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Dodoma

REPORT OF SIX-WEEK TRAINING ON DIAGNOSIS OF ACUTE LEUKEMIA IN CHILDHOOD AT THE HAEMATOONCOLOGY LABORATORY -UNIVERSITY OF PADOVA, ITALY

1. INTRODUCTION

This report summarizes my six-week specialized training program on the diagnosis of acute childhood leukemia conducted at the Hospital of University of Padova, Italy. The training took place from 8th October to 15th November within the Haemato-Oncology Laboratory of the Department of Maternal and Child Health, a leading pediatric diagnostic center equipped with advanced flow cytometry, cytogenetics, and molecular platforms. The primary focus of the training was advanced Flow Cytometry, specifically using the DxFLEX flow cytometer by Beckman Coulter. The training aimed to strengthen competence in immunophenotypic diagnosis, data interpretation, and the integration of flow cytometry findings into comprehensive pediatric leukemia workups. Additionally, the lab performs morphology, cytogenetics, and molecular diagnostics.

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2. TRAINING OVERVIEW AND STRUCTURE The program was structured into weekly modules, with continuous emphasis on building strong flow cytometry skills.

Week 1: Orientation and Laboratory Introduction I was introduced to the Hemato-Oncology Laboratory setup, its workflow, biosafety systems, and sample handling procedures. An overview of pediatric leukemia epidemiology and the WHO 2022 classification was provided. Flow cytometry principles and the role of immunophenotyping in leukemia diagnosis were introduced early to set the foundation for subsequent weeks.

Week 2: Sample receiving, preparation and staining protocols I was also able to be taken through the sample receiving process, as the laboratory receives samples from all around Italy, i.e. it is the designated center for Leukemia diagnosis. Also, I was able to get familiar with the sample preparation techniques and staining protocols for the various panels of flow cytometry being performed. i.e Primary panel for diagnosis, B-ALL secondary panel and T – ALL secondary panels. Although the primary focus was on Flow cytometry, morphology provided essential background for correlating blast

appearance with immunophenotypic findings. Specialists in the lab reviewed peripheral blood and bone marrow smears, identifying lineage features that guide panel design and interpretation.

Week 3-5: Intensive Flow Cytometry Training with DxFLEX by Beckman Coulter These three weeks formed the core of the training, with extensive sessions emphasizing DxFLEX operation and diagnostic immunophenotyping. Key areas covered included: - Daily instrument quality control and maintenance - Detector configuration, compensation, and fluorochrome selection - Creation and optimization of leukemia diagnostic panels - Staining protocols and sample preparation - Data acquisition using CytExpert software and Kaluza 2.0 - Gating hierarchy development and blast population identification - Interpretation of immunophenotypic patterns for ALL (B-cell and T-cell) and AML I was able to perform analysis on real clinical cases, comparing DxFLEX results with morphology findings. The sensitivity, ease of use, and reproducibility of DxFLEX were highlighted as key advantages for pediatric leukemia diagnostics. Note: During this phase I was also welcomed to present and talk about my country of Tanzania and Benjamin Mkapa Hospital.

Week 6: Independent Flow Cytometry Practice and Competency Assessment The final week involved independent operation of the DxFLEX system, from sample preparation to full data analysis. I was able to perform panel setup, gating, interpretation, and reporting under supervision.

3. KEY LEARNING OUTCOMES The main outcomes—particularly in flow cytometry—include: - Strong proficiency in DxFLEX operation, maintenance, and troubleshooting