

Report: Modern Biology – Advanced Molecular Tools for Healthcare

Swami Rama Himalayan University (SRHU)

10th February – 7th March 2025

Overview

Swami Rama Himalayan University (SRHU) successfully conducted a four-week intensive training program on *Modern Biology: Advanced Molecular Tools for Healthcare*, aimed at providing an in-depth understanding of contemporary molecular techniques and their transformative role in healthcare. The training brought together academic experts, industry professionals, and young researchers, combining theory, practical sessions, and technological demonstrations to create a well-rounded learning experience. The program covered key topics such as DNA/RNA techniques, PCR and cloning, next-generation sequencing, bioinformatics, AI in healthcare, and advanced cell culture techniques. A total of 30 participants attended the workshop representing BIT Mesra, LPU Jalandhar, SGRR University, Dehradun, SRHU, Dehradun.



IMPORTANT INFORMATION

- Fully Sponsored Program
- Accommodation available for outstation candidates, food and transport excluded.
- Caution fee of ₹1000, fully refundable to be deposited in:
Bank Details:
AC No: 37200223663
State Bank of India, HIHT, Jolly Grant, Dehradun
IFSC Code: SBIN0010580
- No Training Fee
- Certificates for lectures and hand-on training after successful completion
- Registration Link:
<https://docs.google.com/forms/d/1o01Lg7iHqm1ZdISE3Z-wt1sqeDxazzvQHs1ovRoNEE/edit>

ELIGIBILITY

- Clinicians, Medical Faculty, Scientists, Research Scholars, & PG Students.
- 30 seats per batch

IMPORTANT DATES

- Last Date of registration 25th Jan 2025
- Announcement of selected participants on university website 30th Jan 2025

CONTACT US

Dr. Geeta Bhandari
Himalayan School of Biosciences SRHU, Jolly Grant, Dehradun
E mail: dhsrtraining2025@gmail.com | geetabhandari@srhu.edu.in
Mobile: +91 8439020392

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**MODERN BIOLOGY
ADVANCED MOLECULAR TOOLS FOR HEALTHCARE**

Organised by Himalayan School of Biosciences
Swami Rama Himalayan University

Sponsored by

Department of Health Research
Ministry of Health & Family Welfare, Govt. of India

30-DAY WORKSHOP
10th February to 8th March 2025

srhu.edu.in

Week 1: Molecular Biology Techniques in Healthcare

The program was inaugurated by the Chief Guest, Dr. Vijendra Chauhan, DG, Academic Development along with other eminent guests. The keynote was addressed by eminent

speakers including Dr. C.S. Nautiyal, Scientific Advisor, SRHU, who emphasized disruptive innovation and transformative thinking in scientific endeavors. The inaugural session ended with the release of souvenir for the workshop. The first week introduced participants to molecular techniques like DNA and RNA extraction, nucleic acid quantification, agarose gel electrophoresis, and cDNA synthesis. Dr. Vikas Singh Jadon, Associate Professor, HSBS, delivered a comprehensive lecture on the applications of biosciences in regenerative medicine, RNA editing, and personalized healthcare.

Hands-on sessions covered various PCR techniques including traditional PCR, quantitative PCR (qPCR), RT-PCR, and nested PCR, highlighting their roles in diagnostics and therapeutics. The week concluded with industrial sessions on NanoString technology, GeneNat diagnostics, oncology profiling using HemaVision, and a practical workshop on droplet digital PCR (ddPCR) led by industry experts from Genetix Biotech Asia Limited.








Week 2: PCR Applications and Cloning Strategies

This week deepened participants' understanding of PCR applications with sessions on data interpretation, troubleshooting, and quality control. Participants learned TA cloning,

recombinant selection using colony PCR, and protein purification. The sessions were enhanced with hands-on experiences, including gradient PCR and SDS-PAGE.

Dr. Divya Anthwal presented on molecular diagnostics of tuberculosis, introducing tools like NAAT and NGS for detecting pulmonary and extrapulmonary TB. Dr. Rabbind Singh delivered expert sessions on primer and probe designing, RT-PCR diagnostics, and Sanger sequencing. A special session on Next-Generation Sequencing (NGS) was also conducted by Thermo Fisher Scientific.




SPECIAL SESSION
NEXT GENERATION
PROFILING AND ddPCR

**MODERN BIOLOGY: ADVANCED
MOLECULAR TOOLS IN HEALTHCARE
WORKSHOP**

GENETIX BIOTECH ASIA LIMITED

Saturday, February 15th 2025
10.00 AM Onwards



Week 3: Cell Culture Techniques and Diagnostics

Led by Dr. Purandhi Roopmani and Dr. Gourav Kumar, this week introduced animal cell culture basics, including media preparation, passaging, cryopreservation, and equipment

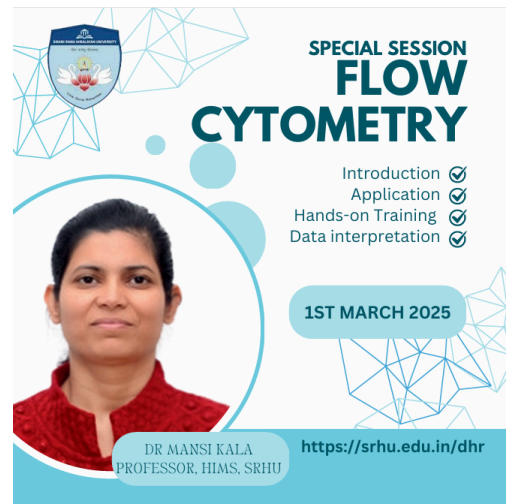
usage. Participants practiced cell culture techniques and pathology diagnostics like Pap smears, histopathology, and cancer screening. Additional sessions included ELISA, MTT assays, scratch wound healing assays, and mesenchymal stem cell isolation from umbilical cords.

Cutting-edge technologies such as Oxford Nanopore sequencing and flow cytometry were demonstrated, providing participants with real-world experience in genomics and cellular analysis.



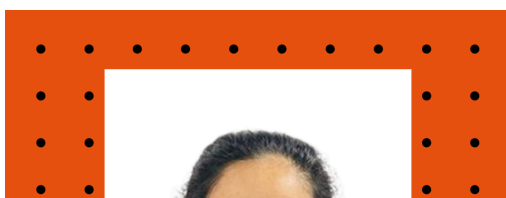
Week 4: Bioinformatics and AI in Healthcare

Dr. Kshipra Chauhan led sessions on bioinformatics, guiding participants through



database navigation (NCBI, EMBL, DDBJ), DNA sequence alignment using BLAST, and phylogenetic analysis. Python programming workshops covered data structures like lists and dictionaries, with a focus on biological data analysis.

Dr. Anupama Mishra introduced AI tools such as ChatGPT, ORANGE, and CNN-based models for healthcare analytics and diagnostics. The week also featured a session on statistical modeling of healthcare data by Dr. Ashulekha Gupta, discussing p-values, chi-square tests, and significance analysis. The program concluded with a yoga session and a visit to Sadhana Mandir Ashram.



Conclusion

This four-week training program marked a milestone for SRHU, reinforcing its position as a leader in biosciences and healthcare research. It provided a comprehensive platform for participants to gain theoretical insights and practical experience in modern biological tools. Special thanks to Mr. Mayank and Ms. Jyoti for preparing the detailed report and supporting the event organization.

