

“PROTEOMIC TECHNOLOGIES FOR BIOSCIENCES”

25th & 26th August 2014

A workshop organized by Rayat Shikshan Sanstha’s Karmaveer Bhaurao Patil College, Vashi in association with Proteomics Society, India and funded by Lady Tata Memorial Trust, Mumbai.

The ‘omics’ era is an evolution of technologies for global profiling of macromolecules. These technologies are now being taught in syllabi of colleges across the country. However several of the teachers have not had an opportunity to gain firsthand experience of the techniques or to learn about them from researchers who undertake research in these areas. They are therefore unable to translate the information effectively to the students. To bridge this lacuna, **Karmaveer Bhaurao Patil College, Vashi**, had organized a Workshop on “Proteomic technologies for Biosciences” **in association with Proteomics Society, India.** This event was **sponsored by Lady Tata Memorial Trust, Mumbai.** It was a 2 day workshop in which lectures were held on 25th August 2014 at KBP College, Vashi and demonstrations on 26th of August 2014 at Advance Center for Treatment, Education and Research in Cancer, Kharghar, Navi Mumbai. One hundred ninety four participants [including teachers and students] attended the lectures on day 1 and selected 30 teachers visited ACTREC on day2 for demonstrations. The teachers belonged to colleges from Mumbai, Navi Mumbai, Bhivandi, Karad, Indore & Gujarat.

At the Inauguration, **Dr. D.B. Thakare, Vice-Principal** and HOD of Microbiology Department, K.B.P. College, welcomed the participants and informed about the importance of the workshop. **Principal of K.B.P. College, Hon. Dr. V.S. Shivankar**, informed the audience about the college and its mandates, one of

which is Training of Teachers. He expressed the need for teachers to keep updated on the recent trends in biology so that they can teach the students effectively. The Preamble for the Program was delivered by Dr. Surekha Zingde, President, Proteomics Society, India (PSI). In her presentation Dr. Zingde elaborated on the importance of Human Proteome Project and technological advancements in mass spectrometry, bioinformatics (knowledge base) and antibodies which are now considered the three pillars of Proteomics. She also spoke on the immense contributions of computer modeling and X-ray crystallography in studying protein-protein interactions to understand the proteome. Finally she gave a brief on the lectures to follow and how they form the basic proteomic technologies for any biological research. Dr Zingde informed the audience that this program was being conducted to update students and teachers on the latest in Proteomics as this was one of the mandates of the PSI. Dr. Zingde, is also a member of the ISAC of the Lady Tata Trust. She informed the audience about the activities of the Trust and the modalities for applying for the LTMT fellowships and support for the Teacher Training programs.



The first day of the workshop included lectures by 5 eminent speakers with expertise in the field of Proteomics.

Dr. Srikanth Rapole from National Centre for Cell Sciences, Pune, very elegantly described the basic aspects of mass spectrometric techniques used in biological sciences. In addition to the traditional techniques of protein quantification with gel-based approaches, he described stable isotope labeling and



label-free methods of mass spectrometry that are used in quantification at the peptide level. He also added that in combination with chromatographic separation techniques, MS is playing an important role in biomarker discovery for various diseases.

Dr. Mahesh Kulkarni from National Chemical Laboratories, Pune, explained the importance of post translational modifications in proteins in his lecture on “Mass spectrometric approaches to characterize post translational modifications”. He described the different mass spectrometry techniques such as



collision induced dissociation, electron transfer dissociation, neutral loss scan etc, that facilitate PTM characterization with special reference to characterization of protein glycation in diabetes.

Dr. Sanjeeva Srivastava from IIT, Bombay spoke on “High through put protein array techniques used in biomarker discovery, validation and functional proteomics. He provided an overview of protein microarrays and explained their several applications such as biomarker identification, immunological studies, vaccine development, protein-protein interaction studies and enzyme assays. He shared his findings of the first comprehensive analysis of human meningiomas to identify autoantibody markers using human proteome arrays.



