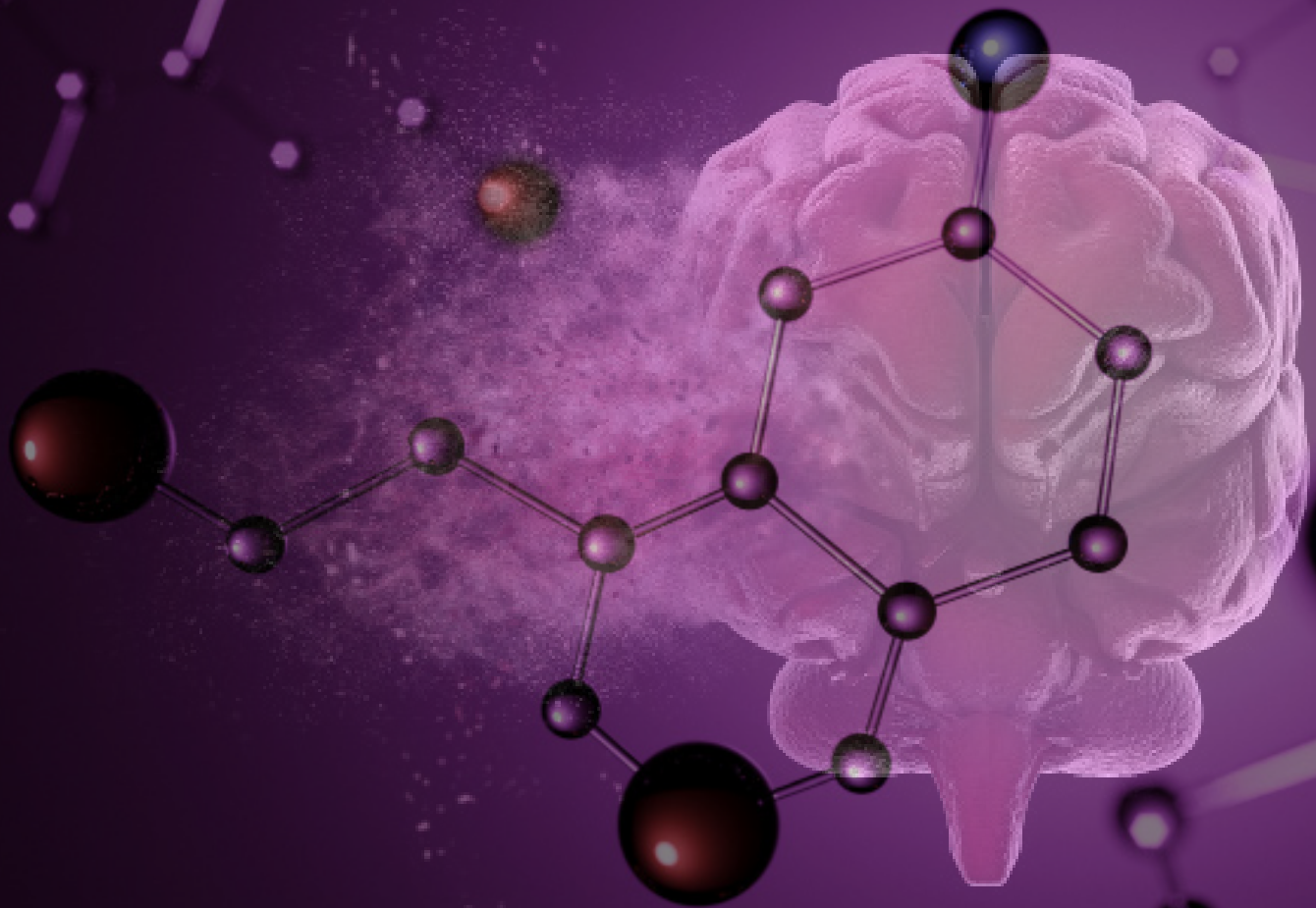




CENTRE FOR BRAIN RESEARCH

INDIAN INSTITUTE OF SCIENCE



ANNUAL REPORT

2023-24

Contents

Section	Page No.
Director's Message	04
Research and Innovation at CBR	05
Flagship Research Projects	
- CBR-SANSCOG	06
- CBR-TLSA	08
- GenomeIndia	11
- YLOPD Study	13
Research and Innovation Snippets	14
Research Publications	21
Events and Initiatives	25
Finance	47
Governance Structure, Faculty, and Staff at CBR	53

Director's Message

The Centre for Brain Research, Indian Institute of Science, is committed to pursuing "Global Science with a Local Context". CBR has progressed well, in the last year, in its mission to identify effective diagnostic biomarkers for dementia and to develop intervention mechanisms to prevent or postpone the disease. The commitment has been ably demonstrated by the CBR team in understanding cellular and molecular mechanisms of the disease; finding genetic variants; analyzing data collected from cognitively healthy urban and rural cohorts to decipher patterns that could lead to the development of a composite diagnostic biomarker; and undertaking non-pharmacological intervention studies.

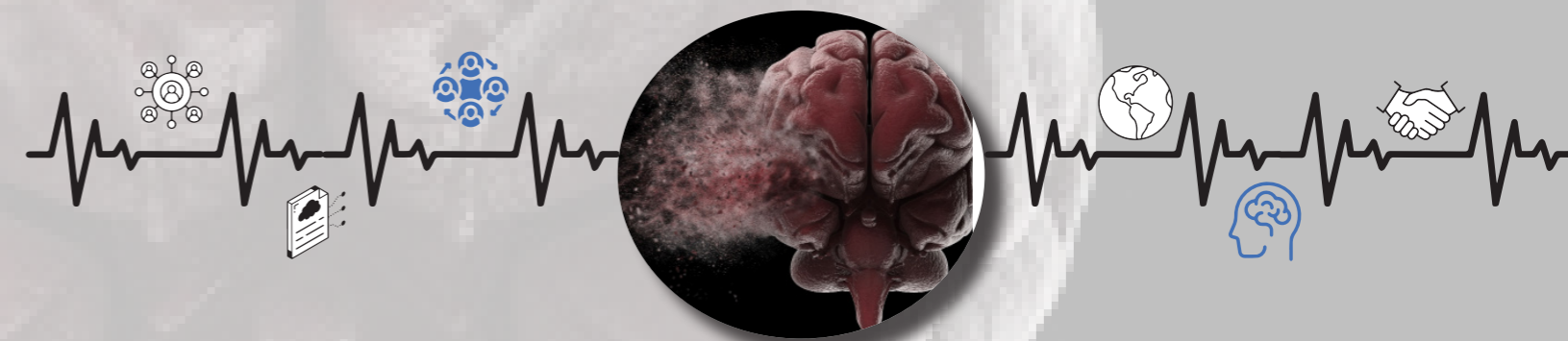


The Centre was ably led by Prof Y Narahari who did a stellar job before stepping down on 31 Dec 2023 and we acknowledge his significant contributions to the growth of CBR. As CBR approaches the completion of a decade of its existence, the future beckons an exciting journey in the continued quest for knowledge.

Professor K V S Hari

Director

hari@cbr-iisc.ac.in



Research at CBR

Research and Innovation at CBR

Flagship Research Projects

The Centre for Brain Research spearheads large-scale research projects that address some of India's major health challenges and have significant implications, particularly, for the aging population.

Longitudinal Cohort Studies on Aging

Population-based longitudinal studies are essential for understanding the risk and protective factors related to dementia and other neurodegenerative diseases associated with aging. CBR is conducting two distinctive studies in this area: the Srinivaspura Aging, Neuro Senescence, and COgnition (CBR-SANSCOG) study and the Tata Longitudinal Study on Aging (CBR-TLSA). These parallel, prospective cohort studies are based in rural and urban settings in India, respectively, and aim to provide a comprehensive evaluation of factors associated with cognitive changes due to normal aging, dementia, and related disorders.

The CBR-SANSCOG study focuses on rural areas, recruiting cognitively healthy individuals aged 45 and above from the villages of Srinivaspura Taluk in Kolar District, Karnataka, using an area sampling strategy. In contrast, the CBR-TLSA study targets urban Bangalore, using convenience sampling to recruit participants from a similar age group. Both studies include participants of all genders, but they differ in socio-economic status, migration patterns, literacy levels, and lifestyle factors. By harmonizing assessments across these studies, we enable direct comparisons of outcome measures.

Srinivaspura Aging, Neuro Senescence and COgnition (CBR-SANSCOG) Study



Funding: CBR

CBR-SANSCOG study is a large-scale, prospective, aging cohort study that is being conducted in the rural Indian population (projected n=10,000), hailing from the villages of Srinivaspura

taluk in Kolar district of Karnataka. This study aims to understand differential trajectories of healthy and pathological aging and identify risk and protective risk factors for dementia and related disorders. It follows an interdisciplinary, multimodal approach, including detailed clinical, neurocognitive, biochemical, genetic, and neuroimaging assessments, with long-term follow-up.

