

*Exclusive Training 2022*  
@  
*CytoGene, Lucknow*

TRAINING MODULE

# CYTOGENE RESEARCH & DEVELOPMENT LUCKNOW

## Registered by -

Ministry of corporate affairs,  
Government of India under section 12(1)  
of LLP Act 2008

## Certified by –

ISO 9001:2015  
ISO 14001:2015  
ISO 45001:2018

## Member of –

IIA (Indian Industries Association)  
CII (Confederation of Indian Industries)

## Facilities provided –

Contract Research Services  
Testing and Analysis of Samples &  
Formulations  
Training Services / FDP  
Workshop (Indoor & Outdoor)

## Achievements -

10+ Years of Experience  
65+ Workshops  
70+ Publications  
50+ Sequence in NCBI  
180+ Associated Institutions  
3500+ Trainees Undergone  
1 International Conference

## General Information

### *Details for Recommendation Letter / Training Letter*

To,

*The Director  
CytoGene Research & Development  
Lucknow - 226021*

### *Registration Process (Online)*

- ❖ *Visit to [www.cytogene.in](http://www.cytogene.in)*
- ❖ *Open “Training Registration form” in “Training” section*
- ❖ *Fill the form carefully and submit*
- ❖ *Pay Rs. 500/- (payment details is available in “Mode of Payment”)*
- ❖ *Confirmation letter will be sent by email within 24 hr.*

### *Document Required at the time of Joining*

- ❖ *Recommendation Letter*
- ❖ *Students personal ID*
- ❖ *2 Photographs*
- ❖ *Training Fee*

30 DAYS  
TRAINING MODULES

# Advance Biotechnology (ABT)

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation

## Microbiology

- Media Preparation
- Sterilization
- Serial Dilution
- Pour Plate Method
- Spread Plate Method
- Streak Plate Method
- Culture Broth Preparation
- Growth Kinetics of Microbes  
(Grams staining, Acid Fast staining  
& Endospore staining)
- Casein Hydrolysis Test
- Antibiotic sensitivity test

## Molecular Biology

- DNA isolation from bacteria
- Plasmid DNA isolation & Electrophoresis
- DNA isolation from plant leaves &  
Electrophoresis
- RNA isolation from plant leaves
- Formaldehyde Gel Electrophoresis
- Quantification of genomic DNA & RNA
- PCR Amplification & its Electrophoresis
- Multiplex PCR & its Electrophoresis

## Biochemistry

- Isolation of Protein from different sources.
- Protein estimation by Lowry's Method
- Separation of amino acids by Thin Layer  
Chromatography.
- Separation of compounds by Paper  
Chromatography.
- Purification by Column Chromatography.
- Estimation of Sugar by DNS Assay.
- Estimation of Cholesterol.
- Estimation of Amino Acid.

## Enzyme & Fermentation Technology

- Media Preparation and sterilization
- Screening of enzyme producing bacteria
- Enzyme production from submerged  
fermentation
- Enzyme production from plant tissue
- Precipitation of enzyme
- Estimation by Bradford's method
- Enzyme Kinetics
- Sodium Dodecyl Sulphate-Polyacrylamide Gel  
Electrophoresis.

## Recombinant DNA Technology

- Sequence retrieval
- Primer designing
- L.B. Broth preparation & Sterilization
- Culturing & multiplication
- Plasmid DNA Isolation
- Electrophoresis
- PCR
- Restriction digestion
- Ligation and Competent cell preparation
- Transformation and Screening of transformants

Duration: 1 Month

Registration Fee: Rs. 500/- Training Fee: Rs. 8,000/-

# Advance Microbiology (MCR)

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation

## **General Microbiology**

- Media Preparation & Sterilization
- Pour Plate Method
- Serial Dilution
- Spread & Streak Plate Method
- Culture Broth Preparation & Growth Kinetics of Microbes
- Total Plate Count
- Grams staining
- Acid Fast staining
- Endospore staining
- Capsule staining

## **Biochemical Test**

- Indole Test
- Methyl Red Test
- Voges Proskauer Test
- Citrate utilization Test
- Catalase Test
- Oxidase Test
- Urease Test
- Nitrate Reduction Test

## **Plant Growth Promoting Test**

- Siderophore Production Test
- Ammonia Production Test
- IAA Production Test
- Characterization by UV Spectra

