

INTERNSHIP REPORT

Dissertation 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

Ms. PREETHI. S (Reg. No: 40737002)



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 2023



SATHYABAMA

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BONAFIDE CERTIFICATE

This is to certify that **Ms. PREETHI. S (40737002)** student of III Year B. Sc, Department of Medical Laboratory Technology, School of Allied Health Sciences, Sathyabama Institute of Science and Technology has done her internship work in the **“ENDOCARE DIAGNOSTIC CENTRE- ANNA NAGAR”** and **“EGMORE LIONS BLOOD BANK AND RESEARCH FOUNDATION- EGMORE”** for the partial fulfilment of the degree of Bachelor of Science in Medical Laboratory Technology, during the academic period 2022 – 2023 and I certify that the work is original.

Dr. J. Premkumar,
Associate Professor & Head,
Department of Medical Laboratory Technology,
School of Allied Health Sciences
Sathyabama Institute of Science and Technology,
OMR, Chennai – 119.

DECLARATION

I, Ms. PREETHI. S (40737002), hereby declare that the internship trainings done by me at “ENDOCARE DIAGNOSTIC CENTRE- ANNA NAGAR” under the guidance of Dr. JAMES JOHN 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: 21.04.23
Place: CHENNAI

A handwritten signature in purple ink, appearing to read 'Preethi S', with a stylized flourish at the end.

(Ms. PREETHI. S)

ACKNOWLEDGMENT

We are pleased to acknowledge our sincere thanks to Board of Management of **SATHYABAMA INSTITUTE OF SCIENCE & TECHNOLOGY** for their kind encouragement in doing this internship and for completing it successfully. We are grateful to them.

I wish to express my sincere thanks to **Dr. J. PREMKUMAR**, Head, Department of Medical Laboratory Technology, School of Allied Health Sciences, for his inspiration to successfully complete this work.

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 project.

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I am worked in the **ENDOCARE DIAGNOSTIC CENTER – Annanagar**, laboratory during my internship training period on 18th July 2022 and 19th July 2022 from 10am to 4pm.

ENDOCRINOLOGY

In endocrinology, I have seen and learned about the two fully-automated analyzers, namely

1. Snibe diagnostic- maglumi 4000 plus
2. Abbott- i1600SR

1. Snibe diagnostic- maglumi 4000 Thiplu

This automated analyzer will give the result for test of number of hormones like,

- i. FSH [Follicle Stimulating Hormone]
- ii. TSH [Thyroid Stimulating Hormone]
- iii. Troponin
- iv. HCG [Human Chronic Gonadotropin]
- v. Insulin
- vi. LH [Leutinizing Hormone]
- vii. TGA [Triglycerides]
- viii. PRC [Prolactin]
- ix. Ferritin
- x. vit. D
- xi. Anti TPO [Thyroid Peroxidase]
- xii. DHEA-S [dehydroepi aldosterone- sulphate test]
- xiii. AMH [Anti- Mullerian Hormone]
- xiv. CAFB [C- alpha Feto Protein Test]
- xv. F- PSA [Free- Prostate Specific Antigen]

In that analyser there are 25 slots to place the 6 cuvettes in each slot.

In that laboratory the assumed 12 and 13 slot is for maintenance purpose.

The results were displayed in the software CareLIS, in this the results are updated automatically.

2. Abbott- i1000SR;

It will give the test results like,

- i. Testosterone
- ii. CA125 [Cancer antigen- 125]
- iii. HCG [Human Chronic Gonadotropin]
- iv. GM
- v. TTG- 6
- vi. Progesterone
- vii. C- peptide
- viii. HIV [Human Immunodeficiency Virus]

- ix. CEA [Carcinoma Embryonic Antigen]
- x. Total PSA [Prostate Specific Antigen]
- xi. AFB-3 [Alpha- Feto Protein]
- xii. TFT3- 6 [Thyroid Function Test]
- xiii. vit. B12
- xiv. Cortisol
- xv. Estradiol
- xvi. Folate RBC

This automated analyzer contains 13 slots to place the single cuvette. It is single cuvette user.

In this analyzer 11 and 12 position is considered as maintenance place and test results are displayed in the software which is used by that laboratory is CareLIS.

