GeNei™
Since 1989

GeNei Custom Services

Oligonucleotide Synthesis and Modification Platform		Gene Synthesis Platform	Gene Expression and Protein Purification Service
DNA	**RNA**		
Research Grade: • qPCR probes • Capture probes • Fluorescence in situ Hybridization probes **Industrial Grade:** • qPCR probes • NGS primers/probes • Modified oligos for forensic diagnostic	• siRNA • miRNA • sgRNA • ASO • Aptamer • Modified/Labeled RNA • Delivery system customization and coupling	• Gene Synthesis Codon Optimization • PCR Cloning & Subcloning • Site-Directed Mutagenesis • Plasmid Preparation • Synthetic DNA Libraries	Bacterial Expression system Yeast Expression System Mammalian Cell System Antibody (IgG) Production Baculovirus / Insect Cell System **One Stop Platform:** • Recombinant Protein • Expression • Antibody Expression Assay Development

Detection Platform: Biological Evaluation of Oligonucleotide

About GeNei

Genei Laboratories is a Life Science division established in Bangalore, India in 1989. The company offers broad range of innovative performance products, services, business relationships and educational products that enables the customer's success in research, development and production of biotech products. The company focuses on advanced technology development, large-scale production, and applications of DNA, RNA, and gene synthesis

Genei Educational Products are better platform to learn Bio-techniques from handling of microbes to unraveling the DNA sequences, amplification by PCR to in-vitro expression of genes. The Products are designed to integrate the needs of academia and research to synchronize themselves with the Industry level expertise. Our association and experience with products for Biological Research is over three decades old. Therefore, we take pleasure in extending this service/ experience to the research and teaching fraternity.

Technology Platforms

Platforms	Capacity & Capability	Advantages
Oligonucleotide Synthesis and Modification	Provide customized synthesis and modification services for various types of DNA and RNA primers/probes supplied in OD, mg, gram, to hundreds of grams level	Good batch-to-batch stability and high product purity; strict quality standards, and customized items can be provided for various applications such as molecular diagnosis and drug research and development
Gene & Plasmid	Complete gene synthesis and plasmid preparation platform	With rich experience, we can synthesize ultra-long sequences, difficult sequences, etc., and clone genes into any designated vector. 100% sequence accuracy is guaranteed.
Protein Expression	Integrated technology platform for R&D and production, providing customized protein expression and purification services	We have accumulated a large number of successful cases and can provide overall solutions for difficult proteins.

Citations

- Inefficient excision of uracil from loop regions of DNA oligomers by E.coli uracil DNA glycosylase N.Vinay Kumar and U.Varshney* Centre for Genetic Engineering, Indian Institute of Science, Bangalore 560012, India.
- Intramolecular triplex potential sequence within a gene down regulates its expression in vivo Partha S.Sarkarl and Samir K.Brahmachari 2, * Molecular Biophysics Unit and 2Centre for Genetic Engineering, Indian Institute of Science, Bangalore 560 012, India.
- Angle and locus of the bend induced by the MspI DNA methyltransferase in a sequence-specific complex with DNA Ashok K. Dubey* and Sanjoy K. Bhattacharya Department of Biochemical Engineering and Biotechnology, Indian Institute of Technology-Delhi, Hauz Khas, New Delhi-110016, India.
- Hairpin duplex equilibrium reacted in the A®B transition in an undecamer quasi-palindrome present in the locus control region of the human b-globin gene cluster Mahima Kaushik, Ritushree Kukreti1, Deepak Grover1, Samir K. Brahmachari1 and Shrikant Kukreti* Department of Chemistry, University of Delhi (North Campus), Delhi 110007, India and 1 Institute of Genomics and Integrative Biology (CSIR), Delhi University Campus, Delhi 110007, India.
- Optimization of PCR reagents for amplification of microsatellites in oil palm M. Jayanthi*, G. Sujatha and P.K. Mandal National Research Centre for Oil Palm Pedavegi, West Godavari District, Andhra Pradesh 534 450.
- Multi-loci Molecular Characterisation of Endophytic Fungi Isolated from Five Medicinal Plants of Meghalaya, India Ranjan Kumar Bhagobaty# and S. R. Joshi*