The CBR-SANSCOG team coordinates with local public health officials and collaborates closely with grassroots leaders and community health workers. This helps establish strong connections within the community and raise awareness about the study. Study participants undergo a comprehensive assessment process, which follows a three-visit protocol:

First visit: Conducted at the participant's home to collect socio-demographic information and obtain written consent for study participation.

Second visit: Held at the project site office in Srinivaspura or a mobile unit, where detailed clinical and neurocognitive evaluations are performed. Biochemical and genetic tests are conducted through periodic blood collection camps in the villages.

Third visit: Involves neuroimaging, where a subset of participants undergoes brain MRI scans at the JN Tata MRI Centre, IISc.

This structured approach ensures a thorough and consistent evaluation of all participants.

Recruitment for the study began in January 2018. The pilot phase of the study (n=1,000) ended in March 2019. The main phase of the study is currently underway, with follow-up assessments having begun in February 2020. Below is an overview of the study's progress for the period from 01 April 2023 to 31 March 2024.

Recruitment:

Participants have been recruited from the villages attached to 9 Primary Health Centres (PHCs). During the reporting period (01 April 2023 – 31 March 2024), we conducted 63 awareness camps, and 3168 individuals consented to participate in the study.

Assessments:

During the reporting period, we conducted a total of 3310 assessments – 2465 baseline and 845 follow-ups (overall: 8561 baseline and 2182 follow-ups)

Brain MRI:

MRI-related awareness (through videos and in-person information) was given to all participants who came for assessments. We maintained the increased number of three MRIs per day and completed 812 MRI scans during the above-mentioned period. (overall: 2118 MRI scans).

The table of progress of various project activities for the current reporting period in comparison with the overall progress since the start of the study is displayed below.

Parameter	1 Apr 2023 – 31 Mar 2024	Overall
Participants consented	3168	10301
Villages recruited from	64	175
Baseline assessments	2465	8561
Follow-up assessments (V2)	626	1963
Follow-up assessments (V3)	219	219
Total follow-up assessments	845	2182
Brain MRI	812	2118
Interim telephonic + home visit contact	1366	3217
Based on interim contact, participants interested in follow-up	1157	2812
Blood sample collection camps completed	154	557
Sample collections completed	3005	10049
Feedback/consultation sessions completed	125	428
Village surveys	0	33
Awareness programs	63	187
Community engagement events	0	9

Tata Longitudinal Study of Aging (CBR-TLSA)



Funding: Tata Trusts

The CBR-Tata Longitudinal Study of Aging (TLISA) is a unique, large-scale, prospective cohort study focused on aging, conducted in the urban metropolitan city of Bangalore, India. With a projected enrollment of 1,000 participants, this study aims to identify risk and protective factors for dementia and related disorders through annual, multi-modal assessments. These assessments include clinical, cognitive, biochemical, genetic, and neuroimaging evaluations of individuals aged 45 and older, both male and female. The study tracks aging trajectories and investigates various risk and preventive factors affecting the aging brain and its impact on cognitive impairment or resilience.

Recruitment for the study began in 2015. Recruitment strategies include community awareness and outreach programs led by our research team to educate potential participants about healthy aging, neurodegenerative disorders, and the TLSA study. Participants who provide consent undergo comprehensive assessments during 1-2 visits. The first visit takes place at CBR, IISc campus, where detailed clinical and cognitive evaluations are conducted. The second visit occurs at the JN Tata MRI Centre, also on the IISc campus, for neuroimaging. Blood samples for biochemical and genetic assessments are collected at participants' homes.

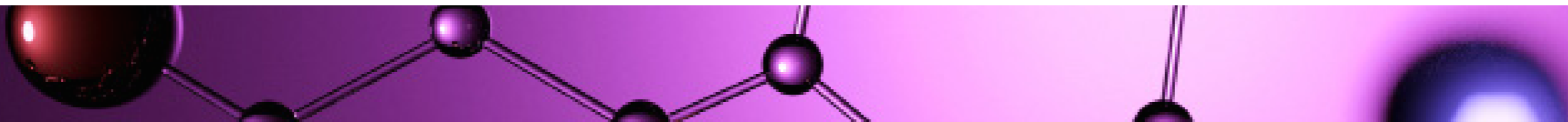
The second phase of CBR-TLSA began in January 2022. As part of Phase II of the project, a multimodal (non-pharmacological) intervention trial is being carried out in a pilot exploratory mode. An advisory committee consisting of global experts oversees and guides the progress of the trial.

During the reporting period (01 April 2023 – 31 March 2024), the CBR-TLSA focused on follow-up assessments while the pilot multimodal intervention study (CBR-TLSA Phase II) focused on completing the recruitment and baseline assessments.

The progress concerning the former was as follows.

Parameter	Overall (01 Jun 2015 to 31 Mar 2024)								Reporting period (01 Apr 2023 – 31 Mar 2024)							
	BL	F1	F2	F3	F4	F5	F6	F7	BL	F1	F2	F3	F4	F5	F6	F7
Number of subjects consented	1518								219							
Number of clinical assessments	1518	1074	595	277	192	114	35	0	219	418	277	66	62	79	31	0
Number of MRI scans	1053	473	296	77	104	40	24	0	186	242	153	34	37	32	22	0
Number of blood investigations	1404	1002	549	267	187	106	31	0	232	436	258	67	66	74	27	0

Abbreviations: BL- Baseline, F1-Follow-up 1, F2- Follow-up 2, F3- Follow-up 3, F4- Follow-up 4, F5- Follow-up 5, F6- Follow-up 6, and F7 - Follow-up 7.



Parameter	Reporting period (01 May 2023 – 31 Mar 2024)	
	Number of subjects consented to participate in the study	109
Number of clinical assessments	BL	F1
	109	18
Number of blood investigations	BL	F1
	101	14
Number of MRI scans	BL	F1
	92	1

In this period, a total of 127 assessments (Baseline 109 + Follow-up 18), 115 blood investigations (Baseline 101 + Follow-up 14), and 93 (Baseline 92 + Follow-up 1) MRI scans were completed. The enrolment of participants has been initiated for a large-scale study. It is aimed to complete the inclusion of 440 samples by December 2024.

GenomeIndia



Funding: Department of Biotechnology, Government of India

CBR serves as the National Coordinator for the GenomeIndia project, a major mission-mode initiative (involving 20 institutions across 15 different states in the country) focused on identifying genetic variations in the Indian population. The project's first phase involves Whole Genome Sequencing (WGS) of 10,000 representative individuals.

The Indian population is currently the largest in the world and extremely diverse with the presence of more than 4500 prominent ethnic groups, many of these groups following unique sociocultural practices, thus leading to the well-known endogamous nature of the Indian population. This, combined with the antiquity of the populations, and the variability of their demographic history have made the Indian population groups unique and distinct. These groups can thus harbor distinct population-specific genetic variations, disease-causing or otherwise. GenomeIndia aims to conduct large-scale WGS-based variant identification from the Indian population to further human genetics research and understand disease susceptibilities, since genetic variations are known to predispose individuals to complex polygenic multifactorial diseases, cause rare inherited disorders, as well as determine an individual's response to drugs. These population groups can have novel genetic variations, as well as their own unique allele-frequency-spectrum, with varying degrees of differences compared to other world populations.

The project aims to create an exhaustive catalogue of genetic variations in Indians and, thereby, a reference haplotype structure for Indians, that can be used for imputing missing genetic variation in future Indian population genome-wide studies. The results will help design genome-wide arrays for research and diagnostics at an affordable cost. A biobank for DNA samples collected for future use in research is being established.

The successful completion of the project will help to identify the genetic variations in our population that result in the manifestation of complex diseases such as diabetes, cardiovascular diseases, obesity, and neurodegeneration, among others. The comprehensive list of genetic variations obtained from healthy individuals will serve as a screening mechanism for non-causal mutations and help perform genetic studies on monogenic disorders.

The WGS of 10,074+ samples have been completed under this project, out of which the WGS of

3153 samples were carried out by CBR. These 10074+ individuals represent 99 distinct ethnicities within the population groups across India. After thorough quality checks at the sample level, and considering possible batch effects, 9871 of these were taken for joint genotyping. The joint genotyping has recently been concluded. After another round of in-depth quality checks for various sequencing-based parameters, 9772 samples have been retained in the final joint variant callset. This is a crucial milestone and final deliverable for the project, and the variant callset is currently being analysed for valuable inferences about the Indian population.

