

COOPERATIVE TRAINING • FSGENE001AI

# STEP INTO THE GENOME.

## Molecular Genomics & Therapeutics

Integrated Theoretical and Hands-On Laboratory Training



TRAINING BEGINS

**08**  
**NOV 2026**

10 WORKING DAYS

46 TOTAL TRAINING HOURS

JEDDAH • KSA

## THE EXPERIENCE

# A journey through the genomic workflow.

Ten structured days combining essential laboratory theory, supervised practical techniques and techniques and applied molecular design.

10

WORKING DAYS

22

CONTACT HOURS

24

HANDS-ON HOURS

## THE 5-PHASE ROADMAP

01

DAYS 01-02

### FOUNDATIONS + BIOSAFETY

BSL-2 safety, precision pipetting, core instruments & DNA/RNA fundamentals

02

DAYS 03-05

### DNA EXTRACTION + QUALITY

Sample preparation, genomic DNA extraction and NanoDrop assessment

03

DAYS 06-07

### AMPLIFICATION + SCREENING

PCR fundamentals and NIFTY Basic & Pro workflow simulations

04

DAYS 08-09

### THERAPEUTICS + DESIGN

ASO mechanisms, chemical modifications and in-silico target design

05

DAY 10

### EVALUATION + CERTIFICATION

Data review, competency demonstration, feedback and course completion

WEEK 01 / DAYS 1–5

# Build the foundations.

From lab safety to reliable nucleic-acid quality assessment.

01

## Genomics Safety & Precision Liquid Handling

THEORY • 2 HOURS

BSL-2 practices, PPE, safe waste management and lab conduct.

PRACTICAL • 4 HOURS

Single- and multichannel pipetting, calibration checks and contamination control.

02

## Essential Lab Instruments & the Language of Life

THEORY • 2 HOURS

Central Dogma, DNA/RNA structure, genetic genetic information flow.

PRACTICAL • 2 HOURS

Centrifuges, vortexers, thermal cyclers and lab instrument operation.

03

## Principles of DNA Extraction & Sample Prep

THEORY

Cell lysis, protein denaturation and nucleic-acid acid precipitation.

PRACTICAL

Sample preparation, lysis setup and initial DNA-binding protocols.

04

## Genomic DNA Extraction Protocols

THEORY

Extraction yield, purity troubleshooting and sample preservation.

PRACTICAL

Full extraction, wash steps and final elution of genomic DNA.

05

## NanoDrop Quantification & Quality Assessment

THEORY • 1 HOUR

UV–Vis principles; reading 260/280 and 260/230 260/230 absorbance ratios.

PRACTICAL • 1 HOUR

Hands-on DNA quantification and purity assessment using NanoDrop.

*DNA extraction practical: 3 hours in total across Days 3–4.*

WEEK 02 / DAYS 6–10

# Amplify. Design. Apply.

From PCR and molecular screening to ASO design and assessment.

06

## Polymerase Chain Reaction (PCR)

### THEORY

Thermal cycling, primer design, master mix preparation and optimization.

### PRACTICAL

Reaction setup, pipetting master mixes and thermal cycler programming.

07

## Non-Invasive Prenatal Testing (NIFTY)

### THEORY • 1 HOUR

cffDNA, NIFTY Basic & Pro, fetal trisomy screening screening and bioinformatics.

### SIMULATION • 2 HOURS

Screening workflow walkthrough, simulated sample processing and data interpretation.

08

## Antisense Oligonucleotide (ASO) Therapeutics

### THEORY • 3 HOURS

RNA-targeting approaches: RNase H, steric hindrance and splicing modulation.

### CHEMISTRY CONCEPTS

Phosphorothioate (PS) backbones and 2'-O-MOE modifications.

09

## Rational ASO Design Workshop

### PRACTICAL • 3 HOURS

In-silico target selection and sequence alignment alignment.

### DESIGN OPTIMIZATION

Off-target minimization and rational oligonucleotide design.

10

## Data Review & Competency Assessment

### MORNING

Lab logs; DNA extraction, NanoDrop and PCR data; PCR data; group troubleshooting.

### AFTERNOON

Practical skill demonstration, feedback and certificates of completion.