CURRICULUM VITAE

SARAVANAKUMAR VENKATESAN
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Research Profile

Early-career researcher with a Ph.D. specializing in molecular biology and biochemistry. Proven track record in translating mechanistical *in vitro* and *in vivo* data into clinical contexts, backed by competitive national fellowships (ICMR) and peer-reviewed publications. Expertise in mammalian cell culture, cell-based assays, drug efficacy evaluation, confocal microscopy, microRNA regulation and preclinical disease models.

Education

- **Ph.D., Biochemistry & Molecular Biology**
  (2018–2026; Thesis submitted – October 2024; PhD viva – May 2026)
  Madras Diabetes Research Foundation, University of Madras, India
- **M.Tech, Biotechnology** (2011–2013), Anna University, India - **84.2%**
- **B.Tech, Biotechnology** (2007–2011), Anna University, India - **81%**

Research Experience

- **Senior Research Fellow** (2021–Present)
  Department of Vascular Biology, Madras Diabetes Research Foundation, India
- **Junior Research Fellow (DST–SERB)** (2017–2020)
  Department of Vascular Biology, Madras Diabetes Research Foundation, India
- **Junior Research Fellow (DBT–BBSRC)** (2014–2016)
  Department of Veterinary Parasitology, Madras Veterinary College, India
- **Research Fellow** (2013–2014)
  AUKBC Research Centre, Anna University, India

PhD work summary

Title: **Phytotherapeutic actions of *Aegle marmelos* against diabetic kidney disease: A mechanistic demonstration using in vitro and in vivo studies with a focus on the role of gasotransmitters**

Key Contributions

- Demonstrated the therapeutic efficacy of *Aegle marmelos* leaf extract (AMLE) in diabetic kidney disease using cell culture (Primary cells & kidney cell line) and animal model (C57BL6/J)
- Identified 14 bioactive phytochemicals using HPLC and GC–MS
- Defined mechanisms linking oxidative stress, inflammatory signaling, and fibrotic remodeling through NOX4–ROS–ERK/TGF-β1 pathways.
- Established the protective role of AMLE by augmenting NO and H_2S gasotransmitters via modulation of NOS3 phosphorylation and CBS expression

- Analysis of inflammatory mediators and cytokine-associated signaling pathways related with DKD
- Identified aegeline as a key active component of AMLE and functionally validated its protective role using molecular and mechanistic approaches
- Investigated roles of microRNAs associated with kidney injury and disease progression in patients with diabetic kidney disease

Key Achievements : Published 4 peer-reviewed articles, Secured ICMR-SRF grant funding, Presented findings at 4 conferences

Technical Expertise

Molecular and cellular biology

- Cell culture: Mammalian cell culture, Isolation of endothelial cells from bovine aorta, Lymphocyte culture, cell viability assay
- Gene Manipulation Techniques: Transient Transfection (Overexpression, Silencing)
- Molecular Cloning
- Real-time qPCR, Western blotting, ELISA, Enzymatic assays, Immunocytochemistry,
- Proliferation assay, Cell adhesion assay, microRNA isolation and expression analysis, drug screening and evaluation.

Animal Models & In Vivo Physiology:

- C57BL/6J mouse handling, STZ-induced diabetes models, OGTT, systemic drug administration (IP/oral), and tissue harvesting, Immunohistochemistry, miRNA expression, protein and gene expression.

Clinical Study

- Designing the clinical study, Clinical Sampling with questionnaire, miRNAs isolation and expression analysis, gasotransmitters measurement, RBC protein analysis and Repository.

Imaging technique

- Confocal microscopy

Computational & Statistical Tools:

- Molecular docking analysis, Phylogenetic tree construction and analysis, Primer designing, SPSS, GraphPad Prism

