

INTERNSHIP REPORT

Submitted to

SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY

In partial Fulfilment for the Award of The Degree Of

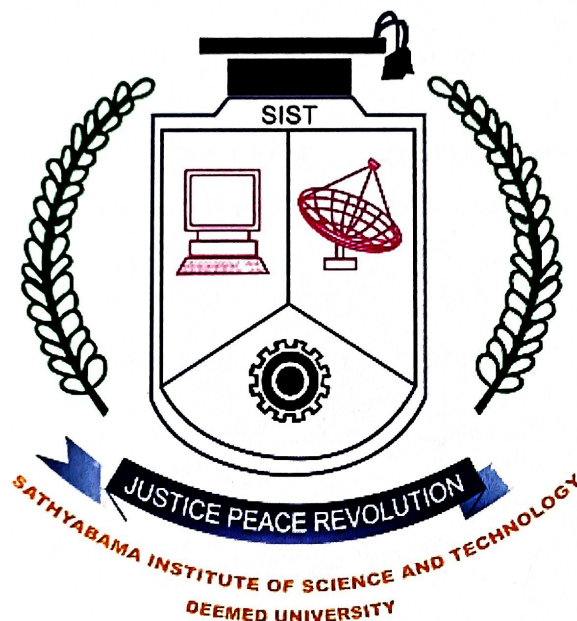
BACHELOR OF SCIENCE

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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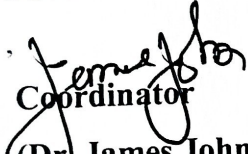
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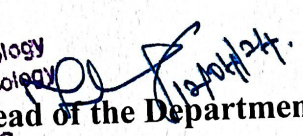
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BONAFIDE CERTIFICATE

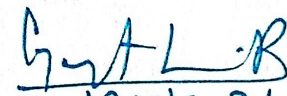
This is to certify that this internship report is the Bonafide work of BERUTHOSE BANU.S who have done the internship work as a team and carried out the training program at "CHENGALPATTU MEDICAL COLLEGE – CHENGALPATTU DISTRICT" and "EGMORE LIONS BLOOD BANK AND RESEARCH FOUNDATION- EGMORE" under our supervision from August 2023 to April 2024.

Submitted for Viva voce examination held on 12th April 2024


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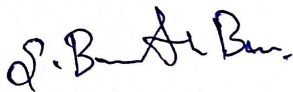

12/APR/2024
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DECLARATION

I, Ms. BERUTHOSE BANU (41737003), hereby declare that the internship trainings done by me at “CHENGALPATTU MEDICAL COLLEGE – CHENGALPATTU DISTRICT” under the guidance of Dr. JAMES JOHN Assistant professor and “EGMORE LIONS BLOOD BANK AND RESEARCH FOUNDATION- EGMORE under the guidance of Ms. D. JASMINE PRIYA 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: 12.04.2024

Place: CHENNAI


(Ms. BERUTHOSE BANU.S)

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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.

I 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 for the completion of the project.

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I am worked in the CHENGALPATTU MEDICAL COLLEGE – CHENGALPATTU DISTRICT, Histopathology laboratory during my internship training period on 01st November 2023 to 15th November 2023 from 10am to 4pm.

HISTOPATHOLOGY

In histopathology laboratory, I learned about techniques and procedures of tissue examination for diagnose the diseases from the biopsy of the patients

SPECIMEN ACCESSIONING

Tissue specimen received in the laboratory have a request form that lists the patient information, history, description of the site of origin. The specimen is accessioned by giving them a number that will identify each specimen of each patient

Specimen container must be labeled with the correct information of the patient as follows:

- ✓ Full patients name.
- ✓ Medical record number.
- ✓ Age and sex of the patient.
- ✓ Type of specimen (Anatomic site).
- ✓ Date and time of collection.

SPECIAL SAFETY PRECAUTIONS

- All surgical specimens are considered highly infectious.
- Small specimens must be sealed in a biohazard labeled bags.
- Large specimens must be covered tightly to ensure no leak.
- All precautions must be considered to avoid inhaling fixative.
- Requisition form should be clean of blood and fixative at all times.

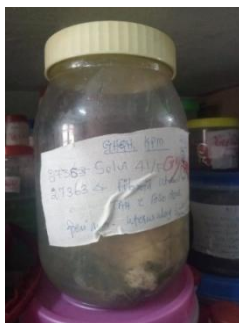


Figure- 1

GROSS EXAMINATION:

Tissues removed from the body for diagnosis arrive in the Pathology Department and are examined by a pathologist, pathology assistant, or pathology resident. Gross examination consists of describing the specimen and placing all or parts of it into a small plastic cassette which holds the tissue while it is being processed to a paraffin block. Initially, the cassettes are placed into a fixative.

When a malignancy is suspected, then the specimen is often covered with ink in order to mark the margins of the specimen. Different colored inks can be used to identify different areas if needed. When sections are made and processed, the ink will mark the actual margin on the slide.