- Complication of Salmonella Bacteraemia in a Case of Treated Fungal Endophthalmitis J. Malathi,1 M. Sowmiya,1 Vikas Khetan,2 K. Lily Therese,1 and H. N. Madhavan1
- Indian Journal of Clinical Biochemistry, 2008 / 23 (2) 123-129 HIGHER ALLELES OF APOLIPOPROTEIN B GENE 3' VNTR: RISK FOR GALLSTONE DISEASE Manjusha Dixit, Anvesha Srivastava* , Gourdas Choudhuri* and Balraj Mittal Departments of Genetics and *Gastroenterology, Sanjay Gandhi PostgraduateInstitute of Medical Sciences, Lucknow (India)
- Detection of I1 cam mutation in a male child with mental retardation M. Swarna, M. Sujatha, P. Usha Rani and P.P. Reddy Institute of Genetics and Hospital for Genetic Diseases, Begumpet, Hyderabad-500 016, A.P., India.

Oligonucleotide Synthesis and Modification

Genei provides high-quality oligonucleotide synthesis and modification services, including standard primers, RNA, qPCR primers and probes, NGS primers, etc. We have established corresponding production processes and quality control standards for different applications, such as scientific research, small nucleic acid drug development, and in vitro diagnostics.

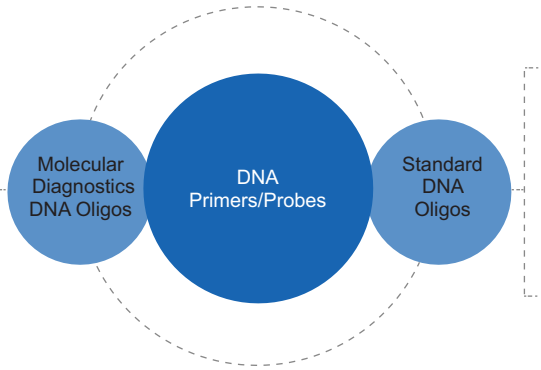
Service features

- Experienced R&D and production teams, providing up to 100-gram scale oligonucleotide synthesis with batch-to-batch consistency; Professional technical support, standardized project management, and comprehensive pre-sales and after-sales services;
- Customized services: over 100 chemical modifications with different functions, multiple purification methods, and various items for different applications;
- Strict Quality Control standards, ISO 9001: 2015 Quality Management system.

Purification Method	Modification		QC Items
	Positions	Groups	
RPC MoP PAGE, HPLC, etc,	5' - end Modifications 3' -end Modifications Intermedia Modifications Dual/Multiple Modifications	Rare bases, Biotin, Digoxingein, Phosphorylation, Phosphorothioates, Amino Likers, Thiol, Quenchers, Internal Modification, Fluorescence, etc.	Standard detection items Custom detection items: Purity, fluorescent value, Ct value, human genomic DNA contamination, NTC amplification, cross contamination rate, batch-to-batch consistency, etc.

DNA Primers/Probes

- **qPCR Primers/Probes**
  IVD qPCR primers IVD qPCR probes
- **Forensic Diagnosis**
  STR fluorescent-labeled primers
- **NGS Primers**
  NGS adapter primers NGS capture probe
  NGS multiplex PCR primers NGS
  blocking primers



High-purity primer synthesis Modified primer synthesis

Custom DNA Primer/Probe Synthesis, Large-scale DNA Primer/Probe Synthesis

RNA Synthesis and Modification

Synthesis	Modification
• **siRNA：** siRNA Synthesis, Guaranteed siRNA Package, siRNA Library • **miRNA：** miRNA mimic, miRNA inhibitor, miRNA agomir, miRNA antagomir, miRNA Library • **sgRNA：** sgRNA Synthesis, sgRNA Library ASO, Aptamer	• **Sugar Modification:** 2'-OMe, 2'-MOE, 2'-F etc. • **Base Modification:** methylated cytosine (5-Me-dC), etc. • **Backbone Modification:** PS, PO, phosphoramide modification, etc. • **End Modification:** Chol, Biotin, Thiol, NH2, Fluorescent dyes, etc. • **Delivery System:** LNA, GalNAc, PMO, PNA, etc.

