

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

Ms. SUDHA V (41737025)



DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY

SCHOOL OF ALLIED HEALTH SCIENCES

SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

(DEEMED TO BE UNIVERSITY)

Accredited with Grade "A++" by NAAC

JEPPIAAR NAGAR, RAJIV GANDHI SALAI, CHENNAI - 600 119

APRIL 2024



SATHYABAMA

INSTITUTE OF SCIENCE AND TECHNOLOGY

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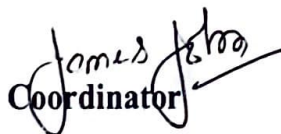
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DEPARTMENT OF MEDICAL LABORATORY TECHNOLOGY

BONAFIDE CERTIFICATE

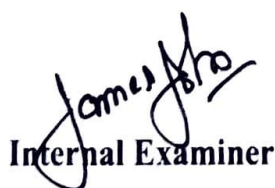
This is to certify that this internship report is the Bonafide work of SUDHA V who have done the project work as a team and carried out the training program at Voluntary health services, Adayar and lions blood bank, Ambattur under our supervision from November 2022 and November 2023.

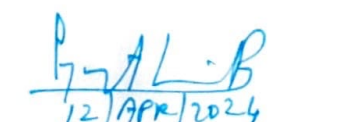

Coordinator

(Dr. James John)


Head of the Department
(Dr. J. Premkumar)
Head of the Department
Department of Medical Laboratory Technology
Sathyabama Institute of Science & Technology
(Deemed to be University)
Category I University by UGC
Jeppiyaar Nagar, Rajiv Gandhi Salai,
Chennai - 600 119

Submitted for Viva voce examination held on 12th April 2024


Internal Examiner


12/APR/2024
External Examiner
(Dr. Gayathri . P)

DECLARATION

I, Ms. SUDHA V (41737025) , hereby declare that the internship trainings done by me at “VOLUNTARY HEALTH SERVICES” under the guidance of Dr. JAMES JOHN and “AMBATTUR LIONS BLOOD BANK AND RESEARCH

FOUNDATION-AMBATTUR” 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: 12.04.24

Place: CHENNAI



(Ms. SUDHA V)

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 successful 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.

CONTENTS

	HAEMATOLOGY
1	Introduction
2	HbA1c
3	Complete blood count
4	Prothrombin Time
5	Activated partial thromboplastin time
6	Bleeding time
7	Clotting time
	BIOCHEMISTRY
8	Liver function test
9	Renal function test
10	Electrolyte analysis
	MICROBIOLOGY
11	Media preparation
12	Blood culture
13	Urine culture
14	Wound and pus swab culture
15	Stool culture
16	Zeil Nelson staining
17	Vitek-2
18	Antibiotic sensitivity test
	SEROLOGY
19	C-reactive protein
20	Rheumatoid factor
21	HIV card test
22	Hepatitis test
23	VDRL
	CLINICAL PATHOLOGY
24	Urine examination
25	Stool examination
26	Occult blood examination
	PHLEBOTOMY
27	Vein puncture

INTRODUCTION

The voluntary health services hospital known for its IDMC (infectious disease medical centre) services for highly infectious diseases like HIV, AIDS, HCV, COVID-19 and so on as there are known and unknown bacteria and virus that's affecting the present and future generations. The laboratory and hospital surroundings was clean and cautious. The laboratory had a strict protocol that's being followed to prevent contamination. The hospital has every department such as neurology, cardiology, oncology etc The laboratory has been focused even more specially and there are about 25-30 people to work in each laboratory and the needs of patients has been prioritized. From every sample collection to reporting every process is performed by well-practised and experienced technician. The laboratory has a manager/incharge to manage all the data regarding well equipped machines and also has a HOD (head of the department) who mentors the technicians and manager to prevent the mistakes of identification or reports handling process. All departments such Haematology, serology, microbiology, molecular biology, biochemistry were present for diagnostic of diseases. every departments had its specialized machines that has been bought help of organizations such as WHO (world health organization) etc. The laboratory is NABL (National accreditation board for testing and calibration laboratories) verified as every protocol of NABL has been followed.

DEPARTMENTS

DEPARTMENT: HEMATOLOGY

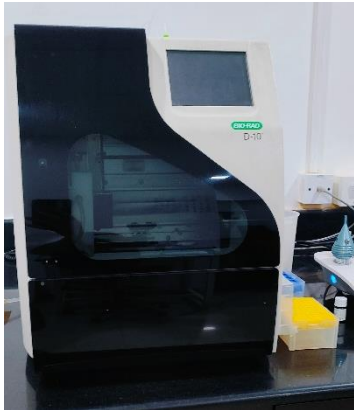
TEST PROCESSED:

Hba1c

PROCEDURE:

1. The blood collection is done by laboratory technician in phlebotomy laboratory using 21 or 22 Guage needle for about 2ml in EDTA (Ethelene diamide tetra acetic acid) an anticoagulant containing tube to prevent blood clot in sample which provides false result if processed .every blood sample collected with 21 or 22 Guage needle should be processed on or before 48hours.
2. The sample which is collected is then labelled using a machine which has a specific bar code, order id and MR number. The order id changes for every sample as the same person must have given various samples for processing. The MR number remains the same for all patients even after years of test processing.
3. The label contains patient's name, order id, bar code, date, time, MR number.
4. The test samples are placed in a rack with capacity of 10 samples and 50 samples in a batch.
5. The samples are placed in a machine called haematology analyser which aspirates sample from tube with a needle and reagents are placed in machine wash buffer, DCA, sample diluent.
6. The sample is aspirated and reagent is mixed in reaction chamber and the chemical reaction is analysed and calibrated by the machine self.
7. The result is produced and transported through LIS (laboratory information system) as the computers are connected to each other machine system.
8. The report is handed to patients on time.

AUTOMATION:



The machine used for Hba1c is
hematology analyser
BIO RAD-D10
Batch 1 – 50 samples in 1 hour.