BIOCHEMISTRY

In this session is seen and learned about the two automated analyzer, namely

1. Trinity Biotech- Premier 4b9210 Analyzer
2. Erba- Mannheim H360 Analyzer
3. ELISA [Enzyme Linked Immuno Sorbent Assay] and its techniques

1. Trinity Biotech- Premier 4b9210 Analyzer

This analyzer is mainly use for HbA1C testing. It's a continuous flow analyzer which is, the liquid is pumped through a system of continuous tubing.

Samples are introduced in the sequential manner.

A series of air bubble at regular intervals serves as the separator and cleaning media.

Run many samples requiring the same procedure.

2. Erba- Mannheim H360 Analyzer

This analyzer is fully automated, which effectively perform a wide range of assays for,

- i. Substrate
- ii. Enzyme
- iii. Protein
- iv. Immuno turbidity
- v. HbA1C [Hemoglobin A1C/ Glycated hemoglobin]
- vi. RFT [Renal Function Tests]
- vii. CRP and other biochemical test

3. ELISA: [Enzyme Linked Immuno Sorbent Assay]

- I. We used the kit HCV microlisa 3rd generation for HIV testing.

- II. In this session I learned about handling of sample and reagent and processing that and observing the final result.
- III. Also, the gives the practice to how to mix the sample and reagent inside of the Elisa well by using the pipette.
- IV. Finally, the wells are placed in the analyzer tray and then it gives test result of test.

HAEMATOLOGY

In this lab session I was learned about the sample collecting procedure and smears and analysis.

Also, I seen and learnt about the two fully automated analyzer, namely,

- i. TBA Aggappe
- ii. Transasia- Xs- 800i Also learnt about the,
- iii. Indirect coomb's test
- iv. Semen analysis TBA Aggappe

This analyzer is designed to only analyses the 3 parameters,

1. Total blood cell count
2. Platelets level
3. Haemoglobin level Transasia- Xs- 800i

This analyzer is used to detect the 5 types of WBCs in the blood sample are

- i. Neutrophils
- ii. Lymphocytes
- iii. Monocytes
- iv. Eosinophils
- v. Basophils

INDIRECT COOMB'S TEST:

1. In this session I have learnt about the procedure of indirect coomb's test which is done in the laboratory,
2. Place the small drop of blood sample in the clean grease free glass slide.
3. Add one drop of anti-hemoglobin and make the thin smear. Now place the cover slip to the smear.
4. Now observe under the microscope.

Interpretation

Negative result: the appearance of separation of sample and anti human globulin.

Positive result: the appearance of clumping of sample ant antihumanglobulin.

SEMEN ANALYSIS:

This analysis is used to analyses the motility of the sperms and its activation

Interpretation

Motile: patient is normal, good living moving sperms are seen.

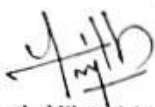
Non motile: non-moving sperms are seen; patient is unhealthy have toconsult doctors.

July 19, 2022

INTERSHIP TRAINING CERTIFICATE

This is to certificate that **MS. PREETHI. S** [D.O.B 19/01/2003], pursuing B.Sc., MLT, Course in **SATHYABAMA INSTITUTE OF SCIENCE AND TECHNOLOGY, CHENNAI**, has been trained in our Laboratory in the capacity of "Internship Trainee" from 18/07/2022 to 19/07/2022 (2 days) . She trained with the basic techniques in **Observing and Handling Clinical Laboratory Instruments** used for the Diagnostic Services.

For Endocare Diagnostic Centre


Amjad Khan A M
Head - HR



CHENNAI:Reg. Off. H 11, 2nd Street,
Annanagar East, Chennai - 600 102.
Tel # 044- 26205635 / 26205636
Mobile: 90030 51811

MADURAI:No. 128, East 5th Street,
K.K. Nagar, Madurai - 625020
Tel # 0452- 258 5635 / 2585636
Mobile: 9840 44 5635

KOVILPATTI:No. 12,
Muthanandapuram 1st street
Kovilpatti - 628501
Tel # 04632-210635 Mobile: 99400 9563

Email: endocarelab@rocketmail.com | Web: www.endocarediagnostics.in

INTRODUCTION TO BLOOD BANK

I've trained in the Lions blood bank, Egmore. The screening, component separation, Blood grouping, and bleeding room. In reception, where all the details of donors are collected. Then the doctor checks the donor. In the phlebotomy lab or bleeding room they'll have the Haemoglobin level with copper sulphate, the blood bag is selected according to the Hb level and collects blood. The next lab where the blood grouping, cross matching, lysis check, coombs test and water bath is done. The screening lab they test for any diseased samples to be known and if those are in such conditions, it will not be useful in transfusing to the recipient and so they are discarded and finally, the storage room is where they store blood components, plasma, wholeblood, WBC and platelets according to the temperature.