Gene Synthesis and Related Services

Genei's experienced R&D and production team has established an advanced gene synthesis technology platform, standardized operating procedures, and a strict Quality Control system. We provide high-quality customized services including gene synthesis, codon optimization, PCR cloning, sub-cloning, plasmid preparation, site-directed mutagenesis, and mutation library construction.

Just submit the gene sequence you need, and Genei will deliver the desired plasmid on time!

Service Features

- Advanced technology platform: Our team has successfully synthesized various types of difficult sequences, such as repetitive sequences, GC/AT-rich sequences, etc., and delivered the plasmids according to customer-specific requirements.
- Professional technical support: Considerate pre-sales and after-sales services, free codon optimization and project design, timely project updates, and free technical consulting
- On-time delivery: Experienced production and R&D teams ensure the on-time delivery rate of over 95%.
- Intellectual property protection: The nucleic acid/amino acid sequence provided by the customer is kept strictly confidential and will not be distributed to third-party in any form.

Service Types

Gene Synthesis	On-time delivery rate >95%, successfully synthesized and delivered various difficult gene sequences
Codon Optimization	Free codon optimization, proven to significantly improve protein expression
PCR Cloning and Sub-cloning	Clone the gene of interest into any position of the designated vector; free vector storage for 3 years
Plasmid Preparation	Microgram to gram level, good stability between batches; the endotoxin level of transfection grade plasmid can reach 0.005 EU/μg and below upon request
Synthetic DNA Libraries	Design and construction of point mutation libraries, random mutation libraries, degenerate libraries, controlled libraries, sgRNA and other libraries

Gene Expression and Protein Purification Services

Avail our expertise and facility to express your gene and gel purified protein for further studies including raising polyclonal or monoclonal antibody, assay development, etc. Starting from fill-length cDNA clone, the gene would be cloned into an expression vector, sequence confirmed, protein expressed and purified. The services offered would include:

- Sub-cloning of the full-length cDNA into an expression vector
- Sequence confirmation of the gene by bi-directional sequencing.
- Optimization of protein expression.
- Purification (5-10 mg) of expressed protein, up to 90% purity.

Service Features

- Sequencing of the gene after cloning into expression vector would be undertaken if PCR based cloning techniques are employed.
- Protein expressed may or may not be biologically active.
- Bacterial & Yeast based expression system available.
- GST and (His) 6 tags available for easy purification of the recombinant protein.
- N-terminal GST-tagged, N-terminal, C-terminal, N- and C-terminal (His) 6 tags together as well as no tag expression systems available.
- Level of expression of recombinant protein may vary (very high to no expression at all) depending on toxicity of the protein to the Bacteria or Yeast host.
- Facility for >90% purity available, please enquire.
- Subsequent raising of Monoclonal and Polyclonal antibody from the purified proteins, available.

Selection guide

Experimental success depends on many factors such as the source of target protein, protein function, yield, cost, and the application of the purified protein. For successful recombinant protein expression, it is important to choose the appropriate system for a specific application. Please review the guide below.

Expression Systems	*E. coli*	Baculovirus-insect	Mammalian
	Prokaryotic	Eukaryotic	Eukaryotic
Most Common Applications	• Bacterial proteins • Antigen proteins • Cytokines • Enzymes	• Cytoplasmic and Nucleus proteins • Secretory proteins • Transmembrane proteins • Viral proteins • Kinases • Toxic proteins	• Secretory proteins • Extracellular domain of transmembrane proteins • Transmembrane proteins • Recombinant antibodies • Antibody fragments
Advantages	• Low cost • Rapid expression • Easy to scale up • Most widely used system for recombinant protein production	• High capacity genes • Suitable for toxic proteins • Post-translational modifications similar to those of mammalian systems	• Low endotoxicity • High bioactivity • Comprehensive post translational modifications • Transient and stable expression
Challenges	• Inclusion bodies • Lack of post-translational modifications	• Demanding culture conditions • Lack of partial glycosylation	• Demanding culture conditions

Gene-to-Protein Solutions

Sequence analysis And codon optimization → Gene synthesis and sub-cloning → Protein Expression → Protein purification and QC

Nucleic Acid Purification Service

Genei, offers nucleic acid isolation and purification services from various sample sources. Opting our service not only saves time and effort but can also provide benefits to our customers from technical expertise.

