

Biotechnology Research Training Program

This research-focused biotechnology program provides hands-on experience in biotechnology research methodologies, helping participants develop skills in experimental design, data analysis, and the application of biotechnology in solving real-world problems.

Note: Below modules are designed keeping high end industrial professionals into consideration. Please refer individual protocols below for affordable prices.

Cell Biology Research Protocols

Kindly review the fees outlined for the individual protocols listed in this module.

- Advanced Cell Imaging Techniques: Two-photon Microscopy for Deep Tissue Imaging, Light Sheet Fluorescence Microscopy for Live, Whole-Organism Imaging, Total Internal Reflection Fluorescence (TIRF) Microscopy for Cell Membrane Events, Structured Illumination Microscopy (SIM) for High-Resolution Imaging, Stimulated Emission Depletion (STED) Microscopy for Nanoscale Resolution, Live-cell STORM (Stochastic Optical Reconstruction Microscopy) for Molecular Dynamics, Intra-vital Microscopy for Observing Cellular Function in Live Animals, High-content Screening Systems for Automated Image Acquisition and Analysis, Spinning Disk Confocal for Fast, High-Resolution Live Cell Imaging
- Single-cell Sequencing: Single-cell RNA Sequencing (scRNA-seq) for Transcriptome Analysis, Single-cell DNA Sequencing for Genomic Variability, Single-cell ATAC-seq for Chromatin Accessibility, Single-cell Multi-omics (Simultaneous DNA, RNA, Protein Analysis), Single-nucleus Sequencing for Cells from Solid Tissues, Single-cell Lineage Tracing using CRISPR-Cas9 Barcoding, Single-cell TCR Sequencing for Immune Repertoire Analysis, Microfluidic-based Single-cell Isolation and Library Preparation, Single-cell Epigenomic Sequencing with CHIP-seq
- Cell Signaling Pathway Studies: Western Blot for Protein Activation/Modification Detection, ELISA-based Phosphorylation Studies, Luciferase Reporter Assay for Gene Expression Control, Calcium Imaging for Intracellular Signaling Events, Bioluminescence Resonance Energy Transfer (BRET) for Protein-Protein Interactions, Chromatin Immunoprecipitation (ChIP) Assays for Transcription Factor Binding, Mass Spectrometry for Global Protein Phosphorylation Analysis, Fluorescence Lifetime Imaging Microscopy (FLIM) for FRET Efficiency, Use of Knockout

and Knockdown Techniques to Dissect Pathways, Real-time PCR for Quantifying mRNA Levels of Target Genes

Enzyme Kinetics Research Protocols

Kindly review the fees outlined for the individual protocols listed in this module.

- Enzyme Assay Development: Colorimetric Assays for Enzyme Activity, Fluorometric Assays for Sensitive Detection, Radioactive Labeling Assays for Precise Tracking, Spectrophotometric Assays to Measure Absorbance Changes, High-throughput Screening Assays in Microplate Formats, Biotin-Avidin Based Capture Assays for Specific Detection, Electrochemical Assays for Redox Active Enzymes, HPLC Assays for Product Quantification, Immunoassays for Enzyme Detection and Quantification
- Kinetic Parameter Analysis: Michaelis-Menten Kinetic Studies for Determining V_{max} and K_m , Lineweaver-Burk Plot Analysis to Visualize Enzyme Kinetics, Temperature and pH Profiling for Optimal Activity, Time-course Studies for Enzyme Stability, Turnover Number (kcat) Calculation for Catalytic Activity, Isothermal Titration Calorimetry for Binding Affinity, Sequential and Competitive Inhibition Studies, Use of Computer Modeling for Kinetic Simulations, Rapid Equilibrium Assays for Fast Acting Enzymes
- Inhibitor Screening Assays: Competitive Inhibitor Screening to Identify Active Site Blockers, Non-competitive Inhibitor Screening for Allosteric Modulation, Mixed-Type Inhibitor Screening to Determine Binding Interactions, Z Factor Calculation for Assay Optimization, IC_{50} Determination Assays for Inhibitor Potency, High-content Screening for Cellular Context Inhibition, Thermal Shift Assays for Binding Affinity Changes, Surface Plasmon Resonance for Real-time Interaction Analysis, Automated Liquid Handling Systems for High-throughput Screening

Genomics Research Protocols

Kindly review the fees outlined for the individual protocols listed in this module.