Principles of macroscopic assessment or gross examination of a specimen or lesion:

- Location of the lesion
- Size, weight, length
- Shape and architecture
- Color and consistency

Grossing of Specimen

- Cutting up specimens is known as grossing
- Sectioning the tissue to be processed for diagnosis
- Cut the organ at interval of 1 cm thickness
- Histopathological sections-5-6mm
- Put in metal cassettes/capsules and then in fixative
- Small specimen can be wrapped in tissue paper and then in cassette



Figure-2



Figure-3

TISSUE FIXATION

It is a process by which the cells or tissues are fixed in chemical and partly physical state so that they can withstand subsequent treatment with various reagents, with minimal distortion of morphology and no decomposition.

- ❖ 10% buffered formalin is the commonest fixative.
- ❖ Tissues may be kept in 10% buffered formalin for long duration.
- ❖ Volume of the fixative should be at least ten times of the volume of the specimen. The specimen should be completely submerged.
- ❖ Special fixatives are used for preserving particular tissues.
- ❖ Formalin vapors cause throat/ eye irritation hence mask/ eye glasses and gloves should be used.
- ❖ Tissues should be well fixed before dehydration.
- ❖ Penetration of fixatives takes some time. It is necessary that the bigger specimen should be given cuts so that the central part does not remain unfixed.
- ❖ Mercury pigment must be removed with Lugol's iodine.
- ❖ Biopsies cannot be kept for more than 24 hours in bouin's fluid without changing the alcohol.

PRINCIPLE OF FIXATION:

Fixation results in denaturation and coagulation of protein in the tissues. The fixatives have a property of forming cross links between proteins, thereby forming a gel, keeping everything in their in vivo relation to each other.

Most Commonly used Fixatives in the Laboratory are

- ❖ 10% Formalin
- ❖ 10% Buffered Formalin
- ❖ Bouin's solution
- ❖ Alcoholic formaldehyde
- ❖ Carnoy's fixatives
- ❖ Zenker's fluid



Figure-4

TISSUE PROCESSING

Embed the tissue in the solid medium firm enough to support the tissue and give it sufficient rigidity to enable thin sections to be cut and yet soft enough not to damage the knife or tissue. We used automated tissue processor to process the tissue in the histopathology laboratory.

STAGES OF TISSUE PROCESSING

- ✓ DEHYDRATION
 - Water is completely removed from the fixed tissue
- ✓ CLEARING
 - Aiming to remove alcohol and other dehydrants from tissues
- ✓ IMPREGNATION
 - The tissue is transferred from clearing agent to molten paraffin wax.

AUTOMATIC TISSUE PROCESSOR

- 12 chambered automated devices
- 10 stations are steel/glass jars and two are thermostatically controlled wax bath
- For fixation in formalin: 1 jar.
- For dehydration in ascending grades of alcohol: 6 jars, one each of 70%, 80%, 90% and 3 for 100%
- For clearing in xylene: 3 jars.
- For impregnation in molten paraffin wax 2 wax baths
- Tissues move automatically from one jar to next after scheduled time, usually 1.5 hours in each jar

STEP	SOLUTIONS	PERIOD
1.	80% Alcohol	2 hour
2.	90%Alcohol	1 hour
3.	95%Alcohol	1 hour
4.	100% Alcohol	1 hour
5.	100% Alcohol	1 hour
6.	100% Alcohol	1 hour
7.	Xylene	1 hour
8.	Xylene	2 hour
9.	Paraffin	2 hour
10	Paraffin	2 hour
11	Paraffin	2 hour



Figure-5

TISSUE EMBEDDING

- Embedding is the process in which the tissues or the specimens are enclosed in a mass of the embedding medium using mold.
- Since the tissue blocks are very thin in thickness, they need a supporting medium in which the tissue blocks are embedded.

- This supporting medium is called embedding medium.

The Choice of Embedding medium depends upon

- Type of Microscope
- Type of Microtome
- Type of Tissue

TYPES OF EMBEDDING MEDIUMS/ AGENTS

- | | |
|-----------------|-------------|
| 1. Paraffin wax | 4. Agar |
| 2. Celloidin | 5. Gelatin |
| 3. Resin | 6. Carbowax |

PARAFFIN WAX

- ✓ Paraffin wax with higher melting point (56- 62°C) is used for embedding.
- ✓ The molten wax is filtered inside the oven through a coarse filter paper into another container.
- ✓ This will protect the knife edge

Thermo Fisher Histostar Tissue Embedding Station

We embed processed tissue samples using the Histostar Tissue Embedding System. The processed tissue is orientated within a metal mould which is then filled with molten paraffin wax. A labelled cassette is then placed on top and also filled with wax. The mould is then transferred to a cold plate to set before it can be removed to expose the final paraffin embedded tissue block.



Figure-6

TISSUE SECTIONING

- ❖ Cut biological specimens into very thin sections for microscopic
- ❖ Trim the block with a knife until 1 to 3mm of paraffin remains all side of the tissue.
- ❖ Fix the block in the block holder of the microtome. Insert tightly a knife in the knife holder with proper position.

- ❖ Cut sufficient sections.
- ❖ We section tissue blocks using a Leica RM2235 rotary microtome.

