

ROBOTICS & AI IN HEALTHCARE

On February 14, national and international experts of repute had gathered to present the latest updates in their respective fields in a think tank organised by **Suraksha Diagnostics**, in association with **The Economic Times**. The idea was to showcase leading edge laboratory technologies in Molecular Pathology and Diagnostics changing lives today

The medical world is undergoing huge transformation and disruption with each passing day, which at times makes it difficult to keep abreast of so many technologies and updates in various domains of knowledge. One of the primary areas witnessing such colossal changes would be Molecular Biology, as advancements in computer science are also allowing experts to decipher conundrums that were unsolved so far. To highlight these areas, Suraksha Diagnostics, in association with *The Economic Times*, had organised a think tank on February 14 with experts from India and abroad. The discussions centred around state of the art tests being performed in labs and also R&D in times to come. The experts also agreed that it's imperative to make new technologies affordable for the mass. On this occasion, Suraksha Diagnostics also introduced the first fully automated robotic platform in its new lab in Rajarhat. The introduction of robots with AI not only increases productivity, but also reduces human error significantly.

SESSION I PCR & Real Time PCR: Gateway to Molecular Diagnostics



(L to R): Dr Joydeep Mukherjee, researcher, University of California; Anne Beyou Zulliani, PhD, Molecular Diagnostics, Paris; Dr Col Mithu Banerjee, additional professor; Dr Syamasis Bandyopadhyay, consultant physician and rheumatologist

Chaired by Dr Joydeep Mukherjee, researcher, University of California, San Francisco, the panel discussion focussed on the uses and scope of polymerase chain reaction (PCR) and Real Time PCR in cancer diagnosis. "Real Time PCR comes with advantages such as specificity, sensitivity and reproducibility, etc and can also be applied in cases of DNA damage measurement, radiation exposure assessment, in vivo imaging of cellular processes, genotyping, etc." Highlighting the benefits of

digital PCR, Dr Mukherjee also added that a revolution in the analysis of the cancer genome over the last few years has been the application of NGS protocols. Drawing attention to multiplex PCR in consideration with diagnosis of different syndromes and underscoring the need to address the global concern of infectious diseases, Anne Beyou Zulliani, PhD, Molecular Diagnostics, Paris, said, "Molecular methods are beneficial in direct detection and find application in Hepatitis, HPV, respiratory and gastric hazards.

The solution today could be a one-step syndromic approach, through the use of Real Time PCR multiplexing kits for simultaneous detection of viruses, bacteria, fungi or parasites." Highlighting the potential of epigenetics, shared Dr Col Mithu Banerjee, additional professor at a government medical institute in Jodhpur, "DNA methylation holds enormous opportunities for the future. The road ahead is to develop the therapeutics for optimum outputs." Sharing his inputs from the perspective of a physician, Dr Syamasis Bandyopadhyay, consultant physician and rheumatologist, opined, "Through the use of Real Time PCR, diagnosis has become way faster and also transgressed barriers such as that of bacteria, virus or fungi." Currently, there is a higher incidence of metapneumovirus infections and diagnosis is being facilitated with the aid of technology. "The scope of Oncogenetics has widened today, thanks to the incredible backup in diagnostic advancements," signed off Dr Bandopadhyay.

SESSION II



(L to R): Dr Venkat Manohar, expert, analytical sciences; Daryl Hee, senior scientist, LC-MS/MS, Singapore; Dr Abhik Banerjee, consultant, pathology, Suraksha Diagnostics Pvt Ltd and Dr Subhankar Chowdhury, endocrinologist during a panel discussion

