



## PUSHPAGIRI RESEARCH CENTRE UPDATES

Showcasing PRC's Animal Research Capabilities



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A session introducing the animal house facilities and ongoing animal-based research studies at Pushpagiri Research Centre was conducted on June 6, 2025, at the PRC Conference Hall. The session was led by Dr. Nebu George Thomas, Scientist, PRC, and Dr. Ampadi A. N., Veterinarian, PRC. It was attended by Dr. Vikram Gowda and Dr. Gaddam Vijayalakshmi, Vice Principals of Pushpagiri Institute of Medical Sciences & Research Centre, along with faculty and postgraduate students from the Department of Physiology. The session offered valuable insights into the scope of preclinical research infrastructure and opportunities for interdisciplinary collaboration.

### **Bioradiance 2025: A Global Confluence of Science and Innovation** **13th International Conference | June 17–18, 2025 | Senate Hall, PIMS & RC**

The 13<sup>th</sup> edition of Bioradiance, the flagship international conference organized by the Pushpagiri Research Centre, was held on 17<sup>th</sup> and 18<sup>th</sup> June 2025 at the Senate Hall, PIMS & RC, Thiruvalla. Anchored on the theme "From Molecules to Medicine: Bridging Biochemistry and Therapeutics," the event brought together an outstanding gathering of researchers, clinicians, scientists, and students for two days of interdisciplinary exchange on cutting-edge innovations in biochemistry, translational science, and therapeutics.

The conference opened with a video overview of PRC's research activities, followed by a prayer song. Rev. Dr. Mathew Mazhavancheril, Director of Pushpagiri Medicity and PRC, welcomed the gathering. Dr. Soumya R. S., Scientist at PRC, introduced the conference theme. The benedictory address was delivered by H.G. Most Rev. Dr. Thomas Mar Koorilos, Metropolitan Archbishop of Tiruvalla, and the function was presided over by Prof. (Dr.) G. M. Nair, President, Kerala Academy of Sciences. Fr. Dr. Biju Varghese, CEO, Pushpagiri Group of Institutions, gave a special address.

The conference was inaugurated by Dr. Sanjay Behari, Director, SCTIMST, who also delivered the plenary lecture titled "Publications in Science: A Self-Improvement Exercise or Drudgery?" He discussed transforming these into publications, ethical publishing practices, and the importance of referencing Indian research.

Three Memoranda of Understanding (MoUs) were exchanged with the University of South Wales (UK), University of Salento (Italy), and Wellness Solutions Pvt. Ltd., fostering international collaborations in research and student exchange. A Book of Abstracts was released during the session. Felicitations were delivered by Dr. K. B. Ramesh Kumar and Dr. Reena Thomas, and the inaugural function concluded with a vote of thanks by Dr. Sreejith P.

Scientific sessions on Day 1 featured engaging talks by Dr. E. Sreekumar on emerging viruses and biosafety, Dr. Venkatesh Sundararajan on mitochondrial proteostasis, and Dr. Ruby John Anto on the role of nutraceuticals in disease prevention. Further sessions included Dr. Rajeev Jayadevan on scientific temperament, Dr. C. N. Ramchand on a novel drug candidate for diabetic retinopathy, and Dr. Hussain Ali on advancements in HCV diagnostics. A lively panel discussion with invited scientists allowed attendees to interact and reflect on the relevance of science in contemporary life. The day ended with a cultural program featuring Kathakali, music, and dance performances by students.

Day 2 began with Dr. Bipin Nair addressing antimicrobial resistance using integrated biomedical approaches, followed by Dr. A. Sreekumar who highlighted the promise of biochemical interventions in precision medicine. Dr. Christian Demitri presented on hydrogel technology in tissue engineering and smart medical devices. Dr. Biji Bahuleyan delivered a captivating talk on white matter tract mapping for safer brain tumor resection, supported by live surgical videos.