DONOR SELECTION

- a. Good health of the donor must be fully ensured. Age between 18 and 60 years
- b. Haemoglobin - not less than 12.5 g/Dl
- c. Pulse - between 50 and 100/minute with no irregularities
- d. Blood Pressure -Systolic 100-180 mm Hg and Diastolic 50 -100 mm Hg
- e. Temperature - Normal (oral temperature not exceeding 37.50C)
- f. Body weight - not less than 45 Kg
- g. Health conditions: The donor should be in a healthy state of mind and body.
- h. Past one year - not been treated for Rabies or received Hepatitis B immune globulin.
- i. Past six months - not had a tattoo, ear or skin piercing or acupuncture, not received blood or blood products, no serious illness or major surgery, no contact with a person with hepatitis or yellow jaundice.
- j. Past three months - not donated blood or been treated for Malaria.
- k. Women should not be pregnant or breast feeding her child.
- l. Women donors should not donate during her menstrual cycles.

DONOR REJECTION

Individuals under certain conditions are deemed ineligible to donate blood: Have been tested HIV positive. Suffering from ailments like cardiac arrest, hypertension, blood pressure, cancer, epilepsy, kidney ailments and diabetes. Have asthma with active symptoms, and severe asthma patients.

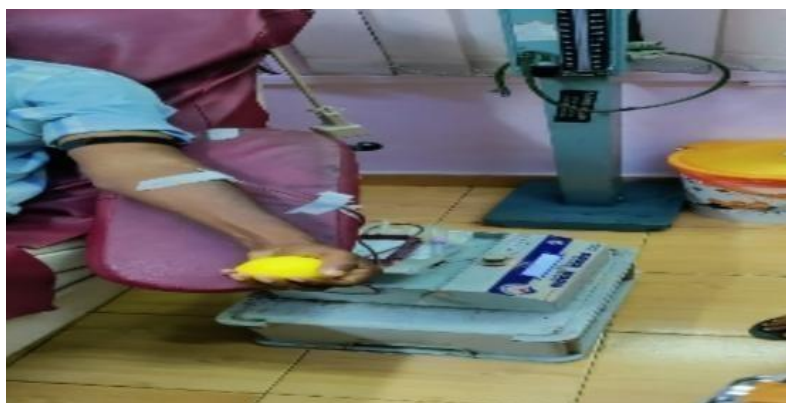
BLOOD GROUPING

Blood types are determined by the presence or absence of certain antigens – substances that can trigger an immune response if they are foreign to the body.

FORWARD GROUPING

- The forward grouping suggests the presence or absence of A and B antigens in RBCs.
- Have 3 tiles for the experiment. One for A group, other for B group and one more for the D antigen.
- Clean the fingertip aseptically.
- During collection of blood, the first drop should be discarded because the apprehension of blood is mixed with the tissue fluids.
- The collected blood sample should be diluted with the help of normal saline in watch glass. After diluting, put the diluting blood in drops on tiles taken.
- 3 antisera were subsequently diluted to blood drops on tiles. It should be mixed thoroughly with the help of toothpicks.
- Toothpicks should not be shared with any other blood drops.
- Have to wait for a few minutes to observe the agglutination and for results.

Cells/Group	Group A	Group B	Group AB	Group O
Red blood cell type	A	B	AB	O
Antibodies in plasma	Anti B	Anti A	None	Anti A & Anti B
Antigens in red blood cells	A antigen	B antigen	A and B Antigens	None



REVERSE GROUPING

- a. Reverse grouping indicates the presence or absences of anti-A and anti-B in serum.
- b. Label tubes as A and B.
- c. Tube A: Place 1 drop of red cells each from 3 of A groupsamples.
- d. Tube B: Place 1 drop of red cells each from 3 of B groupsamples.
- e. Add Normal saline and suspend the cells. Centrifuge the tubes for at least 1 minute at 1000 rpm.
- f. To make 5% red cell suspension, add 1 drop of RBC to 19 drops of saline. Make 20% suspension for the slide method.
- g. Test the pooled cells prepared by adding the antisera (Anti-A, B) in use.