## **Microbial Activity**

- Antibiotic sensitivity test
- Antifungal Test
- Minimum Inhibitory concentration (MIC)
- Minimum Bactericidal concentration (MBC)
- Minimum Fungicidal Test (MFC)
- Antagonistic Activity

**Duration:** 1 Month

**Registration Fee:** Rs. 500/- **Training Fee:** Rs. 7,500/-

# Advance Biochemistry (BCH)

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation

## **Extractions and Purifications**

- Protein Extraction
- Partial purification by Column Chromatography
- DNA Extraction
- Agarose Gel Electrophoresis
- Extraction of RNA
- Formaldehyde Gel Electrophoresis.
- Extraction of Fat
- Extraction of Carbohydrate
- Extraction Soxhlet method

## **Estimations/Quantifications**

- Protein Estimation by Lowery Method
- Protein Estimation by Bradford Method
- Carbohydrate Estimate by DNS/Anthron Method
- Fat Estimation by Soxhlet Apparatus
- Estimation of Nucleotide by UV – Vis Spectrophotometer
- Estimation of Cholesterol
- Separation of amino acids by Thin Layer Chromatography
- Separation of compounds by Paper Chromatography

## **Phytochemical Activity**

- Glycoside Test
- Alkaloid Test
- Terpenoids Test
- Saponin Test
- Phenol Test
- polyphenol Test
- steroids Test

## **SDS PAGE & Blotting**

- Set up of SDS PAGE Staining, de-staining & Analysis
- Set up of Native PAGE Staining, de-staining & Analysis
- Set up of Western Blotting & Transfer
- Application of primary and secondary antibody & Analysis of Results

**Duration:** 1 Month

**Registration Fee:** Rs. 500/- **Training Fee:** Rs. 7,500/-

# Advance Molecular Biology (MOL)

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation

## **Extractions and Purifications**

- DNA isolation from bacteria
- Agarose Gel Electrophoresis
- Plasmid DNA isolation & Electrophoresis
- DNA isolation from plant leaves & Electrophoresis
- Estimation of Nucleotide by UV – Vis Spectrophotometer
- RNA Isolation from Plant
- Formaldehyde Gel Electrophoresis

## **Amplification of Gene by PCR**

- Selection of Gene of Interest
- Primer Designing
- Preparation of Master mix
- Amplification of Target Gene by PCR
- Setup of Multiplex PCR
- Analysis of Multiplex PCR on Agarose Gel Electrophoresis

## **Molecular Identification of Species**

- Genomic DNA Isolation (Bacteria)
- Agarose Gel Electrophoresis
- PCR Amplification using Universal Primer
- DNA Sequencing (Theory only)
- Bioinformatic Analysis.
- Conversion of raw data to sequence form by bio edit
- Combining of forward sequence with reverse sequence
- Blast & Phylogenetic Analysis of 16S/18S rRNA Sequence

## **Application of Molecular Marker**

- Genomic DNA Isolation from Blood
- Agarose Gel Electrophoresis
- PCR Amplification using RAPD Primers
- RAPD Analysis by software
- Restriction Digestion for RFLP and Agarose Gel Electrophoresis
- Result Interpretation of RFLP and their Application

**Duration:** 1 Month

**Registration Fee:** Rs. 500/- **Training Fee:** Rs. 8,000/-

# Recombinant DNA Technology (RDT)

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation

## **General Bioinformatics**

- Selection Selection of gene from database
- Selection of Vector
- Primer Designing of Gene of Interest

## **Gene Cloning by traditional Method**

- Genomic DNA Isolation
- Agarose Gel electrophoresis
- Quantification by UV- Vis Spectrophotometer
- PCR Amplification of Gene of Interest
- Restriction Digestion
- Ligation
- Preparation of competent cells
- Transformation by Heat shock method
- Screening by Antibiotic Resistant gene

## **Gene cloning by CRISPR**

- Selection of gene from database
- Designing of spacer sequence by E-CRISPR tool
- Construction of crRNA-Cas9 plasmid (Digestion)
- Construction of crRNA-Cas9 plasmid (Ligation)
- Preparation of competent cells of *E. coli* DH5- $\alpha$
- Transformation of *E. coli* DH5- $\alpha$
- Screening of Transformants
- Plasmid DNA Isolation from *E.coli* DH5 Alpha
- Agarose Gel Electrophoresis of Isolated plasmid
- Competent Cell preparation
- Transformation of *S. Cerevisiae* with crRNA-Cas9 Plasmid
- Screening on media for selection of Transformants
- Genomic DNA isolation from positive clones
- Interpretation of gene deletion by PCR amplification
- Observation of result on Agarose Gel



