

G. Velmurugan M.Sc., Ph.D., Scientist



Chemomicrobiomics Laboratory
Department of Biochemistry & Microbiology
KMCH Research Foundation
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Vision & Objective:

The Chemomicrobiomics laboratory is focused on understanding the interaction between the chemicals (phytochemicals, elements, pharmaceuticals, agrochemicals, pollutants, etc.,) and microbes (bacteria, virus, fungi, protozoa, etc.,) in different environments (human body, water, soil, air, etc.,) and its implications on ecosystem and human health. Subsequently, transfer of these basic knowledge for development of microbial technology-based products like biosensors, bioremediation and microbiota based diagnostic and therapeutic strategies for diseases.

Academic Profile:

Course	Period	Institution	University/ Board	Percentage
Ph.D., Biology	2011-2015	School of Biological Sciences, Madurai Kamaraj University	Madurai Kamaraj University	Highly Commendable
M. Sc., Biochemistry	2005-2007	School of Biological Sciences, Madurai Kamaraj University	Madurai Kamaraj University	75.1 %
B. Sc., Botany	2002-2005	St. Joseph's College Tiruchirappalli	Bharathidasan University	85.6 %

Fellowships and Awards received:

- **SERB Start-up Research Grant Award – 2020**
- **International Travel Grant – 2019** from Council for Scientific & Industrial Research, Government of India.
- **Travel Bursary Award – 2019** from International Diabetes Federation.
- **Early Career Scientist Travel Award – 2018** from International Society for Microbial Ecology.
- **Tamilnadu State level Eligibility Test for Assistant Professor - 2018**
- **Young Scientist Award - 2017** from Association of Microbiologists of India.
- **Institute Post-Doctoral Fellowship - 2016** from Indian Institute of Technology, Chennai, India.
- **Senior Research Fellowship - 2014** from Council for Scientific and Industrial Research, Government of India.
- **Research Fellowship in Biological Sciences for Meritorious Students - 2013** from University Grants Commission, Government of India.
- **International Max Planck Research Fellowship - 2008** from Max Planck Society, Germany.
- **Indian Academy of Sciences Summer Research Fellowship – 2006** to work at National Institute of Immunology, India.
- **First Rank Holder and won merit endowment awards** during under graduation studies.

Ongoing Research Projects:As Principal Investigator,

Period	Project Title	Amount (Rs. in Lakhs)	Funding Agency
2024 - 2027	Biological Assessment of impact of water sustainable technologies in a village: A one health approach (SWITCH4INDIA – Multi-institutional Project)	101.00	Department of Science & Technology (DST)
2023 - 2025	Association of gut microbiota with genetic and environmental risk factors: Implications on glycemic control and clinical outcomes in type 1 diabetes	52.74	SKAN Research Trust

As Co-Principal Investigator,

Period	Project Title	Amount (Rs. in Lakhs)	Funding Agency
2022 - 2025	Longitudinal study on progression of sub-clinical coronary artery disease and its risk factors in rural Tamil Nadu	59.00	Indian Council for Medical Research
2023 - 2025	Role of combination therapy with mesenchymal stem cells and erythropoietin in the prevention of preterm brain injury: A preclinical study	33.81	Department of Biotechnology (DBT)
2023 – 2025	Development of digital twin platform for water-health nexus in a rural village	5.00	Aqua-Map (IIT Madras)

Completed Research Projects:As Principal Investigator,

Period	Project Title	Amount (Rs. in Lakhs)	Funding Agency
2020 - 2024	Profiling of gut microbiota and its metabolites during endocrine disrupting chemical-induced glucose dyshomeostasis (Indo-French Joint Grant)	48.65	Indo-French Centre for Promotion of Advanced Research (CEFIPRA)
2021 - 2023	Tumour microbiota in breast cancer: Implications on pharmacogenomics of anti-cancer drugs	21.29	Science & Engineering Research Board (SERB)

Publications:

No. of published manuscripts		24
No. of published invited book chapters		03
No. of manuscripts under review/ preparation		05
h-index	14	i10-index
Average Impact Factor	6.07	Cumulative Impact Factor
Average Citation (Excluding self-citations)	33.0	Total Citations (Excluding self-citations)
No. of first authored publications		19 (70.3 %)
No. of publications as corresponding author		13 (48.2 %)
Scopus	https://www.scopus.com/authid/detail.uri?authorId=56442445400	
Google scholar	https://scholar.google.co.in/citations?hl=en&user=HOXU4CEAAAAJ&view_op=list_works	

Journal Publications:

1. D Vasudevan, Ramakrishnan A & **Velmurugan G.** (2023) Exploring the diversity of blood microbiome during liver diseases: Unveiling novel diagnostic and therapeutic avenues. *Heliyon* 9: e21662. **Impact Factor:** 4.0.