PROCEDURE

- Bevel of the knife face is parallel to the cutting motion
- Section thickness 10-15 microns
- Operate until complete sections are cut
- Reset section thickness to 4-5 microns
- Ice can be applied to the surface of block wiped -> cut
- Right hand operates the microtome
- Left hand holds sections away from the knife
- Gentle breathing on the block removes creases

MICROTOMES

- ❖ Mechanical device designed for accurate cutting of thin, uniform tissue sections for microscopic examination

Tissue floatation bath

It is thermostatically controlled water bath with the inside-colored black. It is maintained at a temperature maintained 5–6-degree paraffin wax.



Figure-7

SLIDE STAINING

Staining is widely used in histopathology and diagnosis, as it allows for the identification of abnormalities in cell count and structure under the microscope.

HAEMATOXYLIN AND EOSIN (H&E) STAIN

Hematoxylin and Eosin (H&E) staining is the most widely used staining technique in histopathology

PROCEDURE

- ❖ Deparaffinize and rehydrate slides to distilled water
- ❖ Stain in Mayers Hematoxylin for 1 minute
- ❖ Wash with 4-5 changes of Tap water or until blue stops coming off slides
- ❖ Blue nuclei in 1X PBS for 1 minute
- ❖ Wash with 3 changes of distilled water
- ❖ Counterstain in Alcoholic-Eosin for 1 minute (DO NOT RINSE)
- ❖ Dehydrate through 3 changes of 95% EtOH and 2 changes of 100% EtOH 1 minute each
- ❖ Clear in 3 changes of Xylene 1 minute each change
- ❖ Mount and coverslip

PREPARATION OF HEMATOXLIN

Reagents for Hematoxylin solution:

1. Weigh hematoxylin 4 G for 900 mL solution.
2. Weigh Mercuric oxide 2 G for 900 mL solution.
3. Weigh potash alum 100 G for 900 mL solution.
4. Measure 60 mL ethanol.
5. Distal water 800 mL.



Figure - 8

I am worked in the CHENGALPATTU MEDICAL COLLEGE – CHENGALPATTU DISTRICT, Microbiology laboratory during my internship training period on 15st November 2023 to 30th November 2023 from 10am to 4pm.

MICROBIOLOGY

In Microbiology laboratory, I learned about types and preparation of media and culture and some serological procedures for certain tests

CULTURE MEDIA

TYPES OF CULTURE MEDIA

Based on their consistency

- a) Solid medium- Nutrient agar, Blood agar
- b) Liquid medium- Nutrient Broth
- c) Semi solid medium-Motility Medium

Based on the constituents/ ingredients

- a) Simple medium- Nutrient agar
- b) Complex medium-Media other than basal media
- c) Synthetic or defined medium- Peptone water
- d) Special medium-
 - Enriched media- Blood agar, Chocolate agar
 - Enrichment media-Alkaline Peptone Water
 - Selective media-Mac Conkey's medium
 - Indicator media
 - Differential media-Mac Conkey's medium
 - Sugar media- Starch, glucose
 - Transport media- Stuart's medium
 - Media for biochemical reactions

Nutrient Agar

- Contain 2% agar added to Nutrient broth commonly used
- Concentration can be increased to 6% to prevent swarming
- Used for maintaining stock cultures
- Sub-cultures
- Demonstration of pigment production

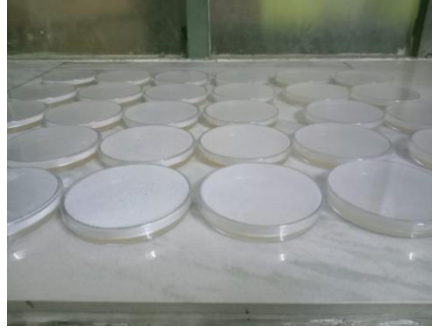


Figure - 9

MacConkey's (MAC)

- MacConkey media is both selective & differential.
- Selective because it only grows Gram-negative bacteria. Inhibits the growth of Gram-positive bacteria.
- Differential because neutral red (pH-sensitive dye) and lactose (type of sugar) have been added to media



Figure -10

Mannitol Salt (MSA)

- Mannitol Salt media is both selective & differential.
- Selective because it has a high NaCl (7.5%) concentration, and few types of bacteria can grow on this hypertonic medium
- Differential because this medium contains a pH-sensitive dye to identify organisms that ferment mannitol.



Figure-11

PREPARATION OF MEDIA

Preparation of Nutrient Agar

- Suspend 28 g of nutrient agar powder in 1 liter of distilled water.
- Heat this mixture while stirring to fully dissolve all components.
- Autoclave the dissolved mixture at 121 degrees Celsius for 15 minutes.
- Once the nutrient agar has been autoclaved, allow it to cool but not solidify.
- Pour nutrient agar into each plate and leave plates on the sterile surface until the agar has solidified.
- Replace the lid of each Petri dish and store the plates in a refrigerator.