The purified DNA and RNA are suitable for various downstream applications like cloning, qPCR and NGS etc.,

Our services enhanced the young researchers and scholars with the advantages of a complete workflow that yield high quality DNA or RNA, even from difficult sources.

In deciding on a service, considering the factors that include the desired scale and throughput, as well as the nucleic acid type, such as Genomic DNA, total RNA or mRNA.

We offer isolation of nucleic acids from multiple sample source types like,

- Mammalian Cells
- Blood or Blood Components
- Blood Cards
- Tissue
- Paraffin-Embedded Tissue
- Formalin-Fixed Tissue
- Gram Negative and Positive Bacteria
- Saliva/Sputum
- Urine
- Stool
- Any Plant Material (Including seed, leaf, root etc.)
- Fungi
- Yeast
- Insects etc.

Service Features

- Isolation and purification of Nucleic acid from a variety of sample sources.
- High quality directly suitable for different downstream applications.
- Flexibility in choosing the scale

Deliverables

- Quantification of the extracted RNA by OD measurement, RiboGreen or RT - PCR.
- Quality control of RNA extraction via Bioanalyzer (RIN values).
- High quality DNA and/or RNA in desired concentration and aliquots.

Custom Amplification Service

Our expert team can be of your support in highly complex and multiplex PCR amplification, gene expression (Relative and Absolute quantification) studies and copy number studies by using PCR and real-time PCR (qPCR).

End-point PCR:

Optimization of PCR usually take time and efforts especially in dealing with issues such as optimization of PCR components, poor or no amplification, mis-priming and primer dimer formation etc., We at Genei with over three decades of experience are capable to provide solutions and deliver you a well-optimized, robust and reproducible PCR assay.

Real-time PCR:

We offer a wide range of Real-time PCR amplification services which includes,

- Gene expression studies (Relative and absolute quantification) of any pathogen/gene/target
- Qualitative detection
- MicroRNA analysis
- SNP genotyping etc.,

Sanger Sequencing Service

Sanger sequencing (also known as dideoxy or capillary electrophoresis sequencing) is an excellent choice when a small region of DNA to be analysed and looking for a fast and cost-effective sequencing.

Our lab is fully equipped with the Applied Biosystems 3500xL Genetic Analyzer and expert staff to handle DNA sequencing projects of various complexities including PCR product sequencing, plasmid DNA sequencing, Sequencing of other DNA constructs, direct Bacteria colony sequencing, Sequencing of glycerol stock, GLP DNA sequencing.

Our specialty is to provide cutting-edge MDx grade Sanger sequencing and data analysis services with high quality and accuracy to Molecular Diagnostic labs (MDx labs).

We offer DNA sequencing read lengths of up to ~900-1100 bases (Phred20 score).

Our Comprehensive Sanger sequencing Portfolio:

- **Routine single or bidirectional sequencing** on PCR products and plasmid DNA of single samples or plates
- **Molecular identification** services of Bacteria (16SrRNA gene) and Fungi (18S/ITS/26S rRNA)
- **Primer walking** services with a guaranteed final data accuracy of ≥99.90%
- **DNA Barcoding** services for Insect, Animal, and plants (COI/COII/matK etc.)
- **Single nucleotide polymorphism (SNP) Genotyping** services through PCR and Sanger sequencing
- **Targeted re-sequencing of** defined genomic regions after Next Generation Sequencing (NGS)
- **Cloning of PCR products and subsequent sequencing**

Molecular Identification Service

Molecular identification service is used to identify various isolates of microbes (Bacteria and Fungi). It is not only an alternative to traditional phenotypic detection methods whilst it offers highly sensitive, specific, and fast in detecting slow growing and non-culturable organisms.

Genei, provides fast and accurate identification of Bacteria (16S rRNA gene) and Fungi (18S/ITS/26S rRNA) by DNA sanger sequencing method.

We provide complete service which includes Nucleic acid isolation, PCR Amplification, Sanger sequencing, Contig generation and Report.