A Cells	B Cells	ABO reverse typing
+	+	O
O	+	A
+	O	B
O	O	AB



BLOOD BAGS

- i. Blood bags are used for the reliable collection, separation, storage and transport of blood.
- ii. Rounded blood bag design prevents blood coagulation and ensures the blood and anticoagulants are properly mixed during separation and transfusion.

SAGM BAGS

Additive solution containing combinations of Saline, Adenine, Glucose and Mannitol (SAGM) provides extended shelf life of RBC up to 42 days with increased functional viability.

CPDA BAGS

- a. Citrate phosphate dextrose adenine (CPDA) a solution containing citric acid, sodium citrate, monobasic sodium phosphate, and dextrose that is the primary anticoagulant used for preservation of whole blood or red blood cells for up to 21 days.
- b. **Single Blood Bag:** used for collection, preservation, and transfusion of human blood.
- c. **Double Blood Bag:** separates red blood cells and plasma. It includes a primary bag and a satellite bag.
- d. **Triple Blood Bag:** this system separates red blood cells, plasma and buffy coat (includes leukocytes and platelets). It is made of a primary bag and two satellite bags.
- e. **Quadruple Blood Bag:** separates red blood cells, plasma, buffy coat (poor platelet) and platelets.



DU TEST

- i. Du Test is performed on the blood sample to measure the level of Weak D Antigen in the blood.
- ii. It confirms Rh Negativity and is also administered during and after Rh negativity treatment.
- iii. Prepare the gel card centrifuge them before using.
- iv. Then take a tube add 1µl LISS and add 50µl of sample. Mix them.
- v. Take the centrifuged gel card and add 50µl antigen D to the sample and gel to it.
- vi. Centrifuge again. And then check for its sedimentation.

LYSIS CHECK

- i. The method to check whether the blood in the bag got ruptured.
- ii. Take a tube to collect blood from the bag. Add modified LISS for red cell suspension. Centrifuge at 3000 rpm.
- iii. If the serum and blood didn't get separated then the bag is discarded.

DIRECT COOMBS TEST (Direct Agglutination test)

The direct Coomb's test detects antibodies that are stuck to the surface of RBCs. Since these antibodies sometimes destroy RBCs, a person can be anemic and this test helps to classify their condition.

PROCEDURE

- i. Prepare a 5% suspension in isotonic saline of the RBCs to be tested.
- ii. With a clean pipette add one drop of the prepared cell suspension to a small tube.
- iii. Wash 3 times with normal saline to remove all the traces of serum.
- iv. Decant completely after the last washing. Add 2 drops of Anti-human serum.
- v. Mix well and centrifuge for 1 minute at 1500 rpm.
- vi. Resuspend the cells by gentle agitation and examine macroscopically and microscopically for agglutination.

INTERPRETATION

- i. In specimens containing potent cold - reactive antibodies agglutination may occur before adding the anti-human globulin reagent.
- ii. Dirty glassware may cause clumping of cells.
- iii. A positive direct agglutination test from a clotted sample should be repeated on an EDTA sample.
- iv. Sample collected from infusion lines may have a complement present on the cells.

INDIRECT COOMBS TEST (Indirect Agglutination test)

This is the test that is done on the mother's blood sample as part of her prenatal labs. Frequently referred to as the "antibody screen", this test identifies a long list of minor antigens that could either cause problem in the mother if transfusion is necessary.

PROCEDURE

- i. Label 3 test tubes as T (test serum), PC (positive control) and NC (negative control).
- ii. In the test tube labelled as T (test), take 2 drops of test serum.
- iii. In the test tube labelled as PC (positive control), take 1 drop of anti D serum.
- iv. In the test tube labelled as NC (negative control), take 1 drop of normal saline.
- v. Add one drop of 5% saline suspension of the pooled 'O' RhO (D) positive cells in each tube.
- vi. Incubate all the 3 test tubes for 1 hour at 37°C.
- vii. Wash the cells 3 times in normal saline to remove excess serum with no free.

INTERPRETATION

POSITIVE CONTROL (PC)

Agglutination - correctly referred to performed test procedure.

No agglutination - coombs serum magnet be proper. Repeat the test again.