Preparation of MacConkey Agar

- Suspend 49.53 grams of dehydrated medium in 1000 ml purified/distilled water.
- 2. Heat to boiling to dissolve the medium completely.
- 3. Sterilize by autoclaving at 15 lbs pressure (121°C) for 15 minutes.
- 4. Cool to 45-50°C.
- Mix well before pouring into sterile Petri plates

Preparation of MSA agar

- Suspend 111 grams of Mannitol Salt Agar in 1000 ml of distilled water.
- Boil to dissolve the medium completely.
- Sterilize by autoclaving at 15 lbs. pressure (121°C) for 15 minutes.
- If desired, sterile Egg Yolk Emulsion (E7899) can be added to a final concentration of 5% v/v after autoclaving.
- Pour cooled Mannitol Salt Agar into sterile petri dishes and allow to cool to room temperature.

AUTOCLAVE

DEFINITION:

An autoclave is a machine that provides a physical method of sterilization by killing bacteria, viruses, and even spores present in the material put inside of the vessel using steam under pressure. Autoclave sterilizes the materials by heating them up to a particular temperature for a specific period of time. The autoclave is also called a steam sterilizer that is commonly used in healthcare facilities and industries for various purposes. The autoclave is considered a more effective method of sterilization as it is based on moist heat sterilization.

WORKING

PRINCIPLE

The autoclave works on the principle of moist heat sterilization where steam under pressure is used to sterilize the material present inside the chamber. The high pressure increases the boiling point of water and thus helps achieve a higher temperature required for sterilization. In an autoclave, pressure is used to produce high temperature steam to achieve sterilization. The temperature of saturated steam at atmospheric pressure is approximately 100 °C. When water is boiled at an increasing pressure the temperature at which it boils and of the steam it forms, rises, i.e. temperature increases with pressure. At a pressure of 1.1 bar (15 lb/in², or 15 psi), the temperature of the saturated steam rises to 121 °C. Autoclaving at 121 °C for 15-20 minutes is required for sterilization. Both the temperature and holding time must be correct.



Figure-12

CULTURE METHODS

Culture methods include:

- Streak culture
- Lawn culture
- Stroke culture
- Stab culture
- Pour plate method
- Liquid culture
- Anaerobic culture methods

STREAK CULTURE

- Used for the isolation of bacteria in pure culture from clinical specimens.
- Platinum wire or Nichrome wire is used.
- One loopful of the specimen is transferred onto the surface of a well dried plate.
- Spread over a small area at the periphery.

- The inoculum is then distributed thinly over the plate by streaking it with a loop in a series of parallel lines in different segments of the plate.
- On incubation, separated colonies are obtained over the last series of streaks.



Figure-13

LAWN CULTURE

Provides a uniform surface growth of the bacterium.

- ✓ For bacteriophage typing.
- ✓ Antibiotic sensitivity testing.
- ✓ In the preparation of bacterial antigens and vaccines.

Lawn cultures are prepared by flooding the surface of the plate with a liquid suspension of the bacterium.



Figure -14

STROKE CULTURE

- Stroke culture is made in tubes containing agar slope / slant.
- Uses

Provide a pure growth of bacterium for slide agglutination and other diagnostic tests.



Figure-15

LIQUID CULTURES

Liquid cultures are inoculated by touching with a charged loop or by adding the inoculum with pipettes or syringes.