Our preliminary comprehensive analysis resulted in the identification of >180 million genetic variations, comprising biallelic and multiallelic variants in these 9856 individuals. Among these, about 169 million are single nucleotide variations (SNV) and the rest are short insertions and deletions (InDel). We also noted that about 60% of these are singletons and doubletons. This trend aligns closely with the pattern observed in the 1000Genome dataset of 3202 samples, which also reported 47.6% singletons across both SNVs and INDEL. In our dataset, a majority of the variants belong to the ultra-rare category, with a minor allele frequency (MAF) of less than 0.1%. Nevertheless, considering merely the number of variants having minor allele frequency <5%, these are prevalent enough to be of implications in large-scale association studies for Indians and South Asians. Also, these can comprise a better population reference dataset that can be used for precise screening in rare disease and complex trait genetics.

Genotype Imputation: We used 5750 whole genome sequence-derived haplotypes as one of our haplotype reference panels for genotype imputing. Post-imputation, we augmented from array-derived genotypes corresponding to ~400,000 high-quality genetic markers to ~53 million genetic markers. Post-imputation quality control resulted in an analysis set of ~19 million genetic markers. We plot imputation accuracy against minor allele frequencies and observe that, across all minor allele frequency ranges, imputation performance is better than the widely known HRC and TOPMed reference panel. We observe >98% concordance in reference allele frequency in the reference panel as well as the study panel. We are currently undertaking deep genomic and clinical annotation of this joint callset.

Young and Late-onset Parkinson's Disease (YLOPD) Study



Funding: SKAN Research Trust

The 'Young and Late-Onset Parkinson Disease (YLOPD)' study is a longitudinal investigation into Parkinson's disease (PD), the second most common neurodegenerative disorder. This collaborative study is conducted by CBR and the National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru. The study aims to recruit 1,000 patients with young-onset and late-onset PD and to follow them periodically to examine the disease's natural history.

Growing evidence underscores the significant impact of young-onset PD (YOPD) and late-onset PD (LOPD) on individuals' quality of life. Despite this, the multifactorial causes, neuroanatomical features, and genetic underpinnings of YOPD and LOPD are not yet fully understood. Through whole genome analysis of patient samples, we aim to explore the genetic variations associated with PD in the Indian population. We are also investigating blood-based inflammatory and protein biomarkers to assess the role of inflammation in disease progression. Additionally, we are examining the impact of environmental factors, particularly pesticide exposure, and its differential effects on YOPD and LOPD. Moreover, the molecular mechanisms underlying neurobehavioral symptoms and the progression of non-motor and motor symptoms of PD are being studied using mouse models.

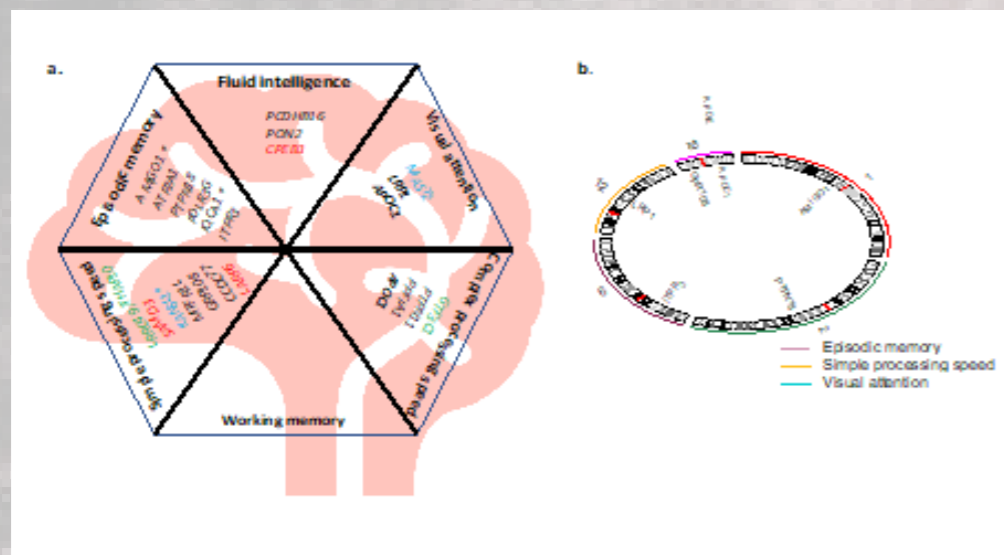
We hope that this 'bench-to-bedside' study will provide insights into unresolved questions about PD, thereby supporting the development of effective interventions and the refinement of treatment protocols.

DNA was successfully isolated and stored from all 200 samples, and WGS has been completed for these samples. The resulting data is being subjected to detailed bioinformatic analysis. This analysis has already revealed numerous novel variations in known pathogenic genes, and further investigation is underway to identify additional genetic variants. A structural variation pipeline has been implemented to identify structural variants that could cause PD. In parallel, a mouse model of PD has been established, enabling us to track the progression of both non-motor and motor symptoms over time.

Research and Innovation Snippets

Exome-wide Analysis Reveals the Role of LRP1 and Additional Novel Loci in Cognition

How do genetic variations contribute to the architecture of cognition?

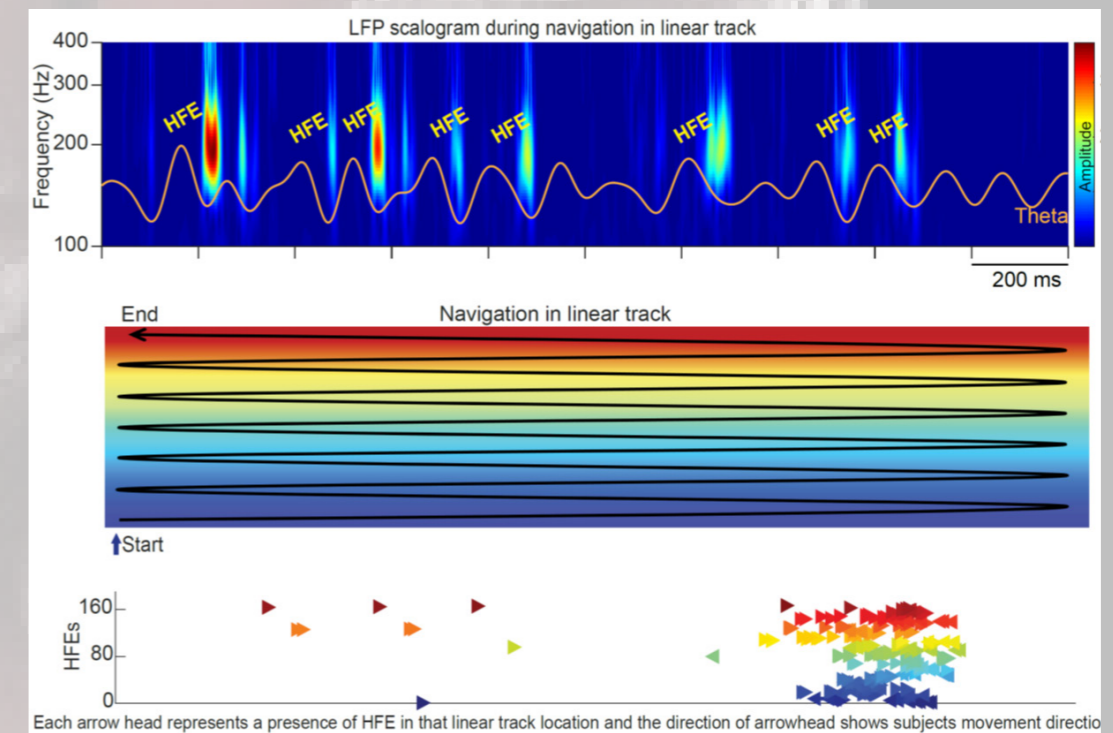
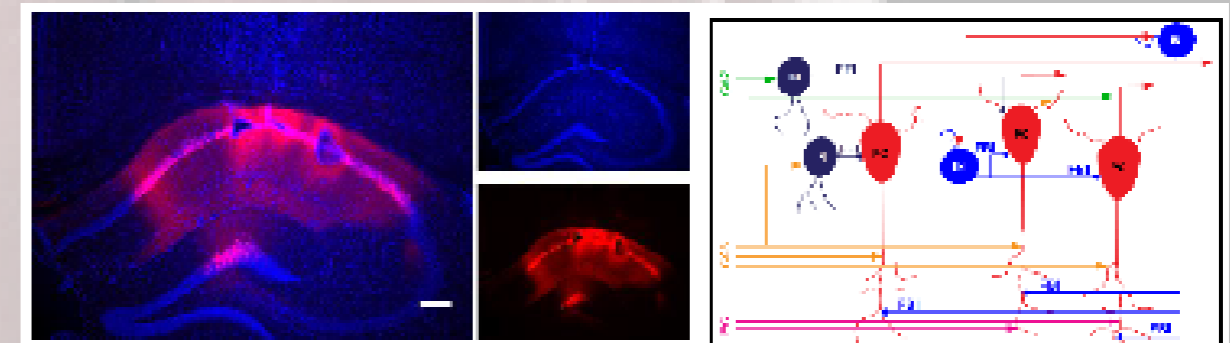


- We study the human exome and uncover 20 genetic variants and two lipid metabolism-associated genes that affect different domains of cognition, adjusting for other age-associated lipid and glycemic risks and APOE.
- We also uncover interactions of these variants with APOE, as well as pleiotropic effects on lipid/glucose metabolism, as well as mediating effects of lipid/glucose metabolism on cognition domains, thus hinting at causal roles of metabolic dysfunction on cognition.