NEGATIVE CONTROL (NC)

It should show no agglutination, since saline doesn't contain Anti D or any other antibodies.

TEST SERUM

Agglutination - patient serum contains Anti D.

No agglutination - patient's serum doesn't contain Anti D.

CROSS MATCHING

- i. To avoid agglutination before blood transfusion. (Cross Matching is done between the antigen of donor's and antibodies of the recipients. This is the essential pre- transfusion compatibility test.
- ii. For major cross match - Donor's red cells and recipient's serum or plasma.
- iii. For minor cross match - Recipient red cells and donor's serum or plasma

MAJOR CROSS MATCH

- i. Label a test tube. Add two drops of the patient's serum and one drop of the appropriate donor cell suspension.
- ii. The major method used is immediate spin technique which detects only IgM antibody, reactive at 22°C
- iii. Clinically significant IgG antibody reactive at 37°C not detected.

MINOR CROSSMATCH

- i. Label a test tube. Add two drops of the appropriate, donor serum and one drop of the patient's cell suspension.
- ii. Mix the tubes and incubate at 37°C for above 45 minutes Add two drops of AHG (Antihuman globulin) and mix well. Centrifuge for 1 min at 1500 rpm
- iii. Read macroscopically and microscopically and record the results.

INTERPRETATION

Matching methods improve the validity of causal inference by reducing model dependence and offering intuitive diagnosis. Although they have become a part of the standard tool kit across disciplines, matching methods are rarely used when analyzing time - series cross sectional data. We fill the methodological gap.



POOLED CELLS PREPARATION.

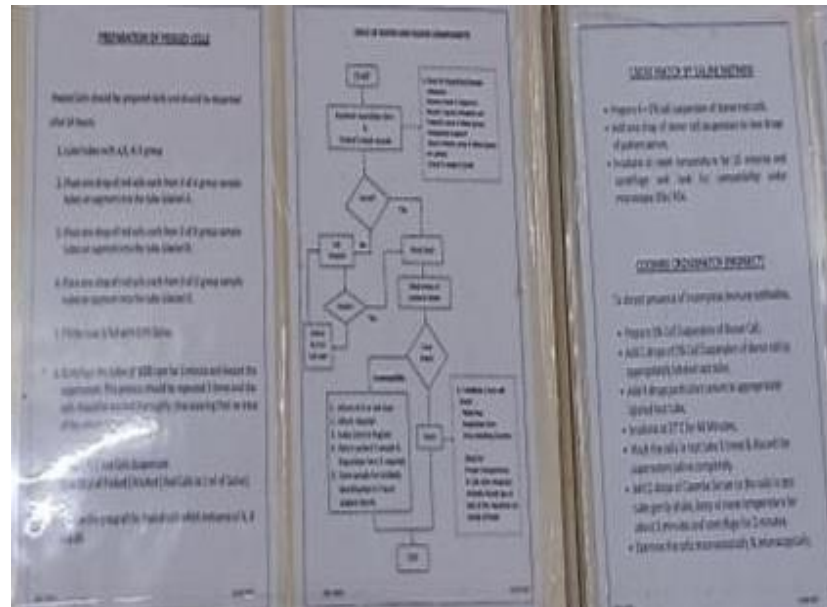
The pooled RBC units will be made by sterilely pooling five (5) single RBC units into one container where the blood will be mixed together, and then separated into five individual RBC units, ready to be used for transfusion.

Pooled Screening Cells may be used to detect unexpected antibodies in serum or plasma from donors. Pooled cells are not recommended for pre-transfusion tests, performed in lieu of a major cross match, to detect unexpected antibodies in patients' samples.

PROCEDURE

- i. Place 1 drop of red cells each from 3 of O group sample tubes or segment into the O labelled tube.
- ii. Fill the tube $\frac{3}{4}$ full with 0.9% saline to suspend the cells.
- iii. Centrifuge the tubes for at least 2 to 3 minutes at high speed. Decant the supernatant fluid.
- iv. Prepare a working solution 5%.
- v. Add 1 one drop of pooled cell to 19 drops of saline. Check specificity.

- vi. Example: B cells should react with anti B only.



HB TEST

- i. A haemoglobin test measures the amount of haemoglobin in your blood.
- ii. Normal results for adults vary, but in general are: Male: 13.8 to 17.2 grams per decilitre (g/dL) or 138 to 172 grams per litre (g/L) Female: 12.1 to 15.1 g/dL or 121 to 151 g/L.