- Uses
 - Blood culture
 - Sterility tests
 - Continuous culture methods



Figure-16

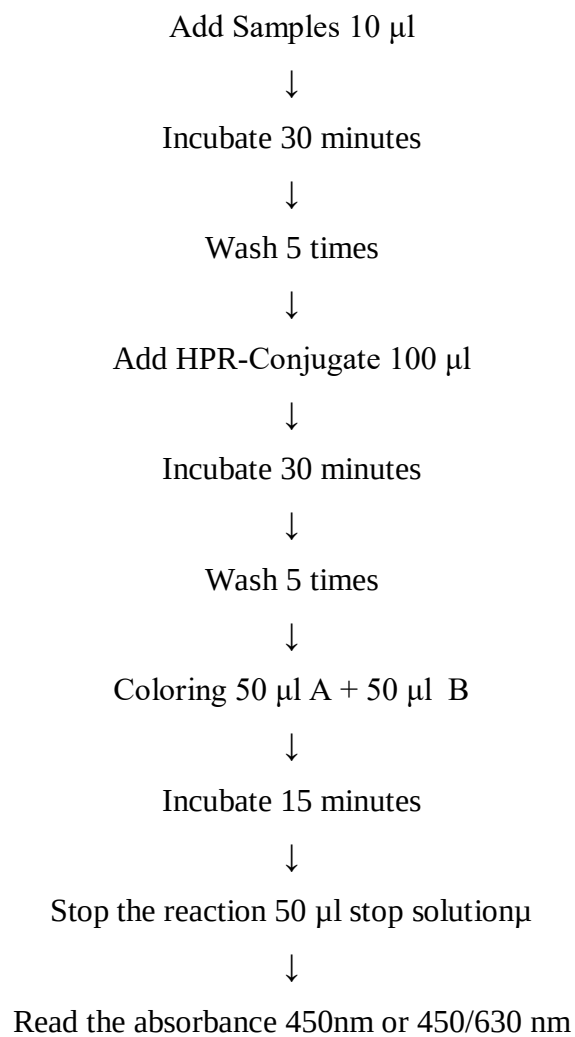
SEROLOGY

HCV PROCEDURE

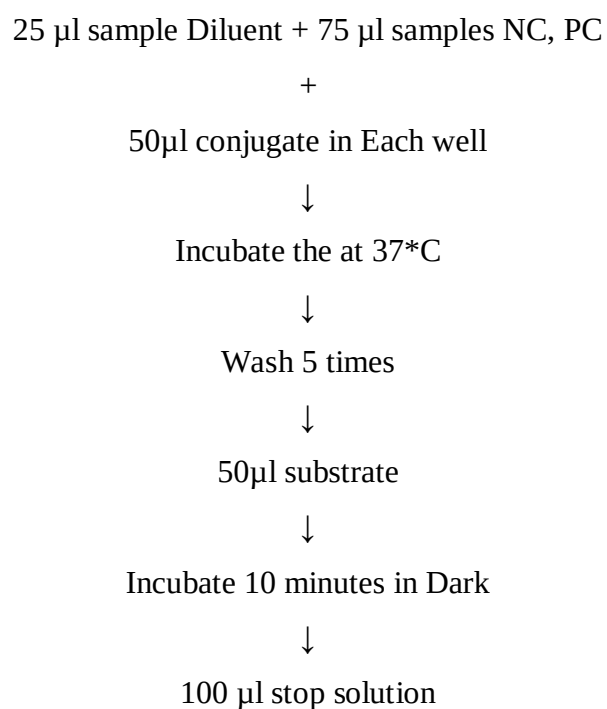
The HCV Ab test is used for initial screening for hepatitis C. The test is performed by enzyme immunoassays (EIAs), which detect the presence of hepatitis C antibodies in serum. The result of the test is reported as positive or negative.

Add Specimen Diluent 100 μ l





HBsAG PROCEDURE



↓
Read

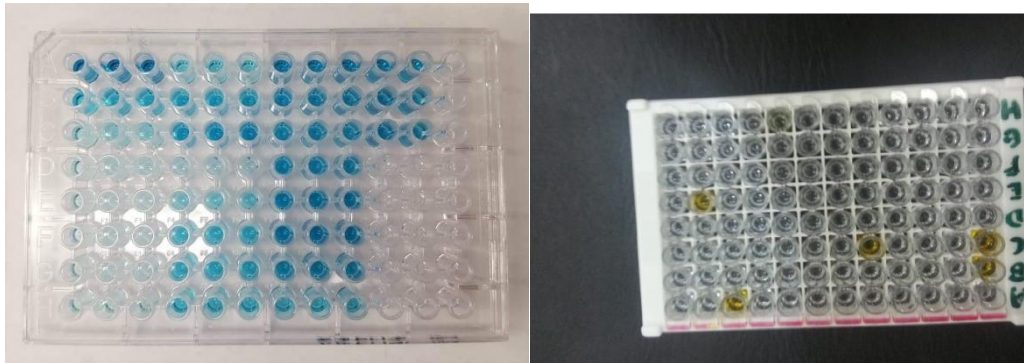


Figure-17

ELISA READER

There I used ELISA reader and washer to wash the wells and read the results READ WELL TOUCH is a Stand-Alone Micro Plate ELISA Reader which provides sensitive and accurate analysis of ELISA assays, our micro plate reader provides cost effective data collection. This reader has a wide range of applications like Life Sciences, Laboratories, Blood Banks, Food Testing, Fisheries and Veterinary sciences. Being an Open system, this reader can be programmed to run all of ELISA tests.



Figure-18



Figure -19

WIDAL TEST PROCEDURE

- Bring all reagents to room temperature and mix well.
- Add 1 drop of test sample (25ul) into each reaction circle labeled as O, H, AH, BH according to given antigen solution.
- Add 1 drop of positive control (25ul) into the circle marked as PC and 1 drop of negative control (25ul) into the reaction circle marked as NC.

- Add antigen solutions of Salmonella typhi 'O', Salmonella typhi 'H', Salmonella Para typhi 'AH' and Salmonella Para typhi 'BH' to circles labeled as O, H, AH, BH respectively in which test samples has been added.
- Mix it thoroughly with the aid of applicator stick and rotate the slide gently.
- Observe for agglutination.



Figure -20

CRP TEST PROCEDURE

- Take all reagents and serum samples to room temperature before the test starts and mix latex reagent gently before use. Do not dilute the controls and serum.
- Place one drop of serum, positive control, and negative control on a separate glass slide using a (disposable pipette) dropper.
- Add one drop of CRP latex reagent to the drop of test specimen (serum) on each slide.
- Using the mixing stick mix the serum and CRP latex reagent uniformly over the entire circle. Immediately start a stopwatch, and rock the slide gently back and forth for 2 minutes.
- Observe the clump (agglutination) macroscopically.



Figure- 21

BLOOD BANK

I am worked in the EGMORE LIONS BLOOD BANK AND RESEARCH FOUNDATION-EGMORE during my internship training period on 21st November 2022 to 26thNovember 2022 from 10am to 4pm.