Dr. Geetanjali Sachdeva from National Institute of Research in Reproductive Health, Mumbai described how proteomics is being used for research in reproductive biology. Her presentation “A Proteomic Dive in the Uterine Fluid and Insights into Endometrial Receptivity” made the participants aware of how a biological query can be addressed using proteomic tools. She also showed how the proteins identified in the discovery step have to be functionally validated to understand their role in vivo .



Final presentation on day 1 was by **Dr. Kakoli Bose** from Advanced Centre for Treatment, Research and Education in Cancer, Mumbai. She spoke on- “Proteomic data bases and their use for protein-protein interactions”. She began her talk with the basic structures of proteins and went on to explain important



hotspots for ligand recognition as well as structural basis of these interactions. She also explained about several relevant biophysical and *in silico* probes along with some Protein-Protein Interaction [PPI] databases that are commonly used to dissect the physiological systems that modulate complex human diseases at the molecular level.

Dr. Shubhada Nayak, Vice Principal, KBP College, proposed the vote of thanks at the end of day one of the workshop.

The **day 2** session of the **workshop was held at ACTREC on 26th August 2014.** The day's activities began with talks by two eminent speakers from ACTREC who gave enlightening and informative talks describing the highlights of Proteomics and X-ray crystallography, processing of samples for mass spectrometry and their analysis and demonstrating the range of instrumentation used in proteomic research.



Dr. Rukmini Govekar, opened the morning session by presenting the informative talk on "Analysis driven selection of MS platforms". **Dr. M. V. Hosur** then described in simple terms about "Proteomics and X-ray crystallography".

The **demonstration sessions** were followed by dividing participants into three batches for effective & interactive demonstrations. In the first session **Dr. M. V. Hosur & his team** explained



the protocol for preparation of protein crystals & then showed the crystal of lysozyme under the microscope. This was followed by explaining the internal details & working of X Crystallography machine. He also explained data interpretation after crystal analysis and enthusiastically solved queries of participants.

In the second session **Dr. Rukmini Govekar & her team** explained & demonstrated sample preparation for Mass Spectrometer. Using animations they explained internal details & working of MS-MS, MALDI TOF & ESI. They also explained how to interpret MS outputs towards obtaining identity of proteins using search engines such as MASCOT.



The post lunch session was started with a detailed talk cum **demo by Dr. Kakoli Bose's team** on use of Protein databases for proteomic inquiries. Exhaustive demonstration on “Interacting Protein Databases” & “Functional Protein Databases” were presented on the networked computers. Elaborate explanation on applications of various protein databases was also covered. The afternoon session closed with a demonstration on Circular Dichroism Polarimeter, Fluorimeter and Isothermal Titration Calorimeter wherein the internal details &

working of these instruments were explained. The team members explained about the applications of the instruments for Proteomics Research.

At the **Valedictory function** many participants shared their critical & unbiased feedback about the Proteomics workshop. Overall, the remarks were very positive and there is a sincere request from all the teacher participants to organize similar workshops on topics like- Animal and Plant Tissue Culture Techniques, Microscopic Techniques, Bioinformatics & Biostatistics, Virology Techniques and Scientific Writing. The teachers expressed that they teach several of the techniques covered in this workshop by reading from books and without actually having seen the instruments or undertaking the experiments themselves. Attending this workshop has ensured that they now understand many of the technical details which they can now explain better to their students.

Certificates were then distributed to the participants by Dr. Surekha Zingde, President, PSI; Dr. Shubhada Nayak , Convener & the eminent speakers of the workshop.

The workshop was formally closed by Dr. Shubhada Nayak, Convener who expressed her vote of thanks to the invited speakers, ACTREC, Lady Tata Memorial Trust and the Proteomics Society, India for helping to make the Proteomic Technologies for Biosciences Workshop a successful event.