426

R. J. COLLEGE of Arts, Science & Commerce (AUTONOMOUS)

(Hindi Vidya Prachar Samiti's RAMNIRANJAN JHUNJHUNWALA COLLEGE of Arts, Science & Commerce)
Opposite Ghatkopar Railway Station, Ghatkopar (West), Mumbai 400086, Maharashtra, INDIA.
Website: www.rjcollege.edu.in Email: rjcollege@rjcollege.edu.in Tel No: +91 22 25151763 Fax No: +91 22 25150957

Affiliated to UNIVERSITY OF MUMBAI II NAAC Re-Accredited 'A' Grade (CGPA: 3.50)

Department of Biotechnology

On Job Training Completion Report

This is to certify that Nandini Pravin Thorat has completed On Job Training at

Central Pathology Laboratory

Date of Commencement	Date of Completion	Total Number of Days	Total Number of Hours completed in OJT
26-12-2023	30-1-2024	30	180

Name of the Guide/ PI/ Incharge : Dr. Pradnya P. Tike

Phone Number of Guide/ PI/ Incharge : 9821011681

Email Address of the Guide/ PI/ Incharge : tikepathlab@gmail.com

Ramniranjan Jhunjhunwala College NAAC Re-Accredited "A" Grade Ghatkopar, Mumbai-86

Central Pathology Laboratory
Ground Floor, Ramkunwar Mansion,
Ramwadi, Opp. Zojwalla Petrol Pump,
Bail Bazaar, Kalyan (W).

Signature of Guide/ PI/ Incharge

Stamp

Roll no.-426

Name – Nandini Pravin Thorat

Std- MSc.-Bt-I

Report on the observations or practical work carried out during On Job training.

My name is Nandini Pravin Thorat and I am pursuing Master's degree in biotechnology from Ramniranjan Jhunjhunwala college. I have done my on-job training in Central pathology laboratory which is situated in Kalyan, Mumbai from 26th December 2023 till 30th January 2024, for approximately 180 hours. I have been working there on mainly on biochemistry analyzer and hematology analyzer under the guidance of Pradnya Tikke mam and Pravin Sir, as a Part of my educational purpose.

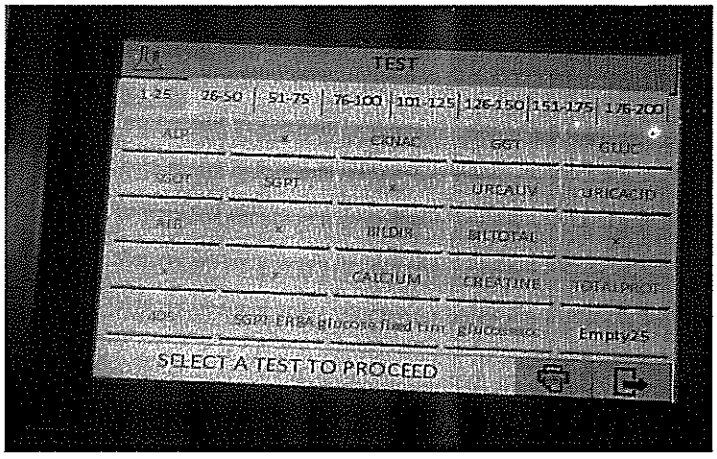
First few days I had learn about various types of **anticoagulant tube** which includes, Plain tube, EDTA tube, Citrate tube, Heparin tube, Clot activator tube, fluoride tube. Color of these tube and presence of anticoagulant which separated plasma or serum from those particular tubes.

Then they introduced me to **biochemistry analyzer** which runs various test such as:

1) LFT i.e., liver function test (for function of liver) it includes various test such as
    a. Bilirubin total and direct (These tests help diagnose and monitor conditions such as liver disease, jaundice, and hemolytic anemia.),
    b. SGOT and SGPT test (Both tests are often included in liver function panels to assess liver health, diagnose liver diseases, monitor the progress of treatment, and determine the extent of liver damage.),
    c. Alkaline Phosphatase test (used to diagnose liver disease, such as hepatitis or blockage of the bile ducts),
    d. total protein test (This test measures the total amount of protein in the blood, including albumin and globulin. It helps evaluate nutritional status, liver and kidney function),
    e. Albumin test (The albumin test measures the level of albumin in the blood. Low albumin levels can indicate liver disease, kidney disease, malnutrition).
2) RFT i.e., Renal Function Test or Kidney function test (RFTs are used to diagnose kidney disease, monitor the progression of kidney disease, and evaluate the effectiveness of treatment. They are also used to assess the risk of kidney damage in people with conditions such as diabetes or hypertension.)
   it includes various test such as:
    a. Creatinine
    b. Uric acid

