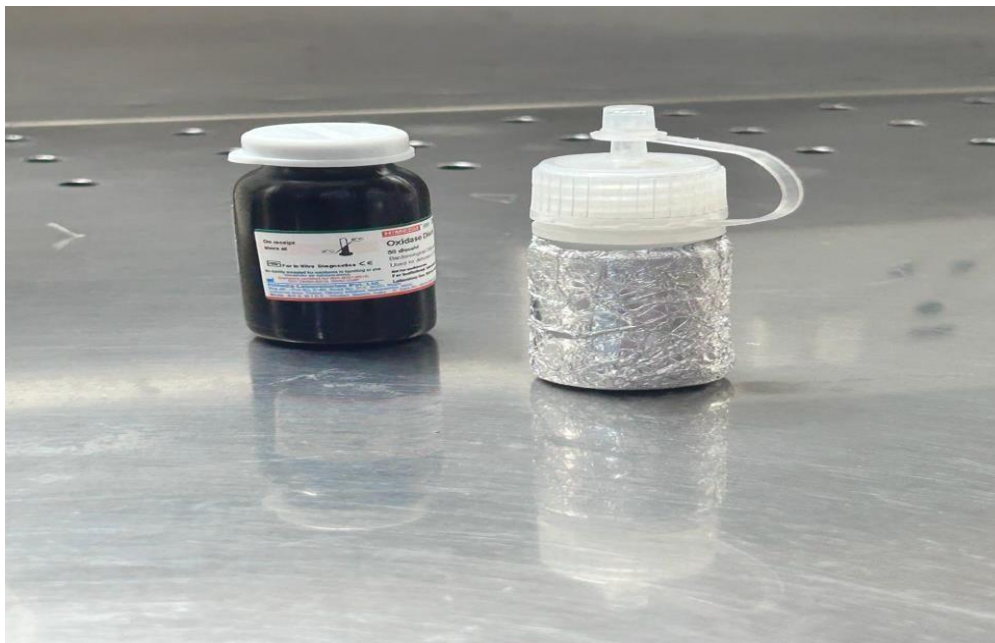
OXIDASE DISCS:

Oxidase discs are quick tests used to identify certain bacteria based on an enzyme they produce. Imagine them as tiny detective kits for germs!

- **The Enzyme:** The test checks for the presence of cytochrome c oxidase, an enzyme some bacteria use for oxygen respiration.
- **The Test:** A drop of culture fluid or a bacterial colony is placed on the disc. If the enzyme is present, the disc changes color, typically from yellow to purple within seconds.
- **Fast Results:** This simple test helps differentiate bacteria in minutes, aiding doctors in quicker diagnoses.

It's not a perfect ID check, but oxidase discs are a handy tool for narrowing down suspects in the bacterial world.

OXIDASE DISCS



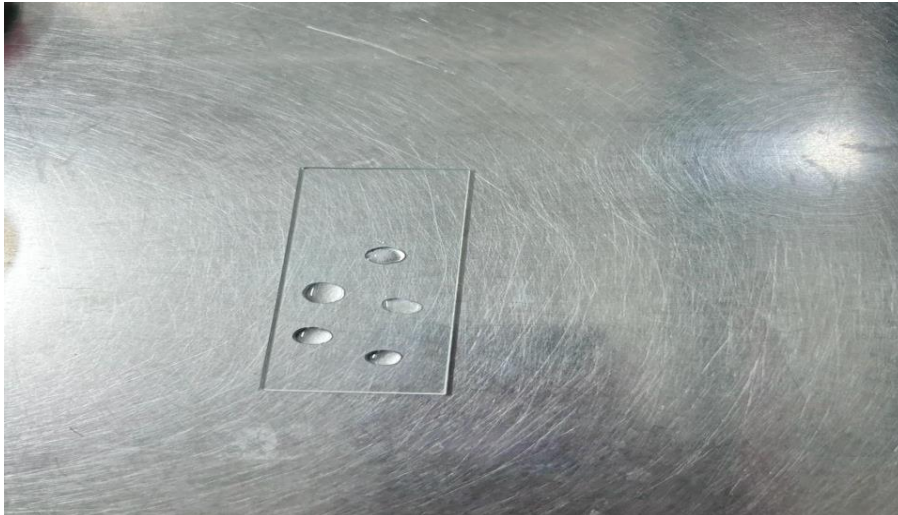


Figure-21



Figure-22

Purpose of Petri dish

- The petri dish was made for separation. It was developed for culturing microorganisms while separating them from airborne contaminants., the dish also assisted in separating individuals from disease.

What is a Petri dish

It is a shallow glass or plastic lidded dish that is used to culture cells. It is named after the German bacteriologist Julius Richard Petri.

Many kinds of Petri dishes are used depending upon their size and shape.

Grids are used on the bottom of dish to relocate the cells after the experiment.