PROCEDURE

- a. A sample of blood is taken by pricking your fingertip. A drop of blood, allowed to fall into a copper sulphate
- b. solution of specific gravity, becomes encased in a sac of copper proteinase, which prevents dispersion of fluid for 15 seconds.
- c. If the specific gravity of blood is higher than the solution, the drop will sink or else it will remain suspended for sometime.

CENTRIFUGATION

- a. A machine called a centrifuge spins your blood to separate your red blood cells, platelets and plasma. As the blood is separated, the heavier red cells sink to the bottom.
- b. Centrifugal force is used to separate the components of blood – red blood cells, platelets and plasma – from each
- c. other. The result is that the particles with different densities precipitate in layers.

PRINCIPLE

- i. A centrifuge works by using the principle of sedimentation: Under the influence of gravitational force (g-force), substances separate according to their density.
- ii. Different types of separation are known, including isopycnic, ultrafiltration, density gradient, phase separation, and pelleting.

COMPONENT SEPARATION

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

PROCEDURE

- i. First, the collected sample bags are to be weighed as whole.
- ii. Then, separate the bags according to their weights for balancing each other while centrifuge.
- iii. Place them in opposite order where to balance them correctly according to centrifuge positions. Centrifuge them.
- iv. After centrifuging, separate the plasma and blood cells in different bags.

- v. Weigh both the bags (red blood cells and plasma) and record them. And then store them.



SCREENING

Laboratory screening of donated blood is the step that determines whether or not a donation is non-reactive for specific markers of infection and is therefore safe to release for clinical or manufacturing use.

There are 5 screening tests in blood bank

- HIV
- Hepatitis B
- Hepatitis C
- Syphilis
- Malaria

HIV TEST PROCEDURE

- a. Bring all the reagents and specimens to room temperature before use.
- b. Take out the required number of strips and immediately close the pouch.
- c. Prepare ELISA protocol sheet indicating the location of controls and specimen.
- d. Use controls in duplicate.
- e. Add 200 µl sample diluent to separate wells. Add 10 µl of control or specimen in the wells.
- f. Gently shake the plate to mix thoroughly. Care should be taken to avoid spillage.
- g. Apply plate sealer and incubate for 30 minutes at 22-28° C.
- h. Wash each well by filling approximately 350 µl diluted wash buffer and aspirating/flicking off

six times. Blot dry.

- i. Add 100 µl diluted conjugate in each well and incubate for 30 minutes at 22-28° C.
- j. Wash six times as in step 9. Blot dry.
- k. Add 100 µl substrate and incubate at 22-28° C away from light for 30 minutes.
- l. Stop reaction by adding 100 µl stop solution. The stop solution should be added in the same sequence as substrate addition.
- m. Read the absorbance at 450 nm with 600-700 nm as reference within 30 minutes of stopping the reaction.

HEPATITIS B TEST PROCEDURE

- a. Bring all the reagents and specimens to room temperature before use.
- b. Take out the required number of strips and immediately close the pouch.
- c. Prepare ELISA protocol sheet indicating the location of controls and specimen.
- d. Use controls in duplicate.
- e. Add 100 µl undiluted control or specimen in separate wells.
- f. Add 50 µl conjugate to all the wells. Mix by gentle tapping. Ready to use.
- g. Apply plate sealer and incubate for 120 min. at 37°C. Wash each well by filling 350 µl diluted wash buffer and aspirating / flicking off six times with 1 minute soak time between each wash. Blot dry.
- h. Add 100 µl substrate and incubate at 22-28°C away from light for 30 minutes.
- i. Stop reaction by adding 100 µl stop solution. The stop
- j. solution should be added in the same sequence as substrate addition.
- k. Read the absorbance at 450 nm with 600-700 nm as reference within 30 minutes of stopping the reaction.

HEPATITIS C TEST PROCEDURE

- a. Bring all the reagents and specimen to room temperature before use.
- b. Take out required number of strips and immediately close the pouch.
- c. Prepare ELISA protocol sheet indicating the location of controls and specimen.
- d. Use controls in duplicate.
- e. Add 200 µl sample diluent to separate wells. Add 10 µl of control or specimen in the wells.
- f. Gently shake the plate to mix thoroughly. Care should be taken to avoid spillage.
- g. Apply plate sealer and incubate for 30 minutes at 22-28° C.
- h. Wash each well by filling approximately 350 µl diluted wash buffer and aspirating/flicking off

six times. Blot dry.