Publications

- **Venkatesan S**, Rajagopal, A., Ganeshjeevan, R., Suvaithenamudhan, S., Balasubramanyam, M., Mohan, V., & Manickam, N. (2025). Aegle marmelos attenuates high glucose induced renal cell fibrosis via redox homeostasis maintenance and gasotransmitters modulation. Phytomedicine Plus, *100942*. https://doi.org/10.1016/j.phyplu.2025.100942
- **Venkatesan S**, Rajagopal A, Muthuswamy B, Mohan V, Manickam N. Phytochemical Analysis and Evaluation of Antioxidant, Antidiabetic, and Anti-inflammatory Properties of Aegle marmelos and Its Validation in an In-Vitro Cell Model. Cureus. 2024;16(9):e70491. https://doi.org/10.7759/cureus.70491
- Sundararajan S, Jayachandran I, Pandey GK, **Venkatesan S**, Rajagopal A, Gokulakrishnan K, Balasubramanyam M, Mohan V, Manickam N. Metformin Reduces the Progression of Atherogenesis by Regulating the Sestrin2-mTOR Pathway

in Obese and Diabetic Rats. Journal of Lipid and Atherosclerosis. 2023.12(3):290-306. https://doi.org/10.12997/jla.2023.12.3.290

- Jayachandran I, Sundararajan S, **Venkatesan S**, Paadukaana S, Balasubramanyam M, Mohan V, Manickam N. Asymmetric dimethylarginine (ADMA) accelerates renal cell fibrosis under high glucose condition through NOX4/ROS/ERK signaling pathway. Scientific reports.2020.10(1):1600. https://doi.org/10.1038/s41598-020- 72943-2
- Sundararajan Saravanakumar, Jayachandran Isaivani, **Venkatesan Saravanakumar**, Balasubramanyam Muthuswamy, Mohan Viswanathan, Venkatesan Balachandar, Manickam, Nagaraj. Role of sestrin2 in the regulation of ER stress and pro- inflammation under diabetes with dyslipidemia. Indian Journal of Inflammation Research.2020. 4 (1).
- Rajakani R, Sellamuthu G, **Saravanakumar V**, Kannapan S, Shabala L, Meinke H, Chen Z, Zhou M, Parida A, Shabala S, Venkataraman G. Microhair on the adaxial leaf surface of salt secreting halophytic Oryza coarctata Roxb. show distinct morphotypes: Isolation for molecular and functional analysis. Plant Science. 2019. 285:248-257. https://doi.org/10.1016/j.plantsci.2019.05.004
- Manivannan Jeganathan, Prashanth Manjunath, **Saravanakumar Venkatesan**. Systems biological understanding of regulatory network and possible therapeutic strategies for vascular calcification. Molecular Biosystems.2016. 12(12):3683-3694. https://doi.org/10.1039/c6mb00557h
- Nagarajan Shunmugam, Rajendran Kadarkarai, **Venkatesan Saravanakumar**, Balaguru Uma Maheswari, Vinoth Kumar, Yogarajan Shathya, Mohammed Jaffar, Venil Suman, Suvro Chatterjee. Mechanical perturbations invoke endothelial nitric oxide synthase activity in red blood cells. Scientific Reports.2016; 6:26935**.** https://doi.org/10.1038/srep26935
- Balaguru Uma Maheswari, Lakshmikirupa, Jeganathan Manivannan, Reji Manjunathan, Krishna Priya, Akila Swaminathan, **Venkatesan Saravanakuma**r, Dharanibalan kasiviswanathan. Disturbed flow mediated modulation of shear forces on endothelial plane: A proposed model for studying endothelium around atherosclerotic plaques. Scientific Reports**.** 2016. 6: 27304. https://doi.org/10.1038/srep27304
- Anbarasan Chakrapani, Sheela Sasikumar, **Saravana Kumar Venkatesan**, Shilpa Sivaram, Soma Guhathakurta, Kotturathu Mammen Cherian.Human epicardial lipid profile status in CAD patients: correlation with age, diabetes and hypertension. Biochemistry an Indian Journal.2012.6(4);12-127.

Fellowship & Personal Funding

Title : miRNAs targeting gasotransmitters (miR-21, miR-195): Status in diabetic kidney disease and its regulation by *Aegle marmelos* leaf extract active components in high glucose mediated Kidney cell injury

Funding agency : Indian Council of Medical Research - SRF

Duration : 2021-2023

Academic supervision

- Supervised 4 research thesis projects at postgraduate and undergraduate levels
- Mentored UG and PG students during one-month summer internships, providing training in laboratory techniques (Cell culture, RT-PCR, Western blot, ELISA), data analysis, and scientific writing