URINE CULTURE

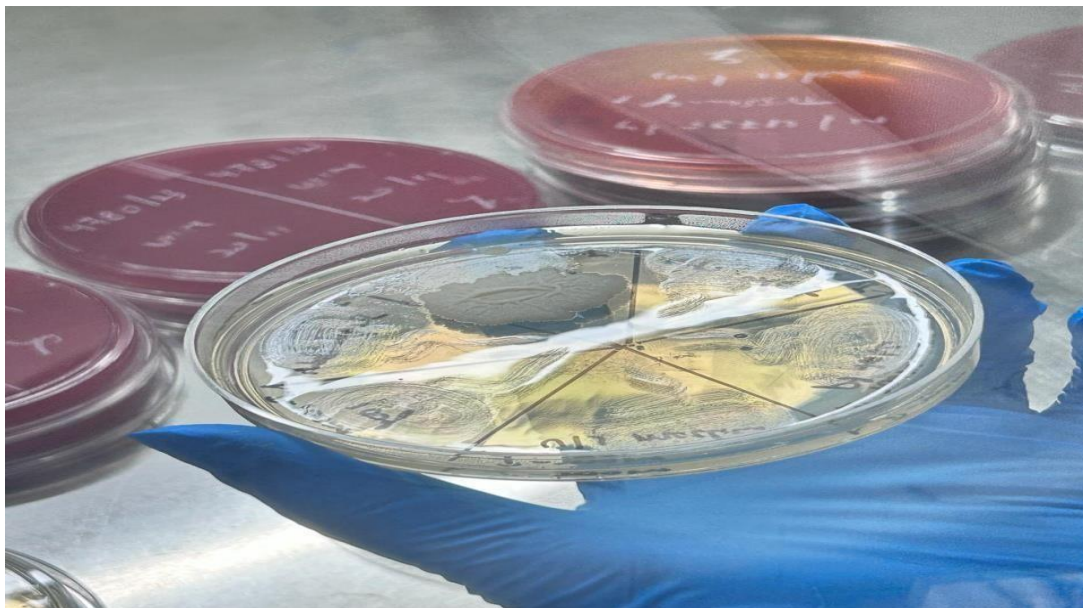


Figure-23

Urine culture

A urine culture is a laboratory test that is performed to detect and identify any bacteria or other microorganisms in a urine sample. It is typically ordered by healthcare providers when a urinary tract infection (UTI) is suspected. The culture helps determine the specific type of bacteria causing the infection and their sensitivity to antibiotics, which guides appropriate treatment.

HEMATOLOGY

INTRODUCTION:

This Laboratory Taught me about how to perform blood tests and staining methods .

Tests:

1. BT
2. CT
3. CBC
4. DC
5. APTT
6. PT

Procedures:

1.BT (Bleeding Time)

d: Ivy's method involves making a small incision (1-2 mm deep) on the forearm or earlobe and blotting the blood every 30 seconds with filter paper until bleeding stops.

Duke's method uses a blood pressure cuff inflated to 40 mm Hg around the upper arm, and the cuff is released after 10 minutes to observe bleeding.

Procedure: The time taken for bleeding to stop is recorded.

Bleeding Time

1. Clean the tip of finger with an alcohol swab
2. Prick the finger tip with a lancet
3. Start stopwatch and note the time when blood first appears on the skin
4. After 30 sec place the edge of the filter paper on the top of the drop of blood.
5. Perform the operation at every 30 sec interval.
6. When no blood is seen on the filter paper then stop the watch and calculate the

time.

Normal Bleeding Time is: 2-7 min



Figure-23

CT (Clotting Time):

Method: Lee and White method involves adding a drop of blood to a clean, dry glass slide and gently rocking the slide until a fine fibrin clot forms.

Procedure: The time taken for the clot to form is recorded.

Normal range is usually 5-8 minutes



Figure-25

1. CBC (Complete Blood Count):

Method: Blood collected in an EDTA tube is analyzed using automated hematology analyzers. These instruments count and size blood cells based on their electrical properties or light scatter characteristics.

Procedure: The analyzer measures various components including red blood cells (RBCs), white blood cells (WBCs), hemoglobin, hematocrit, platelets, and differential counts of WBC types.

Normal ranges vary by age and gender.

CBC ANALYZER



Figure-26

2. DC (Differential Count):

Method: A blood smear is prepared by spreading a drop of blood thinly on a glass slide, staining it with Wright stain, and examining under a microscope.

Procedure: A trained technician identifies and counts different types of WBCs based on their staining properties and morphology.

Normal percentage ranges are: Neutrophils (40-60%), Lymphocytes (20-40%), Monocytes (2-8%), Eosinophils (1-4%), Basophils (0.5-1.0%).

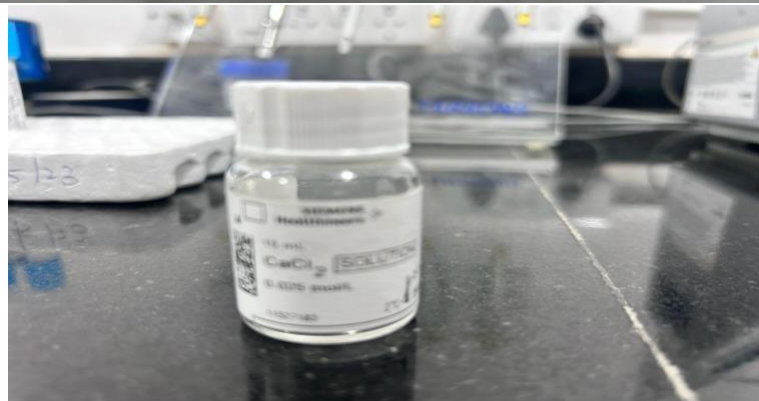
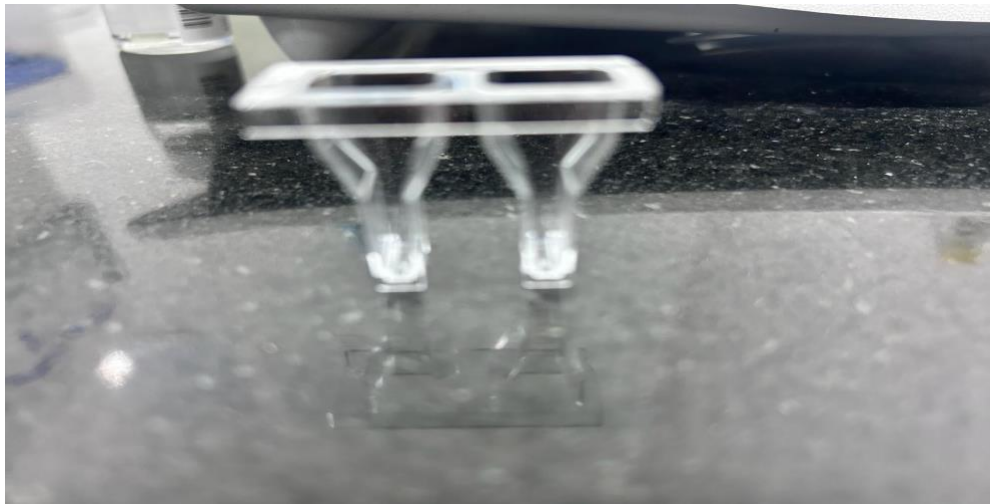
3. APTT (Activated Partial Thromboplastin Time):