REPORT:

**DRLOGY PATHOLOGY LAB**

Accurate | Caring | Instant

105-108, SMART VISION COMPLEX, HEALTHCARE ROAD, OPPOSITE HEALTHCARE COMPLEX. MUMBAI - 689578

0123456789 | 0912345678

drlogypathlab@drlogy.com

www.drlogy.com

Yash M. Patel

Age : 21 Years

Sex : Male

PID : 555

**Sample Collected At:**125, Shivam Bungalow, S G Road,
MumbaiRef. By: **Dr. Hiren Shah**

Registered on: 02:31 PM 02 Dec, 2X

Collected on: 03:11 PM 02 Dec, 2X

Reported on: 04:35 PM 02 Dec, 2X

HbA1c (GLYCOSYLATED HEMOGLOBIN)

Investigation	Result	Reference Value	Unit
Primary Sample Type :	Blood		
GLYCOSYLATED HEMOGLOBIN			
HbA1c	6.5	High < 5.7	%
HPLC, NGSP certified			

Interpretation :

As per American Diabetes Association (ADA)	
Reference Group	HbA1c in %
Non diabetic adults >=18 years	<5.7
At risk (Prediabetes)	5.7 - 6.4
Diabetes	>= 6.5
Therapeutic goals for glycemic control	Age > 19 years - Goal of therapy: < 7.0 - Action suggested: > 8.0 Age < 19 years - Goal of therapy: <7.5

Note:

1. Since HbA1c reflects long term fluctuations in the blood glucose concentration, a diabetic patient who is recently under good control may still have a high concentration of HbA1c. Converse is true for a diabetic previously under good control but now poorly controlled.
2. Target goals of < 7.0 % may be beneficial in patients with short duration of diabetes, long life expectancy and no significant cardiovascular disease. In patients with significant complications of diabetes, limited life expectancy or extensive co-morbid conditions, targeting a goal of < 7.0 % may not be appropriate.

Thanks for Reference

****End of Report****

Medical Lab Technician
(DMLT, BMLT)**Dr. Payal Shah**
(MD, Pathologist)**Dr. Vimal Shah**
(MD, Pathologist)

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Page 1 of 1

**Sample Collection****0123456789****SKILLS ACQUIRED:**

The test processed was neat and clear and the mentor explained it with a clarity we have improved our skills in handling of sample, processing of sample, reporting of sample. we also learnt how to handle the technological machines which is error free if the machine is revised properly for quality control checking. The number of machines are involved in processing of samples in batch analysis each batch process 50-60 samples according to the manufacturer of the machines. the haematology analyser which was placed in VHS laboratory has the capacity of running 50 samples.

DEPARTMENT: HEMATOLOGY

TEST PROCESSED: CBC (complete blood count)

PROCEDURE:

- The blood is collected from patient via primary vein for about 2ml and injected into purple tube which has anticoagulant EDTA (Ethelene diamine tetra acetic acid) which prevents clotting of blood.
- The blood sample is transported to perspective laboratory for testing with certain protocols as followed.
- The sample is then labelled and barcoded by machine which has name of patient, order id, MR number, age, test name.
- The sample is placed in a rack which has a capacity of 10 each and inserted inside the machine and the machine is operated to start or run the sample.
- The result is produced within an hour which has percentage and units/ml for every cells.
- The results has CBC and DIFFERENNTIAL COUNT.

CBC:

WBC-5.88 [$10^9/L$]

RBC-4.45 [$10^{12}/L$]

HGB-136 [g/L]

HCT-0.396 [L/L]

MCV-89.0 [fL]

MCH-30.6 [pg]

MCHC-33.1 [g/dl]

RDW(CV)-14.7 %

RDW-SD 44.3 [fl]

DIFFERENTIAL COUNT:

NEUT 3.47 [$10^9/L$]

LYMPH 1.96 [$10^9/L$]

MONO 0.31 [$10^9/L$]

EO 0.11 [$10^9/L$]

BASO 0.02 [$10^9/L$]

IG 0.01 [$10^9/L$]

NRBC 0.0 [/100WBC]



AUTOMATION:

SYSMEX

MODEL: XN-550

WORK ANALYSIS OF CBC MACHINE:

After the sample in EDTA tube is placed inside the machine small amount of sample is aspirated through a needle inside the machine and passed through a narrow channel as the blood passes through the channel they are hit by a rays the cells are detected through the sensor and then the number of RBC's and WBC's are calculated accurately.

SKILLS OBTAINED:

- Learnt to handle samples
- Learnt to operate CBC machine
- Learnt to write reports
- Learnt to communicate patients

PROTOCOL OF CBC:

- The machine is manufactured by certain companies and each company will have various protocols to run and handle the machine to avoid errors.
- The VHS laboratory used XN-550 model of CBC machine which is manufactured by SYSMEX company.
- Every machine has to run quality checking on the basis of alternate days or on the basis of everyday even early before the sample arises.
- The quality control checking decides the quality of the test which is processed in machine.
- The machine has to be serviced immediately after an error as the machines are expensive and to avoid the errors free results.

- The buffers or reagents in the machine has to be checked daily
- The tubes which has to be placed inside the machine has to be checked twice for bar code and tube breakage and the colour of tube.
- The EDTA tube must always be prioritized as this is a haematology belonging test.
- Every sample/tube placed in machine has to be checked for plasma in it.
- Every sample collected in tube has to be checked for the amount of sample in it to avoid errors.

REPORTS OF CBC:

Test name	Initial CBC	18 months later	Unit	Reference range
White blood cells (WBC)	1.90	4.25	K/ μ L	4.5–11.5
Red blood cells (RBC)	3.75	2.47	M/ μ L	4–5.40
Hemoglobin (Hb)	11	8.8	g/dL	12–15
Hematocrit (Hct)	30.6	26.9	%	35–49
Mean cell volume (MCV)	81.6	108.9	fL	80–94
Mean cell hemoglobin (MCH)	29.3	35.6	pg	32–36
Platelets	12	51	K/ μ L	150–450
Reticulocyte absolute	0.020	0.128	%	0.5–2

DEPARTMENT: HEMATOLOGY

TEST PROCESSED:PT (prothrombin time)**PROCEDURE:**

- The blood is collected from patient who has clotting factors deficiencies of factor 2.
- The blood is collected from patient through primary vein for about 2ml and injected into blue tube which contains 3.2 % sodium citrate as anticoagulant.
- The plasma is derived after mixed with anticoagulant.
- The blue tube which has 3.2% sodium citrate is used for two tests that is PT, APTT, D-dimer.
- The tube is then transported to the laboratory and is labelled which has name, order id, MR number, age, gender.
- The plasma of 50microlitre is taken through pipette into a sample well which has microbeads.
- The plasma is incubated for 50seconds after an alarm sound the reagent of 100 microlitre is poured in sample well and incubated for 60seconds and analyse the results obtained.

Results:

Normal prothrombin time – 9.60-11.70

Patient value – 12.10

AUTOMATION:

Equipment name: coagulation analyser

Model: star max stage

WORK ANALYSIS OF COAGULATION ANALYSER:

- The coagulation analyser of model star max stago has been installed in VHS laboratory to make error free estimation of prothrombin time (PT) and activated partial prothrombin time (aPTT)
- The machine has 4 columns and 4 rows and total of 16 sample wells and machine is also provided with microbeads.
- The machine then has a separate column for incubation and has a specialized theme of alarm for presenting the reagent to sample.
- The chemical reaction followed and the light rays passed through it and the calibration has been proceeded.
- After the result is produced the result is transported through LIS(laboratory information system).



