Advanced Training for Pathologists in Molecular Diagnosis for Cancer Control at Tata Medical Centre, Kolkata

April – May 2025

Eight experienced pathologists from four government medical colleges in Tamil Nadu underwent two-week observership training at Tata Medical Centre (TMC), Kolkata in four batches from April 7 to May 30, 2025. The specialists, selected by the Directorate of Medical Education & Research (DME&R), were from Madras Medical College, Institute of Child Health (ICH), and Government Medical Colleges in Coimbatore, Madurai, and Tirunelveli.

Training objectives

This training in molecular diagnostics aimed to equip the pathologists at selected government medical colleges designated as cancer care centres in Tamil Nadu with sufficient skills and knowledge to perform quality molecular diagnostic tests with the existing Polymerase Chain Reaction (PCR) and Florescence in Situ Hybridisation (FISH) equipment, which contribute to determining effective treatment regimens such as the following:

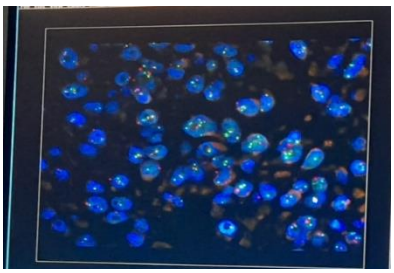
FISH	• HER2/neu for breast, endometrium, ovary, stomach, colon, lung and head and neck cancers • N-myc for Neuroblastoma • EWSR for Ewing's sarcoma • t(8,21), t(15,17) for Leukaemia • SS18-SSXI for synovial sarcoma
PCR	• Kras, Nras, Hras for Colorectal cancer • EGFR, ALK, RET, ROS, MET and BRAT for lung cancer • FLT3 for Leukaemia • qMIDS for oral cancer

Currently, although targeted therapy drugs such as Pertuzumab, Emtansine and Trastuzumab are available at government hospitals, their administration is often empirical or based on molecular testing performed in private facilities, incurring significant out-of-pocket costs for patients. This program aims to bridge that gap by strengthening the skills at the government facilities already equipped with the hardware, so that necessary tests can be performed in-house, thereby reducing the costs to applicable patients and increasing the effectiveness of the targeted therapies at the government cancer care centres.

Observer training at TMC Kolkata

Under the mentorship of Dr. Deepak Mishra (Laboratory Director) and Dr. Mayur Parhar (HOD, Cytogenetics) of Department of Laboratory Sciences of TMC, the pathologists from Tamil Nadu learnt various techniques related to molecular diagnostic tests from sample preparation to result interpretation and report writing including the following:

- FISH: Sample preparation, hybridization, signal detection, interpretation per clinical guidelines



Her2 neu positive case

- PCR: RNA extraction, cDNA synthesis, and real-time quantification
- Sanger Sequencing: PCR amplification, cycle sequencing, and chromatogram analysis

Batch 2 at training completion

During their observership at TMC spanning for eight weeks, the trainees developed a set of **Standard Operating Procedures (SOPs)** for the techniques they learn, with the first batch started its development, handed over to the subsequent pairs of the pathologists. These documents, once finalised, are expected to serve as guiding documents for them and other pathologists in ensuring practical and standardised implementation across the relevant government institutions.

Putting the learning into practice

The eight pathologists as a group are now tasked **to finalise the SOPs** by the end of August 2025. Also envisaged as master trainers at each institution, they are **training fellow pathologists, laboratory technicians as well as PG students as per the action plan** each institution established at the end of the observership at TMC.

The eight trained pathologists are also expected to be instrumental in **mainstreaming the molecular diagnostic tests for cancer treatment at each institution**. The action plans mentioned above have identified a number of **structural/institutional challenges in this context,** including (i) non-accessibility of the equipment for clinical services by the Pathology Dept., (ii) human resource shortages, (iii) procurement of necessary supplies and (iv) changing the current outsourcing practice to generate demands for the in-house molecular diagnostic services for cancer treatment.

The DME will be the lead agency to address the challenges mentioned above. To ensure accountability and continuous quality improvement, the JICA Project team is monitoring the implementation of the action plans at each institution as well as the finalisation of the SOPs.

Major dissemination activity – Pre-conference workshop organised by ICH

Hands-on workshop on qPCR technique

As a part of the post-training skill dissemination, a hands-on workshop was organised on the 24th July 2025 in conjunction with the Annual event of Tamil Nadu Pondicherry Chapter of Indian Association of Pathologists (IAPM) (TAPCON'25). Dr Chandramouleeswari, HOD (Pathology) of Institute of Child Health (ICH), led the session in which some of the learned techniques utilising FISH and PCR were imparted to some 60 attendees. Dr Chandramouleeswari said "Thanks to JICA's support, we were able to acquire the necessary skills to perform molecular cancer diagnosis techniques and have also begun efforts to disseminate those skills".

The training was organised under the TNNCD (Oncology) Project as a part of its "OUTPUT 3" component, which specifically aims to **enhance clinical skills and practices for cancer diagnosis and treatment at government cancer care institutions.**

Besides pathology, observership training in **surgical oncology, radiation oncology, and surgical gastroenterology** are/have been carried out by the Project at renowned institutions in India and Japan.