Method: Citrated plasma is mixed with an activator and phospholipid, and the time taken for clot formation is measured.

Procedure: The activator initiates intrinsic coagulation pathway reactions, and the time for clot formation is recorded.

Normal range is typically 25-35 seconds.

APTT MACHINE



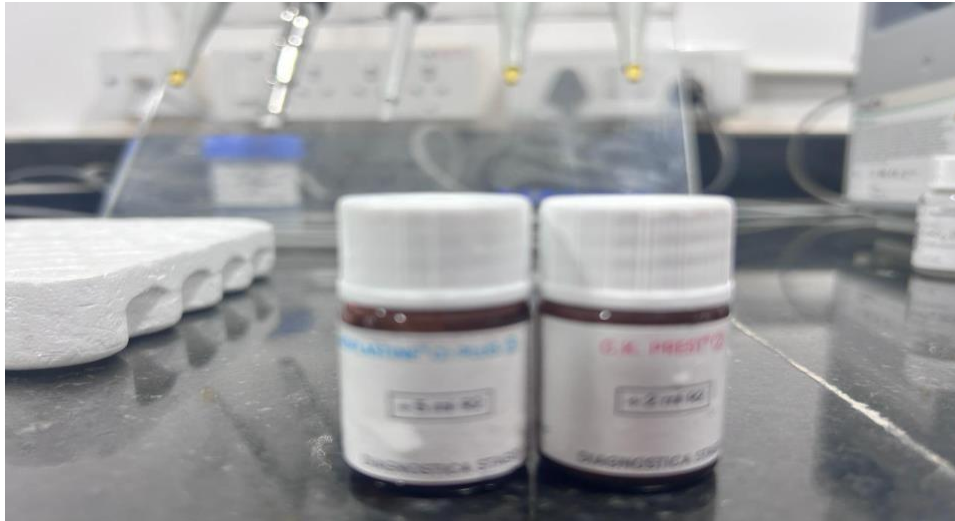


Figure-27

4. PT (Prothrombin Time):

Method: Citrated plasma is mixed with thromboplastin and calcium ions, and the time for clot formation is measured.

Procedure: Thromboplastin activates the extrinsic coagulation pathway, and the time for clotformation is recorded.

These detailed methods and procedures are essential for accurately performing and interpreting these laboratory tests, aiding in the diagnosis and monitoring of various hematological and coagulation disorders. Variations in techniques may exist based on specific laboratory protocols and instrumentations.

Normal range is generally 11-13 seconds.

SEROLOGY

- HIV
- HCV
- CRP

- HBsAg screening test
- Widal

HIV

TRI-DOT

Rapid Visual Test for the Qualitative and differential Detection of Antibodies to HIV-1 & HIV-2 in Human Serum/Plasma

TEST PROCEDURE

Step-1 Add 3 drops of Buffer Solution to the centre of the Device

Step-2 Add 1 drop of patient's sample (serum or plasma) using the sample dropper provided

Step-3 Add 5 drops of Buffer Solution

Step-4 Add 2 drops of Conjugate Solution directly from the vial

Step-5 Add 5 drops of Buffer Solution and read results.



Figure-28



Figure-29



HCV

A blood test, called an HCV antibody test, is used to find out if someone has ever been infected with the hepatitis C virus. The HCV antibody test, sometimes called the anti-HCV test, looks for antibodies to the hepatitis C virus in blood.

PROCEDURE:

- Open the pouch at the notch and remove device. Place the test device on a clean, flat surface.

- Add 5 μ l of blood specimen into the sample well making sure that there are no air bubbles.
- Then add 2 drops (about 50-100 μ L) of lysis Buffer immediately into the buffer well.
- Set up timer and result can be read at 30 minutes. It may take more than 20 minutes to have the background become clearer.



Figure-30

WIDAL

1-Rapid Slide (screening) Test:

PRODUCERS:

- 1- Place 1 drop (or transfer 50 μ l) of the serum patient into each of circle slide.
- 2- Add 1 drop of well shake Ag. O, H, B (O) & B (H) respectively into each circle.
- 3- Spread the contents to fill the whole circle area.
- 4- Mix & rotate the slide for 1 minute & observe for agglutination.
- 5- Report the result.

