TRAINING BROCHURE

How We Work & How You Will Be Trained

At our center, we provide comprehensive training on **DNA Profiling**, the gold standard in forensic DNA analysis. This brochure outlines our step-by-step process and how you will be trained to become proficient in DNA profiling.

Our program covers theoretical foundations, hands-on laboratory experience, and forensic case study applications to ensure you are well-equipped for real-world forensic DNA analysis.

TRAINING MODULES & WORKFLOW

1. SAMPLE COLLECTION & PRESERVATION

✅ **Understanding Biological Samples:**

- Blood, saliva (buccal swabs), semen, hair, bone, and tissue samples
- Sample handling techniques to avoid contamination

✅ **Collection Methods:**

- Post-Mortem sample collection and storage
- Sample Collection from living subjects

✅ **Preservation & Storage:**

- Use of sterile collection kits
- Temperature-controlled storage methods
- Sample labeling and documentation for traceability

🔍 ***Training Focus:*** Hands-on practice with collection kits, labeling, and documentation

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2. DNA EXTRACTION

✅ Extraction Methods:

- Organic (Phenol-Chloroform)
- Automatic DNA Extraction
- Silica column-based extraction
- Magnetic bead-based purification

✅ Steps of DNA Extraction:

1. **Lysis:** Breaking open cells to release DNA
2. **Protein Removal:** Eliminating proteins using organic solvents or protease treatment
3. **Purification:** Using alcohol precipitation or column-based methods
4. **Storage:** Storing extracted DNA at -20°C to -80°C

🔍 ***Training Focus:*** Hands-on extraction of DNA from biological samples

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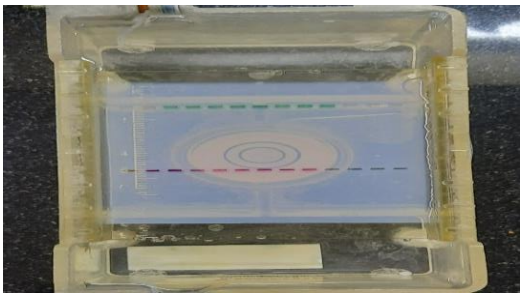
3. DNA QUANTIFICATION



✅ Purpose of Quantification:

- Assessing DNA quality and quantity before PCR
- Ensuring optimal DNA input for amplification

✅ Techniques Used:

- **Spectrophotometry (NanoDrop):** Measures DNA concentration based on absorbance at 260/280 nm
- **Agarose Gel Electrophoresis:** Uses EtBr to quantify DNA
- **Quantitative PCR (qPCR):** Determines human-specific DNA quantity for STR profiling

🔍 ***Training Focus:*** Practical experience using NanoDrop, Gel Electrophoresis, and qPCR for DNA quantification

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4. POLYMERASE CHAIN REACTION (PCR) AMPLIFICATION

✓ Principles of PCR:

- Denaturation, Annealing, and Extension
- Multiplex PCR for amplifying multiple STR loci

✓ STR Kits Used:

- 27 STR Marker Kit

✓ PCR Setup:

- DNA template, primers, buffer, dNTPs, polymerase
- Thermal cycling conditions for STR amplification
- PCR contamination control

🔍 ***Training Focus:*** PCR setup, reagent preparation, and thermal cycling

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5. CAPILLARY ELECTROPHORESIS (CE) & STR ANALYSIS

✓ Introduction to Capillary Electrophoresis:

- Separation of DNA fragments based on size
- Use of fluorescent dyes for STR detection

✓ Equipment Used:

- ABI 3500/3500xL Genetic Analyzer
- Sample preparation and loading

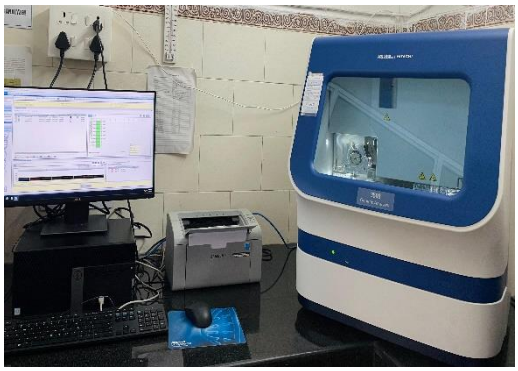
✓ Data Analysis:

- Interpretation of electropherograms
- Identifying peaks, stutter, artifacts, and allelic dropout

🔍 ***Training Focus:*** Operating CE instruments and analyzing STR profiles using GeneMapper software

6. STR DATA INTERPRETATION & QUALITY CONTROL

✅ **Understanding Electropherograms:**



- Peak height ratios, allelic ladders, and stutter analysis
- Interpretation of homozygous vs. heterozygous peaks

✅ **Ensuring Data Accuracy:**

- Internal positive and negative controls
- Addressing contamination and drop-in/drop-out artifacts

✅ **DNA Database:**

- UMID-AIIMS DNA Database

🔍 ***Training Focus:*** Comparative analysis of known and unknown STR profiles

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HANDS-ON TRAINING EXPERIENCE

Our training includes practical exercises such as:

✅ **DNA extraction from real biological samples**
✅ **STR amplification and analysis using CE**
✅ **Contamination control techniques**
✅ **Data interpretation and reporting**
✅ **Simulated case studies**

🔬 Join us and become an expert in DNA analysis!