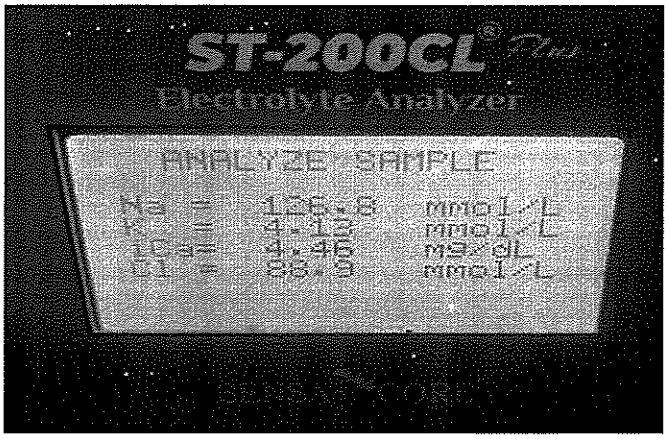
c. Calcium
d. Serum Urea
e. Inorganic Phosphorous
f. BUN (Blood urea nitrogen)

3) LPT (Lipid Profile Test) - measures the levels of various types of fats (lipids) in the blood. lipid profile test is to assess the risk of developing cardiovascular disease (CVD) and to monitor the effectiveness of treatments for high cholesterol or other lipid disorders. it includes various test such as:
   a. Cholesterol
   b. Triglycerides
   c. HDL
   d. LDL
   e. VLDL
4) Pancreatic test (These tests are used to diagnose various pancreatic disorders such as pancreatitis, pancreatic cancer, cysts, or pancreatic insufficiency. The choice of tests depends on the suspected condition and the individual's symptoms and medical history.) it includes various test such as:
   a. Lipase
   b. Amylase
5) Sugar Test - These tests are used to diagnose diabetes, monitor glucose control in people with diabetes, and screen for prediabetes. The results of these tests help healthcare providers determine the appropriate treatment and management plan for individuals with diabetes or prediabetes.
   a. FBS (Fasting blood sugar)
   b. PPBS (Post Prandial blood sugar)
   c. RBS (Random Blood Sugar)

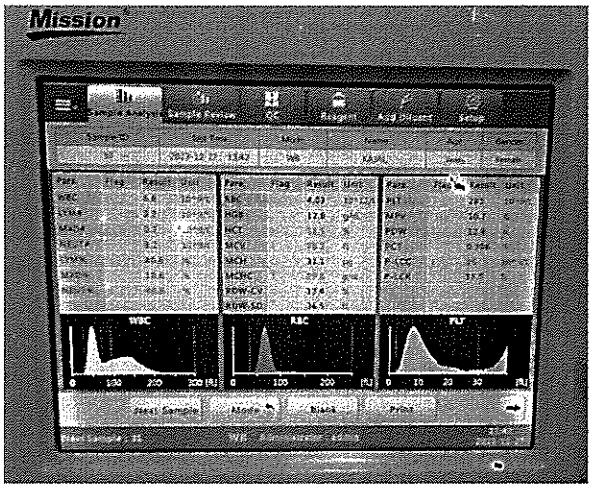


These are the test which runs on biochemistry analyzer. All these tests perform half manually, like it includes separating serum or plasma from respected anticoagulant tube and adding of specific reagent or standard which is different for each test, with particular volume using micropipette according to kit based sheet which has been provided along with analyzer. And rest work is belonging to machine which includes aspirating sample and giving reading (level) about particular test of component.

There was also one separate analyzer for **electrolyte** which included analyzing of electrolyte levels from serum such as sodium, potassium, ionic calcium and chlorine.