2. Anand DK, Swaminathan K, **Velmurugan G**, Alexander T, Raghupathy AK & Mohanraj S. (2023) Association between serum uric acid levels and cardiovascular risk factors among adults in India. *Nutr. Metab. Cardiovasc. Dis.* 33: 1330-1338. **Impact Factor:** 4.7. **Citations:** 04.
3. Mohanraj S, **Velmurugan G**, Swaminathan K & Ramakrishnan A. (2023) Prevalence and risk factors for dyslipidemia among South Indian adults: A community based-NCD study. *Int. J. Diabetes Dev. Ctries.* 43: 936-945. **Impact Factor:** 1.0. **Citations:** 03.
4. **Velmurugan G**, Ramprasath T & Mithieux G. (2022) Human microbiota: A key player in the etiology and pathophysiology of cardiovascular and metabolic diseases. *Front. Cardiovasc. Med.* 9: 1081722. **Impact Factor:** 6.1.
5. Arulraj R,* **Velmurugan G,*** Aravindh S, Mohanraj S, Dinakaran V, Paari V, Nightingale P, Swaminathan K & Neuberger J. (2022) Prevalence of abnormal liver tests and liver fibrosis among rural adults in low and middle-income country: A cross-sectional study. *eClin. Med.* 51: 101553. **Impact Factor:** 17.0. **Citations:** 04. [***Equally contributed**]
6. Ranjani J, Sivakumar R, Gunasekaran P, **Velmurugan G**, Ramasamy S & Rajendhran J. (2022) Genome-wide identification of genetic requirements of *Pseudomonas aeruginosa* PAO1 for rat cardiomyocyte (H9c2) infection by insertion sequencing. *Inf. Gen. Evol.* 98: 105231. **Impact Factor:** 4.4. **Citations:** 02.
7. **Velmurugan G** & Dinakaran V (2021) Metagenomic analysis of RNA-sequencing data reveals SARS-CoV-2 mediated progressive dysbiosis of upper respiratory tract microbiota. *Biomed. J.* 44: 504-507. **Impact Factor:** 4.9. **Citations:** 03.
8. **Velmurugan G**, Mohanraj S, Jenifer Y, Rekha B, Suresh S, *et al.*, (2021) Association of Agriculture Occupational Exposure with Diabetes and Cardiovascular risk factors in South Indian Villages: REDSI Study. *Front. Cardiovasc. Med.* 8: 737505. **Impact factor:** 6.1. **Citations:** 02.
9. **Velmurugan G**, Mohanraj S, Dhivakar M, Veerasekar G, Brag-Gresham, *et al.* (2020) Differential risk factor profile of diabetes and atherosclerosis in rural, sub-urban and urban regions of South India: The KMCH-Non-communicable disease studies. *Diabet. Med.* 35: e14466. **Impact Factor:** 4.4. **Citations:** 01.
10. **Velmurugan G**, Dinakaran V, Swaminathan K & Rajendhran J. (2020) Blood microbiota and circulating microbial metabolites in diabetes and cardiovascular diseases. *Trends Endocrinol. Metab.* 31: 835-847. **Impact Factor:** 11.6. **Citations:** 68. [**Invited Article**]
11. **Velmurugan G**, Swaminathan K, Mohanraj S, Dhivakar M, Veerasekar G, *et al.* (2020) Association of co-accumulation of arsenic and organophosphate insecticides with diabetes and atherosclerosis in a rural agricultural community: KMCH-NNCD-I study. *Acta Diabetologica.* 10: 1159-1168. **Impact Factor:** 4.3. **Citations:** 27.
12. Ramprasath T, Freddy AJ, **Velmurugan G**, Tomar D, Rekha B, *et al.* (2020) Context-dependent regulation of nrf2/ARE axis on vascular cell function during hyperglycemic condition. *Curr. Diabet. Rev.* 16: 797-806. **Impact Factor:** 2.1. **Citations:** 10.
13. **Velmurugan G**. (2018). Gut microbiota in toxicological risk assessment of drugs and chemicals: The need of hour. *Gut Microbes.* 9: 465-468. **Impact Factor:** 10.3. **Citations:** 22. [**Invited Article**].
14. **Velmurugan G**, Swaminathan K, Veerasekar G, Purnell JQ, Mohanraj S, *et al.* (2018). Metals in urine in relation to prevalence of pre-diabetes, diabetes and atherosclerosis in rural India. *Occup. Environ. Med.* 75: 661-667. **Impact Factor:** 4.4. **Citations:** 30.
15. Rekha B, **Velmurugan G**, Freddy A, Anusha S & Ramasamy S. (2018). Chronic intake of 4-methylimidazole induces hyperinsulinemia and hypoglycemia via pancreatic cell hyperplasia and glucose dyshomeostasis. *Sci. Rep.* 8: 17037. **Impact Factor:** 4.4. **Citations:** 12.
16. Ramasamy S*, **Velmurugan G***, Ramprasath T, Rekha B, Anusha S, *et al.* (2018). Egr-1 mediated cardiac miR-99 family expression diverges physiological hypertrophy from pathological hypertrophy. *Exp. Cell Res.* 365: 46-56. **Impact Factor:** 3.9. **Citations:** 25 [***Equally contributed**]

