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 Priyanka Prakash Bhuwad has completed On Job Training at

MediCheck Lab; Mulund (W)

Date of Commencement	Date of Completion	Total Number of Days	Total Number of Hours completed in OJT
3/1/2024	3/2/2024	30	150

Name of the Guide/ PI/ Incharge : Dr. Shilpa Deshpande

Phone Number of Guide/ PI/ Incharge : 9167018131

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

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

Gupta 22-03-24

Dr. Shilpa Deshpande's MediCheck Lab Mulund (W)

Signature of Guide/ PI/ Incharge

Stamp

Priyanka Bhuwad
MSc.BT- 413

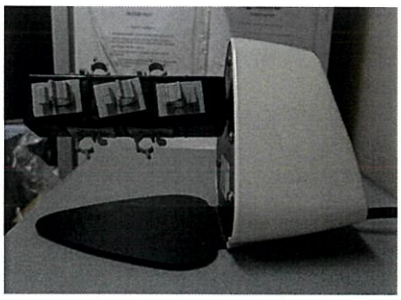
Report on On Job Training (OJT)

This report details my on-job training (OJT) experience at MediCheck Lab, Mulund West, Mumbai - 400080, conducted under the guidance of Dr. Shilpa Despande and his fellow co-workers. The training spanned from 3rd January 2024 to 3rd February 2024 (150 hours) and provided valuable insights into the practical aspects of a pathology laboratory. I was exposed to different clinical biochemistry techniques involving automated, semi-automated and manual testing methods of various samples such as blood, stool, semen and urine.

I was introduced to many techniques such as basic Phlebotomy, routine pathology techniques like stool routine, urine routine and also complete blood count, along with the biochemistry and operation under the guidance of the respective technician. During my training, I gained hands-on experience with various laboratory instruments crucial for diagnostic testing. These instruments included:

- **Centrifuge:** This workhorse of the laboratory utilizes centrifugal force to separate components of blood and other samples based on their density. It's essential for isolating red blood cells, white blood cells, plasma, serum, and other components for further analysis.

- **Rotary Shaker**: This instrument gently mixes samples in tubes or flasks on a rotating platform. It's commonly used for various applications, such as mixing blood samples with anticoagulants, facilitating antibody-antigen reactions in immunoassays, and promoting uniform cell growth in cell culture experiments.



Hematology Analyzers

- **Medonic Cell Counter:** This automated instrument performs complete blood counts (CBC) by analyzing the size, number, and characteristics of red blood cells, white blood cells, and platelets. This provides valuable information about blood cell health and potential underlying conditions like anemia, infection, or leukemia.

Urinalysis Equipment:

- **DX Urilyzer 100 Pro:** This automated analyzer conducts a comprehensive analysis of urine samples. It measures various parameters like pH, specific gravity, glucose, protein, white blood cells, and red blood cells, aiding in the diagnosis of urinary tract infections, kidney diseases, and diabetes.

Immunoassay Systems:

- **MISPA-i2:** This automated immunoassay system performs a variety of tests by utilizing antibodies to detect specific biomarkers in patient samples. Examples include IgE (allergies), CRP (inflammation), RF (rheumatoid arthritis), D-dimer (blood clot formation), and ferritin.

- **DX Instacheck II :** This rapid immunoassay system provides quick results for various analytes like β-hCG (pregnancy), TSH (thyroid function), troponin I (heart attack), dengue NS1 antigen (dengue fever), ferritin (iron stores), and PCT (bacterial infection).

Coagulation Analyzers:

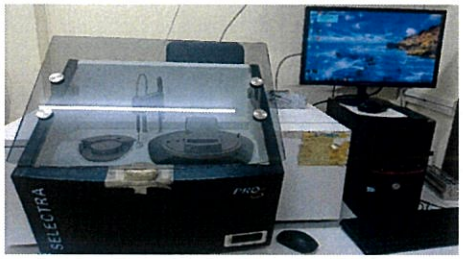
- **Erba Mannheim ECl 105:** This instrument measures blood coagulation parameters like prothrombin time (PT) and activated partial thromboplastin time (aPTT). These tests assess blood clotting time and help diagnose bleeding disorders or monitor patients on blood-thinning medications.

Other Specialized Instruments:

- **Sperm Meter:** This instrument evaluates sperm motility and concentration, aiding in male infertility diagnosis.

- **proLYTE and SEDY 12 ESR:** These instruments analyze the erythrocyte sedimentation rate (ESR), which is a nonspecific test for inflammation.