MS/MS (TMS) in Clinical Diagnostics

The second session was chaired by Dr Venkat Manohar, director of an institute that specialises in spectrometry. As pointed by Dr Manohar, advancements in diagnostics have remarkably lowered errors in recent times. "There needs to be awareness, education and management of regarding New Born Screening (NBS) in our country. Screening out diseases such as PKU, Amino Acid Disorders, etc in new borns, NBS is both cost effective and credible, and also ensures minimum human error." Daryl Hee, senior scientist, LC-MS/MS, Singapore, felt that India is quite receptive to adopting the latest technologies in healthcare and is already in a better zone compared to many other countries. Rooting for LC-MS in TDM (Therapeutic Drug Monitoring, a branch that specialises in the measurement of medication concentrations in the blood) and its advantages over immunoassay, Hee said, "The future lies in automation. Thanks to qualities like sensitivity, selectivity, extended compound range, etc TDM improves patient care by adjusting the dose of drugs which have been shown to improve out-



(L to R): Dr Joydeep Mukherjee, researcher, University of California; Dr Somnath Chatterjee, director and founder member, Suraksha Diagnostics and Ritu Mittal, CEO, Suraksha Diagnostics at the launch of robotic laboratory

come in different populations." Next up, Dr Abhik Banerjee, consultant, pathology, Suraksha Diagnostics Pvt Ltd, elucidated the application, scope and challenges of Mass Spectrometry (MS) in clinical diagnostics through his presentation. Explaining the evolution of mass spectrometry in clinical diagnostics, Dr Banerjee maintained, "Development of new applications has accelerated the incorporation of MS into more areas of IVD and has stood out as a powerful analytical tool for TDM, identification of IEM, analysis of steroid hormones and measurement of Vitamin D." Highlighting factors that make it a popular

with hormone related hazards, but Bioinformatics has to be more developed to make the most of technology." In this regard, Dr Venkat Manohar also maintained that for optimum results, suppliers should ensure zero-failure devices, well trained specialists should be taken on board and calibration is to be done accurately. Urging clinicians to listen to their 'hearts' while discharging their duties, Dr Soma Gupta, HoD, department of biochemistry, NRS Medical College, highlighted the 12 ethical principles by Indian Council of Medical Research.

SESSION III

Neo Cytogenetics: All about Personalised Medicines

On February 14, Suraksha also signed a joint venture agreement with Cluegenix, a California based Biotechnology company for Molecular Biology test. Cluegenix will be helping Suraksha design and perform an array of molecular tests as per needs of the Indian population. This will enable Suraksha to reduce the cost and time required to perform such high end esoteric tests.



(L to R): Dr Somnath Chatterjee, director and founder member, Suraksha Diagnostics; Anne Beyou Zulliani, Dr Joydeep Mukherjee, Daryl Hee and Dr Joe Daniel



(L to R): Dr Seema Thakur, expert, clinical genetics and foetal medicine; Dr Venkateshwari, expert, genetics; Dr V Babu Rao, scientist, Cytogenetics; and Dr Debarshi Sanjal, consultant Cytogeneticist Suraksha Diagnostics Pvt Lts during the third session

As per Dr Seema Thakur, expert, clinical genetics and foetal medicine, "Genomic testing is becoming an integral part of clinical practice, with genetic testing being immensely informative and cost effective. This is the era of direct to consumer testing, hence it's important to be well versed with the tests so as to improve evidence based health care standards." As per Dr Venkateshwari, director of a Hyderabad based institute which specialises in genetics, "It's interesting to note how the evolution of Karyotype analysis has resulted in chromosomal abnormalities being accounted significantly in the etiology of mental retardation, congenital anomalies or cancers, apart from genetic

syndromes." Up next, Dr V Babu Rao, scientist, cytogenetics, spoke about the applications of Molecular Cytogenetics and how Digital Microscopy has enabled a fast analysis of cells today. "While advancements in cytogenetic technology help to identify multiple genomic changes in a single cell today, expertise is also integral to accurate interpretation of results." Shared Dr Debarshi Sanjal, consultant Cytogeneticist, Suraksha Diagnostics Pvt Lts Kolkata, "Interphase Chromosome Profiling (ICP), a novel cytogenetic technology, can detect all numerical and structural abnormalities, balanced and unbalanced aberrations, including characterisation of marker chromosomes up to 600 band resolution."