Reference: Chakraborty, S., & Kahali, B. (2023). Exome-wide analysis reveals role of LRP1 and additional novel loci in cognition. *Human Genetics and Genomics Advances*, 4(3), 100208. <https://doi.org/10.1016/j.xhgg.2023.100208>

Neural Basis of Memory and Navigation

How do different neuronal groups communicate to drive behaviour such as memory?



- We have addressed the central question of what the activity patterns in the hippocampus are during rest and spatial navigation when feedback inhibition (FBI) is reduced. Addressing this question will facilitate our understanding of neural processes underlying spatial navigation and memory.
- We have performed a very sophisticated experiment in which we first reduced FBI (top left image) in the CA1 hippocampal circuit (top right cartoon), followed by recording neuronal activity and LFP (summed activity of cells) from the hippocampus as the animals performed a navigation task. This allowed us to investigate the relationship between neural activity patterns and behavioral performance (bottom).
- We show that FBI is crucial for local sparsity of neuronal action potential to represent a place.

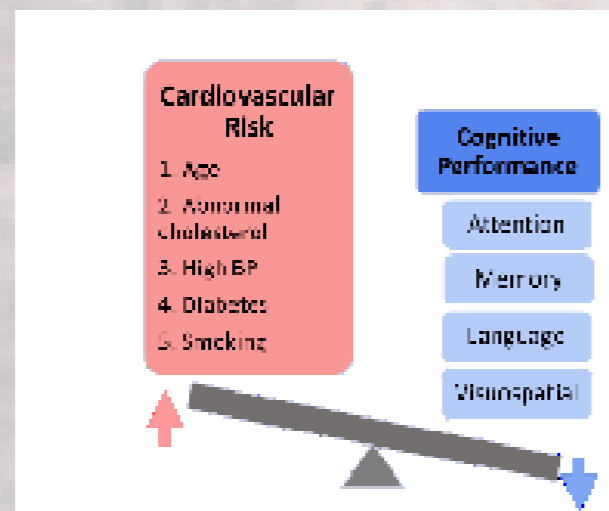
In its absence or reduction, the hippocampal CA1 becomes hyperexcitable, and spatial navigation and contextual memory are impaired.

- We are now testing how improving this neural rhythm (by using inhouse-developed brain stimulation devices and paradigms) impacts behaviours, including memory.

Reference: Adaikkan, C., Joseph, J., Foustoukos, G., Wang, J., Polygalov, D., Boehringer, R., Middleton, S. J., Huang, A. J. Y., Tsai, L. H., & McHugh, T. J. (2024). Silencing CA1 pyramidal cells output reveals the role of feedback inhibition in hippocampal oscillations.

Nature Communications, 15(1). <https://doi.org/10.1038/s41467-024-46478-3>

Is Cardiovascular Risk Linked to Cognitive Performance?



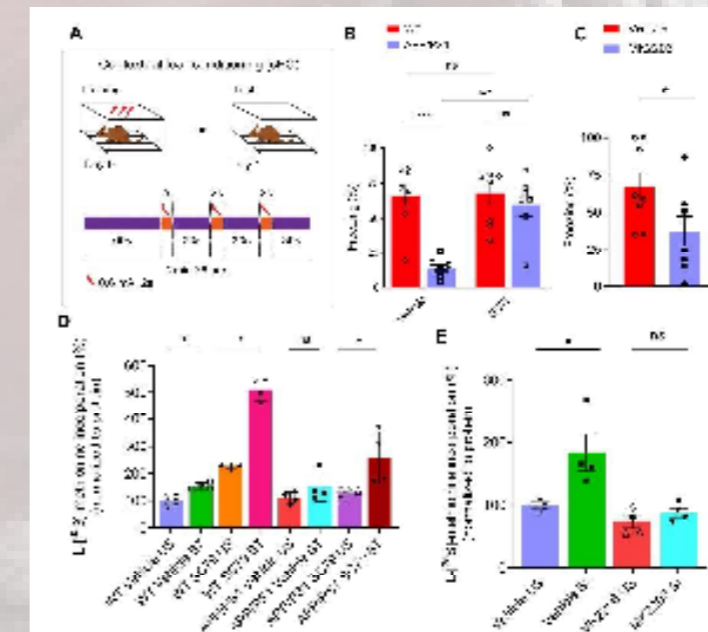
- The burden of cardiovascular risk factors (CRF) is increasing in India.
- CRF tend to cluster together, which is comprehensively captured by Framingham Risk Scores (FRS).
- Increased cardiovascular risk, as evidenced by FRS, was associated with poorer cognitive performance in all cognitive domains among dementia-free, older rural Indians.

Reference: Mensegere, A. L., Sundarakumar, J. S., Diwakar, L., & Issac, T. G. (2023). Relationship between Framingham Cardiovascular Risk Score and cognitive performance among ageing rural Indian participants: a cross-sectional analysis. **BMJ Open**, 13(11), e074977.

<https://doi.org/10.1136/bmjopen-2023-074977>

Akt Activation Ameliorates Deficits in Hippocampal-dependent Memory in an AD Mouse Model

What are the molecular mechanisms impeding new protein synthesis at the synapse in Alzheimer's disease pathogenesis?



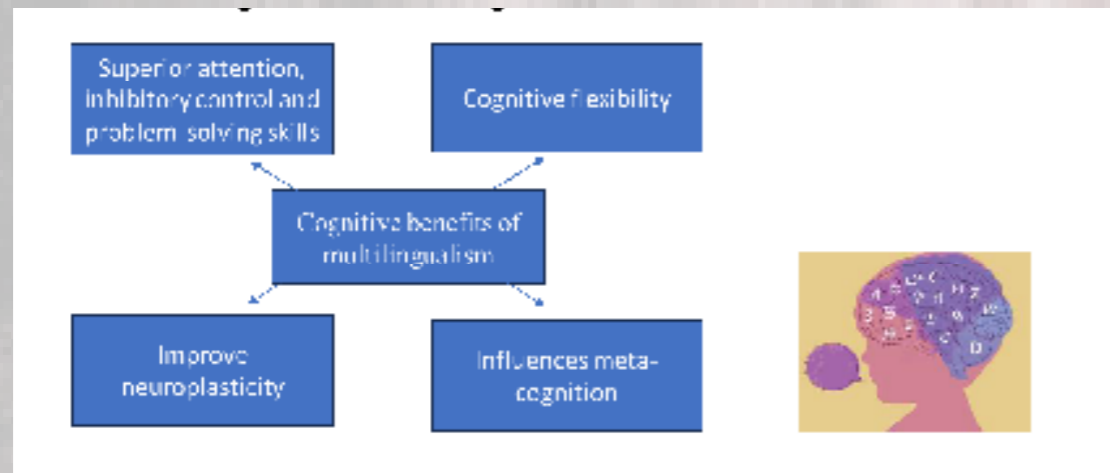
(A) Schematic of the cFC behavioral design. (B, D) Akt activator (SC79) rescued memory function and protein synthesis in AD mice. (C, E) Akt inhibitor (MK2206) impaired memory recall and protein synthesis

- Akt/mTOR signaling pathways are implicated in AD pathology.
- Dysregulation of Akt1/mTOR signaling proteins in the hippocampus contributes to memory recall deficits and loss of activity-dependent synaptic protein synthesis.
- Akt activation (activator, SC79) ameliorates deficits in memory recall and activity-dependent synaptic protein synthesis.

Reference: Kommaddi, R. P., Gowaikar, R., A. H. P., Diwakar, L., Singh, K., & Mondal, A. (2024). Akt activation ameliorates deficits in hippocampal-dependent memory and activity-dependent synaptic protein synthesis in an Alzheimer's disease mouse model. **Journal of Biological Chemistry**, 300(2), 105619. <https://doi.org/10.1016/j.jbc.2023.105619>

Cognitive resilience through multilingualism!