SKILLS OBTAINED:

- Learnt to handle machine
- Learnt to operate machine
- Learnt to write reports
- Learnt to perform test

PROTOCOL OF COAGULATION ANALYSER:

- The machine is manufactured by various companies each company provides machine with its own protocol to process the sample and handle the machine.
- The VHS laboratory used the model of star max stago to process the PT (prothrombin time) and APTT (activated partial prothrombin time) to derive results of clotting factor deficient patients.
- The machine doesn't have any alternate days processing as the test is simple and the samples arises every day the test is being processed every day.
- The machine only uses sodium citrate tube as it contains plasma with anticoagulant.
- The plasma which contains all the clotting factors in it is being measured. The factor that is measured in prothrombin time is factor 2.
- The machine has separate 3 connected glass wells to pour sample and reagent.

The wells once used should be disposed and so the tips.

- Reagents has to be placed safely in the reagent wells.

No	Test Sample	^a PT (sec)	^b APTT (sec)	Interpretation (Based on 10% rule calculation)
Mixing Test				
1	Control Normal (Pool), 1 ml	11.8	35.8	
2	Patient, 1 ml	13.6	58.9	
3	Control normal + patient Mix 1:1		85.9	Immediate mixing test for ^b APTT wasnot corrected

^aPT=prothrombin time; ^bAPTT=activated partial thromboplastin time

DEPARTMENT: HEMATOLOGY

TEST PROCESSED: APTT (activated partial prothrombin time)

PROCEDURE:

- The patient is first enquired by doctor and the specific test is certified by doctor and being processed and reported.
- The blood is withdrawn from patient through primary vein by using 21 or 22 Gauge needle.
- The blood should be processed within 48 hours of collection.
- The blood is injected into blue colour tube which contains sodium citrate as an anticoagulant which prevents clotting of blood.
- The plasma is derived from the tube which has anticoagulant
- The plasma of 50 microlitre and reagent of 100 microlitre has been added into the sample well and incubated for 180 seconds.
- After the incubation period the calcium chloride reagent is being added for about 50 microlitre.
- The chemical reaction happens and the light rays measure the clotting factors.
- The results are obtained automatically.

RESULTS OBTAINED:

Patient value: 30.00 sec

Control value: 28.40 sec

Reference value: 23.70 – 33.00 sec

AUTOMATION:

Equipment name: coagulation analyser

Model: star max stago

WORK ANALYSIS OF COAGULATION ANALYSER:

- The coagulation analyser of model star max stago has been installed in VHS laboratory to make error free estimation of PT (prothrombin time) and APTT (activated partial prothrombin time).
- The machine has 4 columns and 4 rows which has the capacity to handle total of 16 sample wells alternative test can be done at same time.
- The sample wells also contain microbeads.
- The machine has separate column for incubation and machine has a special time alarm to provide the sample with reagent.
- The chemical reaction is proceeded and the light rays is passed through it then then calibration take place to measure the apt clotting factors in the sample.
- After the result is produced by the machine its then transported through LIS (Laboratory Information system).



SKILLS OBTAINED:

- Learnt to handle machine
- Learnt to operate machine
- Learnt to write reports
- Learnt to process test samples.

PROTOCOL OF COAGULATION ANALYSER:

- The machine is manufactured by various companies each company provides machine with its own protocol to process the sample and handle the machine.
- The VHS laboratory used the model star max stago to process the PT (Prothrombin time) and APTT (activated partial prothrombin time) to derive results of clotting factor deficient patients.
- The machine doesn't have any alternated days processing as the test is simple and the samples arises every day the test is being processed every day.
- The machine only uses sodium chloride tube as it contains plasma with anticoagulant.
- The plasma which contains all the clotting factors in it is being measured the factor that is measured in prothrombin time is factor 2.
- The machine has separate 3 connected glass wells to inject samples and reagents.
- The well once used should be disposed and so the tips.
- Reagents has to be placed safely in the reagent wells.

No	Test Sample	^a PT (sec)	^b APTT (sec)	Interpretation (Based on 10% rule calculation)
Mixing Test				
1	Control Normal (Pool), 1 ml	11.8	35.8	Immediate mixing test for ^b APTT wasnot corrected
2	Patient, 1 ml	13.6	58.9	
3	Control normal + patient Mix 1:1		85.9	

^aPT=prothrombin time; ^bAPTT=activated partial thromboplastin time

DEPARTMENT: PHLEBOTOMY**TEST PROCESSED: COLLECTION OF SAMPLE****PROCEDURE:**

- The phlebotomy lab was separately placed in order to avoid contamination. The lab has been maintained neatly to provide patients an infection free environment.
- The phlebotomy lab bar code labelling machines attached to computers system to make the process of labelling easy and error free.
- The lab was segmented into two rooms to make collection of various people within less time limit.
- The lab technicians and assistant technicians were collecting the sample and transporting the sample to testing area.
- The patient's request form is submitted to lab technician for receiving the order id and name for bar coding and labelling.
- The test tube is provided according to the test assisted by the doctors.
- The patients were made to sit comfortably in a chair for positioning the arm in 90degree angle to make the collection.
- The tourniquet is tied tightly for 1-2 mins for spotting the vein and collecting the sample using 21 or 22 Gauge needle.
- The blood is collected in syringe for about 2ml and injected into the tube for either EDTA or specified tubes according to test.
- Then the tube is placed in sterile storage rack placed in a basket which is been carried for testing to laboratory.
- The lab then using computer notifies the received channel.

PRECAUTIONS:

- The lab had certain procedures and protocols for pre collection, collection and post collection.
- The lab technicians were working under guidelines and sops of the laboratory. The technicians were only allowed to collect samples after receiving the requisition form consisting of patient details id number etc.
- The patients are addressed for their meal before a blood withdrawal according to the test to be conducted
- The blood are collected in appropriate test tube with anticoagulants.
- The needles and syringes should be disposed according to the protocols given by the laboratory.
- Every infectable products and hazardous products should we handled with care.
- As per the guidelines the tubes should be cleansed with disinfectant.