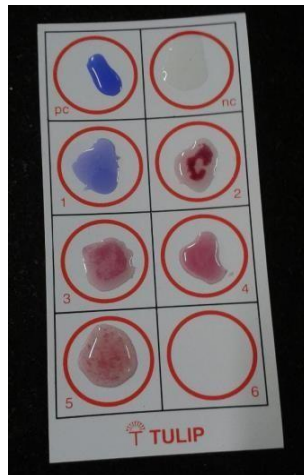


Figure-31

WIDAL

HBsAg RAPID TEST

Diagnostic Test for Detecting Hepatitis B Surface Antigen

NAME AND INTENDED USE

HBsAg Rapid Test is a visually read, qualitative immunoassay for in vitro detection of Hepatitis B Surface Antigen in serum or plasma. The test is intended as an aid to diagnosis of Hepatitis B infection

SUMMARY AND EXPLANATION OF THE TEST

Viral hepatitis is a systemic disease primarily involving the liver, and in most cases is caused by one of three viruses: Hepatitis A (HAV), Hepatitis B (HBV) or Hepatitis C (HCV). The antigen found in the envelope of HBV is designated. Hepatitis B Surface antigen (HBsAg) and its presence in serum or plasma indicates active HBV infection, HBsAg Rapid Test is a simple, one-step test that detects the presence of HBsAg

BIOLOGICAL PRINCIPLES OF THE PROCEDURE

HBsAg Rapid Test is a lateral flow immunoassay. If HBsAg is present in the sample, it forms a complex with the colloidal gold anti-HBsAg conjugate that is dried onto the test strip. The liquid migrates through the nitracellulose membrane, and if colloidal gold-antibody-HbsAg is

present this binds to a second anti-HBsAg antibody immobilized on the membrane, forming a visible red line. The test strip contains an internal control line in the control region that should always show up as a red line regardless of the test line result

MATERIALS PROVIDED

HBsAg Rapid Test contains the following components to perform the assay:

1. Test device (cassette)
2. Instruction manual

Accessories (required but not provided)

1. Timer
2. Disposable dropper or micropipettor

STORAGE AND STABILITY

The test devices are sealed in a moisture-proof foil laminate pouch, containing desiccant. These should be stored in the coolest and driest area available, preferably at 4-30°C. The kit has a shelf life of 15 months from the date of manufacture. The devices should not be frozen and must be protected from exposure to humidity; once a pouch is opened, the device should be used within one hour.

PRECAUTIONS

To obtain reproducible results, the following instructions must be followed:

1. For in vitro diagnostic use only with serum or plasma samples.
2. Use disposable gloves while handling potentially infectious material and performing the assay
3. Do not use the kit beyond the expiration date.
4. Do not eat, smoke, or drink while handling specimens.
5. Do not combine reagents from different batch numbers as the components are optimized for individual batch to give best results

6. Clean up spills thoroughly using an appropriate disinfectant.
7. Do not open the foil pouch until it attains room temperature to prevent formation of condensation.
8. For best results, strictly follow the test procedure and storage instructions

SPECIMEN COLLECTION AND STORAGE

Collect whole blood in a clean container by venipuncture. Use either plain tubes for serum or tubes containing anti- coagulant (EDTA, citrate or heparin) for plasma Separate the serum or plasma. If samples are not immediately tested, they should be stored at 4-8°C for not more than 2 weeks

TEST PROCEDURE

1. Bring the complete kit and sample to be tested to room temperature prior to testing. Once the device pouch is opened, it must be used within one hour
2. Place 4 drops (-150 µL) of serum or plasma into the sample window of the device 2
- 3 The sample will rehydrate and mix with the red colloidal gold conjugate, which flow into the membrane After 10- 15 minutes all the pink color from the conjugate will clear from the membrane except for test and controls lines which form. The result of the test can then be read



HBsAg

Figure-32

CRP

C-reactive protein (CRP) is a protein made by the liver. The level of CRP increases when there's inflammation in the body. A simple blood test can check your C-reactive protein level. A high-sensitivity C-reactive protein (hs-CRP) test is more sensitive than a standard C-reactive protein test.

PROCEDURE OF CRP TEST

QUALITATIVE TEST

1. Bring all reagents and serum sample to Room Temperature and mix latex reagent gently prior to use.
2. Do not dilute the controls and serum.
3. Place 1 drop of Serum, Positive control and Negative control on separate reaction circle on glass slide.
4. Then add 1 drop of CRP latex reagent to each of the circles.
5. Mix with separate mixing sticks and spread the fluid over the entire area of the cell.
6. Tilt the slide back and forth slowly for 2 minutes
7. observing preferably under artificial light.
8. Observe for visible agglutination.



Figure-33



Figure-34

MEDIA PREPARATION

HOT AIR OVEN



Figure-35

A hot air oven is used to sterilize the product in a particular period of time under specific conditions like humidity, pressure, and other environmental factors. Hot air oven controls the humidity level by removing moisture from the products and combining the airflow with heat.

Hot air oven sterilizes objects such as glassware (test tubes, flasks, and pipettes), metal instruments (blades, scissors), powders (sulfadiazine, starch, zinc oxide), materials that have

oil and glass test tubes.

The standard settings for a hot air oven are: 1.5 to 2 hours at 160 °C (320 °F) 6 to 12 minutes at 190 °C (374 °F)

The commonly-used temperatures and time that hot air ovens need to sterilize materials is 170 degrees Celsius for 30 minutes, 160 degrees Celsius for 60 minutes, and 150degrees Celsius for 150 minutes

DISADVANTAGES OF HOT AIR OVENS

In comparison to the autoclave or other moist heat sterilization methods, a hot air oven has a lower heat capacity and it's slower in killing microorganisms. It's not suitable to sterilize all equipment, like plastic wares and heat-sensitive materials.

