At **Elite Clinical Laboratory**, we combine scientific precision with state-of-the-art molecular techniques to deliver accurate, timely, and actionable diagnostic insights. Among the most powerful tools we employ is **Polymerase Chain Reaction (PCR)** — a highly sensitive method used to detect genetic material from pathogens and to analyze specific gene variants associated with drug response.

1. **PCR Based Techniques**

Molecular Infection Testing: Detecting Pathogens with Precision

PCR is central to our **molecular infection testing** platform, enabling us to detect the presence of disease-causing organisms with unmatched accuracy and speed. Unlike conventional culture-based techniques, PCR can identify pathogens even when present in low amounts, ensuring earlier diagnosis and treatment.

We use **real-time PCR (qPCR)** to identify infectious agents from various sample types:

Sample Type	Test Type	Target Pathogens
Nasopharyngeal Swabs	Respiratory Pathogen Panel (RPP) PCR	Influenza A/B, RSV, SARS-CoV-2, and more
Urine Samples	UTI and STI PCR	*E. coli*, *Klebsiella*, *Chlamydia*, *Neisseria*, *Mycoplasma*
Nail Clippings	Nail Fungal PCR	*Trichophyton rubrum*, *T. mentagrophytes*
Wound Swabs/Aspirates	Wound Infection PCR	Bacterial and fungal pathogens

These molecular infection tests help clinicians make **targeted treatment decisions**, minimize unnecessary antibiotic use, and reduce the spread of drug-resistant organisms.

Molecular Genetics: Personalized Medicine Through Pharmacogenetics (PGx)

In our **molecular genetics division**, we utilize advanced PCR platforms to assess **pharmacogenetic (PGx) gene variants** — the genetic differences that influence how individuals metabolize and respond to medications.

We use the **OpenArray™ Real-Time PCR System** from **Applied Biosystems** to screen for dozens of clinically significant variants across genes such as:

- **CYP2D6**, **CYP2C19**, **CYP3A4/5** – Drug metabolism
- **SLCO1B1**, **UGT1A1**, **VKORC1** – Drug transport and response
- **HLA-B*57:01**, **TPMT**, **DPYD** – Adverse drug reaction risk

This cutting-edge platform allows us to deliver **high-throughput, accurate, and reproducible results** that guide personalized treatment strategies across psychiatry, cardiology, oncology, and pain management.

Why PCR?

PCR offers:

- **High sensitivity and specificity**
- **Rapid turnaround time**
- **Direct detection of pathogens and gene variants**
- **Quantitative and qualitative data**

Whether detecting a respiratory infection or tailoring a patient's medication based on their DNA, PCR enables us to deliver **precision diagnostics** that improve outcomes.

Advancing Diagnostics, Enhancing Care

At Elite Clinical Laboratory, we are committed to providing **clinically relevant testing** using validated molecular techniques that meet the highest quality standards. Our PCR-based testing services empower clinicians with reliable insights for both infectious disease management and personalized medicine.

2. Sequencing-NGS:

The Techniques Behind Genetic Testing

At Elite Clinical Laboratory, we utilize cutting-edge technologies to bring the future of personalized healthcare into today's clinical practice. One of our most powerful platforms is Next Generation Sequencing (NGS) — a revolutionary approach that enables comprehensive analysis of genetic material to uncover disease predispositions with unmatched accuracy and depth.

Precision through Illumina-Based Sequencing

Our NGS platform is powered by Illumina's industry-leading Sequencing by Synthesis (SBS) technology — the gold standard in high-throughput genetic analysis. Using V2 targeted enrichment probes and advanced XLEAP-SBS™ chemistry, we achieve exceptional data quality, sensitivity, and coverage across clinically relevant genes.

Our sequencing workflow includes:

- **Targeted enrichment library preparation**
- **Precision indexing and adapter ligation**
- **Deep sequencing using Illumina instruments**
- **Advanced bioinformatics analysis with ACMG/AMP guideline-based interpretation**

Genetic Testing Panels We Offer

Our NGS-based panels are designed to identify clinically actionable variants from simple, non-invasive buccal swab samples. We analyze key genes associated with a wide range of disease predispositions, helping clinicians and patients make proactive, informed healthcare decisions.

Disease Area	Panel Focus
Cancer Genetics	Hereditary breast, ovarian, colorectal, prostate, and other cancer syndromes
Cardiomyopathy & Cardiac Disease	Hypertrophic and dilated cardiomyopathies, arrhythmogenic conditions
Pulmonary & Cardio-Pulmonary	Pulmonary fibrosis, primary ciliary dyskinesia, PAH, and syndromic disorders
Metabolic Disease Predisposition	Inborn errors of metabolism, familial hypercholesterolemia, obesity syndromes
Neurological & Neurodegenerative	Alzheimer's, Parkinson's, epilepsy, motor neuron diseases, ataxias
Thyroid & Endocrine Disorders	Congenital hypothyroidism, thyroid hormone resistance syndromes
Ophthalmic Genetics	Retinal dystrophies, congenital cataracts, glaucoma-related gene variants

Why Choose NGS?

- **High-throughput: Analyze hundreds of genes in a single test**
- **Sensitive & specific: Detect even low-frequency variants with high confidence**
- **Targeted & efficient: Focused panels reduce noise and increase clinical relevance**
- **Future-ready: Data can support updated interpretations as science evolves**

Clinical Value You Can Trust

Our genetic testing services follow strict CLIA/CAP-compliant workflows and interpretations adhere to ACMG/AMP guidelines, ensuring the highest standards of clinical validity and utility. Each result is reviewed by experts and delivered with actionable insights, helping providers with:

- **Risk stratification**
- **Preventive screening recommendations**
- **Family counseling**
- **Targeted treatment planning**

A Commitment to Precision Medicine

At Elite Clinical Laboratory, we're redefining diagnostics by integrating next-generation science with clinical care. Our Illumina-powered NGS platform brings precision medicine to life — enabling earlier detection, more effective prevention, and truly personalized patient outcomes.