DEPARTMENT: BIOCHEMISTRY**TEST PROCESSED: ELECTROLYTE ANALYSIS****PROCEDURE:**

- The blood is collected from patient with skilled personnel.
- The tourniquet is tied and the vein is noticed.
- Using 21 or 22 gauge needle the blood with withdrawal from the vein by vein puncture method.
- The blood is injected into the tube with or without anticoagulant according to the test conducted.
- The blood for electrolyte analysis is collected in plain tube and held for an hour or centrifuged at 1500rpm for 10 mins.
- The serum is separated
- The roche 9180 electrolyte analyser was used in VHS laboratory.
- The serum sample was aspirated into the tube and the tube was wiped with tissue for preventing contamination.
- As the sample was aspirated within a minute or less the sodium, potassium and chlorine values were shown.
- The results are produced automatically.

NORMAL RANGE:

Sodium: 136-144mmol/l

Potassium: 3.7-5.1mmol/l

Calcium: 8.5-10.2mg/dl

Chloride: 97-105 mmol/l

AUTOMATION:

9180 Electrolyte analyser

ROCHE

WORK ANALYSIS:

The sample is aspirated through a pipe and goes through various internal analysis by the analyser which measures the amount of electrolyte in blood which is certain unit per dl. The levels are then produced.

SKILLS OBTAINED:

- Sampling
- Handling machine
- Operating machine
- Reporting



DEPARTMENT: BIOCHEMISTRY

TEST PROCESSED: URINE ANALYSIS

PROCEDURE:(manual method)

- The patient is addressed by doctor and prescribed for urine analysis for infections etc
- The patient is advised to drink lot of water and urine of certain amount is collected in a sterile container.
- The urine in container is labelled and bar coded.
- The sample is transferred to the centrifuge tube and centrifuged at 1500rpm for 10-15mins.the supernant is observed and made a thin smear in a slide.
- The smear is covered by a cover slip.
- After it is dried is observed under microscope of 40x magnification.
- The observations are recorded of every id's.

AUTOMATED URINE ANALYSIS:

- The urine after collected from patient in a sterile container is analysed using a automated machine which runs urine strips.
- The urine strips are pH sensitive which when dipped in urine changes its colour.
- Every colour indicates different substances in urine like proteins, ketones etc.
- The strip when placed in strip holder of the machine which intakes the strips and observe for the measurement of the substances.

AUTOMATED MACHINE:

Clinitek status+ analyser

siemens

OBSERVATION:

According to disease or infections the epithelial cells, crystals, pus cells, bacteria, blood cells, Leucocytes are seen.

SKILLS OBTAINED:

- Physical examination of urine
- Analysis under microscope.



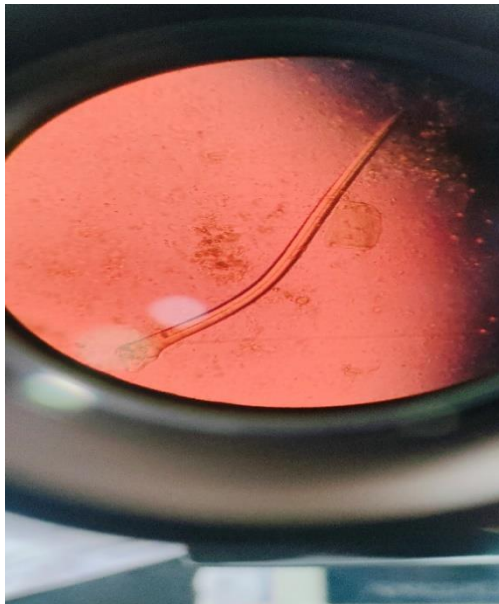
TEST PROCESSED: STOOL EXAMINATION

PROCEDURE:

- The patient is well addressed by doctor and suggested for stool examination.
- The patient's stool sample is collected in a sterile container and labelled with patients name and id
- The sample after entering lab is bar coded and processed.
- Any sample that is obtained is examined physically for its appearance through colour, odour ,blood , pus, food particles etc
- The blood of small amount is taken for fecal occult blood test in a card and observed after some chemicals are added.
- This test is commonly called guaiac test for invisible blood detection in stool.
- The other method where stool sample is diluted with nacl, coverslip is placed over it and observed through microscope in 40X magnification.
- Observation: parasites, pus cells, blood cells.

SKILLS OBTAINED:

- Observation of parasites
- Handling of sample



TEST PROCESSED: LIVER FUNCTION TEST, RENAL FUNCTION TEST:

INTRODUCTION:

Liver function test is done to check the functions of liver such as enzymes, proteins and vitamins synthesis.

Liver function test is done for:

- Alanine transaminase test (ALT)
- Aspartate aminotransferase test (AST)
- Alkaline phosphatase test (ALP)
- Albumin test
- Bilirubin test

PROCEDURE:

- The sample from patient is taken in plain tube and the tubes are labelled with patients name and id then bar coded using machine.
- The sample is taken in a cuvette and placed in the sample holder.
- The reagents are loaded on pre to the test in advance
- Then when test is operated the sample and the reagents are dispensed in the reaction chamber through the needles.
- And the chamber are cleansed through washing buffer
- After the reaction measurement is done automatically.
- The results are generated through LIS

AUTOMATED MACHINE USED:

- SIEMENS
- DIMENSION X PAND PLUS

TEST DONE IS SIEMENS:

- Liver function test
- Renal function test
- Lipid profile
- Electrolyte test
- Protein test
- Glucose test

NORMAL RANGE OF LIVER FUNCTION TEST:

- Alanine transaminase test (ALT) - 4-36 U/L
- Aspartate transaminase test (AST) - 5-34 U/L
- Alkaline phosphatase test (ALP) – 40-150 U/L
- Total serum protein – 6.4 – 8.3 g/dl
- Albumin – 3.8-5.0 g/dl
- Globulin – 2.3-3.5g/dl

- A/G ratio – 1
- Gamma glutamyl transferase(GGT) – 9-48 U/L
- Bilirubin – 0.2-1.2 mg/dl
- Conjugated bilirubin – 0.1-0.3 mg/dl
- Unconjugated bilirubin – 0.2-0.8 mg/dl
- Prothrombin time – 1.1seconds



TEST PROCESSED : RENAL FUNCTION TEST

INTRODUCTION:

Renal function test is done to check the renal functions such as urea, uric acid , and salts such as sodium , potassium and calcium.

Renal function test is done for :

- Glucose
- Calcium
- Phosphorous
- Calcium
- Potassium
- Sodium
- Albumin
- Creatinine
- Blood urea nitrogen(BUN)
- Glomerular filtrate rate
- Total protein

PROCEDURE:

- The sample from patient is taken and labelled with patients name and id number and the bar coded using machine.
- The tube is then centrifuged or placed over some time to obtain serum.
- The serum after separation is taken into sample cuvette and the reagent is placed in the machine prior to test in advance.
- As the test is automated the sample after being placed in the cuvette is dispensed into the reaction chamber with some required amount of reagent and the undergoes the specific test aligned for the sample.
- The reaction is measured for acquiring normal range.
- After the sample is detected the chamber is cleansed using washing buffer by itself and is calibrated daily prior to sample run.
- The results are generated through LIS system.

