

BIOTECHNOLOGY

Professional Training Program



ATG1: Biotechnology and bioinformatics: Biotech protocols: DNA extraction, PCR of extracted DNA, electrophoresis, Restriction digestion, Ligation, Protein isolation, purification, SDS PAGE, Human genetics SNP studies with clinical correlation to sickle cell anemia, **Bioinformatics protocols for viral / Bacterial / human genomics:** NCBI / Pubmed (Finding gene from genome, FASTA, Gene Bank, Graphic) **Bioedit** (DNA sequence data interpretation, reverse and forward primer sequence studies, BLAST, Reverse complement, BLAST2, Multiple Sequence alignment, Phylogenetic tree, Protein comparative structural analysis with SPDB, Visualization by Discovery studio & Chimera **Theory of related protocols:** 30- 45 days

ATG2: Recombinant DNA Technology and Genetic Engineering: DNA extraction, Nested Two step PCR for Viral detection, (only a part of non infectious viral DNA cloned in plasmid, biologically safe for students handling), Agarose gel electrophoresis, Restriction digestion: By Eco RI / Hind III restriction endonuclease, Ligation By T4 DNA ligase, Subculture of *E. Coli*, Preparation of *E. coli* (host cells) in log phase, Competent cell preparation by CaCl₂ method, Transformation, Insertion of plasmid into competent *E. coli*, Screening of transformants, calculation of transformation efficiency, SDS PAGE, Western blot with **Theory:** 30- 45 days

ATG 3: Complete PCR technology: 6 PCR Protocols (All important types of PCRs) DNA extraction protocol by DNAzol as well as by and spin column method, 1. Level 1 PCR with ready to do master mix, 2. Nested two step PCR, 3. Gradient PCR for standardization of new PCR, 4. Touch down PCR for Trouble shooting, 5. bacterial identification PCR by 16S rRNA conserved region primers, 6. Human X and Y chromosome PCR (**PCR Theory:** Basic PCR, PCR types, electrophoresis, How to set up PCR reaction: calculation for PCR reagents, Primer designing **20 - 30 days**

ATG 4: Transformation: Subculture of *E. coli*, preparation of log phase bacteria; preparation of competent cells; transformation protocol, screening of transformants, colony counting and transformation efficiency with **Theory: 6 -10 days**

ATG 5: Single PCR training: One PCR and one electrophoresis **only wet lab protocols 3 days**

ATG 6: Human RT PCR: RNA isolation by Trizol, cNA preparation, RT reaction of extracted RNA, PCR of prepared cDNA, DNA electrophoresis for visualization of PCR product on agarose gel with **Theory: 6 days**

ATG 7: Introductory PCR training: Level 1 PCR with ready to do master mix and DNA electrophoresis; Nested PCR with two sets of primers for viral detection and DNA electrophoresis: with **Theory: 2 lectures** (Basic PCR and DNA electrophoresis) **6 days**

ATG 8: Basic molecular biology: Basic students PCR (Level 1 PCR with ready to do master mix & DNA electrophoresis; Nested PCR with two sets of primers for viral detection & DNA electrophoresis, DNA extraction & PCR with extracted DNA & DNA electrophoresis, **Theory:** lectures (Basic PCR, PCR types and DNA electrophoresis: **10 days**

ATG 9: Advanced molecular biology: Basic students PCR (Level 1 PCR with ready to do master mix & DNA electrophoresis; Nested PCR with two sets of primers for viral detection & DNA electrophoresis, DNA extraction & PCR with extracted DNA & DNA electrophoresis, Subculture of *E.coli*; preparation of log phase bacteria; preparation of plasmid; preparation of competent cells; transformation, screening of transformants: **20 days** fees with **Theory (PPT):** lectures (Basic PCR, PCR types, DNA electrophoresis, Transformation, Calculations.

ATG 10: Applied molecular biology:

Protocols: Nucleic acid isolation, PCR & DNA electrophoresis: DNA and RNA extraction a. Standard general student's PCR, b. Nested PCR for viral diagnosis by diagnostic primers set, c. Gradient PCR: Standardization of new PCR, d. Applied PCR for bacterial detection from conserved region primers, **Reverse Transcriptase PCR:** RT-PCR for specific Human cell lines with DNA electrophoresis **Transformation:** Competent cell preparation, transformation, identification of transformants, **Protein:** Collection, Processing, Isolation, purification, Hb electrophoresis & comparative studies with clinical profile, Pedigree analysis of genetic disorder and Gene flow studies from actual research project at ATG, Standard SDS PAGE, **Applied Bioinformatics:** Reading DNA sequence from Applied Biosystems 310 / 3100 Genetic analyzer, Correction of sequence data for data selection for BLAST, Reverse and forward primer data interpretation, Primer designing: Bioinformatics Software and tools for designing primers, BLAST, Multiple sequence alignment and Phylogeny, **Theory:** Basic PCR, PCR types, DNA electrophoresis, How to set up PCR reaction: calculation for PCR reagents, Introduction to Primer designing, transformation, **Assessment after training:** Lectures by trainee to fresh trainee students, calculation demonstration to new fresh trainees, Group discussion, PowerPoint presentation, CV preparation for particular interviews etc. **60 to 75 days** (Most desired course of ATG LAB i.e. combination of all ATG1+ATG2+ATG3)

ATG 15: Immunology and Virology: Protocols: Recent & Past infection studies by ELISA: IgG & IgM detection, Viral antigen detection by standard nested PCR, Viral RT PCR, PAGE & Western blot for virus detection, **Theory :** Selected topics of ATG Molecular Biology of Viruses: Genome features with viral replication, diagnosis **30 days**

ATG 16: Molecular blotting: DNA & RNA extraction and isolation of protein, DNA electrophoresis and Southern blot, RNA electrophoresis and Northern blot, Protein electrophoresis and Western blot: **Theory: 20 days**

Contact:

DEVENDRA LINGOJWAR, Director ATG LAB

First Floor, Sourabha Apartment, Ganesh Nagar, Pimple Nilakh, Pune 411027
Ph No. 020 65104543; Mobile 9921446321 www.atgbiotech.com