ADVANTAGES OF HOT AIR OVENS

- It doesn't need water to sterilize.
- It can work at a higher temperature than autoclave and is faster.
- It kills the bacterial endotoxins.
- It's the only method to sterilize oils and powders.
- It's economical and safe.
- It's more fitted in the laboratory environment

Common media prepared in the microbiology lab

1. MacConkey Agar: Agar, peptone, lactose, sodium chloride, bile salt, and neutral red are among its constituents. The medium is selective. While bile salt stops the growth of many other bacteria, it does not stop the growth of Enterobacteriaceae.

Preparation: 12.88 grams of agar powder were combined with 250 ml of distilled water. After 15 minutes of autoclaving at 121C and cooling, the media was put into the plates. Each dish will hold 25 ml.

2. Chocolate agar: It is prepared by heating blood agar. It is used for culture of Meningococcal, Pneumococcus, Gonococcus and Haemophilus.

Preparation: 250 ml of distilled water was added to 7 gm of nutrient agar powder. Autoclaving was done at 121C for 15 minutes and cooled till 45C then 5% of defibrinated blood was added. Heated slowly and evenly.

3. Blood Agar: Is used most commonly. For blood agar preparation 5-10% defibrinated blood is mixed with melted agar after cooling and the media is poured into the plates. 25 ml for each plate.

4. Muller Hinton Agar: 250 ml of distilled water was added to 9.5 gm of Agar powder. Autoclaving was done at 121C for 15 minutes and cooled after cooling the media is poured into the plates. 25 ml for each plate.

5. Xylose Lysin Deoxylate Agar: 50 ml of distilled water was added into 2.834 gm of XLD agar powder. Keep in boiling water. After becoming cool pour into plates.

6. Egg yolk agar: 60 ml of distilled water and 1.68 gm of nutrient agar was added. Autoclaving was done at 121C for 15 minutes. Add 3 ml of beaten egg and pour into the plates.

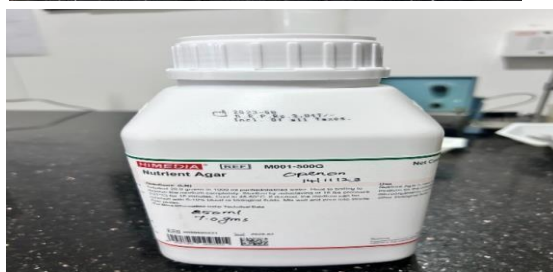
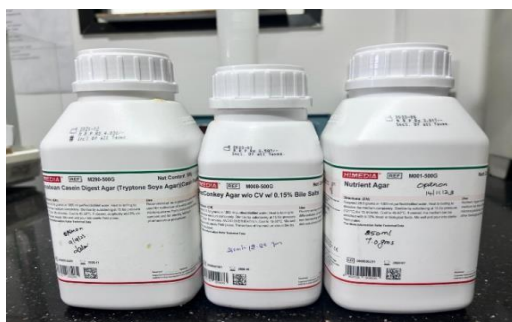


Figure-36

SHIMADZU WEIGHING BALANCE

They are also used for weighing reagents and samples, and measuring mass change and density determination in pretreatment processes before the use of various analytical instruments. For example, they are used in manufacturing departments for piece counting, etc.

Handle with Care: Always handle the balance gently to avoid shocks or impacts that could disrupt its calibration. **Safe Storage:** Store the balance in a clean, dry area with controlled temperature and humidity levels. Protect it from excessive heat, direct sunlight, and chemicals that may cause corrosion.



Figure-37

BLOOD BANK

What is blood banking?

Blood banking is process that take place in the lab to make sure that donated blood, or blood product are safe before they are used in blood transfusion and other medical procedure. Blood banking includes typing the blood for transfusion and testing for diseases

FUNCTION OF BLOOD BANKING

A blood bank collects ,separates, tests ,and stores blood until paitent need it . if you have donated blood before ,you have been part of the blood banking process . the first blood bank in the untied state was established in 1937 by Dr .Bernard Fantus at cook country hospital in Chicago

- Collection, preservation, and distribution of the blood and blood component
- Teaching, Training and research.
- Clinical and therapeutic Function like transfusion and day care service .
- Recruitment of donors and maintenance of donor's record.

BLOOD DONOR SELECTIO AND REJECTION CRITERIA

SELECTION CRITERIA:

Good health of the donor must be fully ensured .The university accepted criteria for donor selection are:

- Age between 18 -60 years

- Hemoglobin –not less than 12.5 g/ Dl
- Pulse – between 50 and 100/ minutes with no irregularities
- Blood pressure – systolic 100 -180 mm Hg and Diastolic 50-100 mm Hg
- Temperatures-normal (oral temperature not exceeding 37.50c)
- Body weight- not less than 45 kg
- Women should not be pregnant or breast feeding her child
- Women donor should not donate during menstrual cycle
- Ever had t b , bronchial asthma ,or allergic disorder, liver diseases, kidney diseases, fits and ,purple spot on skin or mucous membrane .
- Health condition- the donor should be in a healthy state mind and body

REJECTION CRITERIA:

- Affected with HIV virus or AIDS
- If the patient had undergone any open surgery
- When lady is pregnant
- Cancer patient ,kidney patient, TB Patient are not eligible
- Low hemoglobin anemic
- When tattoo
- Allergic
- High blood pressure
- Alcoholic
- Smoker
- Organ transplantation

BLOOD BAGS AND IT'S TYPES

Blood bags are used for the reliable collection ,separation ,storage and transport of blood

- **Single blood bag:**

Used for collection preservation, transfusion, of human blood



Figure-38

- **Double blood bag:**

Separate red blood cell and plasma .