What is the relationship between the number of languages known to an individual and its effect on cognitive functioning?

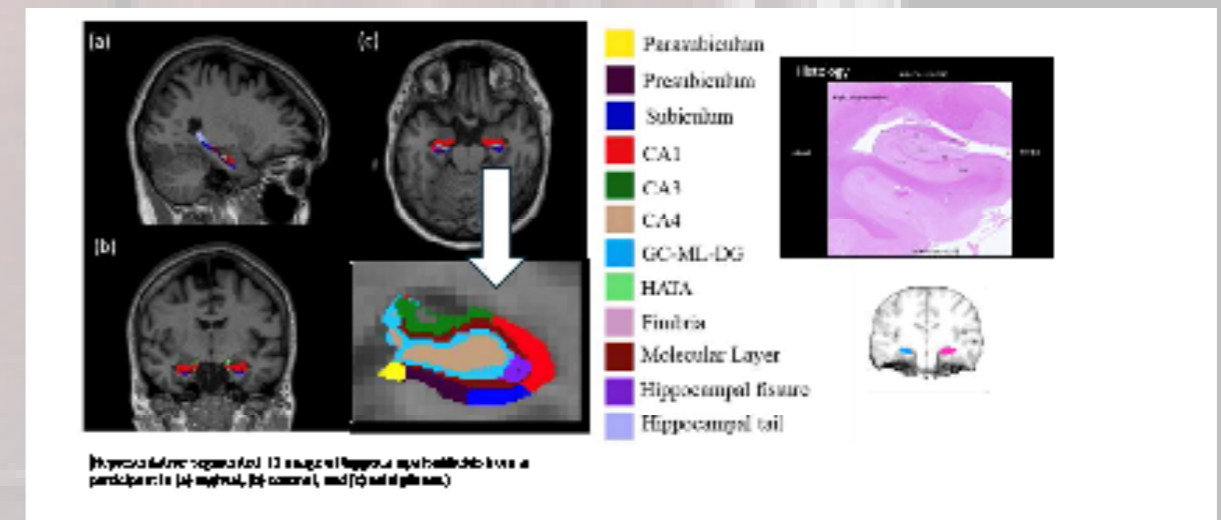


- The ability to use multiple languages sets Asians (especially Indians) apart from the Western population.
- Our study highlights that multilinguals had lesser odds of developing mild cognitive impairment (MCI) than monolinguals (0.69 95% CI (0.5-0.9)). The findings suggest that multilingualism might be a measure of cognitive resilience.
- Practical implication: Learning and using multiple languages can be an effective strategy to maintain cognitive health in aging populations.

Reference: Menon, A. J., Malo, P. K., Jain, S., Gandhi, S., Sundarakumar, J. S., Rai, P., & Issac, T. G. (2023). Association between multilingualism and cognitive performance among older adults in rural southern India. **Journal of Neurosciences in Rural Practice**, 15, 81–85. https://doi.org/10.25259/jnpr_376_2023

Hippocampal Subfield Changes in Mild Cognitive Impairment

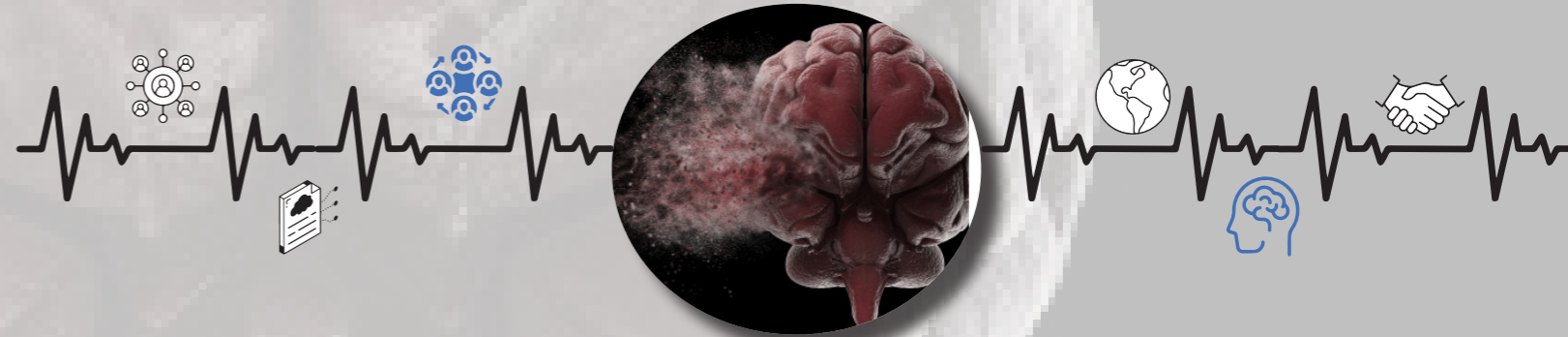
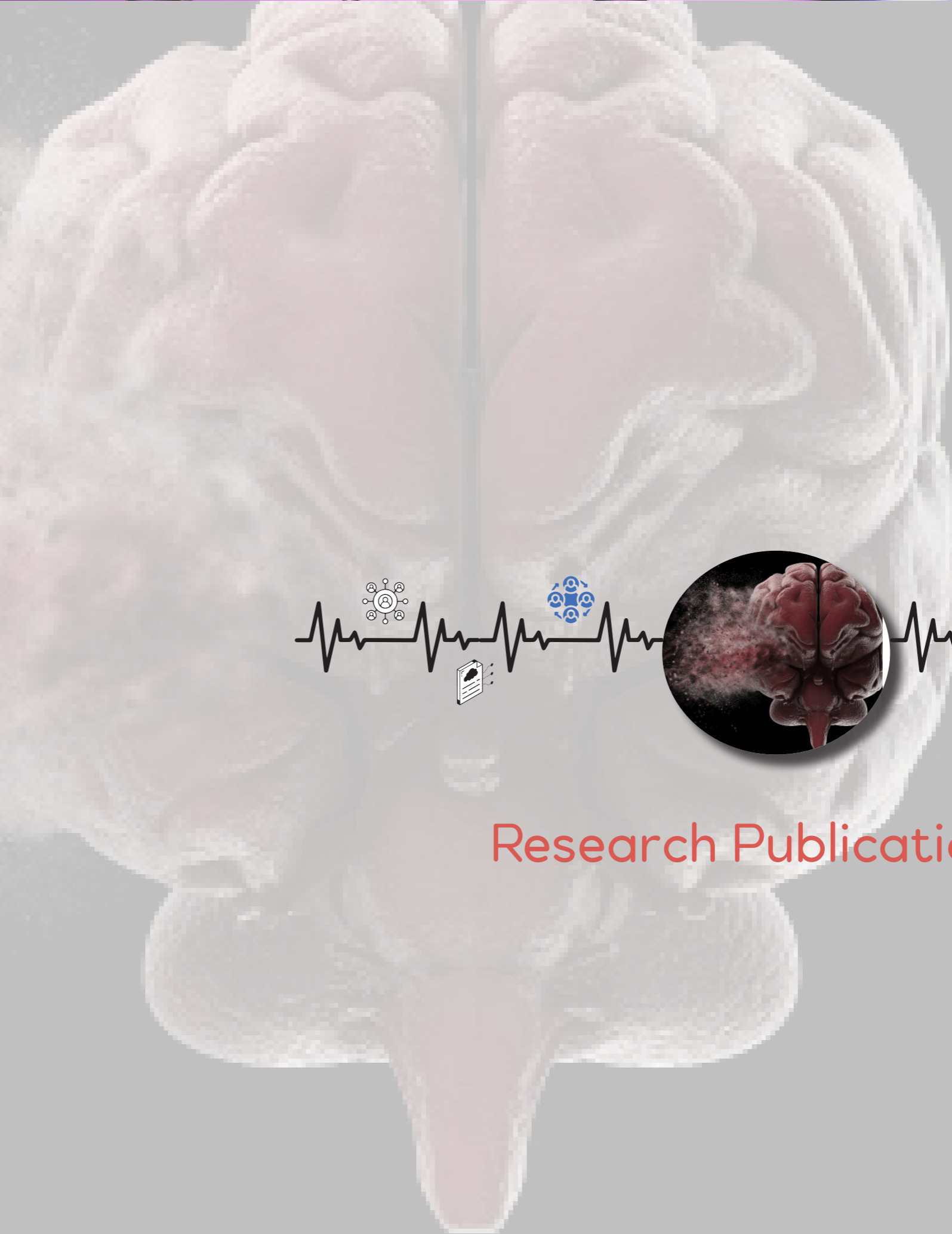
What is the impact of hippocampal subfield volume loss on cognitive outcomes?



