

Balachandar Nedumaran, Ph.D.

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Summary

- Self-motivated productive scientist with strong experience and technical expertise in developing and validating analytical methods, immunoassays, cell-based assays, Real-Time Quantitative PCR assays
- More than 15+ years of experience in cell culture including various cell lines, primary cells, human primary & stem cells
- Extensive experience in lentiviral, adenoviral & adeno-associated viral vectors, cloning, quantitation and testing gene of interest (GOI)
- Capable of producing high quality of reproducible data in highly productive collaborative teams

Education and Academic Experiences

		till year
UCSD, NIH & UCDenver, USA	Postdoc to Junior Research Faculty	2020
Chonnam National University, South Korea	Ph.D., Molecular Biology	2009
Bharathiar University, India	M.S., Human Genetics	2002

Technical Skills

- Numerous RNA extractions were done from very easy to complex sources, such as various cell lines (HeLa, HEK293T, 293AD, 293F, HepG2, H4IE, Hepa1c, HBSM, Min6, etc), primary cells (mouse hepatocytes, rat hepatocytes, human pancreatic islets, human aortic valve cells), mouse tissues (liver, kidney, BAT, WAT, brain, pancreas, testis & urinary bladder), human tissues (liver, pancreatic sections, aortic valves, bladder), more than 20 stable cell lines with gene delivery of GOIs and stem cells (human ESCs & Donor-specific iPSCs)
- Every day (>10+ years) working experience in DNA extractions either for cloning or for genotyping
- Routine gel electrophoresis for DNA fragment size verification, northern blotting (only around Graduate student time) or SDS-PAGE gel running for western blotting and immunoprecipitations, Fragment analyzer, Bioanalyzer
- Denaturing and non-denaturing TBE gel running for ribo-profiling and linker-ligated library construction NGS
- Sandwich ELISA for detecting single or multiplex ELISA (biolegend) for detecting multiple targets using cell lysates or supernatants from various cell types or human tissue samples
- Current GMP (cGMP) experience in routinely executing ddPCRs (BioRad QX200) and ELISAs
- Routine hands-on experiences on virus preps and titrations of Adenoviruses, Lentiviruses or Adeno-associated viruses (AAVs).
- Adenoviruses were constructed to overexpress specific GOIs or shRNAs in HepG2 cells, primary hepatocytes and gene delivery into mouse livers via tail-vein injection.
- Lentiviruses were constructed using classic, gateway, TA cloning or to deliver genes into human primary Aortic Valve Cells, HE293Ts, Suspension 293-F, TKPTS, mUB cells.
- AAVs were prepared from either self-constructed or purchased from vendors and they were successfully transduced into 293Ts, mouse bladders, human pancreatic islets, human pancreatic sections or human ESC-derived or IPSC-derived beta-like cells
- Plasmid or genomic DNA isolation and purification from Adenoviruses, Lentiviruses or Adeno-associated viruses (AAV) preps, mammalian cells, and bacterial cells,
- DNA/Protein purity and quantitation using Nanodrop, Qubit or QubitFlex
- Plasmid and genomic DNA digestion with unique Restriction endonucleases or exonucleases
- PCRs, Real-Time Quantitative PCR (RT q-PCR) assays, Touchdown PCR (TdPCR) or Gradient PCR, Colony PCR
- Optimal primer and DNA probe designing, Sanger DNA sequencing - DNA/Protein Sequence analysis for promoter and regulatory sequences, insertion or deletion or substitutional mutations, codon-amino acid analysis, in-frame gene of interest and translational readouts - Expert in using Snapgene and other various bioinformatic tools, NCBI blast, nucleotide/Protein sequence alignment tools
- All gene (GOI) deliveries are achieved by routine transient transfections, lentiviruses, adenoviruses, or AAVs - Delivered genes and their target gene expressions are used to be verified either by QPCR using Taqman probe-based/SYBRg-based QPCR or by western blotting
- Multiplex Taqman probe QPCRs using each gene probe labelled with FAM/VIC/Hex/Tex/Cy5 Bio-Rad S3e cell sorter is used to sort the cells with 1-4 colors
- Knowledge transfer and Observe runs by trainers in Fate Therapeutics for Cell Counting, Flow assays and Potency assays
- Windows OS, Macintosh OS, Photoshop, Graphpad PRISM, ImageJ, JMP, Snapgene, Microsoft Office, ImageLab, Benchlings eLN, Quartzy, expert in Genome browsers/databases (NCBI, Ensembl, Uniprot, UCSC, dbSNP, Motifscan, TRANSFAC, etc), Google workspace - NotebookLM - Concur - Smartsheet - Biorender

cGxP Experience

Sr. Scientist: R&I, Hills Pet Nutrition/Colgate-Palmolive, KS

2023- 2025

Early research - Assay Development – Molecular Assays – ELISAs – Dog Liver and Colon organoids from frozen tissues – Nanostring assay design and execution using nCounter system– Custom Taqman PCR arrays – Custom Taqman array cards – mRNA-seq using NextSeq2000 - PacBio sequencing training - miSeq Training - Biobanking

