

## **Balachandar Nedumaran, M.Sc., M.Phil., Ph.D.**

Alumni - Barbara Davis Center, UC Denver Anschutz Medical Campus, CO, USA

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**ResearchGate:** [https://www.researchgate.net/profile/Balachandar\\_Nedumaran](https://www.researchgate.net/profile/Balachandar_Nedumaran)



### **Industrial Work Experience** (Jun 2021 - Aug 2025)

More details can be found from <https://www.linkedin.com/in/balachandar-nedumaran-2191b124/>

**Sr.Scientist: R&I, Hills Pet Nutrition/Colgate-Palmolive, KS (Food Industry) 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

**Scientist: PCAD, Fate Therapeutics, CA (Cell Therapeutics) 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: Catalent, MD (Cell & Gene Therapy) 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

### **Academic Research Experience**

Research Associate/ Lab Manager (2019 –2021 ), School of Medicine, UCD-AMC, CO, **USA**

Topic: Generation pancreatic beta cells from embryonic stem cells and ribosome profiling in these cell types under stressed conditions

Research Instructor (2017 – 2019) School of Medicine, UCD-AMC, CO, **USA**

Topic: Role of RUNX2 and extracellular matrix proteins in transdifferentiation of human primary aortic valve interstitial cells

Senior Postdoctoral Fellow (2015 – 2017) School of Medicine, UCD-AMC, CO, **USA**

Topic: Study of Neurogenic bladder dysfunction using novel mouse Knock-IN mouse models

Visiting fellow (2011 – 2015) Immunity, Inflammation and Disease Lab, NIEHS/NIH, RTP, NC, **USA**

Topic: Role of Glis2 and Glis3 in various necrotic and polycystic kidney disease using knockout mouse models. Tandem Affinity Purifications for finding specific interacting proteins.

Postdoctoral fellow (2010 – 2011) Dept. of Dermatology, University of California, San Diego, CA, **USA**

Topic: Investigation of antimicrobial peptide effect on skin microbes

Researcher (2003 – 2004) Hormone Research Center, Chonnam National University, **South Korea**

Topic: Regulation of gene expression by orphan nuclear receptors and transcription factors, and their role in diabetes, lipogenesis and adipogenesis

## **Education**

Ph.D. Molecular Endocrinology (2005 – 2009) Orphan Nuclear Receptor Lab, School of Biological Sciences & Technology, Chonnam National University, **South Korea** (GPA: 4.13/4.5)

M.Phil. Human Genetics (2000 – 2002) Bharathiayar University, **India**

M.S. Zoology (1998 – 2000) Jamal Mohamed College, Bharathidasan University, **India**

## **Areas of Expertise**

Regulation of gene expression by nuclear receptors and transcription factors – Signal transduction – Diabetes – Lipogenesis – Adipogenesis – Chronic and acute kidney diseases – Neurogenic Bladder dysfunction – Calcific Aortic Valve Disease – Osteogenesis – Fibrogenesis – Basic Inflammation – Neurogenetics - Liver metabolism - 3D Liver organoid development - Cancer biology - Immunometabolism - CKD - Urology- Aortic valve disease - 3D pancreatic islet development from iPSCs or ESCs - KO and KI mice generations - STING - mTOR- Aging

## **Technical Experience**

### **DNA:**

Genomic DNA extraction from cells, animal tissues and human tissues; Subcloning; Site-specific Mutagenesis; Promoter studies; EMSA; Southern Blot; *In vivo* ChIP; Construction of Viral Vectors and Tissue-specific transgenic vectors; DNA-Methylation study, SNP assays; AAVs, Adenovirus; Lentiviruses-ddPCR for identity

### **RNA:**

RNA isolation from cells, animal tissues and human tissues; Northern Blotting, Quantitative RT-PCR; RNA-seq; miRNA array - Custom Taqman PCR array plates - Nanostring - mRNA seq using Illumina and PacBio instruments-ddPCR

### **Protein:**

Protein extraction from cells animal tissues and human tissues; Western Blot; *in vivo* Co-immunoprecipitation; Confocal microscopy, FACS; Sample preparation for LC MS/MS; LC MS/MS data analysis; Tandem Affinity Purification (TAP)

### **Biochemistry:**

*In vitro* and *in vivo* GST pull-down assays; MBP pull-down assay; Yeast two-hybrid library screening; Tandem Affinity Purification (TAP) for mass-spec analysis

### **Microbiology:**

Radial diffusion assays, Colony reduction assays, Protease assays; RBC hemolysis using anti-microbial peptides; Fusion protein preparations in bacteria.