- **Selectra ProS and Mindray BS-240 E Analyzer:** This automated chemistry analyzer performs a broad range of biochemical assays on various patient samples, providing insights into organ function and metabolic status.



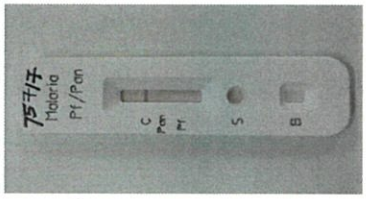
In addition to instrument operation, I participated in the following laboratory techniques:

- **Microscopic Examination**: Comprehensive training in preparation and analyzing slides prepared from various samples like semen, urine, and stool. This included identifying normal and abnormal cell morphology for accurate diagnosis.
- **Chemical tests:** Performing manual tests like occult blood test for stool sample to observe the presence of blood in the stool and semen fructose test on semen samples to indicate the presence of fructose.
- **Blood collection**: Observing and assisting trained staff with blood collection from patients.

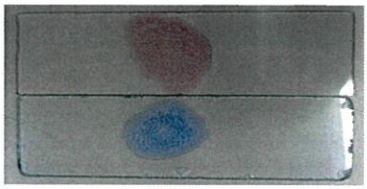
I was introduced to kit-based assays for different tests. Some are given below:

- **HIV, HCV, HBsAg**: These rapid tests detect the presence of antibodies or antigens associated with Human Immunodeficiency Virus (HIV), Hepatitis C Virus (HCV), and Hepatitis B Virus (HBV) respectively. Early detection of these infections is crucial for timely treatment and prevention of transmission.

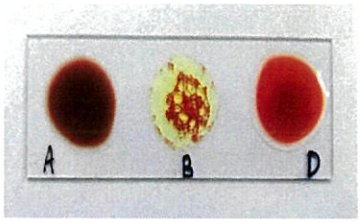
- **Malaria and Dengue**: These immunochromatographic assays diagnose malaria and dengue fever by detecting specific parasite antigens or viral proteins in patient blood samples. This allows for prompt initiation of appropriate treatment for these potentially life-threatening illnesses.



- **Widal Test:** This traditional test uses a panel of antigens to screen for typhoid fever by detecting antibodies developed against the *Salmonella typhi* bacteria.



- **Blood Grouping and Rh Factor Determination**:Kit-based assays are available for rapid blood type (ABO and Rh factor) determination. This information is essential for safe blood transfusions and managing Rh incompatibility during pregnancy.



I also gained experience in the following administrative tasks involving entering patient information into the laboratory information system (LIS) , preparing patient reports based on laboratory results and communicating results to healthcare providers or patients.

The OJT program at MediCheck Lab was an invaluable learning experience. I gained hands-on experience with various instruments and laboratory procedures, enhancing my understanding of diagnostic testing in pathology. I learned the importance of accuracy, precision, and quality control in patient care. Additionally, I developed essential skills in patient interaction, data entry, and reporting. This experience has solidified my interest in the field of laboratory medicine and motivated me to pursue further training or education in this area.I am grateful to Dr. Shilpa and the entire staff for their guidance and support throughout this enriching program.

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Report on Karyotyping Training

The ATC course was organised by the Department of Biotechnology in the Ramniranjan Jhunjhunwala College. This course included a hands-on training course on karyotyping aimed to provide students with practical knowledge and skills in the field of cytogenetics, particularly focusing on chromosome preparation using the leucocyte culture procedure.The students enthusiastically engaged in the course activities.

Karyotyping is a fundamental technique in cytogenetics that involves the visualization and analysis of an individual's chromosomes. It is crucial for the diagnosis of various genetic disorders and abnormalities. Dr. Posam, a renowned specialist in cytogenetics, led the training session, providing participants with insights into the importance and application of karyotyping. She elucidated the fundamental principles underlying karyotyping, including chromosome structure, staining techniques, and interpretation of results.The participants were briefed on various genetic disorders identifiable through karyotyping, such as Down syndrome, Trisomy 21, Mosaicism, Williams syndrome Turner syndrome, and Klinefelter syndrome. The case studies and real-life examples were discussed to illustrate the clinical significance of karyotyping in Prenatal diagnosis, Postnatal diagnosis, Cancer diagnosis, Infertility evaluation and Carrier testing.