- Dementia and late MCI are associated with hippocampal atrophy.
- However, hippocampal subfield volumetry is not well-studied.
- MCI participants in the CBR-TLSA cohort exhibited significant decrease in memory scores in ACE-III and notable volumetric changes in hippocampal subfields.
- The subfields implicated are - bilateral hippocampal tail, subiculum, CA1, CA3, molecular layer, as well as the left presubiculum, parasubiculum, CA4, GC-ML-DG, and HATA.

Reference: Singh, S., Malo, P. K., Stezin, A., Menesgere, A. L., & Issac, T. G. (2024). Hippocampal subfields volume changes and its correlation with memory functions in patients with Mild Cognitive Impairment. **Aging and Health Research**, 4(1), 100183. <https://doi.org/10.1016/j.ahr.2024.100183>

Further details about the research projects being pursued at CBR are accessible via <https://cbr-iisc.ac.in/group/faculty/>

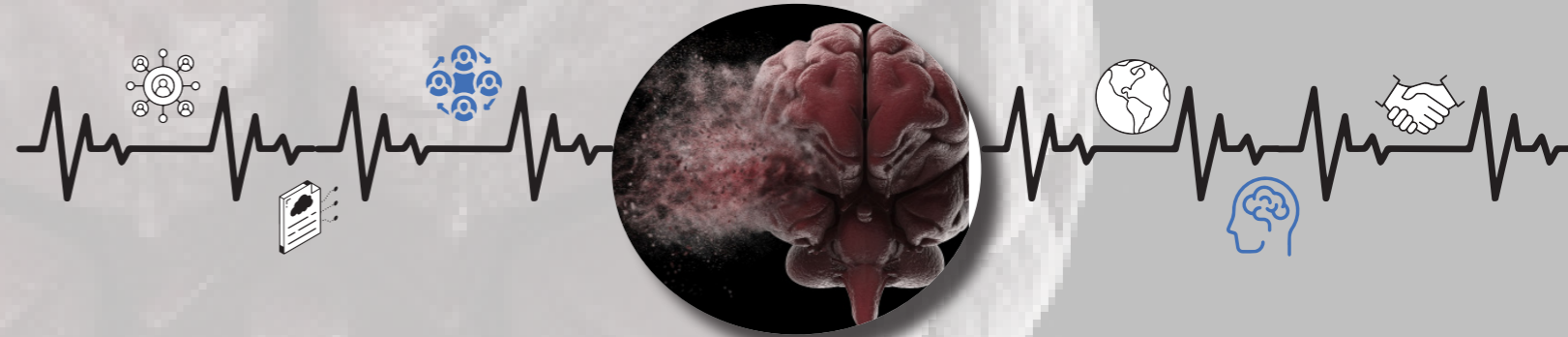
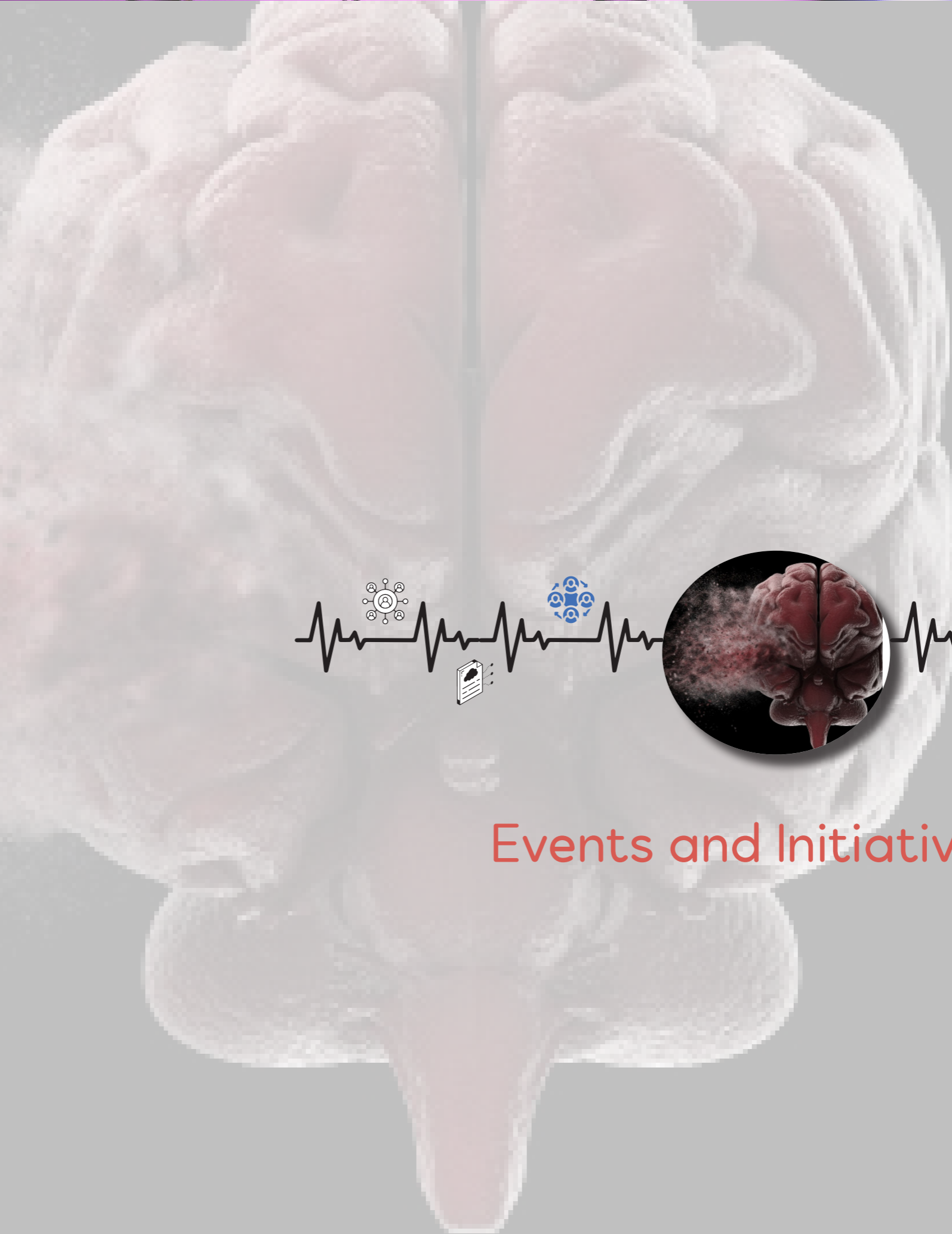


Research Publications

Research Publications

During the reporting period, the research output of CBR was published in peer-reviewed scholarly journals of repute. The citations are as follows.