### **Cell Culture:**

Hands-on experience in working with at least 20 different cells/cell lines over 15 years; Culturing of mammalian cell lines and Primary Hepatocytes; Viral infections; Transient transfections; Generation of Stable cells; Primary rat and mouse hepatocyte culture; Primary human/pig aortic interstitial valve cells isolation and culture; Live cell imaging; Co-culturing primary cells with monocytes; Tremendous experience in maintaining and generating pancreatic beta-like 3D clusters from human ESCs/iPSCs; 3D culture in bioreactors

**Animals:**

Mouse injections (Glucose/Insulin/Pyruvate Tolerance Tests); Histochemical analysis of tissue sections; Mouse imaging; Generation of knock-out and Knock-in mice; Genotyping; Mouse Breeding strategies; Neurogenetic mouse models; IACUC protocol

**Cell and tissue based assays:**

Reporter gene assays; Multiplex ELISA; Sandwich ELISAs: Calcium staining; Collagen staining; Proliferation assay; Cytotoxicity assays; 3D cultures in bioreactors

**Clinical:**

Bladder tissues from patients with overactive bladder and bladder cancer; Blood Serum; Urine proteomics in Cannabis users; Aortic valves from patients with Cardiomyopathy and Calcific aortic valve disease: human pancreatic islets.

**Computer & Software:**

Windows iOS, Macintosh OS, Photoshop, Graphpad PRISM, ImageJ, Snapgene, Microsoft Office, ImageLab, Benchlings eLN, Quartzy, Ordering lab supplies through marketplace, pathway analysis, network analysis, expert in Genome browsers/databases (NCBI, Ensembl, Uniprot, UCSC, dbSNP, Motifscan, TRANSFAC, etc), Google workspace - NotebookLM - Concur - Smartsheet

**Industrial Experience**

Jun 2021 - Aug 2025: More details @ <https://www.linkedin.com/in/balachandar-nedumaran-2191b124/>

**Awards, Certifications and Honors**

- Scholarship of National Research Lab: Full Scholarship including tuition fee and boarding.
- Project Management Course: A certificate course on Project Management offered by UCD-AMC
- Speaking & Presenting Course: A certificate course offered by UCD-AMC

**Managements: Mentoring/Teaching/Instructing Experience****Teaching/Tutoring** (as Volunteer)

- Orientation classes for Graduate students (2015, 2016, 2017 & 2018)
- Tutor for graduate students: "Experiments in molecular biology", UCD AMC (2015)
- Served as tutor for the Core 1, "Foundations in Biomedical Sciences", UCD AMC (2016)
- Lecture on Transcription and gene regulation, Cell & Molecular Bioengineering Course (BioE 3050), UCD AMC
- "Genetics" and "Cell biology" courses for M.S. Students in India (2000-2003)
- Instructor/lecturer for molecular biology lab (BIOL4125/5125) – spring 2017. **Non-tenure track faculty appointment** (part-time) in department of integrative biology, UCD-Downtown Campus (***Did not accept this offer***)

**Mentoring**: I have trained several lab fellows for molecular biological techniques from my PhD till now. Officially, I have had an opportunity to mentor an undergraduate student in University of Colorado, Denver. The mentoring program involved training and helping the student to perform and design experiments.

**Instructing**: Provided technical guidance and expertise to facilitate the experimental output of junior researchers in the laboratories, including graduate students, postdoctoral fellows and research residents. Scientific editing of manuscripts/abstracts for other lab mates and assisted PI for his grant proposals and other of his peer-reviewing jobs (close to 140 peer-reviews as an assistant).

**PRA recruitment**: Took lead for recruiting new professional research assistants for our division.

## Science Outreach

### Peer Reviewer: (Reviewed > 50 articles)

Nucleic Acids Research - Biochemical Journal - Nutrition & Metabolism (19) – Bioscience Reports (2) - Molecular Biosystems (7) - Molecular Biology Reports – (13) - Frontiers in Endocrinology (2) - Biomedical Research International (2) - Gene Reports (1) – JBC (5) – PlosOne (1) Scientifica (3) Editorial: Section Editor, Research in Biotechnology (2015 - )

### Judging:

- Served as a judge for poster session at 7 different occasions and judged 33 posters
- 2018 Western Group on Educational Affairs Annual Meeting – 5 Abstracts
- Assisted PI for judging 123 Abstracts submitted for various awards in a big Scientific Meeting.