The afternoon sessions included Dr. Sreejith N. Kumar on evolutionary dietary practices, Dr. Sadeesh E. M. on mitochondrial genomics in indigenous bovines, and Dr. Finosh Thankam on hydrogel-based strategies for cardiac regeneration. A highlight of the day was the session by the University of South Wales (UK) team—Dr. Michelle Thomas, Prof. Carolyn Wallace, Dr. David Pontin, and Mrs. Anitha Livingstone—who introduced the Family Resilience Assessment Tool (FRAIT) for use in Indian community health settings.

A total of 59 oral and 40 poster presentations were showcased by faculty, undergraduate, and postgraduate students from institutions within and outside Kerala, reflecting the diversity and strength of biomedical research. Awards were presented in both basic and clinical research categories for oral and poster presentations.

Supported by the Anusandhan National Research Foundation and Department of Biotechnology as main sponsors, with Abbott Core Diagnostics, Qiagen, and Lab A to Z Services as partners, Bioradiance 2025 concluded on a high note. The conference reaffirmed Pushpagiri's commitment to advancing research and innovation at the interface of basic science and clinical care.



## MoC with University of South Wales, UK: Advancing Family Resilience Research



As part of Bioradiance 2025, a Memorandum of Collaboration (MoC) was formally exchanged between the University of South Wales (UK) and the Pushpagiri Research Centre (PRC), Thiruvalla, launching a meaningful research partnership under the Family Resilience Project. This collaborative study aims to explore how community health workers in Kerala perceive family resilience, with the objective of developing a culturally tailored assessment tool for families with children under six years of age. The project will adopt Group Concept Mapping (GCM) to build a structured conceptual framework, with Anganwadi workers playing a central role in assessing and referring families. The MoC was ceremoniously exchanged by Fr. Dr. Biju Varghese, CEO of Pushpagiri Group of Institutions, on behalf of Pushpagiri, and received by Prof. Carolyn Wallace, Principal Investigator, on behalf of the University of South Wales.

## MoU with University of Salento, Italy: Strengthening Scientific and Academic Exchange

A Memorandum of Understanding (MoU) was exchanged between the University of Salento, Italy and the Pushpagiri Research Centre (PRC), Thiruvalla, during Bioradiance 2025. Representing the University of Salento was Prof. Christian Demitri, Rector and National Scientific Research Representative, committed to promoting the spread of scientific knowledge. This MoU sets the framework for academic mobility, joint implementation of activities, protection of intellectual property, confidentiality, publication policies, and the peaceful settlement of disputes, all contributing to long-term scientific cooperation and cultural exchange. The MoU was formally exchanged by Dr. Reena Thomas, Principal of PIMS & RC, on behalf of Pushpagiri.



## MoU with Wellness Solutions Pvt. Ltd.: Advancing Precision and Preventive Healthcare



Memorandum of Understanding (MoU) was exchanged between Wellness Solutions Pvt. Ltd. and the Pushpagiri Research Centre (PRC), Thiruvalla, during Bioradiance 2025. WellGenome, a collaborative venture between Wellness Solutions Pvt. Ltd. and MagGenome Technologies Pvt. Ltd., was established through a prior MoU signed in January 2025. The company is focused on delivering personalized, precision health solutions by integrating expertise in nutrigenomics, functional medicine, and genomic science. It is co-founded by Dr. A. Sreekumar, a veteran clinician and pioneer in integrative modern medicine, and Dr. C. N. Ramchand, an acclaimed scientist and entrepreneur in biotechnology and nutraceuticals. With a strong commitment to evidence-based and molecular-level interventions, WellGenome is actively involved in genetic testing, health improvement services, and the development of advanced nutraceutical formulations. The MoU was formally exchanged by Rev. Fr. Dr. Mathew Mazhavancheril, Director and Head of PRC, with Dr. A. Sreekumar and Dr. C. N. Ramchand representing Wellness Solutions Pvt. Ltd.