# Food Analysis & Quality Control (FQC)

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation

## Proximate Analysis

- Moisture Content
- Fat Content determination (Soxhlet method)
- Carbohydrate (Anthrone method)
- Mineral
- Protein by Khjeldahl Method
- Sugar
- pH
- Salt
- Dietary Fiber
- Cholesterol
- Calcium

## Food Microbiology

- Total Aerobic Plate Count
- Anaerobic Mesophilic Count
- Total Coliform Bacteria (Thermotolerant)
- Total Yeast and Mould Count
- E. coli O157:H7 (Presence / Absence)
- Enterobacteriaceae
- Fungal Population (Yeast & Mold)
- Lactobacillus species Count

## Detection of Adulterations

- Adulteration of Urea in dairy products
- Test for chicory in coffee (Selinwanoff test)
- Test for lie tea
- Test for artificial coloration of tea
- Adulteration in Wheat Flour (Vogel's Method)
- Test for presence of Galbnum in Asafoetida
- Test for presence of Foreign Resins in Asafoetida
- Test of presence of Salicylic acid (Ferric Chloride Test) in Jam /Jellies
- Saccharin (Resorcinol Sulphuric acid test) in Jam /Jellies

## Detection of Toxins

- Extraction of Toxin from food sample
- Purification through Column Chromatography (Silica Gel H)
- Detection of toxin by TLC
- Detection of toxin by ELISA
- Quantitative analysis by UV-Vis Spectrophotometer

**Duration:** 1 Month

**Registration Fee:** Rs. 500/- **Training Fee:** Rs. 7,500/-

# Advance Immunology (IMM)

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation

## **Basic Immunology**

- Microscopic study & Identification of blood cells
- Blood cell count using heamocytometer
- Determination of blood group & Rh typing
- Ouchterlony Double Diffusion
- Single Radial immune Diffusion
- Immuno electrophoresis
- Rocket Immuno Electrophoresis
- Antigen antibody Immobilisation
- Dot blot

## **Pathological test**

- Widal Test
- Rapid plasma regain test – RPR test (VDRL test)
- Cholesterol estimation
- Total protein estimation
- Glucose level test of blood
- Albumin level test of blood
- Uric acid test of blood
- Amylase test for serum
- Alkaline phosphatase test
- Creatinine test

## **ELISA Assay**

- Antibody coating
- Capture of Protein and Detection of antibody
- Addition of substrate
- Direct ELISA
- Indirect ELISA
- Sandwich ELISA

## **Molecular Diagnosis**

- Isolation of DNA from patients Blood
- Agarose Gel Electrophoresis
- Quantitative analysis of DNA
- Restriction Digestion
- PCR Amplification of targeted Gene
- RFLP Analysis to diagnose the disease

**Duration:** 1 Month

**Registration Fee:** Rs. 500/- **Training Fee:** Rs. 7,500/-

# Advance Bioinformatics (ABI)

## Basic Bioinformatics

- Introduction to Bioinformatics & NCBI.
- Study of various file formats.
- Sequence retrieval from databases.
- Alignment of sequences using BLAST.
- Primer designing for a given sequence.

## Comparative tools

- Pairwise alignment using EMBOSS.
- Multiple Sequence Alignment using various tools.
- Phylogeny and Cladogram Analysis.
- Complete genome comparison.
- Analysis of percentage divergence between species.
- Phylogenetic tree construction using various software's

## Prediction tools

- Gene prediction tools.
- Secondary structure prediction tool.
- Ligand property prediction tool.
- Toxicity and ADME properties prediction tool.
- ORF finding tool.
- Prediction of potential cleavage sites by ExPasy web tool.

## Drug Designing approach

- Active site prediction of target protein.
- Retrieval of small Molecules from zinc Database/Pubchem
- Drug linkliness of compound
- Screening of ligands on basis of Lipinski rule of 5
- Inter conversion of various file Conversion using software
- Homology modeling for structure of unknown proteins

## Docking of Protein and ligand

- Protein preparation and docking in Autodock Vina
- Docking on HEX server
- Docking on PyRex
- Poses analysis using PyMol
- Interaction of Protein-ligand residues in the active site

## Requirements:

Laptop is a must for this training.