- Whole Genome Sequencing: Library Preparation for Illumina Sequencing, Long-Read Sequencing with PacBio SMRT Technology, Nanopore Sequencing for Real-Time Analysis, Hybrid Sequencing Using Short and Long Reads, Targeted Sequencing for Specific Regions, Mate-Pair Sequencing for Detecting Structural Variants, Multiplexed Shotgun Genotyping for High-Throughput Applications, Single Molecule Sequencing for Direct DNA Analysis, Automated Sample Preparation for Large Scale

Sequencing Projects

- Genomic Data Analysis Using Bioinformatics: Quality Control with FastQC, De Novo Genome Assembly using SPAdes or Velvet, Reference-Based Alignment with BWA or Bowtie2, Variant Calling with GATK or Samtools, Annotation Using Blast or InterProScan, Comparative Genomics with Mauve or Artemis Comparison Tool (ACT), Population Genomic Analysis with STRUCTURE or ADMIXTURE, Metagenomic Analysis Using Kraken or MetaPhlAn, Transcriptome Assembly with Trinity or SOAPdenovo-Trans, Data Visualization with Integrative Genomics Viewer (IGV) or Circos
- Gene Expression Profiling: Microarray Analysis Using Affymetrix or Agilent Platforms, RNA-Seq for Quantitative Gene Expression, Digital Gene Expression Analysis by Tag Sequencing, Quantitative Real-Time PCR for Expression Validation, Multiplex Ligation-Dependent Probe Amplification (MLPA), Single-Cell RNA-Seq for Transcriptomic Profiling, Dual RNA-Seq for Host-Pathogen Interactions, Use of Tiling Arrays for Comprehensive Coverage, RIP-Seq for RNA-Binding Protein Targets, Chromatin Immunoprecipitation Sequencing (ChIP-Seq) for Regulatory Element Mapping

Synthetic Biology Research Protocols

Kindly review the fees outlined for the individual protocols listed in this module.

- Design of Synthetic Circuits: Standard Assembly of BioBrick Parts, Modular Cloning using Golden Gate Assembly, Multi-gene Circuits via Gibson Assembly, CRISPR-based Transcriptional Repressors and Activators, Use of Logic Gates and Oscillators in Circuit Design, RNA-based Switches for Conditional Regulation, Simulation of Synthetic Networks with Computational Models, Optogenetic Tools for Light-Regulated Gene Expression, Automated Design Tools like CAD for Biological Systems
- Genome Engineering Using CRISPR: CRISPR-Cas9 Design and sgRNA Synthesis, Delivery Methods for CRISPR Components (Viral Vectors, Electroporation, Microinjection), CRISPR-Cpf1 for Alternate PAM Sites, Base Editing with CRISPR-Cas9 Nickase and Guided Deaminases, Prime Editing for Precision Gene Correction, Multiplexed CRISPR for Simultaneous Editing of Multiple Targets, CRISPR Activation (CRISPRa) and Interference (CRISPRi) for Gene Regulation, Off-target Effects Assessment with GUIDE-seq or CIRCLE-seq, In Vivo CRISPR Editing for Therapeutic Applications
- Metabolic Pathway Reconstruction: Stoichiometric Analysis for Metabolic Flux Balancing, ¹³C Metabolic Flux Analysis for In Vivo Pathway Activity, Genome-scale Metabolic Models (GEMs) for System Analysis, Pathway Tools Software for Pathway Prediction and Analysis, Synthetic Pathway Integration for Enhanced Productivity, Enzyme Engineering for Improved

Catalytic Properties, Retrobiosynthesis for Novel Metabolic Route Design, Dynamic Metabolic Modeling for Temporal Control of Pathways, Metabolic Control Analysis to Identify Regulatory Hubs

Molecular Dynamics Research Protocols

Kindly review the fees outlined for the individual protocols listed in this module.