## Project Spotlight: FRAIT – Understanding Family Resilience in the Indian Context



The FRAIT (Family Resilience Assessment Instrument and Tool) study, a collaborative research initiative between the University of South Wales (UK) and the Pushpagiri Research Centre (PRC), Thiruvalla, is currently underway. This ongoing study aims to explore the concept of family resilience as perceived by Indian community health workers, with the long-term goal of developing a culturally tailored tool to assess families with children under six years of age. Using the participatory research method of Group Concept Mapping (GCM), the study is systematically building a conceptual framework to inform future interventions. Anganwadi workers from Pathanamthitta district have been actively involved, and were invited to PRC for the data collection phase. The study is led by Prof. Carolyn Wallace (Principal Investigator, USW), with co-investigators Mrs. Anitha Livingstone (cultural lead), Dr. Michelle Thomas, and Emeritus Prof. David Pontin. The Pushpagiri research team is led by Dr. Betsy A. Jose (Principal Investigator), with co-investigators Dr. Meena Issaac, Dr. Rosin George Varghese, and Rev. Sr. Mary Jyothi OSS. Following data collection, the next steps will involve data translation and analysis, laying the groundwork for a practical, context-sensitive tool to support family-focused community health efforts in India.

### International Workshop on Bridging Research & Practice: Qualitative Methods & Consensus Techniques in Healthcare Interventions

The International Workshop on “Bridging Research & Practice: Qualitative Methods & Consensus Techniques in Healthcare Interventions” was held on 21st June 2025 at the Senate Hall, Pushpagiri Institute of Medical Sciences & Research Centre (PIMS & RC). The event was organized by Pushpagiri Research Centre in collaboration with the University of South Wales, UK, and brought together researchers, faculty, and postgraduate students to explore the integration of qualitative and consensus methods into healthcare research and intervention design.

The workshop began with a brief inaugural session, featuring a prayer song by Dr. Aashel, a welcome address by Dr. Meena Issac, and brief messages from Rev. Dr. Mathew Mazhavancheril, Director of Pushpagiri Medicity & PRC. The session concluded with the ceremonial lighting of the lamp by the dignitaries, followed by a coffee break.

The academic sessions began with a presentation on the use of qualitative research methods in healthcare, led by Prof. Carolyn Wallace and Emeritus Prof. David Pontin. This session included a discussion on the structure, relevance, and publication of qualitative studies in healthcare intervention research.

The next session introduced participants to Group Concept Mapping (GCM)—an innovative approach to participatory research. The facilitators, including Dr. Michelle Thomas and Mrs. Anitha Livingstone, shared case-based examples and discussed the use of GCM in current collaborative studies.

Following this, the workshop delved into consensus-building methods, highlighting the Nominal Group Technique, DELPHI method, and World Café as tools for stakeholder engagement and collaborative decision-making in research settings.

The final segment of the workshop offered a hands-on experience with the Nominal Group Technique, allowing participants to apply the method in a guided session facilitated by the international experts.

The workshop concluded with a vote of thanks delivered by Prof. Sr. Mary Jyothi, marking the end of a productive and enriching day. The event reinforced the importance of bridging research with real-world practice and highlighted Pushpagiri's role in promoting collaborative and evidence-based healthcare research.



# Publications

Probiotics and Antimicrobial Proteins  
<https://doi.org/10.1007/s12602-025-10608-0>

RESEARCH



## Pharmacokinetics Screening, Molecular Docking, and Dynamics Simulations Revealed Novel Antimicrobial Peptide NKLF2 Mutants as Potent Inhibitors of *Mycobacterium tuberculosis*