Figure-39

- It includes a primary bag and satellite bag

- **Triple blood bag :**

This system separate RBC, plasma puffy coat (includes leucocytes and platelets)



**Madras Egmore
Lions Blood Bank &
Research Foundation**

EGMORE : 130, Marshall Road,
Egmore, Chennai - 600 008.
Mob : 9941917505
Tel : 28414949 / 4959 / 5959
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AMBATTUR : C-15, A.T.C. Road,
Ambattur Industrial Estate,
Chennai - 600 056. Tel : 48504959
Mob : 99419 17505
E-mail : info@lionsbloodbank.net

BLOOD DONOR CONSENT FORM

LOCATION		DATE :	
குருதி கொடைபாளர் பூர்த்தி செய்ய வேண்டியவரை TO BE FILLED BY DONOR		குருதி வங்கி ஊழியர் பூர்த்தி செய்ய வேண்டியவரை TO BE FILLED BY BLOOD BANK STAFF	
TYPE OF DONOR : VOLUNTARY REPLACEMENT தேதி / Date : பெயர் / Name : முகவரி / Address : பிள்ளைகள் முகவரி / E-mail ID : மொபைல் எண் / Mobile No. : கல்வியறிவு (அ) தொகுப்பு முகவரி / College or Company Address :		Blood Group: HB: Sign of LT : TO BE FILLED BY MEDICAL OFFICER Pulse: FIT / UNFIT BP: Reason : Temp : CVS : RS : Signature of Medical Officer	
பாலினம் / Gender : ஆண் / Male : பெண் / Female : எடை / Weight : வயது / Age : பிறந்த தேதி / Date of Birth : இரத்த குழுவும் / Blood Group : கட்சியாக இருந்த தாண்டி செய்த தேதி / Last Donation Date : எந்த இரத்த தானம் அளித்தது / Last No. of Donation : மீட்டிடு எந்தவரை யாரி நோய் ஆகிறது? / When did you had your last meal?		TYPE OF BLOOD BAG USED SINGLE DOUBLE TRIPLE QUADRUPLE Quantity : 350ml / 450ml BLOOD BAG NUMBER : SEGMENT NUMBER : BLOOD DONATION TIME : START TIME : END TIME : PHELEBOTOMIST கொடைபாளருக்கு வேண்டிய தகுதிகள் / Donor Eligibility Criteria : வயது / Age : 18 - 65 Years எடை / Weight : >45 Kgs இரும்பு சத்து / Hemoglobin : 12.5 gms% நுரத்தகுழியும் / Pulse : 60-100 / minute இரத்த அழுத்தம் / B.P. : 100 / 60 - 140/90 mm	
நிரந்தர தடை / PERMANENT DEFERRAL			
உயர் இரத்த அழுத்தம் / Uncontrolled Blood Pressure / Stroke? இரத்த நோய் / Blood Disease or Anti Arrhythmic? H/O Heart Disease or Anti Arrhythmic? எபிலிப்சி / Epilepsy or Anticonvulsants or Cytotoxic drugs? நரத்த இரத்தம் / Bleeding tendency / Enzyme Deficiencies with known history of Hemolysis? இரத்த நோய் / Blood Disease or treatment with Insulin or Hypoglycemic drugs? கீழ்க் நோய் / Chronic liver Disease or endocrine disorders / Chronic Kidney disease? நியு நோய் / Parkinson's diseases? ஸ்திரீ சிஸ்டர் நோய் / Systemic Sclerosis / Scleroderma? நரத்த உயர்நோய் / Psoriasis or treatment for the same? நரத்த மனநிலை / Psychiatric disorders / Schizophrenia?		10. சிறுநீரகம் / Kidney, Heart, Liver or Brain? H/O Major surgeries for Kidney, Heart, Liver or Brain? 11. அலர்ஜிக் / Allergic disorders or Asthmatic on steroid therapy? H/O severe allergic disorders or Asthmatic on steroid therapy? 12. நோய் / Blood Disease or treatment with Insulin or Hypoglycemic drugs? H/O Diabetes mellitus or treatment with Insulin or Hypoglycemic drugs? 13. நோய் / Blood Disease or treatment with Insulin or Hypoglycemic drugs? H/O Diabetes mellitus or treatment with Insulin or Hypoglycemic drugs? 14. நோய் / Blood Disease or treatment with Insulin or Hypoglycemic drugs? H/O Diabetes mellitus or treatment with Insulin or Hypoglycemic drugs? 15. நோய் / Blood Disease or treatment with Insulin or Hypoglycemic drugs? H/O Diabetes mellitus or treatment with Insulin or Hypoglycemic drugs? 16. நோய் / Blood Disease or treatment with Insulin or Hypoglycemic drugs? H/O Diabetes mellitus or treatment with Insulin or Hypoglycemic drugs? 17. நோய் / Blood Disease or treatment with Insulin or Hypoglycemic drugs? H/O Diabetes mellitus or treatment with Insulin or Hypoglycemic drugs? 18. நோய் / Blood Disease or treatment with Insulin or Hypoglycemic drugs? H/O Diabetes mellitus or treatment with Insulin or Hypoglycemic drugs?	