Link for Software will either be shared with you or you will have to download the software during training. We will let you know that in advance.

**Duration:** 1 Month

**Registration Fee:** Rs. 500/- **Training Fee:** Rs. 7,500/-

15 DAYS  
TRAINING MODULES

## **Basic Biotechnology (BBT)**

- Good laboratory practices*
- Demonstration of all Instruments*
- Chemical calculation & Reagent Preparation*
- Media Preparation & Sterilization*
- Serial Dilution*
- Spread Plate Method*
- Streak Plate Method*
- Culture Broth Preparation*
- Growth Kinetics of Microbes*
- Grams staining*
- Antibiotic sensitivity test*
- DNA isolation from bacteria*
- Agarose Gel Electrophoresis*
- DNA isolation from plant leaves*
- Formaldehyde Gel Electrophoresis*
- Quantification of genomic DNA & RNA*
- PCR Amplification & its Electrophoresis*
- Isolation of Protein from different sources*
- Protein estimation by Lowry's Method*
- Separation of amino acids by Thin Layer Chromatography*
- Precipitation of enzyme*
- Estimation by Bradford's method*
- Separation of compounds by Paper Chromatography*

**Duration: 1 Month**

**Registration Fee: Rs. 500/- Training Fee: Rs. 5,000/-**

# Basic Microbiology (BMC)

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation
- Media Preparation & Sterilization
- Pour Plate Method
- Serial Dilution
- Spread & Streak Plate Method
- Culture Broth Preparation & Growth Kinetics of Microbes
- Total Plate Count
- Grams staining
- Acid Fast staining
- Indole Test
- Methyl Red Test
- Voges Proskauer Test
- Citrate utilization Test
- Catalase Test
- Antibiotic sensitivity test
- Antifungal Test
- Minimum Inhibitory concentration (MIC)
- Minimum Bactericidal concentration (MBC)
- Minimum Fungicidal Test (MFC)

**Duration:** 1 Month

**Registration Fee:** Rs. 500/- **Training Fee:** Rs. 4,500/-

## **Basic Biochemistry (BBC)**

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation
- Protein Extraction
- Partial purification by Column Chromatography
- DNA Extraction
- Agarose Gel Electrophoresis
- Extraction of RNA
- Formaldehyde Gel Electrophoresis.
- Extraction of Fat
- Extraction of Carbohydrate
- Extraction Soxhlet method
- Protein Estimation by Lowery Method
- Carbohydrate Estimate by DNS/Anthron Method
- Fat Estimation by Soxhlet Apparatus
- Estimation of Nucleotide by UV – Vis Spectrophotometer
- Estimation of Cholesterol
- Separation of amino acids by Thin Layer Chromatography
- Separation of compounds by Paper Chromatography
- Set up of SDS PAGE
- Staining, de-staining & Analysis of SDS Page

**Duration: 1 Month**

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## ***Basic Molecular Biology (BMO)***

- Good laboratory practices*
- Demonstration of all Instruments*
- Chemical calculation & Reagent Preparation*
- DNA isolation from bacteria*
- Agarose Gel Electrophoresis*
- Plasmid DNA isolation & Electrophoresis*
- DNA isolation from plant leaves & Electrophoresis*
- Estimation of Nucleotide by UV – Vis Spectrophotometer*
- RNA Isolation from Plant*
- Formaldehyde Gel Electrophoresis*
- Selection of Gene of Interest*
- Primer Designing*
- Preparation of Master mix*
- Amplification of Target Gene by PCR*
- Analysis of PCR product on Agarose Gel Electrophoresis*
- Genomic DNA Isolation from Blood*
- Restriction Digestion for RFLP and Agarose Gel Electrophoresis*
- Result Interpretation of RFLP and their Application*

**Duration:** 1 Month

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# Gene cloning by CRISPR

- Good laboratory practices
- Demonstration of all Instruments
- Chemical calculation & Reagent Preparation
- Selection of gene from database
- Designing of spacer sequence by E-CRISPR tool
- Construction of crRNA-Cas9 plasmid (Digestion)
- Construction of crRNA-Cas9 plasmid (Ligation)
- Preparation of competent cells of *E. coli* DH5- $\alpha$
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- Genomic DNA isolation from positive clones
- Interpretation of gene deletion by PCR amplification
- Observation of result on Agarose Gel