Scientist: PCAD, Fate Therapeutics, CA

2022- 2023

Product Characterization and Analytical Development (PCAD) – Assay Development – Molecular Assays – ddPCR Identity, purity and residual Assays - Current GxPs - Routine assay executions of ddPCRs - SOP Writing - Transfer assays - Qualification assays - Verification assays - AD report (each ddPCR ID assay) for each product – Work with R&D and QC team

Sr. QC Scientist: QC method Services, Catalent Pharma, Harmans, MD

2021- 2022

Current GxPs (cGMPs, cGLPs, cGDPs, cGMPs) - Routine assay executions of ELISAs & ddPCRs - SOP Writing -Transfer, Validation, Qualification and Verification assays – Validation, Transfer, Verification and Qualification - Assay executions in different sites - Writing transfer and verification SOPs - Laboratory Investigations - DCARs -CAPAs-troubleshooting – Smartsheet – Compliancewire – Mastercontrol – DocuSign -TrackWise

Research experience

Research Associate/Instructor/Lab manager: University of Colorado, CO

2015-2021

- AAV preparation and transduction in 293Ts and mouse bladder tissues - SNPs were identified in pore domains of mechano-gated channel with overactive lower urinary tract symptoms in humans - Biobanking of solid and liquid biopsies
- Comparative proteomic analysis in samples from cannabis users and healthy donors - Extracellular matrix proteins were analyzed in human aortic valve interstitial cells
- Human pancreatic beta-like 3D cell clusters are being generated from ESCs or patient-specific iPSCs towards gene therapy for T1D patients – Routine multiplexed **Flow cytometry** up to 5 different channels at a time - CRISPR-mediated reporter gene integration in AAVS1 site- CRISPR-KO iPSCs cells
- Ribosome profiling and ribo-tag sequencing are being performed to find the translating RNAs from various experimental groups and to find novel neoantigens linked to induce autoimmune response

Visiting Fellow: NIEHS/NIH, RTP, NC

2011-2015

- Successfully cloned bicistronic IRES vector with dual tag (FLAG/HA) and GFP reporter with GOI - Gene (GOI) delivery to Freestyle 293F cells and stable cell generation - GFP-High cells were FACS sorted and large scale of these cells used for Tandem affinity purification using magnetic beads and competing peptides - highly purified GOI was pulled down with strong interacting proteins - Interacting proteins were identified by LC-MS/MS and sequence blast with protein data base
- Highly complicated mouse gene knock-out (KO) was successfully achieved using FLP/Lox system – KO mice were confirmed by genotyping, southern blotting, QPCR - Functional effect in the KO mice was also identified under diet-induced obese model system with high-fat diet feeding, monitoring weight & blood glucose, and GTT, ITT and PTT in live mice - Histochemical analysis in various paraffin-embedded or frozen tissue sections

Postdoctoral Fellow: UCSD, La Jolla, CA

2010-2011

- Successfully cloned and sequence-verified skin-specific transgenic vector - Effect of antimicrobial peptides on human skin microbial growth were verified by various assays, such as RBC hemolysis, radial diffusion, colony reduction assays

Graduate researcher: Chonnam National University, South Korea

2003-2009

- Luciferase reporter gene assays to test the transcriptional activity and effect of transcription factors and nuclear receptors
- More than 100 successful cloning of native, point-mutated, serial deletions of numerous genes - Protein-protein interaction assays, such as GST-pulldown, Yeast-two hybrids, CoIPs - Novel protein search using yeast-two hybrid library screening with human cDNA library – Almost 1000 executions of transfections and reporter gene assays

Awards and Certifications

Brain Korea 21 award covered complete tuition fee and living expenses - Served as a committee member in various non-scientific organizations in universities - Project management certification – Public speaking and presentation certification – Invited talks - Team building with Clinicians, surgeons and basic scientists

Management Experience

- As a graduate student and postdoctoral fellow, I guided, managed and/or mentored 1 undergrad, 5 grads, 4 postdocs, 4 medical interns with MD. Collaborated with various research groups and managed for their experimental design and drafted various manuscript writing for other collaborators too. Excellent record keeping and guided other people for excellent record keeping in Benchling and shared drives. Chose speakers and organized monthly sponsored seminars-Trained QC, AD, PCAD trainees and trainers

Publications

<https://pubmed.ncbi.nlm.nih.gov/?term=balachandar+nedumaran>

Green Card holder and no sponsorship of VISA needed.

Ready to relocate any time