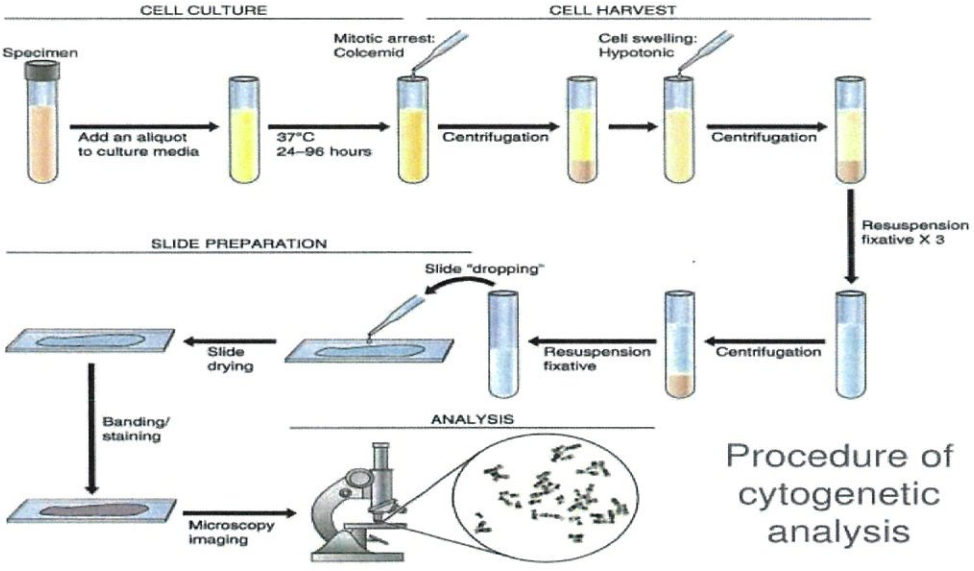
The hands-on session focused on the leucocyte culture procedure for chromosome preparation. Participants were guided through the step-by-step process of culturing leukocytes, synchronization, harvesting, and slide preparation for karyotyping. Dr. Posam shared her experiences and insights into interpreting karyotype data accurately. She had also explained about the CO2 incubator. The participants learned how to identify normal and abnormal karyotypes, as well as common chromosomal aberrations associated with genetic disorders. The careful analysis of karyotypes can also reveal more subtle structural changes, such as chromosomal deletions, duplications, translocations, or inversions. The emphasis was placed on quality control measures and troubleshooting techniques to ensure the reliability and accuracy of karyotyping results.

We were also shown to identify a chromosome after banding. Banding patterns are chromosomal patterns of bright and dark transverse bands. These bands identify where genes are located on a chromosome. The bright and dark bands are visible when the chromosome is stained with a chemical solution and examined under a microscope.

Leukocyte Culture Procedure for Chromosome Preparation
T lymphocytes from peripheral blood are induced to divide using a plant lectin, phytohemagglutinin. The maximum mitotic index is reached at 72 hours of culture.

Peripheral blood was drawn from using a sterile technique into the EDTA tube. A culture medium containing nutrients and a mitogen (cell growth stimulant) was prepared using RPMI 1640 culture Media, Human Serum/FBS, PHA(M) and PHA(P).Blood drops were added to the culture medium and incubated at a controlled temperature of 37°C for 72 hours in the CO2 incubator. During incubation, leukocytes in the blood sample divide mitotically.After a specific incubation period (70 hours), a mitotic inhibitor like colchicine was added to the culture.Colchicine arrests cells at metaphase, when chromosomes are condensed and most visible.The culture was then centrifuged to pellet the cell.

The cell pellet was treated with a prewarmed KCl (hypotonic solution) to swell the cells and spread the chromosomes. A fixative solution (1:3 glacial acetic acid: methanol) was added to preserve the cell structure and chromosomes. A few drops of the fixed cell suspension were dropped from height onto a chilled glass slide then kept on the hot plate to heat dry to spread the chromosomes. A G-banding technique is used to stain the chromosomes with Giemsa stain, creating characteristic banding patterns.This allows for visualization and identification of individual chromosomes.The stained slides were examined under a microscope.Images of well-spread metaphase plates (cells with condensed and arranged chromosomes) were captured.A karyotype was constructed by arranging and pairing chromosomes based on their size, centromere location, and banding pattern.



Karyotyping is a complex yet essential technique for diagnosing chromosomal abnormalities. This course on karyotyping provided me with an invaluable firsthand experience in this crucial cytogenetic technique. I gained a deeper understanding of the theoretical principles and practical steps involved in chromosome analysis. Observing Dr. Posam's expertise in karyotyping and interpretation was particularly enriching. This training has solidified my interest in the field of cytogenetics and its role in diagnosing genetic disorders.We extend our sincere gratitude to Dr. Posam for her expertise and guidance throughout the training session. Special thanks to our department for organizing this enriching educational initiative.