**Duration:** 1 Month

**Registration Fee:** Rs. 500/- **Training Fee:** Rs. 5,000/-

## ***Basic Food Technology (BFT)***

- Good laboratory practices*
- Demonstration of all Instruments*
- Chemical calculation & Reagent Preparation*
- Moisture Content*
- Fat Content determination (Soxhlet method)*
- Carbohydrate (Anthrone method)*
- Mineral*
- Protein by Khjeldahl Method*
- Sugar*
- pH*
- Salt*
- Total Aerobic Plate Count*
- Anaerobic Mesophilic Count*
- Total Coliform Bacteria (Thermotolerant)*
- Total Yeast and Mould Count*
- E. coli O157:H7 (Presence / Absence)*
- Adulteration of Urea in dairy products*
- Test for chicory in coffee (Selinwanoff test)*
- Test for lie tea*
- Test for artificial coloration of tea*

**Duration: 1 Month**

**Registration Fee: Rs. 500/- Training Fee: Rs. 4,500/-**

## **Basic Immunology (BIM)**

- Good laboratory practices*
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- Chemical calculation & Reagent Preparation*
- Microscopic study & Identification of blood cells*
- Blood cell count using heamocytometer*
- Determination of blood group & Rh typing*
- Ouchterlony Double Diffusion*
- Single Radial immune Diffusion*
- Immuno electrophoresis*
- Rocket Immuno Electrophoresis*
- Antigen antibody Immobilization*
- Dot blot*
- Widal Test*
- Rapid plasma regain test – RPR test (VDRL test)*
- Cholesterol estimation*
- Total protein estimation*
- Glucose level test of blood*
- Albumin level test of blood*
- Antibody coating*
- Capture of Protein and Detection of antibody*
- Addition of substrate and analysis by ELISA*

**Duration: 1 Month**

**Registration Fee: Rs. 500/- Training Fee: Rs. 4,500/-**

## **Basic Bioinformatics (ABI)**

- Introduction to Bioinformatics & NCBI*
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- Pairwise alignment using EMBOSS*
- Multiple Sequence Alignment using various tools*
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- Complete genome comparison*
- Analysis of percentage divergence between species*
- Phylogenetic tree construction using various software's*
- Gene prediction tools*
- Secondary structure prediction tool*
- Ligand property prediction tool*
- Toxicity and ADME properties prediction tool*
- ORF finding tool*
- Prediction of potential cleavage sites by ExPasy web tool*
- Active site prediction of target protein.*
- Retrieval of small Molecules from zinc Database/Pubchem*
- Drug linkliness of compound*

**Duration: 1 Month**

**Registration Fee: Rs. 500/- Training Fee: Rs. 4,500/-**

Our passion towards finding the strong association between Research and Industries has led us to extend our services in core testing facility. CytoGene thus presents you our testing laboratory equipped with sophisticated instruments assuring best results for products which have compliance to stringent government regulations for industries and research field.

## AREAS WE COVER

*Biotechnology*

*Microbiology*

*Biochemistry*

*Bioinformatics*

*Molecular Biology*

*Genetic Engineering*

*Food Technology*

*Environmental Biology*

*Chemistry*

*Pharmacy*

*Animal Cell Culture*

*Enzyme Technology*

## CYTOGENE RESEARCH & DEVELOPMENT

### **Training -**

Summer / Winter

Trainings

Industrial Trainings

Mini Project

### **Workshop -**

Faculty Development

Programs

Workshops (In

door/Out Door)

### **Testing Services -**

Sample Analysis

Contract

Research

services

PhD Work

[www.cytogene.in](http://www.cytogene.in)

## CYTOGENE RESEARCH & DEVELOPMENT LLP

Reporting Office: CSC (B) – 301, 2<sup>nd</sup> Floor, Old Complex  
Sahara States, Jankipuram, Lucknow -226021

Laboratory: K-51, Agro Park, UPSIDC Industrial Area  
Kursi Road (Lucknow) Dist-Barabanki – 225001

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+91-77-0309-2222

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+91 - 77 - 0309 - 3333

[services@cytogene.in](mailto:services@cytogene.in)