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### Abstract

The increasing threat of multidrug-resistant *Mycobacterium tuberculosis* (*Mtb*) underscores the urgent need for novel therapeutics that can circumvent existing resistance mechanisms. The clinical ineffectiveness of current treatment regimens propelled the exploration for alternative antimicrobials with minimal toxicity and multi-target specificity. This study aimed to design and optimize antimicrobial peptides (AMPs) targeting crucial *Mtb* enzymes, namely, arabinosyltransferase C, DNA gyrase, 30S ribosomal protein S1, and enoyl-[acyl-carrier-protein] reductase. Curated set of 92 natural peptides, exhibiting high positive charge and reported efficacy against *Mtb*-H37Rv were screened and evaluated for pharmacokinetic properties. To enhance efficacy and overcome the intrinsic limitations of cationic AMPs, a mutant library was generated. Among them, NKLF2 and its mutants (M16C and M16I) demonstrated improved antibacterial efficacy (~5%) and favorable pharmacological profiles with no predicted toxicity. Molecular docking revealed enhanced binding affinities of the mutants across multiple targets. Notably, NKLF2\_M16I exhibited enhancements of 9.71% and 7.63% in binding affinities against 4NNI and 5VRL respectively, while NKLF2\_M16C achieved increments of 5.4% and 4.37% against 4G3N and 3PTY. Intermolecular interaction profiling identified hydrogen bonds, salt bridges, and hydrophobic interactions with the crucial active site residues of each target. Validations through coarse-grained, molecular, and essential dynamics simulations revealed minimal residue-level fluctuations, stable backbone profile, and minimized energy cluster basins ensuring compactness and stability of the protein-peptide docked complexes. These *in silico* findings open new avenues for further experimental validations and suggest that NKLF2 mutants in combination with conventional anti-TB drugs could pave the path towards the development of effective therapeutics in combating *Mtb*.

**Keywords** Antimicrobial peptides · Molecular dynamic simulations · Multidrug resistant · *Mycobacterium tuberculosis* · Principal component analysis · Free energy landscape

### Original Article:

George, E.A., Naha, A., Soundharya, H. et al. Pharmacokinetics Screening, Molecular Docking, and Dynamics Simulations Revealed Novel Antimicrobial Peptide NKLF2 Mutants as Potent Inhibitors of *Mycobacterium tuberculosis*. *Probiotics & Antimicro. Prot.* (2025).

<https://doi.org/10.1007/s12602-025-10608-0>

### Systematic review protocol:

Varughese, C. S., Mani, S. M., Vincent, V., Cherian, S. A., & Kurian, N. (2025). Impact of urban heat islands on human health in India – a systematic review protocol. *International Journal Of Community Medicine And Public Health*, 12(6), 2804–2812.

<https://doi.org/10.18203/23946040.ijcmph20251731>

*International Journal of Community Medicine and Public Health*  
Varughese CS et al. *Int J Community Med Public Health*. 2025 Jun;12(6):2804-2812  
<http://www.ijcmph.com>

pISSN 2394-6032 | eISSN 2394-6040

### Protocol

DOI: <https://dx.doi.org/10.18203/2394-6040.ijcmph20251731>

## Impact of urban heat islands on human health in India – a systematic review protocol

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### ABSTRACT

**Background:** Worldwide, urbanization is occurring at an accelerated rate, especially in India. The development of urban areas contributes to urban heat island (UHI) phenomenon. Though the health effects of UHIs have been studied in various urban areas across the world, there is a need to develop evidence in India. This is essential for implementing effective and country-specific interventions aimed at mitigating the UHI effect while expanding urban areas in the country. The objective of this review is to describe the human health impacts of urban heat islands in India. The review will consider studies that focus on urban populations irrespective of age and sex, which report on health effects due to urban heat islands, or changes in ambient temperatures due to urbanization.

**Methods:** This review will search for both published and unpublished studies. The information sources to be searched will include Medline (PubMed), Embase, Epistemonikos, Virtual Health Library, PsychINFO (EBSCO), Mednar, Dissertation Abstracts International, Proquest dissertations and theses, World Health Organization (WHO) website and Google Scholar. Studies published from database inception till current date, as well as those published in English, will be included. Two independent reviewers will conduct a critical appraisal of eligible studies, assess the methodological quality, and extract the data.

**Conclusions:** This review will add to the body of evidence on urban heat island effects on human health and help to inform urban policy and planning.

**Trial registration number:** PROSPERO - CRD42024588528

**Keywords:** Climate change, Heat stress, Low and middle-income countries, Urban health, Urbanization