AUTOMATED MACHINE USED :

- SIEMENS
- DIMENSION X PAND PLUS

NORMAL RANGE :

- Blood urea nitrogen – 5-25 mg/dl
- Uric acid – 2.5-7.0 mg/dl
- Creatinine-0.3-1.4 mg/dl



DEPARTMENT: SEROLOGY

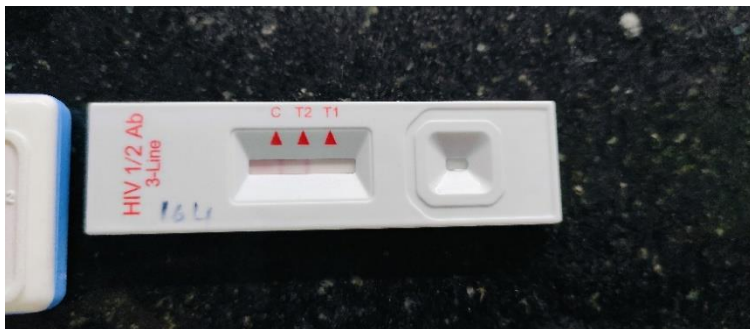
TEST PROCESSED: HIV CARD TEST

PROCEDURE:

- The patient is addressed with symptoms by doctor and prescribed for HIV test.
- The blood is collected from patient by vein puncture method and injected into plain tube without anticoagulant.
- The collected blood is centrifuged at 1500rpm for 10-15mins.serum is separated.
- Serum after separated is used for card test of HIV manufactured by various companies.
- The card had the sample and reagent single hole in it .
- The wash buffer of 5 drops is dropped into the well and made to dry naturally
- Sample(serum) + sample diluent + conjugate is mixed well and added.
- After adding these well is made to dry.
- Wash buffer of 6 drops is added.
- Substrate of 3 drops is added.
- Stop solution of 3 drops is added.

OBSERVATION:

- If only one dot is seen in the card HIV test is negative, if two dots are seen in the card it shows HIV positive.
- If the card test shows positive the expert is called for a look of the results.



TEST PROCESSED: RHEUMATOID FACTOR

PROCEDURE:

- The blood sample from patient is collected in a plain tube by vein puncture method.
- The collected blood is centrifuged at 1500rpm for 10 mins.
- The serum after separation is used for rheumatoid factor test
- Serum of 20microlitre is pipetted into the sample tube followed by reagent 1 of 200microlitre and reagent 2 of 100microlitre is added to the tube.
- The card appropriately for the specific test such as crp,rf are used.
- The result is produced automatically by the machine once card is inserted within or before 30mins.

AUTOMATED MACHINE USED:

- Protein analyser
- Semiautomated machine
- Mispa-i2

NORMAL RANGE:

Adult - <20IU/ml

SKILLS OBTAINED:

- Handling machine
- Operating machine
- Sampling
- Observing
- Reporting



TEST PROCESSED: C-REACTIVE PROTEIN**PROCEDURE:**

- The blood is collected from patient by the vein puncture method by lab technician and injected into plain tube.
- The tube is then labelled with patient's name, id etc
- The tube is transferred to biochemistry lab where it got bar coded and centrifuged by centrifugation at 1500 rpm for 10-15mins
- The serum is separated
- The serum of sample of 20microlitre is added to the tube and the reagent 1 of 200 microlitre is added followed by reagent 100 microlitre.
- The test specific card is inserted into the machine and started to run and where the results are automatically produced within or before 30 mins.
- The results are observed and reported.

AUTOMATED MACHINE USED:

- Protein analyser-semi automated analyser
- Mispa-i2

NORMAL RANGE:

- 0.8-1 - normal
- 1-2.9 - intermediated risk
- >3 - higher risk of heart ailments
- >10 - high level of inflammation in the body.

SKILLS OBTAINED:

- Sampling
- Handling

TEST PROCESSED: VDRL (VENERAL DISEASE RESEARCH LABORATORY)

INTRODUCTION:

The VDRL test is done in laboratory which is used for sexually transmitted infection such as syphilis by *Treponema pallidum*. It is an immune assay based on antigen and antibody interaction.

PRINCIPLE:

VDRL test is done based on antigen and antibody interaction where the presence of antibody in the serum sample is detected in which flocculation is seen by naked eyes after mixing of sample with the antigen.

PROCEDURE:

- The sample is collected from the patient by well trained technicians.
- The collected sample is centrifuged in 1500 rpm for 10-15 mins
- The serum is separated after separation the sample is placed in the sample circle of the card
- The positive and negative control are placed appropriately
- The sample is mixed with reagent containing cardiolipin phospholipid.
- The card is rotated for 8 mins in a card rotar or manually
- The card is observed for flocculation or aggregation.

OBSERVATION:

- If the aggregation/flocculation is seen is considered positive
- If there is no aggregation/flocculation seen is considered negative.

TEST PROCESSED : HBsAg

INTRODUCTION:

The HBsAg test is immunoassay test used for detection of antigen and antibody interaction in which hepatitis surface antigen is detected using antibodies.

PRINCIPLE:

HBsAg test is used for antigen and antibody interaction where the antigen binds to antibody where the aggregation is seen by naked eyes.

PROCEDURE:

- The sample is collected from patient using lancet by finger prick method
- The sample is placed to the test card
- The 2-3 drops of buffer solution is added on to the sample and allow the blood sample to flow in.
- It captures antibody that binds antigen.
- The control line should appear in the card after adding sample
- The antigen-antibody forms a chromogen line which shows positive of hepatitis.

OBSERVATION:

- The control line together with test line indicates positive.
- The absence of control line indicates the test was incorrect or invalid.



DEPARTMENT: MICROBIOLOGY

INTRODUCTION:

The samples in microbiology laboratory and equipments should be sterilized in a routine manner for pathogen free and contamination free working. This lab has specialized protocols for running and testing microbiology sample using automated machines or manual examination.

Out of all the labs this lab has the most hazardous and dangerous microorganisms which causes diseases when done without the defined protocols to the technicians .It has bio safety levels 4 in the laboratory to examine highly hazardous microorganisms.