- i. Add 100 µl diluted conjugate in each well and incubate for 30 minutes at 22-28° C.
- j. Wash six times as in step 9. Blot dry.
- k. Add 100 µl substrate and incubate at 22-28° C away from light for 30 minutes.
- l. Stop reaction by adding 100 µl stop solution. The stop solution should be added in the same sequence as substrate addition.
- m. Read the absorbance at 450 nm with 600-700 nm as reference within 30 minutes of stopping the reaction.

MALARIA TEST PROCEDURE

- a. Bring all the reagents and specimens to room temperature before use.
- b. Take out the required number of strips and immediately close the pouch.
- c. Prepare a data sheet indicating the location of controls and specimens.
- d. Use controls in duplicate.
- e. Add 25 µl control or whole blood specimen in separate wells, except A1 well.
- f. Add 100 µl Sample diluent in each well except A1 well. Gently shake the plate to mix the contents.
- g. Apply plate sealer and incubate for 30 minutes at 37°C. Wash each well by filling approximately 350 µl diluted wash buffer, giving 30 seconds soak time for each wash and aspirating/flicking off six times. Blot dry.
- h. Add 100 µl diluted antibody reagent in each well, except A1 well & incubate at 37°C for 30 minutes.
- i. Wash six times as in step 9. Blot dry.
- j. Add 100 µl diluted conjugate in each well, except A1 well and incubate for 30 minutes at room temperature (22- 28°C). Wash six times as in step 9. Blot dry.
- k. Add 100 µl substrate in each well, including A1 well and incubate at room temperature (22- 28°C) away from light for 30 minutes.
- l. Stop reaction by adding 100 µl stop solution in each well, including A1 well. The stop solution should be added in the same sequence as substrate addition.
- m. Read the absorbance of each well at 450 nm with 600-700 nm as reference within 30 minutes of stopping the reaction.

STORAGE

- a. The '**Blood cold Chain**' is the system for storing & transporting blood & blood components so

that they are kept at the correct temperature at all times from collection from donor to administration to the patient.

- b. Any break in the blood cold chain increases the dangers for the recipients of blood products.
- c. The '**Blood cold Chain**' is the systematic process for safe storage & transportation of blood & blood components so that they are kept at the correct temperature at all times from blood collection from a donor to administration of blood to a patient in need of transfusion.
- d. Blood bank refrigerators, Plasma freezers, platelet agitator cum incubators, blood transport boxes are the blood cold equipment used for storage of blood and components

WHOLE BLOOD AND RED CELLS

- a. Red cells & whole blood must always be stored at a temperature between +2°C to +6°C in a blood bank refrigerator.
- b. Bloodbank refrigerators have in-built temperature monitoring and alarm devices and a cooling fan to ensure even distribution of cold air throughout the equipment. Maintenance of above storage temp is essential to maintain the oxygen carrying ability of blood.
- c. The upper limit of 6 degree C is essential to minimize the growth of any bacterial contamination in the unit of blood.
- d. Below 2 degree C red cells become hemolyzed. So they must never be allowed to freeze. Hemolyzed cells if transfused can cause renal failure & fatal bleeding problems.
- e. Depending on the type of blood bag used the shelf life ranges from 35-42 days.
- f. Whole blood & red cells should be issued from the blood bank in the blood transport box or insulator carrier that will keep the temperature under 10 degree C, if the room temperature is greater than 25 degree C or if there is a possibility that blood will not be transfused within 30 minutes.

- g. Once issued red blood cells should be transfused within ½ hour of release from BTS. If not required should be sent back to the Bloodcentre immediately.



FRESH FROZEN PLASMA(FFP)

- i. Fresh Frozen Plasma (plasma separated from a unit of blood within 6-8hrs of donation and rapidly frozen) is stored in Blood Transfusion centre at -40°C or colder. It has a shelf life of one year.
- ii. If not stored at this temp the coagulation factors as Factor VIII and Factor V deteriorate and the amount is greatly reduced thereby defeating the purpose for which it is to be administered.
- iii. FFP needs to be thawed before transfusion. in the blood centre in a plasma thawing bath. at 30°C - 37°C which takes about 30-45 minutes FFP should be transported in a blood transport box in which the temperature is maintained between $+2^{\circ}\text{C}$ to 6°C . Once thawed FFP should be infused within 30 minutes.
- iv. If not required for immediate use it can be kept at 2°C – 6°C & transfused within 24 hours. Once thawed the FFP cannot be refrozen & has to be discarded. therefore, FFP should be demanded only when essential & in the required quantities.