INTRODUCTION

Blood banking is the process that takes place in the lab to make sure that donated blood, or blood products, are safe before they are used in blood transfusions and other medical procedures. Blood banking includes typing the blood for transfusion and testing for infectious diseases.

FACTS ABOUT BLOOD BANK

- About 36,000 units of blood are needed every day.
- The number of blood units donated is about 13.6 million a year.
- About 6.8 million volunteers are blood donors each year.
- Annually, more than 21 million blood components are transfused.

STRUCTURE OF BLOOD BANK

- ❖ Reception Room
- ❖ Donation Room
- ❖ Donor Rest/ Refreshment Room
- ❖ Screening Unit
- ❖ The Laboratory
- ❖ Preservation and Storage
- ❖ Blood Bank Records

What tests are done in blood banking?

- Typing: ABO group (blood type)
- Rh typing (positive or negative antigen)
- Screening for any unexpected red blood cell antibodies that may cause problems in the recipient
- Screening for current or past infections, including:
- Hepatitis viruses B and C
- Human immunodeficiency virus (HIV)
- Human T-lymphotropic viruses (HTLV) I and I

BLOOD COLLECTION

The process for collecting blood from donors is similar to that used for blood sampling; however, a few additional measures are required for collection of donated blood. These measures are primarily to ensure patient safety, but also to minimize exogenous contamination of a donated blood unit or its derived components, particularly contamination from the skin flora of the donor's arm.

PROCEDURE OF BLOOD COLLECTION

Step1. Identify donor and label blood collection bag and test tubes

Ensure that:

- the blood collection bag is of the correct type
- the labels on the blood collection bag and all its satellite bags, sample tubes and donor records have the correct patient name and number;

Step 2. Select the vein

- Select a large, firm vein, preferably in the antecubital fossa, from an area free from skin lesions or scars

Step 3. Disinfect the skin

- If the site selected for venipuncture is visibly dirty, wash the area with soap and water, and then wipe it dry with single-use towels.

Step 4. Perform the venipuncture

- In general, use a 16-gauge needle, which is usually attached to the blood collection bag. Use of a retractable needle or safety needle with a needle cover is preferred if available.

Step 5. Monitor the donor and the donated unit

- About every 30 seconds during the donation, mix the collected blood gently with the anticoagulant, either manually or by continuous mechanical mixing.

Step 6. Remove the needle and collect samples

- Cut off the needle using a sterile pair of scissors.
- Collect blood samples for laboratory testing.



Figure - 22

BLOOD TYPING

BLOOD GROUPING PRINCIPLE

The ABO and Rh blood grouping system is based on agglutination reaction. When red blood cells carrying one or both the antigens are exposed to the corresponding antibodies, they interact with each other to form visible agglutination or clumping. The ABO blood group antigens are O-linked glycoproteins in which the terminal sugar residues exposed at the cell surface of the red blood cells determine whether the antigen is A or B.

How the Test is Performed

- ❖ A blood sample is needed. 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. If blood cells stick together, it means the blood reacted with one of the antibodies.
- ❖ The second step is called back typing. The liquid part of your blood without cells (serum) is mixed with blood that is known to be type A and type B.
- ❖ People with type A blood have anti-B antibodies. People with type B blood have anti-A antibodies. Type O blood contains both types of antibodies.
- ❖ The 2 steps above can accurately determine your blood type.
- ❖ Rh typing uses a method similar to ABO typing. When blood typing is done to see if you have Rh factor on the surface of your red blood cells, the results will be one of these:
 - Rh+ (positive), if you have this cell surface protein
 - Rh- (negative), if you do not have this cell surface protein

OBSERVATION

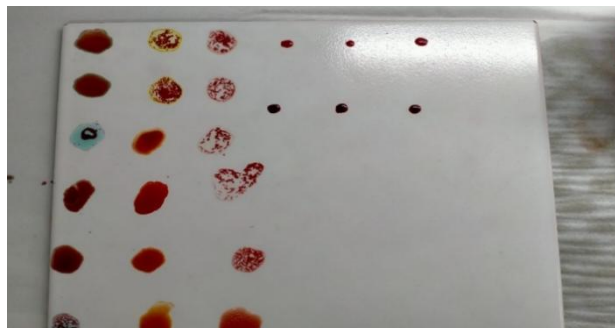


Figure -23

CROSS MATCHING

- Also known as compatibility testing.
- Cross matching is the most important test before a blood transfusion is given.

- The primary purpose of cross matching is to detect ABO incompatibilities between donor and recipient.
- This is carried out to prevent transfusion reactions by detecting Abs in recipient's serum.

FUNCTIONS OF CROSS MATCHING

Two main functions of cross matching test:

- 1) It is a confirm ABO compatibility between donor and recipient.
- 2) It may detect presence of irregular Ab in patient's serum that will react with donor RBCs.

PROCEDURE:

- ❖ Compatibility at Room Temperature -37°C
- ❖ Take 1 drop of recipient's serum/plasma in a small test tube.
- ❖ Add 5% saline suspension of donor's RBC
- ❖ Mix the two.
- ❖ Incubate at room temp.
- ❖ Centrifuge.
- ❖ Check for agglutination or hemolysis.