MEDIA PREPARATION:

There are several medias used to culture organisms based on their growth in particular media which contains specific nutrients. The media used and prepared in laboratory are:

MAC CONKEY AGAR:

Mac conkey agar is used specially for lactose fermenting colonies/bacteria. It is a selective medium prepared by 12.88 grams of agar powder mixed with 250ml of distilled water without any clumps of powder in which after 10-15mins its autoclaved at 121degree C and cooled. The media is then poured into the petri plate of 25ml equally to 10 plates without bubbles.

CHOCOLATE AGAR:

Chocolate blood agar is prepared by heating the blood. Preparation of agar is done by mixing 7 grams of nutrient agar powder into 250ml of distilled water in conical flask and cotton of sufficient amount is used as cork and foiled outside the autoclaved at 121degree C. the media is poured in petri plate with 25ml each of 10plates.

BLOOD AGAR:

Blood agar is prepared using 5-10% of defibrinated blood with 28 grams of nutrient agar powder with 1 litre of distilled water and autoclaved at 121 degree C for 15mins. After colling of nutrient agar blood is injected into the agar and poured into petri plate of 25ml each in 10 plates.



MULLER HINTON AGAR:

Muller Hinton agar is prepared using 9.5 grams of its powder with 250 ml of distilled water and autoclaved at 121 degree C for 15mins and cooled, the poured into petri plate with 25 ml of each in 10 petri plates.

XYLOSE LYSINE DEXTROSE AGAR:

Xylose lysine dextrose agar is prepared using 2.8 grams of its powder with 50ml of distilled water after autoclaving at 121 degree C its poured into 25 ml each in 10 petri plates.

EGG YOLK AGAR:

Egg yolk agar is prepared using 1.68 grams of nutrient agar with 660 ml of distilled water and autoclaved at 121 degree C for 15mins and egg of 3 ml is added and poured into petri plates.

STAINING:

sample used: sputum

PRINCIPLE:

It is an acid fast staining used particularly for Mycobacterium, Nocardia. Mycobacterium upon their lipid rich cell wall is impermeable to various dyes they retain azomethane dyes such as carbol fuschin which after washing with alcohol or weak acid is primary feature of these genus.

MATERIALS REQUIRED:

- Sputum sample
- Carbol fuschin
- 20% H₂SO₄ or 3% Hcl
- 95% ethyl alcohol
- Glass slide
- Inoculation loop
- Bunsen burner

PROCEDURE:

- Sputum sample is collected from patient and made a thin smear in a glass slide.
- Few drops of carbol fuschin is added after the smear is dried
- The slide is heated in Bunsen burner for 30 seconds
- The slide was allowed to stand for 5 mins without heating and the stain was not allowed to get dried.
- After 5 mins slide is washed under running tap water
- The slide is then covered with alcohol solution for 3 mins'
- After 3 mins the slide is washed under running tap water
- The decolourizer is added until its partially colourless
- The slide is washed under running tap water
- The slide is covered with methylene blue for 1 min

- After 1 min slide is washed under running tap water and observed under oil immersion microscope.

OBSERVATION:

Pink colour acid fast rods and blue colour Nonacid fast rods was obtained.

GRAM STAINING:

It is a differential staining which requires primary stain, mordant and a decolourizing agent. It is used to differentiate gram positive and a gram negative bacteria. The gram positive bacteria appears purple as it takes primary stain where as in gram negative bacteria the bacteria appears red/pink through the absorption of counter stain as its cell wall is thin.

MATERIALS REQUIRED:

- Crystal violet
- Iodine
- 95% of ethyl alcohol
- Safranin
- Inoculation loop
- Staining tray
- Glass slides
- Bilurous paper
- Lens paper and microscope

PROCEDURE:

- The smear is made on glass slide using the sample with another slide placed at 45 degrees.
- The slide after placing in staining tray is flooded with crystal violet for 1 min
- The smear is washed under running tap water after one min and the gram's iodine is covers the slide for 1min
- The iodine solution is washed off with 95% ethyl alcohol until no colour flows in the slide
- The slides are washed with safranin for 30secs
- The smear is washed with distilled water
- The stains were examined under microscope for gram positive and negative bacteria.

OBSERVATION:

Pink colour – gram negative rod/bacilli

Purple colour – gram positive cocci/rod

LEISHMAN STAINING:

It is used for peripheral smear, it is characterized by hues of blue, pink and purple. the nuclei stains blue, while cytoplasm stains pink or purple.

Its is used for differentiation of cellular structures.

PRINCIPLE:

Leishman stain is most commonly used for peripheral smear, the chemical components of Leishman dye are azure B blue in colour and Eosin Y orange to stain different groups of molecules in the cells. The DNA and acidic groupings of proteins of cell nuclei and primitive cytoplasm determine the uptake of basic dye azure B. the presence of basic groupings on the Haemoglobin molecules result in affinity for acidic dye like eosin Y.

MATERIALS REQUIRED:

Leishman stain

Phosphate buffer

Pasteur pipette

Blood sample

Glass slide

Timer

Cover slips

Mounting media

PROCEDURE:

Place the smear on the staining rack

Pour Leishman stain to cover the smear for 2-3 mins

Add water twice the amount of Leishman stain to fix for 10 mins

Appearance of golden scum or sheen on the surface of stain

Wash off the stain with running tap water

Allow the slide to dry and observe under microscope.

OBSERVATION:

Nucleus – violet /purple colour

Cytoplasm – pink colour

URINE CULTURE:

Urine is collected from patients in sterile container and used for culturing in agars for the identification and growth of the bacteria.

PROCEDURE:

A midstream urine is collected from patient in a sterile container

The sample is inoculated using inoculation loop in various media such as blood agar, mac agar etc. the media is provided with optimum temperature for growth.

After a specific period of 24-48 hrs the colonies are grown on the media and examined using different biochemical test

The identified organism is further test for antibiotic susceptibility test for its treatment purpose.

PRECAUTIONS:

The media must be prepared contamination free

The equipment used must be sterile

Equal amount of agar is needed for culturing

Observation:

No growth: no growth observation can sometimes be wrong due to various factors of organisms but still it suggests no infection in urinary tract when sub cultured using same specimen.

Growth observation: The growth of specific organism or colonies suggest the infection of the UTI and sometimes it might be due to contamination of unsterilized media or equipment used. The growth can be due to one or more than one organism it is always suggested for biochemical test and vitek test in case of confusions.

Muller Hinton Agar is used for antibiotic susceptibility test in which various antibiotics suggested by doctors is placed in the agar after streaking of the sample and identified with resistant and sensitive antibiotics using the zone of absorption by drugs.

STOOL CULTURE:

Stool sample is obtained from patient in a sterile container and is used for culturing in various medias for growth of organisms.