17. **Velmurugan G**, Ramprasath T, Swaminathan K, Gilles M & Ramasamy S. (2017). Gut microbiota, endocrine disrupting chemicals and the diabetic epidemic. *Trends Endocrinol. Metab.* **28**: 614-625. **Impact Factor**: 11.6. **Citations**: 153. [**Invited Article**].
18. **Velmurugan G**, Ramprasath, T., Swaminathan, K., Gilles, M, Rajendhran J, *et al.* (2017). Gut microbial degradation of organophosphate insecticides-induces glucose intolerance via gluconeogenesis. *Genome Biol.* **18**:8. **Impact factor**: 17.6. **Citations**: 111.
19. Swaminathan K, Veerasekar G, Kuppasamy S, Sundaresan M, **Velmurugan G**, *et al.* (2017) Noncommunicable disease in rural India: Are we seriously underestimating the risk? The Nallampatti noncommunicable diseases study. *Ind. J Endocrinol. Metab.* **21**: 90-95. **Citations**: 40.
20. Rajan KS*, **Velmurugan G***, Gopal P, Ramprasath T, Babu DDV, *et al.* (2016). Abundant and altered expression of piRNAs during cardiac hypertrophy. *Heart Lung Circ.* **25**: 1013-1020. **Impact Factor**: 3.0; **Citations**: 54. [***Equally contributed**]
21. Ramasamy* S, **Velmurugan G***, Rajan KS, Ramprasath T & Kalpana K. (2015). miRNAs with apoptosis regulating potential are differentially expressed in chronic exercise-induced physiologically hypertrophied hearts. *PLoS One* **10**: e0121401. **Impact factor**: 3.3; **Citations**: 65. [***Equally contributed**].
22. Rajan KS, **Velmurugan G**, Gopal P & Ramasamy S. (2014). miRNA and piRNA mediated Akt pathway in heart: antisense expands to survive. *Int. J. Biochem. Cell Biol.* **55**: 153-156. **Impact factor**: 5.1; **Citations**: 41 [**Invited Article**].
23. **Velmurugan G**, Babu DDV & Ramasamy S. (2013). Prolonged monocrotophos intake induces cardiac oxidative stress and myocardial damage in rats. *Toxicol.* **207**: 103-108. **Impact factor**: 4.2; **Citations**: 45.
24. **Velmurugan G**. (2008) Rhizoremediation of Cadmium Soil using a Cadmium-Resistant Plant Growth-Promoting Rhizopseudomonad. *Curr. Microbiol.* **56**: 403-407. **Impact factor**: 2.2; **Citations**: 162.