- 1) Rai, P., Sundarakumar, J. S., Basavaraju, N., Kommaddi, R. P., & Issac, T. G. (2024). Association between ApoE ϵ 4 genotype and attentional function in non-demented, middle-aged, and older adults from rural India. *Journal of Neurosciences in Rural Practice*, **0**, 1–9. https://doi.org/10.25259/jnrp_272_2023
- 2) Kommaddi, R. P., Gowaikar, R., A, H. P., Diwakar, L., Singh, K., & Mondal, A. (2024). Akt activation ameliorates deficits in hippocampal-dependent memory and activity-dependent synaptic protein synthesis in an Alzheimer's disease mouse model. *Journal of Biological Chemistry*, **300**(2), 105619. <https://doi.org/10.1016/j.jbc.2023.105619>
- 3) Chen, Y., Du, X., Kuppa, A., Feitosa, M. F., Bielak, L. F., O'Connell, J. R., Musani, S. K., Guo, X., Kahali, B., Chen, V. L., Smith, A. V., Ryan, K. A., Eirksdottir, G., Allison, M. A., Bowden, D. W., Budoff, M. J., Carr, J. J., Chen, Y. D. I., Taylor, K. D., . . . Speliotes, E. K. (2023). Genome-wide association meta-analysis identifies 17 loci associated with nonalcoholic fatty liver disease. *Nature Genetics*, **55**(10), 1640–1650. <https://doi.org/10.1038/s41588-023-01497-6>
- 4) Chakraborty, S., & Kahali, B. (2023). Exome-wide analysis reveals role of LRP1 and additional novel loci in cognition. *Human Genetics and Genomics Advances*, **4**(3), 100208. <https://doi.org/10.1016/j.xhgg.2023.100208>
- 5) Adaikkan, C., Joseph, J., Foustoukos, G., Wang, J., Polygalov, D., Boehringer, R., Middleton, S. J., Huang, A. J. Y., Tsai, L. H., & McHugh, T. J. (2024). Silencing CA1 pyramidal cells output reveals the role of feedback inhibition in hippocampal oscillations. *Nature Communications*, **15**(1). <https://doi.org/10.1038/s41467-024-46478-3>
- 6) Haukedal, H., Corsi, G. I., Gadekar, V. P., Doncheva, N. T., . . . , Muddashetty, R. S., . . . , Freude, K. (2023). Golgi fragmentation – One of the earliest organelle phenotypes in Alzheimer's disease neurons. *Frontiers in Neuroscience*, **17**. <https://doi.org/10.3389/fnins.2023.1120086>
- 7) Sundarakumar, J. S., Mensegere, A. L., Malo, P. K., & Ravindranath, V. (2023). Impact of the COVID-19 pandemic on some modifiable risk factors of dementia in an aging, rural Indian population. *Frontiers in Psychiatry*, **14**. <https://doi.org/10.3389/fpsy.2023.954557>
- 8) Mensegere, A. L., Sundarakumar, J. S., Diwakar, L., & Issac, T. G. (2023). Relationship between Framingham Cardiovascular Risk Score and cognitive performance among ageing rural Indian participants: a cross-sectional analysis. *BMJ Open*, **13**(11), e074977. <https://doi.org/10.1136/bmjopen-2023-074977>
- 9) Rai, P., & Sundarakumar, J. S. (2024). The role of gender in the . . . S. K., Mensegere, A. M., Issac, T. G., & Sundarakumar, J. S. (2024). Applications of Geospatial Mapping in the Assessment of Environmental Risk Factors for Dementia. *Annals of Neurosciences*. <https://doi.org/10.1177/09727531231222322>
- 11) Menon, A. J., Malo, P. K., Jain, S., Gandhi, S., Sundarakumar, J. S., Rai, P., & Issac, T. G. (2023). Association between multilingualism and cognitive performance among older adults in rural southern India. *Journal of Neurosciences in Rural Practice*, **15**, 81–85. https://doi.org/10.25259/jnrp_376_2023
- 12) Meghana, R., Jain, S., Malo, P. K., Stezin, A., & Issac, T. G. (2023). Potential modifications on verbal-language/orientation-memory ratio from Addenbrooke's cognitive examination III to predict mild cognitive impairment from healthy controls. *Journal of Neurosciences in Rural Practice*, **14**, 531–532. https://doi.org/10.25259/jnrp_223_2023
- 13) Issac, T., Menon, A., Sandhya, G., Varadharajan, A., Rai, P., & Sundarakumar, J. (2023). Particulate matter 2.5 – Muddling the healthy brain. *Journal of Psychiatry Spectrum*, **2**(2), 129. https://doi.org/10.4103/jopsys.jopsys_7_23
- 14) Rai, P., Sahadevan, P., Mensegere, A. L., Issac, T. G., Muniz-Terrera, G., & Sundarakumar, J. S. (2024). Rural-urban disparities in the diagnosis and treatment of hypertension and diabetes among aging Indians. *Alzheimer's & Dementia*, **20**(4), 2943–2951. <https://doi.org/10.1002/alz.13771>
- 15) Singh, S., Malo, P. K., Stezin, A., Mensegere, A. L., & Issac, T. G. (2024). Hippocampal subfields volume changes and its correlation with memory functions in patients with Mild Cognitive Impairment. *Ageing and Health Research*, **4**(1), 100183. <https://doi.org/10.1016/j.ahr.2024.100183>



Events and Initiatives

Events and Initiatives

Snapshots of key events and initiatives that kept CBR bustling with activity throughout the year are presented here.

Periodic CBR Events

Scientific Advisory Committee Meetings

The CBR Scientific Advisory Committee, chaired by Prof. Srinath Reddy, met at CBR on 03 June 2023 and 12 December 2023 to review the progress of the ongoing flagship and faculty-centric research projects. New project proposals were also duly considered during these meetings. The Committee commended the progress made in the research endeavours of the Centre and provided valuable suggestions. The former meeting was graced by Dr. Kris Gopalakrishnan who kindly appreciated the SAC's continued support and offered key pointers on the vision for CBR.



Sharwaree Gokhale Memorial Lecture

Prof. George Davey Smith, Director of the Integrative Epidemiology Unit at the University of Bristol, delivered the 5th Sharwaree Gokhale Memorial Lecture on 05 December 2023 at the Faculty Hall, IISc. His lecture titled 'Triangulation of evidence in aetiological epidemiology: principles, prospects, limitations' was well-received by the CBR fraternity and attendees from



several other centres and departments of IISc. Prof. Smith pioneered the use of germline genetic variants for investigating modifiable causes of disease ('Mendelian randomization'), developed several extensions of the basic method, and contributed to its application in many settings. Throughout his illustrious career spanning several decades, he has promoted increasing the accessibility of data and implemented this in studies he has led, including the Avon Longitudinal Study of Parents and their Children (ALSPAC).

Ms. Sharwaree Gokhale was the first woman Collector of Mumbai City and retired as Additional Chief Secretary (Environment) after 36 years of distinguished administrative service. In an admirable gesture of payback to society, she made a generous donation to CBR to promote neuroscience research. She passed away in January 2016; in her memory, CBR instituted a lecture series, of which Prof. Smith's was the fifth.

Capacity-building

Neurophysiology Workshop

As a capacity-building initiative, CBR organised a training workshop (from 02 to 04 May 2023) on neurophysiology for the benefit of its students, scientific officers, and research staff. The workshop included theoretical lectures and practical sessions handled by internal and external experts. The primary objective of the workshop was to familiarize the CBR workforce with state-of-the-art clinical instruments (such as those for electroneuromyography, transcranial magnetic stimulation, transcranial electrical stimulation, and electrocardiography) and their potential applications for research projects.



CBR Biobank Accreditation

The CBR Biobank catalogues and stores valuable DNA, plasma, and serum samples pertaining to the flagship research projects. With the aim of establishing a robust Quality Management System (QMS) and enhancing the quality of both the biological materials and associated



data, an accreditation initiative was initiated in partnership with the Centre for Laboratory Accreditation (CLA), a subsidiary of the Quality Accreditation Institute (QAI), that confers ISO 20387 certification for biobanks. The accreditation process involved three phases: personnel training, submission of Standard Operating Procedures (SOPs) and related documents using a self-declared assessment tool, and an onsite inspection by

auditors. CBR Biobank staff (a team of 12 members, including 2 faculty members and 2 scientific officers) underwent rigorous training (online) from 15 to 17 June 2023. The training program, led by Prof. B.K. Rana (CEO, QAI), covered various topics such as the general and structural prerequisites of biobanks, with a special focus on data documentation, safety, confidentiality, impartiality, and different aspects of QMS according to ISO 20387 standards. The training concluded with an examination and successful procurement of certificates by all the attendees. The accreditation process is expected to strengthen the biobank's capacity and operations, foster the sharing of biospecimens and data with the research community, and thereby contribute to the advancement of scientific research.

Poster Symposium for CBR Interns



On 31 July 2023, CBR organised a poster symposium wherein research interns enthusiastically showcased their learnings and accomplishments at CBR.

The event was also attended by external experts (scientists and students from institutions like IISc, NIMHANS, InStem, JNCASR, and MAHE) who actively interacted with the interns and offered feedback on their posters. The attendees appreciated the motivation levels of the interns and their contributions to the ongoing research endeavours of CBR. Based on the recommendations of a panel of external experts, poster prizes were awarded.

Encouraged by the overwhelming response to the inaugural cycle (in 2023) of the CBR Research and Innovation (CBRAIN) internships, the 2024 edition of the program was launched in April 2024. Over



4800 enthusiastic applications from hundreds of institutions (research organisations, universities, medical colleges, public health institutes, etc.) across the country were received, and, following a thorough selection process, fellowships were awarded to 20 students. This 3-month internship program will provide young minds with rigorous training and preparation for engaging in cutting-edge, multidisciplinary research focused on normal and/or pathological brain aging.

EMSTAR (Extra-Mural Support for Transformational Aging Brain Research) Program

EMSTAR is an unprecedented extra-mural funding program instituted by the Pratiksha Trust and facilitated by CBR operating as the Secretariat. The objective of the program is to fund and monitor high-risk-high-reward research and innovation in brain aging and aging-related brain disorders. Principal Investigators based at not-for-profit research organisations in India (and co-investigators from not-for-profit research institutions anywhere in the world) are eligible to compete for funding (INR 5 Crores per grant over 5 years). In the first cycle, following an elaborate two-stage application process and rigorous international peer review, the Selection Committee recommended the award of Pratiksha Trust EMSTAR grants to 4 multidisciplinary teams seeking to address challenging research questions related to brain aging and neurodegenerative diseases.