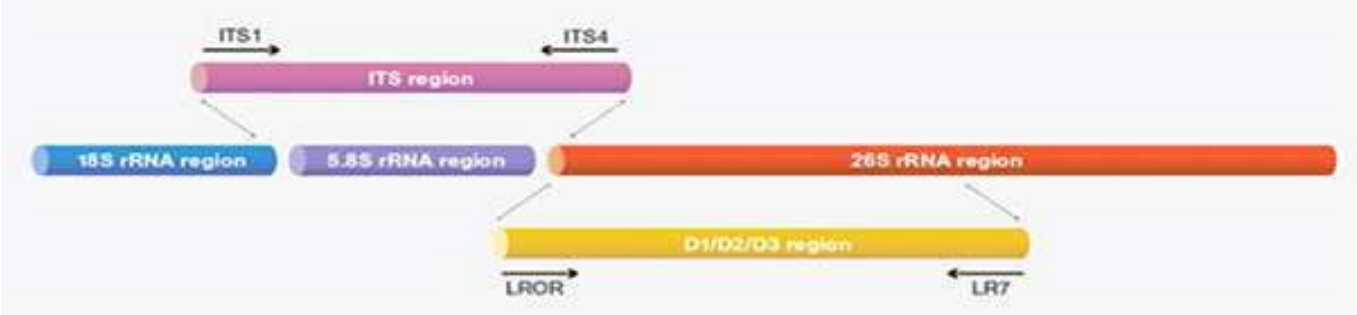
BLAST analysis of contig sequence is performed with the database of NCBI GenBank. Based on maximum identity score, top ten sequences are selected and aligned using multiple sequence alignment software (MAS), such as “CLUSTALW.” Distance matrix is generated, and the Phylogenetic tree is constructed using bioinformatics tools.

We accept the below mentioned starting materials for this:

- Bacterial and Fungal colonies
- Extracted gDNA
- Glycerol stocks
- Cell pellets

Bacteria:

Fungi/Yeast:



Deliverables

This service includes sequencing of ribosomal genes and/or other conserved regions and its comprehensive report which includes genus and species level identification (if possible) along with phylogenetic tree.

Primer Walking Service

Primer Walking is used to fill in the gaps and give a full sequence or additional coverage as needed.

GeNei`s Primer walking services offers an option to choose single-stranded (SS) and double-stranded (DS) sequencing for DNA templates that are longer than 1400 bases. Our Primer walking services offer to discover unknown regions

Service Features

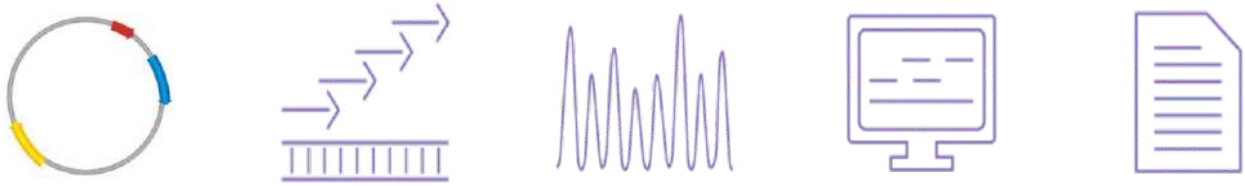
High Quality: A guaranteed final data accuracy of ≥ 99.90%

Fast: Up to 1600 base pairs per day (even faster when a reference sequence is available)

Deliverables

Delivery of electronic files such as project data sheet including sequencing strategy, text files and chromatograms (ab1 and .pdf format) for all the reactions. Consensus sequence as FASTA file.

Primer Walking Workflow



1. Submit Samples
2. Primer Design
3. Sanger Sequencing
4. Contig Generation
5. Report

Barcoding Service

DNA Barcoding is a method for species identification that uses a short DNA sequence in a specific gene or genes of an organism.