- Protein Structure Modeling: Homology Modeling with Tools like MODELLER or SWISS-MODEL, Ab Initio Modeling for Proteins with No Known Homologs, Protein-Protein Docking with HADDOCK or AutoDock, Energy Minimization and Refinement using CHARMM or AMBER, Use of Molecular Dynamics for Model Validation, Secondary Structure Prediction with PSIPRED or Jpred, Solvent Accessibility and Disulfide Bridge Prediction, Domain Prediction and Multimeric Modeling, Integration of Cryo-EM Density Maps for Structure Refinement
- Molecular Interaction Studies: Surface Plasmon Resonance (SPR) for Real-Time Binding Analysis, Isothermal Titration Calorimetry (ITC) for Thermodynamic Profiling, Cross-Linking Mass Spectrometry to Map Interaction Sites, Pull-Down Assays to Confirm Physical Interactions, Co-Immunoprecipitation (Co-IP) for Complex Detection, Yeast Two-Hybrid Screening for Protein-Protein Interactions, Bimolecular Fluorescence Complementation (BiFC) for In Vivo Interaction Studies, Fluorescence Anisotropy for Binding Affinity and Kinetics, Alanine Scanning Mutagenesis for Interaction Hotspot Identification
- Dynamic Simulations of Biomolecular Processes: Molecular Dynamics Simulations with GROMACS or NAMD, Coarse-Grained Simulations for Large Systems, Quantum Mechanics/Molecular Mechanics (QM/MM) Simulations for Chemical Accuracy, Enhanced Sampling Techniques like Metadynamics or Umbrella Sampling, Brownian Dynamics for Diffusion-Driven Processes, Steered Molecular Dynamics for Force-Induced Processes, Monte Carlo Simulations for Conformational Sampling, Agent-Based Modeling for Cellular Processes, Pathway Analysis with Kinetic Monte Carlo Methods

Individual Protocols Under Biotechnology Research Training Program

1. Two-photon Microscopy for Deep Tissue Imaging | **Fee: Contact for fee**
2. Light Sheet Fluorescence Microscopy for Live, Whole-Organism Imaging | **Fee: Contact for fee**
3. Total Internal Reflection Fluorescence (TIRF) Microscopy for Cell Membrane Events |