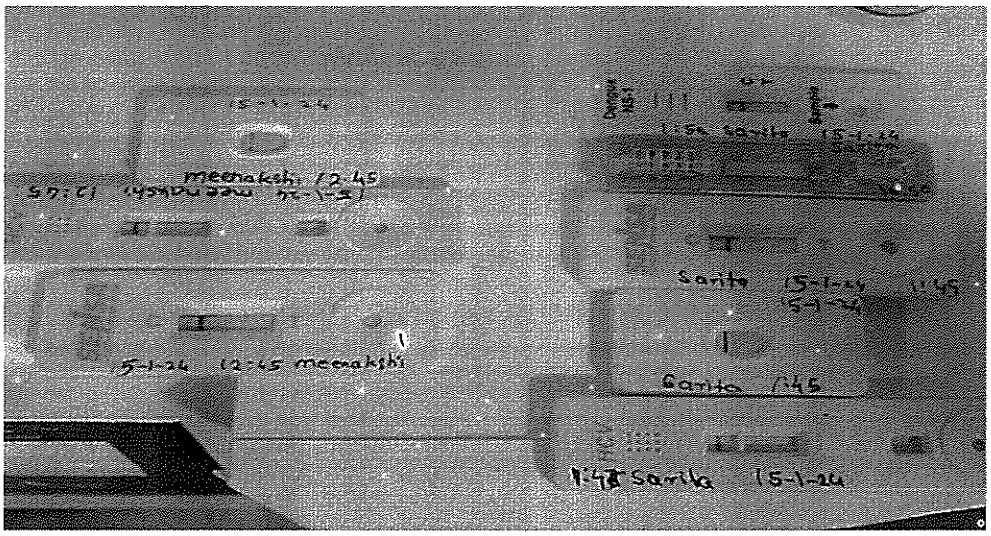


Then I learned and work on **Hematology analyzer** which check the levels of different components in blood such as WBC, RBC, Hemoglobin, Platelate, Hct (Hematocrit), MCV (Mean



Corpuscular Volume), MCH (Mean Corpuscular Hemoglobin), MPV (Mean Platelet Volume), RDW (Red Cell Distribution Width). This analyzer shows elevated levels in red color and decrease levels in blue color.

I also learned about **serological test** which included **HIV** (Human immunodeficiency virus), **HCV** (Hepatitis C virus), **HBSAG** (hepatitis b virus), **Dengue NS1, Dengue (IgG, IgM)**, **VDRL** (Venereal Disease Research Laboratory), **HEV** (Hepatitis E virus), **HAV** (Hepatitis A virus).

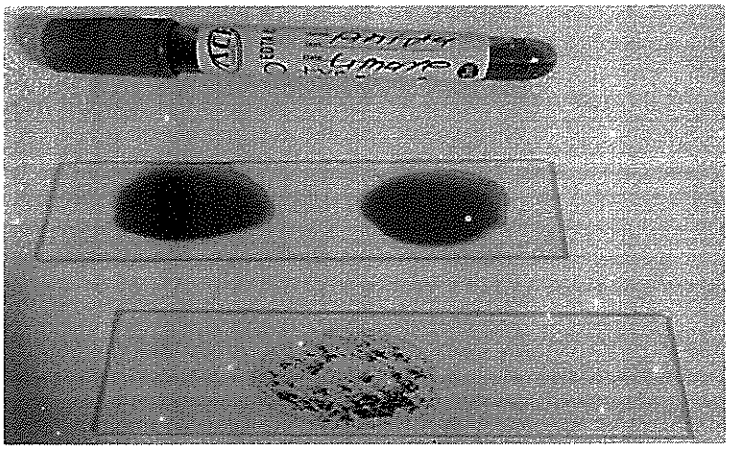


All these tests are kit-based test and respective buffer are provided. these are serum used test, there are also 2 whole blood test I learned which include Malaria Parasite antigen test and Trop-T test (Troponin-T).

I also learned about **urine analysis**. Patients' urine routine is also important for identifying glucose, ketone, blood in urine. A urine routine test, also known as a **urinalysis**, is a common test used to evaluate the health kidneys and urinary tract.it includes physical parameter, chemical parameter and microscopy of urine sample. In the physical parameter, there are various factors like quantity, color, appearance which should be checked. And chemical parameters are checked by **dip-strip method** for checking presence of sugar, protein, occult blood, ketone. And microscopy performed by preparing slide under electron microscope for checking presence of puss cells, epithelial cells, RBCs, Bacteria, Crystals such as Calcium oxalate crystals, phosphate crystals, uric acid crystals. I have observed various urine slides under microscope and also components present in urine.

I also learned to prepare slides of patients' blood which is generally cross check if the hematology analyzer gives elevated platelets number. These laboratory uses ethanol for fixation, field's stain and eosin stain for staining. I have observed various slide of blood under microscope which had elevated level of platelets WBCs in their blood.

I have also tested blood groups in a pathology lab which has been valuable experience for me as a biotechnology student.



It provided me hands-on experience essential laboratory process, such as **blood typing**, it offered me with an opportunity to understand the importance of accurate testing and the implications of blood group compatibility in various medical contexts, including transfusion medicine and organ transplantation.

During this one-month duration of my on job training I have closely observed various laboratory analyzer such as biochemistry, hematology and electrolyte analyzer. I had gain practical experience working with samples, analyzer. I handled those analyzers under the guidance of Tikke mam and Pravin sir and cleared all my doubts. I have become proficient in techniques such as sample preparation, microscopy, which are also fundamentals in biotechnology and I can use it in my field proficiently. I have developed strong laboratory skills, including attention in detail, accuracy in measurements, and adherence to protocols, which are also essential in biotechnology settings. I had expanded my knowledge of human anatomy, diseases, and diagnostic procedures, which will be valuable in biotechnology applications related to healthcare and medicine. I had a chance to network with professionals in the field, which may lead to future job opportunities.