Figure-40

BLOOD DONATION (PROCEDURE)

THE BLOOD DONATION PROCESS

The blood donation process from the time you arrive until the time you leave take about an hour . the donation itself is only about 8 – 10 minutes on averag

REGISTRATION

- We will sign in and go over basic eligibility
- You will be ask to show ID such as your driver license
- Well ask you for your complete address

HEALTH HISTORY

- You will answer a few question about health history and place you have traveled , during a private and confidential interview
- We will check your temperature ,pulse, blood pressure, and hemoglobin

YOUR DONATION

- If you are donating whole blood , well cleanse an area on your arm and insert a brand new sterile needle for the blood draw .this feel like a quick pinch and is over in second
- Other type of donation such as platetes are made using an aphersris machine which will be connected to both arms
- A whole blood donation takes 8 -10 mintues , during which you will be seated comfortably or lying down
- When approximately a pint of whole blood has been collected , the donation is completed and a staff person will place a bandage on your arm

BLOOD DONOR CONSELLING



Figure-41

Their duties include listening to patient , developing treatment plans, and creating coaching strategies.

- Motivate the donor at high risk to test for HIV
- Help the donor to take the right decision
- Create awareness among the donors on HIV AIDS and TTIs
- Encourage voluntary blood donor to donate regularly

BLOOD GROUPING

PRINCIPLE :

Testing with both Anti – A and Anti –B is necessary to determine if red blood cells possess or lack A and / or B blood group antigens. Absence of agglutination is a negative test result, which indicates the corresponding antigen is not demonstrable. Agglutination of red blood cells with a given reagent is a positive test result, which indicates the presence of the corresponding antigen on the red blood cells.

The test to determine your blood group is called ABO typing. Your blood sample is mixed with antibodies against type A and B blood. Then the sample is checked to see whether or not the blood cells stick together, it means the blood reacted with one of the antibodies.

ABO blood grouping is based on the principle of an agglutination reaction. It is the popular method for blood group identification to determine the presence and absence of cellular antigens and their relative antibodies in the blood.

PROCEDURE:

- First mix the patients blood with three different reagents including either of the three different antibodies. A , B or R h antibodies.
- Look for agglutination, then you take a look at what has happened,.
- Figure out the ABO blood group
- Figure out the R h blood group
- Figure out blood type

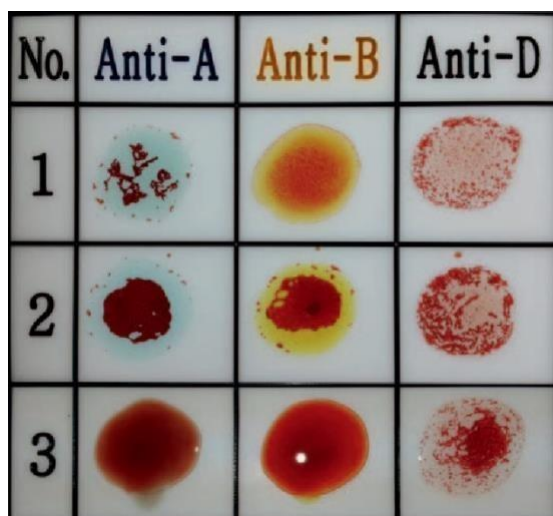


Figure-42

HIV:

An antigen and antibody test performed by a lab on blood from a vein can usually detect HIV 18 to 45 days after exposure. There is also a rapid antigen and antibody test available test is done with a finger stick. Antigen and antibody test means you are protected against the hepatitis B virus.

Blood test can be detect signs of the hepatitis B virus in your body and tell you provider whether its acute Or chronic. A simple blood test can also determine. If you are immune to the condition. Liver ultrasound. A special ultrasound called transient elastography can show the amount of liver damage.



Figure-43

HCV:

A blood test called an HCV antibody test, is used to find out if someone has ever been infected with the hepatitis C virus. The HCV antibody test, sometimes called the anti-HCV test, looks for antibodies to the hepatitis C virus in blood.

HPD:

Histrionic personalised disorder (HPD) Test is designed to see if you might have the symptoms of histrionic personality disorder. About 3% of adult will have histrionic personality disorder in their lifetime.

VDRL:

Screening test for syphilis . it measures substances (protein) called antibody , which your body may produces if you come in contsct with the bacteria that cause syphills.

MALARIA:

The DiaMED ELISA malaria antibody test is based on blinding of anti-plasmodium antibodies present in a serum sample to antigens immobilized on 96 well plates. The antigens are a mixture of a total extract of cultured plasmodium falciparum and

recombinant plasmodium vivax .

COMPONENT SEPARATION

BLOOD COMPONENT:

- Whole blood
- Platelets
- Plasma
- Cryoprecipitate
- Packed red blood cell

PACKED RED BLOOD CELL:

Packed red blood cell from a donation of 450 ml of whole blood are obtained after centrifugation and plasma removal.



Figure-44

FRESH FROZEN PLASMA:

Fresh frozen plasma obtained after centrifugation of whole blood and redcell removal or through direct separation

The plasma must be frozen within 8 hours after collecting in order to preserve coagulation factors and other plasma protein

Because plasma can be stored for a long time plasma is kept in until the donor comes back for a new donation so that he can be tested again for the infection diseases marker.



Figure-45

PLATELETS:

Platelets are mainly obtained through thrombapheresis .platelets product formerly obtained from a mix of more than 10 buffy coat can now be obtained from a single thromobapheresis of about 40 minutes

STORAGE OF BLOOD COMPONENT:

- Packed red blood cells: 2-6 degree celsius up to 42 days



Figure-46

- Fresh frozen plasma :30 degree celsius for up to 2 years



Figure-47

- Platelets: 20 -24 degree celsius for 5 days, under constant mixing of the bags
platelets aggregation occurs in the cold and in absence of antigen

BLOODISSUSE

BLOOD GROUPING:

There are 4 main groups – A,B, AB, and O . Your blood group is determined by the genes you inherits from the parents



Figure-48

CROSS MATCHING:

Cross matching is performed prior to administration of blood or blood products e.g packed red blood cell . the purpose of the cross match is to detect the presence of the antibodies in

the recipient against the red blood cell of donor . these antibodies attach to the red blood cell of the donor after transfusion

CROSS MATCHING

PRINCIPLE:

The cross-match test is used to detect the presence of blood group antibodies in a recipient's serum/plasma to antigen on donor red blood cells. In this test, the donor red blood cells in a hypotonic buffered saline solution are combined with patient serum/plasma to allow antigen/antibody interaction in their upper chamber of the micro tube. This results in promoting antibody uptake. The detection of this anti body occurs uptake. the detection of this antibody occurs when the sensitized red blood cells react with the Anti-I g G gel in the micro tube during centrifugation.