RESULT:

- ✓ Agglutination or hemolysis absent-match
- ✓ Agglutination or hemolysis present-mismatch

OBSERVATION

In hemolysis absent in this rapid card so the results are matching. we should give the donor's blood to the recipient

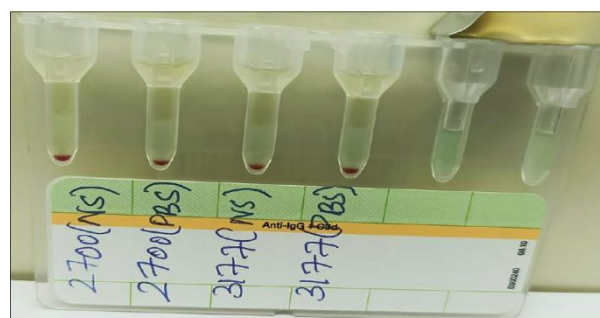


Figure-24

COMPONENTS SEPARATION

BLOOD COMPONENT

- Packed red blood cells
- Fresh frozen plasma
- Platelets
- Cryoprecipitate

Blood Separation Techniques

Plasma Separation from Blood Centrifugation

The separation of plasma from blood usually occurs through centrifugation. The physical force from continuous revolutions pushes the denser, heavier particles to the outer edges of the sample resulting in three layers of different densities: RBCs, a mixture of WBCs and platelets, and plasma.

RBC Separation from Whole Blood Sample

RBCs can be separated or isolated from whole blood in a variety of ways, but some are more efficient than others. While it might take extra money and time to preserve the extracted RBCs, certain methods (such as RBC depletion) simply remove the contaminants without damaging the surrounding blood cells.

Platelets Isolation from Whole Blood

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

Purpose of Blood Separation

Each blood cell type has its own unique purpose and function. Separating the various blood components allows scientists to analyze specific cell types. Some blood components can be used to detect diseases, while others can provide a more comprehensive understanding of the human immune response. Blood separation allows researchers to study **only the target cell population** without any interference from other cell types.



Figure-25

SCREENING OF DONOR 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 and Diastolic 50 - 100 mm Hg
- ❖ Temperature - Normal (oral temperature not exceeding 37.50C
- ❖ Women should not be pregnant or breast feeding her child
- ❖ Women donor should not donate during her menstrual cycles

Donor Rejection

The following patient are not eligible for donating blood.

- ✚ Affected with HIV viruses or AIDS
- ✚ If the patient had undergone any open heart surgery
- ✚ Pregnant lady
- ✚ Cancer patient
- ✚ Kidney disorder or Diabetes patient
- ✚ T'B patient are not eligible
- ✚ Have asthma with active symptoms, and severe asthma patients
- ✚ High blood pressure
- ✚ Organ transplantation
- ✚ Unexpected weight loss of more the 5 kg over 6 month
- ✚ Put the tattoo
- ✚ Cannot donate the blood in alcoholic person
- ✚ Should not donate the blood in smoker
- ✚ Affected with jaundice patient



Figure-26

BLOOD DONOR REQUEST FORM

DONOR REQUESTING FORM

- First when the donor is arrived, we should give the donor request form
- That request form only decides whether he can donate blood or not
- The donor should fill the details like age, weight, hemoglobin level, name, phone number health condition.
- If he is first donor, he has any diseases or genetic problem, last time donated date address, whether he donated blood before or not
- If he is first donor ,he has any disease or genetic problem ,last time donated date
- If he is alcoholic or drug addict or if he uses tobacco etc....
- The donor should fill this kind of question and put his signature
- The doctor will see if he is eligible by the form then only the donor is allowed to donate blood.

Figure -27

BLOOD BAG

- ✓ Blood bags are designed for the collection, processing and storage of whole blood and blood components.
- ✓ They help in providing aseptic conditions for the separation of blood components.
- ✓ It acts as a closed system reducing the chances of contamination.

There are 4 types of blood bags. They are

1) Single Blood bag

- ❖ For whole blood collection
- ❖ The bag contains CPDA solution
- ❖ Available in capacity of 350ml, and 450ml.

2) Double Blood bag

- ❖ For whole blood collection
- ❖ Separation of 2 different blood components (red blood cells and plasma) obtained through the process of Centrifugation and extraction

3) Triple Blood bag

- ❖ Triple Blood bag with SAGIM, for Whole blood collection.
- ❖ separation 3 different blood components. (red blood cells, plasma, platelets)
- ❖ The primary bag contains CPD and One Sterile bag contains SAGM. (Saline Adinine Glucose Monitol).

4) Quadruple Blood bag

- ❖ It Comes with SAGM for Whole blood Collection.
- ❖ Separation for 3 different blood Components (red blood cells, plasma and platelets) through the buffy coat method



Figure - 28

BLOOD BANKING RECORDS

Need to be able to trace a unit of blood from its source to its final disposition.

Need a process to introduce to the computer system new hardware, software or databases. Risk analysis, training, validation.