Hence, working in these pathology laboratories provided me with practical skills, knowledge and experience which I will directly able to apply in my biotechnology career.

Name – Nandini Pravin Thorat

Roll no. 426

Std- MSc. -Bt-I

Report on theory and protocols studies for performing karyotyping

My name is Nandini Pravin Thorat and I am pursuing Master's degree in biotechnology from Ramniranjan Jhunjhunwala college. College had organized theory and protocols for performing karyotyping by Possum mam which took place for someday. During this duration I got detailed knowledge of karyotyping.

During **Leucocyte Culture Procedure for Chromosome Preparation**, on first day, we have removed media, serum, and phytohemagglutinin from the freezer to thaw them to room temperature before use. This was important to prevent stalk to the cells and ensure that the components mix properly. Then the culture medium and the human serum needed to be warmed up to body temperature to mimic the physiological conditions for the cell. After that, PHA, that is, phytohemagglutinin, was leaved at room temperature. The laminar hood is a sterile workplace used to handle to the cell cultures. Cleaning it with a methanol swab helped to maintain sterility. UV light was used to sterilize the workspace further, killing any remaining microorganisms. During **planting of the whole blood culture**, we have taken 4 ml of RPMI 1640, which is commonly used medium for culturing cells and other components like human serum and phytohemagglutinin, which often added to support cell growth and activation. 1 ml of human serum, 0.2 ml of PHA(M), and 0.01 ml of PHA(P), and 8 drops of blood. These all the materials were taken through syringe.
Cleaned the mouth of all the vials with methanol and closed the screwcaps tightly. Kept the vials in a Petri dish cleaned with methanol and keep in the incubator at 37 $^{\circ}$ C for 72 hours. At the 70th hour add 0.1 ml of colchicine (10 ug /ml) to each vial. Mixed properly and incubated for 1 hour.

During **termination** step, kept pipettes, centrifuge tube, and round bottom tubes for according to the number of vials and named them properly. Then we had removed the vials from the incubator and transferred it to the contents into the graduated glass centrifuge tube, which has a 15 ml of capacity with the same labels. Then centrifuge it at 1000 rpm for 10 minutes. Then the supernatant was removed, leaving the pallet behind. Then the remaining content mixed and added pre-warmed KCL to make the volume of 5 ml and then mixed thoroughly and incubated it at 37 °C for 20 minutes.

During **fixation** step, the tube which was centrifuged at 1000 rpm for 20 or 10 minutes, this supernatant was removed from it and the fixative was added which is of the ratio 1 is to 3 of glycolytic acetic acid and methanol and mixed the pallets simultaneously, made the volume to the 5 ml and stored in the temperature overnight.

This way, we had successfully completed the fixation step by adding the fixative to the pellet and stored it overnight. This process helped preserve the cellular structure and the molecule for the further analysis.

During **slide preparation**, Next, day the tubes were removed from the refrigerator centrifuge and 2-3 washes were given with fixative till the pallet become white. At the end, the discarded supernatant leaving behind the fixative till 0.5 ml, kept the hot plate at 40°C and took acidified chilled slides, i.e., the slides which kept in cold water in refrigerator, and mixed the pallet thoroughly and dropped it on the cold slide from a height and kept on the hot plate to heat dry. Next, removed the slide stain with plain ginseng and saw under the microscope. There were adequate number of good qualities of metathesis were achieved in my slide, which can be a sign of a successful culture. So, this way, I have followed a detailed procedure for preparing and analysing cell culture slides and achieved a good number of high-quality metaphases, which is a positive sign for the success of a culture.

This way, during these days of karyotyping theories and practical's allowed me as a biotech student to visualize and analyse the number, size, and shape of chromosomes in any organism. This understanding is crucial for studying genetic disorders, identifying chromosomal abnormalities, and assessing genetic diversity within population. I as a biotech student may in future work in clinical settings where karyotyping will be used to diagnose genetic disorders such as Down syndrome, Turner syndrome, and various types of cancer. Knowing how to perform and interpret the karyotypes is very essential for the accurate diagnosis and patient's care in my future. As a biotech student, I also needed this karyotyping session to be proficient in karyotyping techniques to contribute to advancement in the field such as genetics, developmental biology, and evolutionary biology. As we know, biotech companies often use karyotyping as a quality control measure for the cell lines and other biological products. So, understanding these karyotyping protocols ensure that as a biotech student, I can maintain the integrity and consistency of the research or manufacturing process.

Learning karyotyping protocols provides me as a biotech student with hands-on laboratory skills including sample preparation, chromosome staining, microscopy, and image analysis. These skills are transferable to other molecular biologic techniques and are valuable for my future career opportunities in academia, industry, or healthcare.