### Invited Talks:

- ✧ Department of Zoology, Bharathiar University, Tamil Nadu, India.
- ✧ PPG Institute of technology, Anna University, Coimbatore, Tamil Nadu, India.
- ✧ School of Medicine, Emory University, USA
- ✧ Department of Internal Medicine - Nephrology, University of Michigan, USA
- ✧ Upcoming invited talk in CU Anschutz Alumni Success series

### Past Memberships:

American Society of Neurochemistry - American Urological Association - The Endocrine Society - Korean Society of Molecular Biology - Asia and Oceania Society for Comparative Endocrinology - Indian Society of Human Genetics -

## Leaderships

- ❖ Member: UCD AMC Peer-Network committee (from 2016)
- ❖ Council Member: UCD AMC postdoc association committee (from 2016)
- ❖ Vice President: Association of International Researcher (AIR) UCD AMC (2016)
- ❖ Vice President of Public Relation: AIR, UCD AMC (from 2017)
- ❖ Chair & Organizer: - “postdoc-seminar series” by Postdoctoral Association of UCD AMC (from 2016) – This is a monthly seminar series with 2 speakers. Duties include: - selecting speakers, communicating with them, preparing flyers, seminar hall reservations, receiving Lunch delivery by sponsor, introducing speakers, concluding remarks & feedback by audience.
- ❖ Panelist – Teen science scholar event – Denver Museum of Nature and Science (2016)

## Conferences / Seminars / Symposia / Workshops

Attended various national and international conferences/seminars/symposia and presented some posters in India, South Korea and USA.

### Selected Oral Presentations:

- Department seminar series, IIDL, NIH/NIEHS, NC, USA (2015) – Jazf1 KO mice
- Postdoc-seminar series, UCD-AMC, USA (2015) – Function of Glis2
- Postdoc Research Day, UCD-AMC, USA (Jan, 2016) – Knock-In mice
- Postdoc-seminar series, UCD-AMC, USA (Dec, 2016) – SNPs

## Selected Publications

(>1100 citations)

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

1. Jessie, MB, ... **Nedumaran B**, ....Holger RA (Sep 2025). Cluster Size, Composition, and Signaling Dynamics Govern Function of Stem Cell-Derived Pancreatic Beta Cells. **Nature. Comm.** (Submitted)
2. Zhang P, The E, **Nedumaran B**, Ao L, Jarrett MJ, Xu D, Fullerton DA, Meng X (2020). Monocytes enhance the inflammatory response to TLR2 stimulation in aortic valve interstitial cells through paracrine Up-regulation of TLR2 level. **Int J Biol Sci**, PMID: 33061818 (3.9 IF)
3. Lee S, Koh H, Joo DJ, Hwang S, **Nedumaran B**, Jeon H, Park C, Harris RA, Kim YD (2020). Induction of SIRT1 by melatonin improves alcohol-mediated oxidative liver injury by disrupting the CRBN-YY1-CYP2E1 signaling pathway. **Journal of Pineal Research**, PMID: 32053237 (15.2 IF)
4. Kim YD, Hwang SL, Lee EJ, Kim HM, Chung MJ, Elfadi AK, Lee SE, **Nedumaran B**, Harris RA, Jeong KS. (2017) Melatonin ameliorates alcohol-induced bile acid synthesis by enhancing miR-497 expression. **Journal of Pineal Research**, PMID:28095641 – (15.2 Impact factor)
5. Ahn SW, Gang GT, Tadi S, **Nedumaran B**, Kim YD, Park JH, Kweon GR, Koo SH, Lee K, Ahn RS, Yim YH, Lee CH, Harris RA, Choi HS. (2011) Phosphoenolpyruvate carboxykinase and glucose-6-phosphatase are required for steroidogenesis in testicular Leydig cells. **J. Biol. Chem.**, 287(50):41875-87. PMID: 18525235 - (4.6 Impact factor)
6. **Nedumaran B**, Kim GS, Hong SP, Yoon YS, Kim YH, Lee CH, Lee YC, Koo SH, and Choi HS. (2010) Orphan Nuclear Receptor DAX-1 acts as a novel corepressor of LXRα and inhibits hepatic lipogenesis. **J. Biol. Chem.**, 285, 9221-32. PMID: 20080977 – (4.6 Impact factor)
7. Xie YB, **Nedumaran B**, and Choi HS. (2009) Molecular Characterization of SMILE as a Novel Corepressor of Nuclear Receptors. **Nucleic Acids Res.**, 37, 4100-15. PMID: 19429690 – (11.6 Impact factor)
8. Kim YD, Park KG, Lee YS, Park YY, Kim DK, **Nedumaran B**, Jang WG, Cho WJ, Ha J, Lee IK, Lee CH, and Choi HS. (2008) Metformin inhibits hepatic gluconeogenesis through AMP-activated protein kinase-dependent regulation of the orphan nuclear receptor SHP. **Diabetes**, 57(2):306-14. PMID: 17909097 – (8.9 Impact factor)