Invited Book Chapters (n = 03):

1. **Velmurugan G** & Swaminathan K. (2022) Integrative analysis of host-microbiota based multi-omics data: A novel path towards precision medicine. In: Education 4.0 for Indian Universities. Devi (Ed.). Taylor & Francis Publishers.
2. **Velmurugan G**, Anindita D, Kalpana K, Anusha S, Yacob JC & Ramasamy S. (2016). Functional Genomics of microRNAs. In: Current Developments in Biotechnology & Bioengineering Vol. 2. Ashok Pandey and P. Gunasekaran (eds.) Elsevier Publishers. pp. 103-121. **Citations**: 02.
3. **Velmurugan G** (2012). Rhizoremediation: A pragmatic approach for remediation of heavy metals in Soil. In: Toxicity of heavy metals to legumes and bioremediation. Zaidi, A., Wani, P.A. and Khan, M.S. (eds.) Springer Publishers, Netherlands. pp.147-162. **Citations**: 16.

Popular Science Articles:

- **Velmurugan G**. (2022) You give me pesticides, I give you back diabetes, says the gut bacteria. KMCH Touch Magazine.
- **Velmurugan G**. (2019) Advantages and challenges of doing science in a hospital in India. Journey of Young Investigator Series. India Bioscience. <https://indiabioscience.org/columns/journey-of-a-yi/advantages-and-challenges-of-doing-science-in-a-hospital-in-india>
- **Velmurugan G**. (2010) Drama screen play entitled “Bt-Brinjal” on the pros and cons of transgenic plants. All India Radio. (In Tamil).

Teaching activities:

- **Adjunct Faculty in School of Biosciences, Dr. NGP College of Arts & Science, Coimbatore**
Involved teaching and handling practicals for M.Sc., Biochemistry & M.Sc., Microbiology:
- Serves as one of the course instructors for the NPTEL Course on “**A Hybrid Course on Water Quality – An Approach to People’s Water Data**” jointly organized by IIT Madras, Tel-Aviv University (Israel) and KMCH Research Foundation.
- Involved in teaching and handling practicals on Molecular Techniques for the MBBS students and Allied Health Students from KMCH Institute of Health Sciences & Research.

Positions Held:

August, 2019 – Till date	Scientist in Department of Biochemistry and Microbiology, KMCH Research Foundation, Coimbatore, India.
July, 2017 – July, 2019	Institute Post-doctoral Fellow in Thematic Unit of Excellence in Water Research, Indian Institute of Technology, Chennai, India.
Sep., 2016 – June, 2017	Post-doctoral Fellow in Gastroenterology Division, College of Medicine, University of Florida, USA.
July, 2015 – Aug, 2016	Institute Post-doctoral Fellow in Thematic Unit of Excellence in Water Research, Indian Institute of Technology, Chennai, India.
Feb., 2011 – June, 2015	Junior & Senior Research Fellow in Department of Molecular Biology, School of Biological Sciences, Madurai Kamaraj University, India.
Nov., 2008 – Nov., 2010	International Max Planck Research Fellow in Centre for Biosciences, University of Cologne, Germany.
Aug., 2008 – Oct., 2008	Technician in Centre for Plant Molecular Biology, School of Biotechnology, Madurai Kamaraj University, Madurai, India.
July 2007 – July 2008	Research Fellow in Dr. G. Shanmugam Research Foundation, Madurai, India.
May 2006 – July 2006	IAS-Summer Research Fellow in National Institute of Immunology, New Delhi, India

Editorial responsibilities:

- 2023: Served as guest editor for the special issue entitled, “**Community Series in Human microbiota: A key player in the etiology and pathophysiology of cardiovascular and metabolic diseases**” in *Frontiers in Cardiovascular Medicine* Journal.
- 2022: Served as guest editor for the special issue entitled “**Endocrine disruptors in gut endocrinology**” in *Frontiers in Endocrinology* Journal.
- 2021: Served as guest editor for the special issue entitled, “**Human microbiota: A key player in the etiology and pathophysiology of cardiovascular and metabolic diseases**” in *Frontiers in Cardiovascular Medicine* Journal.