PRECAUTIONS:

Use sterile equipment

Use on date agars

Use media in proper way to avoid contamination

OBSERVATION:

Stool sample is inoculated using inoculation loop and observed for colonies in 24-48 hrs. medias like blood agar and mack agar can be used for culturing these bacteria.

No growth: No growth can sometimes be due to wrong handling or due to less specimens but no growth is subculture is considered as healthy individual without infection.

Growth observation: Growth can be seen in infected individual where colonies of one or more organisms are observed and it is always suggested for biochemical test and vitek machine is used for identification of organism.

WOUND AND PUS CULTURE:

The sample such as wound or pus is swabbed in a cotton stick and cultured in various media for growth of the organisms.

PRECAUTIONS:

Use sterile equipment
Use on date agars
Use media in proper handling

PROCEDURE:

Patient's wound site and pus is collected in a sterile swab of cotton and kept in a sterile container.

The collected sample is then in swab specific agar and kept at optimum temperature of 37 degree C for bacterial growth. Every microorganism has its own temperature, enriched media for its growth and is detected using biochemical tests.

The media with colonies are observed for its unique growth such as neisseria, moroxella etc

If the identification isn't done by observing or for further confirmation the colonies are taken for gram staining, biochemical test, or automated examination of bacteria with dilution method by vitek machine.

OBSERVATION:

Every organism has its own capability of causing diseases but not all bacteria may lead to disease. The organism such as neisseria gonorrhoeae causes gonorrhoea which is sexually transmitted infection has its unique properties for causes symptoms and infections in the genital tract or more.

The severity of organism may also depend on the amount of organism obtained or seen in particular amount of sample.

After the identification comes the antibiotic detection process in which the antibiotics such as penicillin, ciprofloxacin, ampicillin suggested by doctors are inserted into the Muller Hinton Agar with the streaks of bacteria where the zone formations of all antibiotics are observed and reported to doctor for further treatment to avoid allergic reactions in patients.

VITEK-2 MACHINE:

The microorganism which are new to technicians are species with unable detection tendencies are taken in automated machine such as vitek-2 for identification of the microorganism.

The colonies grown in the culture plate is taken in inoculation tube for a little amount and diluted with some concentration of NaCl where the turbidity is checked and must be within range to get identified.

The diluted sample are aspirated with some required quantity in the vitek card and the card is placed into the sample holder.

The card also has specific number for every microorganism and its also contains a label where patients name and id number is written.

The computer is connected with the system where it is operated to start the process and also has an alarm which indicates when the test process is done.

The results are obtained and the organism are obtained in the computer after all the internal procedures of quantifying and detecting of microorganism is over,

The results are then transported through laboratory information system LIS.



BLOOD BANK

INTRODUCTION:

A blood bank is a centre where blood is gathered as a result of blood donation is stored and preserved for later use in blood transfusion. The term “BLOOD BANK” refers to a department of hospital usually within clinical pathology laboratory where storage of blood products occurs and where pre transfusion and blood compatibility testing is performed.

FUNCTIONS OF BLOOD BANK:

A blood bank collects, separates, tests and stores blood until a patient needs it. The first blood bank in the UNITED STATES was established in 1937 by Dr Bernard Fantus.

- Storage of blood
- Compatibility test
- Screening

BLOOD DONOR (SELECTION/REJECTION):

- well being
- age
- whole blood volume collected and weight of donor
- donation interval
- blood pressure
- pulse
- temperature
- respiration
- haemoglobin
- meal
- travel and residence
- pregnancy
- breast feeding
- abortion
- menstruation
- minor/major surgery
- cardiac medication

REJECTION CRITERIA:

All donors through a brief screening, including a health interview and medical history, a haemoglobin test, temperature, pulse rate and blood pressure. From this information, a decision about your ability to donate blood is made. There are certain conditions that mean you may never be able to follow the dictates of your community conscience. A history of hepatitis, heart disease, cancer and bleeding disorders, convulsions or AIDS or being in an AIDS risk group will disqualify you.

BLOOD BAG(TYPES)

- Single blood bag
- Double blood bag
- Triple blood bag
- Quadrapole blood bag

SINGLE BLOOD BAG:

Used for the collection, preservation, and transfusion of human blood.

DOUBLE BLOOD BAG:

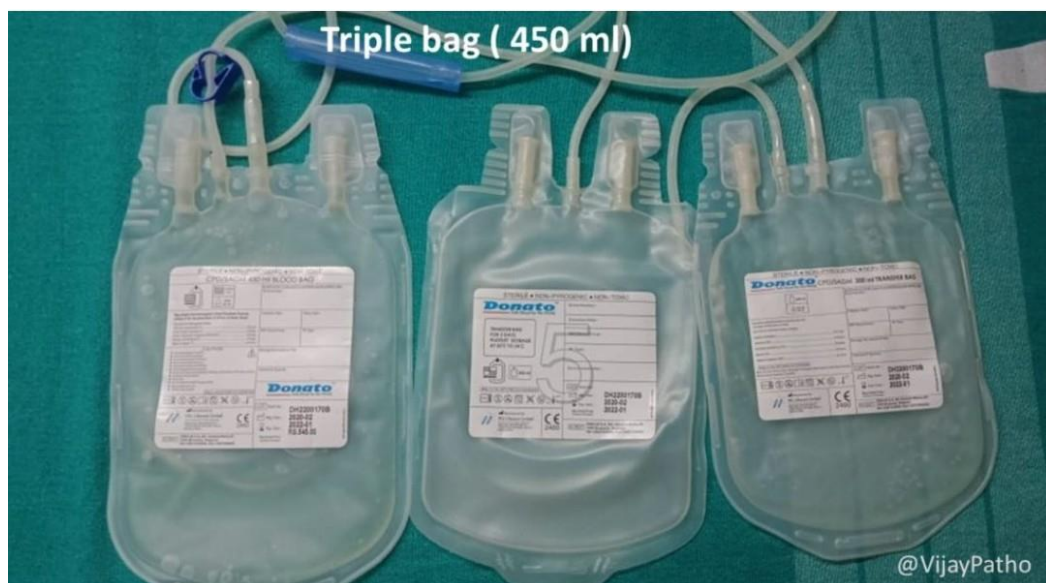
Separates red blood cells and plasma.it includes a primary bag and satellite bag.

TRIPLE BLOOD BAG:

This system separates red blood cells, plasma and buffy coat(includes leucocytes and platelets).it is made of a primary bag and two satellite bags.

QUADRAPULE BLOOD BAG:

Separates red blood cells, plasma, buffy coat(poor platelet) and platelets.