Record	Retention Time
Unique unit identification	10 years
Medical director approval for exceptions to donation	5 years
Donors placed on indefinite deferral	Indefinite
Investigation of transfusion-transmitted disease	10 years
Donor's ABO & Rh type	5 years
Donor testing for unexplained antibodies	10 years
HCV or HIV look back	10 years
Recipient's ABO & Rh type	5 years
Patient's transfusion medical record (unit, date, vital signs)	10 years
Suspected transfusion complication	5 years
Archival of obsolete documents	5 years
Orders for tissue	10 years

USES:

- Ensures hospitals have good supply or inventories of blood bags.
- List the availability of blood bags at any given time.
- Ability to manage the information of its blood donor.
- Alerts for blood requirement from registered donors.
- Auto-check if the person donated blood in the last 3 months.
- Allows good documentation about the donor and their blood donation activities.
- Support fast searching to find match blood bags for the right person
- Effectively manage blood camps

STORAGE

WHOLE BLOOD

- Whole blood can be refrigerated for up to 35 days, depending on the type of anticoagulant used.
- Whole blood is used to treat patients who need all the components of blood, such as those who have sustained significant blood loss due to trauma or surgery.

PACKED RED CELL

- Packed red blood cells (PRBCs) have a shelf life of 21–49 days depending on the additive solution used and jurisdiction.¹ During in vitro storage, PRBCs accumulate cellular and biochemical changes collectively called the red blood cell (RBC) storage lesion.
- Typically one unit of PRBCs is approximately 350 mL in volume, of which RBC volume is 200 to 250 mL. WBCs, platelets, and anticoagulants. The most commonly used anticoagulant is CPDA-1 (citrate, phosphate, dextrose, adenine), which allows for 35 days storage at 1° to 6°C. The hematocrit of such units is less than 80% (range 70% to 80%).

FRESH FROZEN PLASMA

- It can be prepared either from whole blood or plasmapheresis within 8 h of donation, and it must be stored at – 18 °C or colder. The shelf life of FFP is 12 months, but it can be extended to 7 years if stored at – 65 °C [2]. FFP contains all stable and labile coagulation factors, such as factor (F) V and FVIII.

PLATELETS

Platelets (PLTs) are usually stored for up to 5 days prior to transfusion, although in some blood services the storage period is extended to 7 days.

Appropriate storage temperatures

WB and packed RBC	: - 1 to 6°C
Platelet	: -20 to 24°C
FFP	: ≤ -18°
Cryoprecipitate	: ≤ -18°C



Figure-29

S.NO	NAME OF THE FIGURE	PAGE .NO
1.	RECEIVED SAMPLE	1
2.	GROSSING STATION	2
3.	CASSETTE	2
4.	FIXED TISSUE SAMPLE	4
5.	AUTOMATED TISSUE PROCESSOR	5
6.	EMBEDDING STATION	6
7.	MICROTOME&TISSUE FLOTATION BATH	7
8.	STAINING STATION&SLIDES	8
9.	NUTRIENT AGAR	10
10.	MAC CONKEY'S AGAR	10
11.	MSA AGAR	10
12.	AUTO CLAVE	12
13.	STREAK CULTURE	13
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INTERSHIP CERTIFICATES





CHENGALPATTU MEDICAL COLLEGE, CHENGALPATTU - 603001
(AFFILIATED TO THE TAMILNADU DR.M.G.R.MEDICAL UNIVERSITY,
CHENNAI-600032.)



GOVT. CHENGALPATTU MEDICAL COLLEGE, CHENGALPATTU 603001
TAMILNADU
CERTIFICATE OF OBSERVERSHIP

This is to certify that the following students studying in Sathyabama Institute of Science and Technology, Chennai has undergone observership for a period of One Month From 01.11.2023 & 30.11.2023 in the Department of Microbiology & Histopathology at Chengalpattu Medical College, Chengalpattu-603001.

Sl.No.	Name of the Student	Department	Period of posting
1	Mary G	Microbiology & Histopathology	01.11.2023 to 30.11.2023
2	Stephen Xavier M		
3	Oviya M.S		
4	Monika G		
5	Sowmiya S		
6	Shakeera Banu K		
7	Beruthose Banu S		
8	Ajith C		
9	Santhosh Kumar M.S		

They attend the training during the above period has been
Good.




VICE PRINCIPAL

Chengalpattu Medical College,
Chengalpattu.

Date:21.12.2023

Place:Chengalpattu.

ச.சி
21/12/23

Sharing Life. Saving Lives..since 1984



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

Date: 12th Dec 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Beruthose Banu. S, 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, Egmore, Chennai - 08. She 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 21st Nov 2022 to 26th Nov 2022

During her internship, performance was good and she was able to complete the project on time.

We wish him all the best for her 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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CONCLUSION

My internships at both **CHENGALPATTU MEDICAL COLLEGE – CHENGALPATTU DISTRICT and EGMORE LIONS BLOOD BANK AND RESEARCH FOUNDATION- EGMORE** has been great learning experience. During this internship I learned about many procedures and analyzers in the laboratories. Overall, the internship was really a great experience. I'd recommend to my fellow juniors. The place is really good for developing skills. I gained experience. And technician knowledge.