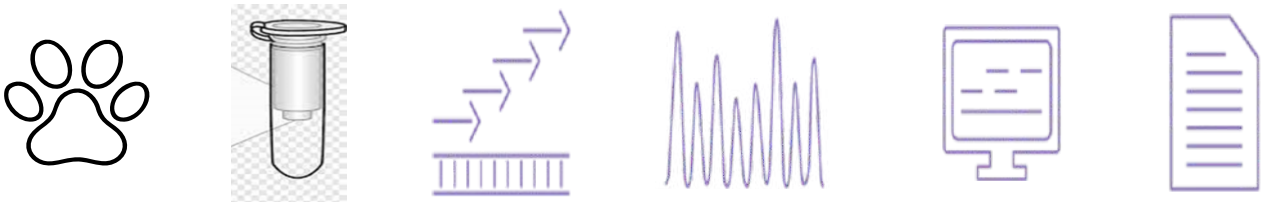
We identify,

- Bacteria, Actinomycetes, Fungi and Algae.
- Land vertebrates, Fishes, and seafood.
- Plant Barcoding.
- Insect Barcoding (termites, mites, ticks, spiders, millipedes etc.).

Deliverables

Delivery of electronic files such as project data sheet including sequencing strategy, text files and chromatograms (ab1 and .pdf format) for all the reactions. Consensus sequence as FASTA file. Comprehensive report which includes genus and species level identification (if possible) along with phylogenetic tree.

DNA Barcoding Workflow



Unknown species | DNA Extraction | DNA Amplification | Sanger Sequencing | Matching Sequence | Report

SNP Genotyping Service

Genotyping is a method of determining differences in the genetic make-up (genotype) of an organism. This method does this by comparing the individual's DNA sequence against a reference sequence.

SNPs (Single Nucleotide Polymorphisms) or point mutations are the most common types of genetic aberrations among all the other types of aberrations.

Genei`s, SNP Genotyping service is a PCR and Sanger sequencing-based solution that is used to SNP screening assays and validate SNPs of interest with speed and accuracy.

Deliverables

SNP Genotyping projects will receive a chromatogram file (ab1 and .pdf) along with a final report identifying SNPs compared to the provided reference sequence.

- Custom reports are also available upon request.

SNP Genotyping Workflow

DNA Extraction | DNA Amplification | Sanger Sequencing | Identification of Mutation | Report

Assay Development Service

We have expertise, experience, and complete knowledge to design, develop, validate, and assist with regulatory requirements for your customized Molecular Diagnostic (MDx) assays.

We develop PCR, Real-time PCR, Sanger sequencing and point-of-care assays for the detection and quantification of various pathogens and genes.

We develop assays for,

- Human Molecular Diagnostics
- Veterinary Molecular Diagnostics
- Aqua Molecular Diagnostics
- Plant Molecular Diagnostics

Why we?

Our expertise team comprises of over three decades of experience in design, development, and manufacturing of Molecular diagnostic (MDx) assays. Our strength is to develop robust, rapid, highly sensitive, and specific Multiplex PCR and Real-time PCR assays.

Our team has experience in developing and manufacturing kits that are in use by various reputable diagnostic centers across the globe.

Flexible and custom-made approaches are an important aspect of our service, with a prime focus on complete fulfillment and customer satisfaction.

Our reliable partnership helps you to innovate in any of your assay development requirements.

Our Assay Development Process:

Definition | Feasibility | Optimization | Verification and Validation | Technology transfer

We also offer Add-on services such as,

- Flexible Design and development: We can design, develop, verify, and validate any part of your assay development such as sample selection, sample collection, sample transportation, sample storage, extraction, Amplification and Data analysis.
- Pre-clinical trials: We are associated with leading service labs in India through whom we can provide pre-clinical trial studies for your developed assays.
- Quality & Regulatory: We are associated with Expert organizations to support your Quality and Regulatory needs for meeting the compliances of Indian Regulatory, CE certification and US-FDA.

Other services

Seed and plant health testing.

- Genetic and trait purity
- Fingerprinting
- Pathogen testing
- Research and consultancy
- A comprehensive list of approved ISTA, ISHA and NSHS Seed Health Testing Methods are examined for plant pathogens in seeds, vegetables and fruits.

Methods and Quarantine services.

- Seed Visual Inspection
- Phytosanitary Field inspection
- Sampling for seed health testing
- Seedling emergency test
- Seed and seedling phenotyping
- Seedling quality assessment
- Paper- based germination assays.

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