BLOOD DONOR REQUEST FORM:

- Date
- Name
- Address
- Email id
- Mobile number
- College or company address
- Male/female
- Weight
- Age
- Date of birth
- Blood group
- Last donation date
- Total number of donation
- When did you had last meal?
- Type of donor
- Pulse rate
- Fit/unfit
- Quantity
- Blood bag number
- Segment number
- Diseases/inflammation/disorder.

[illegible]

BLOOD DONATION:

Blood donation is vital part of worldwide healthcare.it allows for blood transfusion as life sustaining and life saving procedure. over one hundred million units of blood are donated each year throughout the world. this activity reviews donor eligibility and selection, adverse effects of donation, pathogen reduction and inactivation for donated blood.

There are types of blood donation:

- Allogenic
- Directed donation
- Replacement donor
- Autologous donation.

COMPLICATIONS:

Donors are screened for health problems that would put them at risk for serious complications from donating. First time donors are at high risk of reaction.2% of donors has adverse reaction.

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

BLOOD GROUPING:

- The human blood group system consist of 4 main components, the red blood cells, the white blood cells, the plasma and platelets.
- The ABO system is main blood grouping system behind the principle that people into one of the following 4 groups A,B,AB or O.
- When the antigen A is present on red blood cells is considered to have type A blood group
- When the antigen B is present on red blood cells is considered to have B blood group.
- When neither A or B are present, the person is said to have type O blood.

The rh system:

Red blood cells sometimes have another antigen, a protein known as the RhD antigen. if this is present, your blood is RhD positive.if it's absent, your blood group is RhD negative.

	Group A	Group B	Group AB	Group O
Red blood cell type				
Antibodies in plasma	 Anti-B	 Anti-A	None	 Anti-A and Anti-B
Antigens in red blood cell	 A antigen	 B antigen	 A and B antigens	None

BLOOD SCREENING:

A screening test is done to detect potential health disorders or diseases in people who do not have any symptoms of disease. the goal is early detection and lifestyle changes or surveillance, to reduce the risk of disease, or to detect it early enough to treat it most effectively screening tests are not considered diagnostic, but are used to identify a subset of the population who should have additional testing to determine the presence or absence of disease. the following are some examples of screening test:

- Cholesterol measurement
- Pap test
- Prostate specific antigen
- Mammography
- Colonoscopy
- Diabetes or prediabetes.
- HIV
- HCV.

COMPONENT SEPARATION:

All types of donation are now systematically depleted for leucocytes. leucocytes are eliminated to avoid immunological side effects to remove the cellular source of some viruses and prions, and to ameliorate blood conversion.

After filtration the whole blood donation is separated into several components:

PACKED RED CELLS:

Packed red cells from a donation of 450ml of whole blood are obtained after centrifugation and plasma removal. the red cells are then suspended in a nutritive solution. Storage: 2-6degree C up to 42days.

FRESH FROZEN PLASMA:

Fresh frozen plasma is obtained after centrifugation of whole blood and red blood cells removal, or through direct separation. the plasma must be frozen within 8 hrs after collection in order to preserve coagulation factors and other plasma proteins, because plasma can be stored for long time, plasma is kept in quarantine until the donor comes back for new donation so that he can be tested again for the infectious disease markers. This gives optimal security because infections undetectable at the moment of donation have now become apparent.

Storage:<30degree C up to 2years

PLATELETS:

Platelets are mainly obtained through thrombapheresis. platelet products formally obtained from mix of more than 10buffy coats can now be obtained from single thrombapheresis of about 40 minutes.

Storage: 20-24degreeC

CRYOPRECIPITATE:

It is an Anti Haemophilic factor also called cryo portion of plasma. It is used to prevent or control bleeding in people whose own blood does not clot properly. This includes patients with serious but rare hereditary conditions such as Haemophilia A.

STORAGE AND SHELF LIFE OF COMPONENTS:**Shelf life:**

Whole blood-35days

PRBC-35-42days

FFP-1 year

Platelet-5days

Cryoprecipitate-1 year

CROSS MATCHING:

Blood cross matching is a series of tests that are done before a blood transfusion is performed. These tests ensure that the blood is compatible between the person giving it and the person receiving.

If the blood isn't a good match for you, blood crossmatching helps to find blood that is close to your own for it to be a success. If the blood isn't a good match, your immune system could reject the donated blood, thinking that it is a foreign invader looking to harm your body. Your immune system could then create antibodies that fight against the new blood cells. This could cause a dangerous reaction.

Blood crossmatching is also called blood typing or compatibility test. Several tests are required to complete this process. The first test is blood typing which tells you blood type. This test also shows whether your Rh blood type is positive or negative. There are 4 blood groups:

- AB
- A
- B
- O

TYPES OF CROSS MATCHING:

There are 2 types of crossmatching test:

- Major crossmatching
- Minor crossmatching

It is necessary to check if the recipient has any antibodies that might resist donor cells.

The RBC's of the person receiving the donation are mixed with blood serum from the donor.

BLOOD BANKING RECORDS:

The recipient transfusion data file in the transfusion medicine laboratory shall be retained.

For each blood component issued, a record system shall be in place which documents:

- Recipient's name and identification
- Recipient's ABO group
- Recipient's Rh group
- Identification number and name of blood component
- Rh group of the blood component for red cells, platelets and granulocytes
- Compatibility verification for red cells and granulocytes
- Visual inspection
- Date and time of issue
- Name and identification number
- Volume and potency
- Dosage
- Visual inspection
- Date and time of issue
- Records of inspection of blood components and blood products prior to issue shall be retained for 5 years.

CONCLUSION:

We went for internship training from 14th November-19th November 2022 to LION'S blood bank of Ambathur branch. In the 1st day of training we started doing blood grouping and cross matching and blood collection. The 2nd day we started doing segmenting blood bag and sealing it. The 3rd day we learnt plasma grouping (reverse grouping). 4th day we did whole blood centrifuge. the training was very useful for us to learn definite techniques in laboratory. the laboratory has the basic equipment like screening, centrifuge, refrigerator, expressor and weighing machine.



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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
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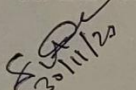
30.11.2023

TO WHOMSOEVER IT MAY CONCERN

This is to certify that **Ms.SUDHA.V** (Reg.No.41737025), B.Sc (MLT) student of Sathyabama Institute of Science and Technology had done her internship in the Department of Laboratory for the period from 01.11.2023 to 30.11.2023 at our Institution.

We wish her all the best for her future endeavors.

For THE VOLUNTARY HEALTH SERVICES


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Date: 12th Dec 2022

TO WHOMSOEVER IT MAY CONCERN

This is to certify that Ms. Sudha. V, 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. 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

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