Memberships:

- ✚ Association for Microbiologists in India (Life Member)
- ✚ Aqua-Terr Society for Biological Sciences (Life Member)

Programmes organized:

- **4th World Microbiome Day Annual Lecture** delivered by Prof. Punyasloke Bhadury, Department of Biological Sciences, IISER Bhopal. 05 July 2024. KMCH Research Foundation, Coimbatore.
- **3rd World Microbiome Day Annual Lecture** delivered by Prof. Mithieux Gilles, INSERM, University of Lyon, France. 23 June, 2023. KMCH Research Foundation, Coimbatore.
- **CEFIPRA sponsored Lecture Course** on “Gut-brain axis signalling on glucose metabolism” delivered by Prof. Mithieux Gilles, INSERM Unit, University of Lyon, France. 19 & 20 June, 2023. School of Biological Sciences, Madurai Kamaraj University.
- **2nd World Microbiome Day Annual Lecture** delivered by Prof. Yogesh Shouche, NCCS, Pune. 01 July 2022. KMCH Research Foundation, Coimbatore.
- **1st World Microbiome Day Annual Lecture** delivered by Dr. Aran Singanayagam, Imperial College, London. 28 June 2021. KMCH Research Foundation, Coimbatore.

Our Team:

Our team has one post-doctoral fellow (supported by ICMR-RA), four Ph.D scholars and one project fellow.

Our Work in News:

- Binoy Valsan. **The bitter harvest: overusing pesticides in crops can cause diabetes.** *Happiest Health* 33 Nov., 2023. <https://www.happiesthealth.com/articles/diabetes/link-between-pesticide-usage-and-diabetes>
- Arulraj Ramakrishnan. **Hips don't lie: Fatty liver is a problem in Tamil Nadu villages as well.** *Times of India* 20 April, 2023. <https://timesofindia.indiatimes.com/city/chennai/hips-dont-lie-fatty-liver-is-a-problem-in-tamil-nadu-villages-as-well/articleshow/99630760.cms>
- Chs-Sachetan. **How Many More Will Fall Ill or Die Because of Exposure to Pesticides and Herbicides?** *Global Research*. 02 July, 2018. <https://www.globalresearch.ca/how-many-more-will-fall-ill-or-die-because-of-exposure-to-pesticides-and-herbicides/5646160>
- Neetu Chandra Sharma. **Heavy metals in fertilizers raise risk of diabetes, heart diseases in farmers.** *Live Mint*. 24 April, 2018. <https://www.livemint.com/Science/SYwGmgKHmzNJx3pyKp4jkJ/Heavy-metals-in-fertilizers-raise-risk-of-diabetes-heart-di.html>
- Ghosh, B. **Does pesticide exposure cause diabetes?** *India Bioscience*. 18 April, 2017. <https://indiabioscience.org/news/2017/does-pesticide-exposure-cause-diabetes>
- Megha Prakash. **A common class of insecticides puts farmers at high risk of diabetes.** *Down to Earth*. 10 Mar., 2017. <http://www.downtoearth.org.in/news/toxic-spray-57309>
- **Pesticide exposure may increase risk of diabetes.** *Nature India*. 31 Jan., 2017. <http://www.natureasia.com/en/nindia/article/10.1038/nindia.2017.14>
- Mukunth, V. **Indian researchers unravel how a common insecticide can cause diabetes.** *The Wire*. 29 Jan., 2017. <https://thewire.in/103777/organophosphates-diabetes-ache/>
- Jacob Koshy. **A Stomach for gut research.** *The Hindu*. 29 Jan., 2017. <http://www.thehindu.com/sci-tech/health/A-stomach-for-gut-research/article17109591.ece>

- R. Prasad. **Chronic Exposure to commonly used insecticide causes diabetes.** *The Hindu*. 29 Jan., 2017. <http://www.thehindu.com/todays-paper/tp-features/tp-sci-tech-and-agri/Chronic-exposure-to-commonly-used-insecticide-causes-diabetes/article17112004.ece>
- **Exposure to commonly used insecticide may contribute to diabetes via the gut microbiome.** *Medical News Today*. 24 Jan., 2017. <http://www.medicalnewstoday.com/releases/315426.php>
- **Bestandteile von Insektiziden erhöhen das Diabetesrisiko.** *Aerzteblatt (Official Journal of German Medical Association)*. 24 Jan., 2017. <http://www.aerzteblatt.de/nachrichten/72553/Bestandteile-von-Insektiziden-erhoehen-das-Diabetesrisiko>
- Pallava Bagala. **Pesticide use can cause diabetes: Scientists sound warning.** *NDTV*. 24 Jan., 2017. <http://www.ndtv.com/health/pesticide-use-can-cause-diabetes-scientists-sound-warning-1652161>

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