Fee: Contact for fee

4. Structured Illumination Microscopy (SIM) for High-Resolution Imaging | **Fee: Contact for fee**
5. Stimulated Emission Depletion (STED) Microscopy for Nanoscale Resolution | **Fee: Contact for fee**
6. Live-cell STORM (Stochastic Optical Reconstruction Microscopy) for Molecular Dynamics | **Fee: Contact for fee**
7. Intra-vital Microscopy for Observing Cellular Function in Live Animals | **Fee: Contact for fee**
8. High-content Screening Systems for Automated Image Acquisition and Analysis | **Fee: Contact for fee**
9. Spinning Disk Confocal for Fast, High-Resolution Live Cell Imaging | **Fee: Contact for fee**
10. Single-cell RNA Sequencing (scRNA-seq) for Transcriptome Analysis | **Fee: Contact for fee**
11. Single-cell DNA Sequencing for Genomic Variability | **Fee: Contact for fee**
12. Single-cell ATAC-seq for Chromatin Accessibility | **Fee: Contact for fee**
13. Single-cell Multi-omics (Simultaneous DNA, RNA, Protein Analysis) | **Fee: Contact for fee**
14. Single-nucleus Sequencing for Cells from Solid Tissues | **Fee: Contact for fee**
15. Single-cell Lineage Tracing using CRISPR-Cas9 Barcoding | **Fee: Contact for fee**
16. Single-cell TCR Sequencing for Immune Repertoire Analysis | **Fee: Contact for fee**
17. Microfluidic-based Single-cell Isolation and Library Preparation | **Fee: Contact for fee**
18. Single-cell Epigenomic Sequencing with CHIP-seq | **Fee: Contact for fee**
19. Western Blot for Protein Activation/Modification Detection | **Fee: Contact for fee**
20. ELISA-based Phosphorylation Studies | **Fee: Contact for fee**
21. Luciferase Reporter Assay for Gene Expression Control | **Fee: Contact for fee**
22. Calcium Imaging for Intracellular Signaling Events | **Fee: Contact for fee**
23. Bioluminescence Resonance Energy Transfer (BRET) for Protein-Protein Interactions | **Fee: Contact for fee**
24. Chromatin Immunoprecipitation (ChIP) Assays for Transcription Factor Binding | **Fee: Contact for fee**
25. Mass Spectrometry for Global Protein Phosphorylation Analysis | **Fee: Contact for fee**
26. Fluorescence Lifetime Imaging Microscopy (FLIM) for FRET Efficiency | **Fee: Contact for fee**
27. Use of Knockout and Knockdown Techniques to Dissect Pathways | **Fee: Contact for fee**
28. Real-time PCR for Quantifying mRNA Levels of Target Genes | **Fee: Contact for fee**
29. Colorimetric Assays for Enzyme Activity | **Fee: Contact for fee**
30. Fluorometric Assays for Sensitive Detection | **Fee: Contact for fee**
31. Radioactive Labeling Assays for Precise Tracking | **Fee: Contact for fee**
32. Spectrophotometric Assays to Measure Absorbance Changes | **Fee: Contact for fee**
33. High-throughput Screening Assays in Microplate Formats | **Fee: Contact for fee**
34. Biotin-Avidin Based Capture Assays for Specific Detection | **Fee: Contact for fee**
35. Electrochemical Assays for Redox Active Enzymes | **Fee: Contact for fee**
36. HPLC Assays for Product Quantification | **Fee: Contact for fee**

37. Immunoassays for Enzyme Detection and Quantification | **Fee: Contact for fee**
38. Michaelis-Menten Kinetic Studies for Determining Vmax and Km | **Fee: Contact for fee**
39. Lineweaver-Burk Plot Analysis to Visualize Enzyme Kinetics | **Fee: Contact for fee**
40. Temperature and pH Profiling for Optimal Activity | **Fee: Contact for fee**
41. Time-course Studies for Enzyme Stability | **Fee: Contact for fee**
42. Turnover Number (kcat) Calculation for Catalytic Activity | **Fee: Contact for fee**
43. Isothermal Titration Calorimetry for Binding Affinity | **Fee: Contact for fee**
44. Sequential and Competitive Inhibition Studies | **Fee: Contact for fee**
45. Use of Computer Modeling for Kinetic Simulations | **Fee: Contact for fee**
46. Rapid Equilibrium Assays for Fast Acting Enzymes | **Fee: Contact for fee**
47. Competitive Inhibitor Screening to Identify Active Site Blockers | **Fee: Contact for fee**
48. Non-competitive Inhibitor Screening for Allosteric Modulation | **Fee: Contact for fee**
49. Mixed-Type Inhibitor Screening to Determine Binding Interactions | **Fee: Contact for fee**
50. Z Factor Calculation for Assay Optimization | **Fee: Contact for fee**
51. IC50 Determination Assays for Inhibitor Potency | **Fee: Contact for fee**
52. High-content Screening for Cellular Context Inhibition | **Fee: Contact for fee**
53. Thermal Shift Assays for Binding Affinity Changes | **Fee: Contact for fee**
54. Surface Plasmon Resonance for Real-time Interaction Analysis | **Fee: Contact for fee**
55. Automated Liquid Handling Systems for High-throughput Screening | **Fee: Contact for fee**

Please contact on +91-8977624748 for more details

Cant Come to Hyderabad? No Problem, You can do it in Virtual / Online Mode