PROCEDURE:

- Prepare donor and recipient blood sample for major cross match; donor red blood cells and recipient serum or plasma
- For minor cross match; Recipient red cells and donor 's serum or plasm
- Prepare 3 – 5% cell suspensions of red cells.
- Major Cross match: Label a test tube. Add two drops of the patient serum and one drop of the appropriate donor cell suspension.
- Minor Cross match; Label a test tube. Add two drops of the appropriate do nor serum and one drop of the patient cell suspension.
- Mix the Tube and incubate at 37 C for about 45 minutes. Add two drops of AHG (Antihuman globulin) and mix well.
- Centrifuge for 1 minute at 1500 rpm

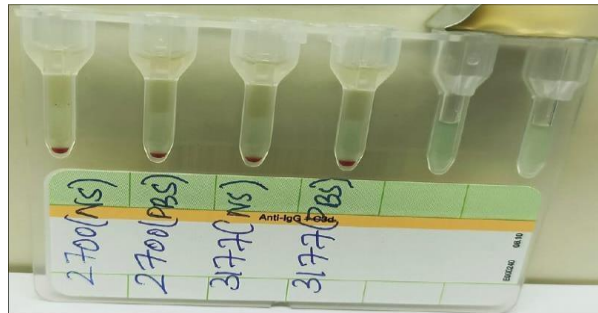


Figure-49

INTERPRETATION AND RESULT

Compatible donor and recipient blood should show no agglutination in both major and minor cross match. Blood which shows incompatibility in major cross should never be transfused, because the large plasma volume of the recipient blood containing antibodies can destroy the donor's red cells easily. The minor incompatibility is less important because the donor's serum which contains the antibodies is diluted in the recipient's own plasma, making the antibodies very dilute and ineffective.

BLOOD BANK RECORD

B

- Systematic procedure by which the records of an organization are created and captured , maintained and disposed off.

L

- Records involve every aspect of blood banking i.e donor recruitment
- donor selection , donor recall , blood collection, blood component , screening of blood for.

TYPES OF RECORD:

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

TEACHNICIAN RECORD:

- Attendance
- Contact no
- Address
- In time and out time
- Personal information
- Name
- DOB
- Age

DONOR RECORD:

- Donor details
- Name
- M/ F
- Age

- Weight/ height
- Blood grouping
- Blood donation date (volume)
- Use
- Donor identification

RECIPIENT RECORD:

- Name
- M/F
- Age
- In patient or out patient
- Recipient date
- Whole blood ,RBC ,Plasma, Platelets

PURPOSE OF RECORD:

- To create statistic
- To retain
- To maintain panel donor
- To recognize and to give award
- To help during emergency

CONCLUSION

Blood transfusion or its product is an invaluable therapeutic should be with good reason because of its potential hazards .

Blood loss during a surgical procedure should be minimized.

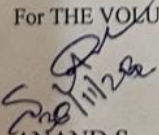
- RBC booster should be give pre and postperatively to patients.
- This report the blood bank management system related issues
- Problem to calculate amount of blood in stock.

In future we must overcome this drawback by using modern technologie

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VHS- CERTIFICATE

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Mobile : 98847 30000 Rajiv Gandhi Salai, TTTI Post, (Near Madhya Kailash) Taramani, Chennai - 600 113.		
Dr. H. Yuvraj Gupta Director & COO		Prof. S. Suresh Hon. Sec. & CEO
VHS/HR/INTERNS/2023		30.11.2023
<u>TO WHOMSOEVER IT MAY CONCERN</u>		
This is to certify that Mr.VIGNESH.T (Reg.No.41737022), B.Sc (MLT) student of Sathyabama Institute of Science and Technology had done his internship in the Department of Laboratory for the period from 01.11.2023 to 30.11.2023 at our Institution. We wish him all the best for his future endeavors.		
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BLOOD BANKING - CERTIFICATE

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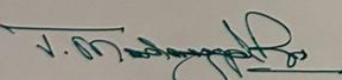
Date: 12th Dec 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Mr. Vignesh. T, BSc in MLT, 2nd year of Sathyabama Institute of Science and Technology, Chennai - 119, undergone Internship training in Madras Egmore Lions Blood Bank & Research Foundation(Ambattur Unit), Chennai - 58. 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 his 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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35CONCLUSION

With the theoretical inclination of our syllabus it becomes very essential to take the utmost advantage of any opportunity of gaining practical experience that comes along. The building blocks of this Major Project “BLOOD BANK Management System” was one of these opportunities. It gave us the requisite practical knowledge to supplement the already taught theoretical concepts thus making us more competent as a computer engineer. The project from a personal point of view also helped us in understanding the following aspects of project development:

- ✓ The planning that goes into implementing a project.
- ✓ The importance of proper planning and an organized methodology
- ✓ The key element of team spirit and co-ordination in a successful project.

The project also provided us the opportunity of interacting with our teachers and to gain from their best experience