Poster Presentation

- **Saravanakumar Venkatesan**, Isaivani Jayachandran, Anusha Rajagopal, Muthuswamy Balasubramanyam, Ranjit Mohan Anjana, Viswanathan Mohan, Nagaraj Manickam. Circulatory levels of microRNAs targeting gasotransmitters (miR-21 and miR-195) and their association with the renal function in T2D. International Diabetes Update, India. July 2024.
- **Saravanakumar Venkatesan**, Isaivani Jayachandran, Saravanakumar Sundararajan, Anusha Rajagopal, Muthuswamy Balasubramanyam, Viswanathan Mohan, Nagaraj Manickam. *Aegle marmelos* leaf extract protects against diabetic kidney injury in mice by augmenting gasotransmitters and subjugating oxidative stress. Reimagine Ethnopharmacology: Globalization of Traditional Medicine, Manipur. February 2023.
- **Saravanakumar Venkatesan**, Isaivani Jayachandran, Saravanakumar Sundararajan, Viswanathan Mohan, Nagaraj Manickam. Aegle marmelos ameliorates high glucose induced renal cell fibrosis by down regulating NOX4 induced ROS generation: Involvement of Gasotransmitters. Advances at the Interface of Biology & Chemistry, Mumbai. September 2019.
- **Saravanakumar Venkatesan**, Kadarakarai raj Rajendran, Suvro Chatterjee.Mechanical Perturbations define Endothelial Nitric Oxide Synthase activity in Red Blood Cells". International Conference Legacy of Nitric oxide Discovery: Impact on Disease Biology RGCB, November 2013
- Shunmugam N, **Saravanakumar Venkatesan**, Suvro Chatterjee, The study of Nitric Oxide Implications in Red Blood Cells. International Workshop on Wound Healing & Angiogenesis, INTERBONE Program, AUKBC Research centre.Chennai, December 2013

Oral Presentation

- **Saravanakumar Venkatesan**, Isaivani Jayachandran, Saravanakumar Sundararajan, Anusha Rajagopal, Ranjit Mohan Anjana, Viswanathan Mohan, Nagaraj Manickam. Aegeline, an active component of *Aegle marmelos* mitigates high glucose induced renal cell fibrosis by alleviating ROS generation and augmenting hydrogen sulphide. International Diabetes Federation, December 2021.
- **Saravanakumar Venkatesan,** Edith R, Azhihianambi P, Aravindan K. Comparative analysis of PCR based diagnosis of *T.annulata* in cattle of Tamilnadu. National Congress on Veterinary Parasitology, Chennai, February 2016.
- **Saravanakumar Venkatesan,** kadarkarai raj, Shunmugam N and Suvro Chatterjee. Implication of Differential Shear stress effect on eNOS Activation. Biological Conference 2013, Calicut University, Kerala, March 2013.
- **Saravanakumar Venkatesan**, Arulrajadurai and Ravikumar. Reduction of carbondioxide using algae synthesizer. National conference on Innovations in biotechnology and clinical research. Adhiyamaan College of Engineering, March 2010.

Training & Workshops Attended

- Attended workshop on "Laboratory animal techniques and Ethics" at Centre for laboratory animal technology and research, Sathyabama University, March 2018.
- Attended National workshop on "Next Generation Sequencing – Data analysis" at University of Mysore on April 2016.
- Participated in International Workshop on "Advanced Techniques in Genomics Research" conducted by Madras Diabetes Research Foundation and University of Minnesota, USA on January 2015.

Scholarships and awards

- Awarded **Senior Research Fellowship** (SRF) award from Indian Council of Medical Research (ICMR), Govt. of India (2021-2023)
- Selected as **best poster** under kidney and eye category at International Diabetes Federation Congress, 2021
- Won **Outstanding Poster Presentation award** from Nobel Laureate Ferid Murad at International Conference, Rajiv Gandhi Centre for Biotechnology
- **Second rank** in the B.tech., Biotechnology examinations from 2007-2011
- Most **Proficient Student** of the Department for the period 2008 - 2009 in undergraduate program
- Received **Prime Minister scholarship** for the undergraduate program
- **Rajya Puraskar award** in Scouts from Honorable Governor of Tamil Nadu, India

Personal information

Name	: Saravanakumar Venkatesan
Date of Birth	: 07-MAR-1990
Languages	: English (Fluent/Professional), Tamil (Native)
Nationality	: Indian

References :

Reference

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