SESSION IV

Haemato Oncology and related issues

In the final session moderated by Dr Utpal Chaudhury and Dr Arnab Chattopadhyay, experts shared their inputs on various aspects of Lymphoma, Leukaemia and Multiple Myeloma. Dr Sumeet Gujral, professor of pathology, spoke on lymphoma diagnosis and its current perspectives. Underscoring the importance of targeted therapies and correct diagnosis, Dr Gujral maintained, "The last 10 years have seen a lot of changes in the field of Lymphoma diagnosis. The emergence of Biomarkers in Lymphoma follow a multidisciplinary approach today. Back in Mumbai, we have this group of Lymphoma specialists who gather from time to time with a view to dis-

cuss various cases and that increases our awareness as practitioners. I'm sure Kolkata's specialists can also follow a similar approach to enrich their scope of work." Up next, Dr Kanjaksha Ghosh, specialist, Immunohaematology, Mumbai, spoke about investigations and evolution of acute leukaemia. As per Dr Ghosh, malignancies need diverse kinds of pathology. "With path breaking technology on offer, the objectives of investigations in acute Leukaemia should include diagnosis, complications, remission, prognosis, follow up, relapse, trials and research. In this context, the need for informatics, software and filters to cancel out 'noise' cannot be un-



(L to R): Dr Utpal Chaudhury, Dr Kanjaksha Ghosh, expert, immunohaematology; Dr Tuphan Kanti Dolui, clinical haematologist; Dr Sumeet Gujral, professor of pathology and Dr Arnab Chattopadhyay, after the fourth session

derscored enough. Next up, Dr Tuphan Kanti Dolui, clinical haematologist, spoke about the diagnosis of Multiple Myeloma (MM) in a current perspective. As per Dr Dolui, "With technology, molecular pathogenesis of Multiple Myeloma is surely improving. Imaging with MRI and/or

PET scan has also made diagnosis more convenient." As the experts unanimously agreed, the ongoing advancements in diagnostics and bioinformatics will take haemato oncology up by several notches in days ahead.

SESSION V

A high-throughput methodology with wide applications, NGS is driving discovery and enabling the future of personalised medicine today. As per Dr Joydeep Mukherjee, "With more and more NGS platforms available today, not only is the cost diminishing, but precision is at an all time high as well. Bioinformatics is also playing an instrumental role in NGS considerations." Next up, Dr Reena Das, professor of haematopathology at a Chandigarh based institute of medical education and research, elucidated the application of NGS in clinical diagnostics, therapeutic implications explained through cases. Currently working on technology designed to impact lives of cancer patients, Dr Joe Daniel, oncology

Next generation sequencing (NGS): A revolution in genomics



(L to R): Dr Joydeep Mukherjee; Dr Reena Das, professor, haematopathology; Dr Joe Daniel, oncology leader, Singapore and Dr Diptendra K Sarkar, consultant surgical Oncologist, during a panel discussion

leader, Singapore, shared, "Personalised medicine in Oncology has steadily increased since 2008 and there are many projects in

the pipeline. Using NGS, the current protocol is of one therapy one test, which comes with advantages such as faster result and bet-

ter turn around time." Emphasising the need to replicate clinical study patterns in the Indian context, Dr Diptendra K Sarkar, consultant surgical oncol-

ogist, also pointed out how there's been a huge paradigm shift with BRCA (a gene test using DNA analysis to identify harmful changes in either of the two breast cancer susceptible genes), "NGS identifies hereditary cancers, and would also help in predicting sporadic cancers with evolved bioinformatics. This helps determine a treatment plan and predict treatment resistance." The programme was anchored by Madhumanti Maitra and all the sessions were followed by the felicitation of the panelists. With more such enriching think tanks programmed to not only make an impact on the lives of patients, but also generate awareness about global progression for clinicians, let's hope a 'healthy' future awaits the healthcare sector of the East.