CRYOPRECIPITATE

- i. Cryoprecipitate is the cold insoluble portion of plasma remaining after FFP has been thawed and contains Factor VIII, Von Willebrand factor, factor XIII and fibrinogen.
- ii. For preparation of cryoprecipitate plasma is separated from a unit of blood within 6-8 hrs of donation and rapidly frozen within 30 minutes, plasma is then thawed slowly at below +4 degree C to obtain maximum yield of cryoprecipitate. It is finally stored in Blood Transfusion centre at -40 degree C or colder. It has a shelf life of one year.
- iii. The volume of cryoprecipitate is 25-30 ml. Cryoprecipitate needs to be thawed at 30 degree C to 37 degree C in a water bath for about 15-30 minutes.
- iv. Once thawed cryoprecipitate should be transfused within 30 minutes.
- v. If not immediately transfused cryoprecipitate is kept at 2 degree C - 4 degree C & can be transfused within 4 hours of thawing. It cannot be refrozen, if not transfused and has to be discarded.

PLATELETS – PLATELET RICH PLASMA (PRP)/PLATELET CONCENTRATE (PC)

APHERESED, SINGLE DONOR PLATELETS (SDP)

- a. Platelets are prepared by manual as well as automated methods and then stored at 22 degree C - 24 degree C in platelet agitator cum incubator to maintain platelet function of preventing spontaneous bleeding or stop bleeding in those patients with established thrombocytopenia or hypoplastic anaemia or bone marrow failure.
- b. Whole blood for separation of platelets should be kept at 20-24 degree C before processing as lower temperatures affect platelet function and its separation.
- c. Platelets should be prepared within 8 hrs of phlebotomy and stored at 20-24 degree C with continuous agitation.
- d. To prevent aggregation which can result in loss of viability. Platelets have a shelf life of 3-5 days depending on the type of blood bag used.
- e. Since they are stored at room temp there is a risk of bacterial contamination therefore the temperature in the platelet storage area should be maintained at ambient temperature below +24 degree C. Platelets should be transported in a blood transport box that keeps the temperature in the correct range of about 20 degree C – 24 degree C.
- f. Platelets should never be REFRIGERATED and should be transfused as soon as possible.

INSPECTION OF BLOOD BAGS PRIOR TO ISSUE/ADMINISTRATION

Blood bags should be inspected for deterioration/damage during storage before blood is issued from the blood centre and before transfusion at the bed side. Any discoloration or signs of leakage is a warning sign of bacterial contamination that can cause fatal reaction if transfused therefore it is important to check each bag for signs.

BLOOD DONATION CAMP

I've gone for 2 days of blood donation camp.

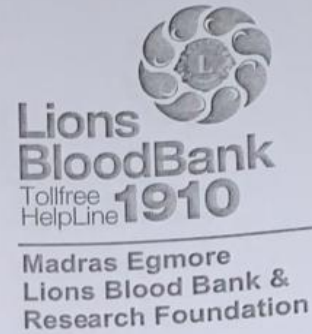
The great lakes institute, Chengalpattu.

Subros Ltd - Chennai Plant, Oragadam.





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Date: 12th Dec 2022

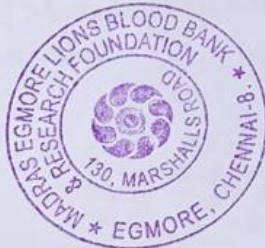
TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Preethi. S, BSc in MLT, 3rd 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 31st Oct 2022 to 19th 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

EGMORE : 130, Marshalls Road, Egmore,
Chennai - 600 008. Mob : 9941917505
Tel : 28414949 / 4959 / 5959
Web : www.lionsbloodbank.net
AMBATTUR : C-15, A.T.C. Road,
Ambattur Industrial Estate,
Chennai - 600 058. Tel : 48504959
Mob : 99419 17505
E-mail : info@lionsbloodbank.net

CONCLUSION

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.