CBR-FABRIC (Funding for Aging Brain Research and Innovation Collaborations)

CBR conceptualised and launched the FABRIC (Funding for Aging Brain Research and Innovation Collaborations) program to promote focused collaborations between CBR and other centres/ departments of IISc on challenging research questions aligned with CBR's mandate. The support is akin to a 'seed grant' intended to lead to a more ambitious project that demonstrates promise to attract support from external funding sources. For the inaugural cycle of the program, after a competitive selection process, 7 projects were approved for funding (up to INR 10 Lakhs per year for 2 years) by an expert committee. Each project has a CBR faculty member as the PI and a faculty member from another centre/department of IISc as the Co-PI. The program has fostered collaborations with faculty members from units such as the Centre for Neuroscience, Molecular Biophysics Unit, Department of Microbiology & Cell Biology, Department of Electrical Communication Engineering, and the Department of Computational and Data Sciences of IISc.

CBR Intra-Mural Support (CBRIMS) Program

To encourage its Scientific Officers and empower them towards research independence, CBR instituted the CBR Intra-Mural Support (CBRIMS) Program. Based on review and recommendations by an external expert committee, the program provides competitive research grants to Scientific Officers to support their pursuit of challenging research questions in areas strongly aligned with the CBR mandate. These seed grants (up to INR 5 Lakhs per grant over 1 year) are expected to set the stage for more ambitious externally funded proposals. In the inaugural cycle, four such grants were awarded.

CBR Distinguished Visitor Program



Philanthropist Ms. Nirmala Govindan Pullur graciously extended a generous sponsorship offer of INR 1 Crore to launch the CBR Distinguished Visitor Program. This initiative aims to host distinguished international experts in the field of aging brain research, facilitating the exchange of cutting-edge research and clinical insights, thereby fostering longstanding collaboration and innovation. The endowment will be to the tune of INR 20 Lakhs per

year to support two visits. Initially committed for a five-year period (April 2024 – March 2029), the program will undergo review for renewal thereafter.

Research Collaborations and Strategic Partnerships

Centre for Nano Science and Engineering (CeNSE), IISc

Keen to expand their interface with medical/biological research, and therefore, to collaborate with CBR, the Centre for Nano Science and Engineering (CeNSE), IISc hosted an interactive session for the faculty members on 08 May 2023. The event provided an opportunity for CBR and CeNSE faculty members to know more about each other's research interests and technical expertise. It has set the stage to effectively identify and pursue specific strands of research collaboration and cross-learning.

Centre for Neuroscience (CNS), IISc



CBR hosted a workshop on 15 May 2023 to explore synergistic collaborations with the Centre for Neuroscience (CNS), IISc. Faculty members from CBR and CNS engaged in focused discussion to identify themes of common interest and potential partnership avenues wherein complementary skills could be capitalised upon. It was agreed that

ongoing and future organically evolving collaborative projects involving the Centres could be nurtured through avenues such as joint PhD supervision and using opportunities like the CBR-FABRIC program as well as extramural sources of funding.

Centre for Biosystems Science and Engineering (BSSE), IISc



On 24 August 2023, CBR had the pleasure of hosting faculty members from the Centre for Biosystems Science and Engineering (BSSE), IISc. The meeting entailed presentations outlining the research interests and initiatives of the Centres and brainstorming to narrow down potential collaborative projects that could benefit

from the research interests and collective expertise of the Centres and strongly aligned with the mandate of CBR. The attendees concurred on the scope for exciting partnerships and expressed interest in delving into these areas through suitable enabling mechanisms.

Sudha Gopalakrishnan Brain Centre (SGBC), IIT Madras

Sudha Gopalakrishnan Brain Centre (SGBC), located on the IIT Madras campus and supported by Mr Kris Gopalakrishnan and Mrs Sudha Gopalakrishnan, spearheads a multidisciplinary mission-mode project to map the human brain at the cellular and connectivity levels, with a focus on



high-resolution brain imaging. CBR Director and Faculty Members were kindly hosted by SGBC on 26 April 2023. This visit enabled close interactions between the CBR and SGBC teams and provided a platform to explore focused scientific and technical partnerships. As a follow-up to this event, a team of researchers from SGBC visited CBR on 11 August 2023. They had a tour of the facilities and interacted with the faculty members. Potential topics of collaboration (involving aspects like vascular dementia, sex differences in AD pathology, early molecular events associated with AD, and brain imaging) identified earlier were discussed in greater detail. It is expected that the conversations will lead to innovative joint research proposals built on both the Centres' complementary infrastructure and collective expertise.

Jawaharlal Nehru Centre for Advanced Scientific Research

Led by Prof. Ravi Manjithaya, Chair of the Neuroscience Unit, a delegation of researchers from the Jawaharlal Nehru Centre for Advanced Scientific Research (JNCASR), Bengaluru, visited CBR on 10 January 2024. They engaged in focused discussions with the CBR faculty leading to the identification of potential channels and topics of collaboration particularly in the molecular neuroscience aspects of brain aging.



The University of Trans-Disciplinary Health Sciences and Technology

The University of Trans-Disciplinary Health Sciences and Technology (TDU), Bengaluru, expressed keenness to establish a research partnership with CBR. A delegation of scientists, led by Vice-

Chancellor Prof. Darshan Shankar, visited CBR on 19 December 2023 and gained a glimpse of the research initiatives and infrastructure. On 11 January 2024, TDU hosted a CBR delegation led by Director Prof. Hari and reaffirmed interest in contributing their expertise, particularly in Ayurveda biology, traditional knowledge informatics, and integrative health sciences, to bolster CBR's ongoing research efforts.

Announcement of the success of GenomelIndia

On 27 February 2024, Dr Jitendra Singh, Honourable Minister of State for the Ministry of Science and Technology, Government of India, announced the completion of whole genome sequencing of over 10,000 individuals from across India. This achievement marks a major milestone in the GenomelIndia initiative, which is funded by the Department of Biotechnology (DBT), Government of India, and led by CBR in collaboration with 20 premier research institutions. Dr Singh celebrated this accomplishment as a watershed moment for India, highlighting its potential to pave the way for genetics-based remedies and significantly enhance the country's public healthcare system. This milestone represents the first step towards integrating genetics into personalized medicine in India. It can revolutionise healthcare (for example, by enabling genetic diagnoses for patients with complex and rare disorders), empower clinicians and basic researchers, and lead to transformative precision interventions.



Earlier (on 18 and 19 October 2023), CBR hosted a successful meeting of the GenomelIndia consortium partners from across the country. The purpose of this meeting was to share detailed updates on the progress made by the various work packages of the consortium, to take stock of data generation and analyses, and to chalk out plans for the remainder of the project duration. It was attended by representatives from 15 out of the 20 partner institutions in the GenomelIndia consortium.



As the national coordinating centre, CBR also actively participated in the GenomeIndia Consortium Meeting held at CSIR-Centre for Cellular and Molecular Biology, Hyderabad, on 21 and 22 December 2023.

For more information about GenomeIndia, please visit <https://genomeindia.in/>

Collaboration with Wipro



In a significant breakthrough, on 20 March 2024, CBR and Wipro Ltd. signed a Memorandum of Understanding to establish a partnership in research and innovation. Under this MoU, Wipro will provide support to sponsor a research engagement for 3 years. These funds will be allocated to an AI/ML-intensive project involving a digital trial for a persuasion engine aimed at the improvement of cardiovascular functioning in

cognitively vulnerable older adults.

Collaboration with Dementia India Alliance

Dementia India Alliance, a non-profit organization focused on creating a dementia-inclusive society with a strong emphasis on family caregivers, initiated collaboration with CBR. CBR has been invited to participate as the 'research partner' in a national-level dementia conference scheduled for November 2024. The conference will gather researchers, medical practitioners, patients, caregivers, communication specialists, and other stakeholders. It will cover the latest research, advancements in medical care and support, outreach efforts, public engagement, policy considerations, and other aspects related to dementia.

Roundtable Discussion with Bavarian University Presidents

Director Prof. Hari was among the esteemed panelists invited to participate in a roundtable discussion with Bavarian University Presidents, jointly hosted by the Bengaluru Science and Technology Cluster and the Bavarian-Indian Centre for Business and University Cooperation on 28 March 2024. Distinguished representatives from leading Bavarian universities, alongside

eminent figures from various Indian academic institutions, industry, and incubators, convened for this significant gathering. The discussion centered around identifying strategic domains for fostering academic and research collaboration between India and Bavaria. There was palpable enthusiasm for research on the aging brain and associated disorders.



Outreach and Public Engagement

Reaching out to Bengaluru hospitals

With an urge to expand CBR's interface with the clinical/hospital ecosystem in Bengaluru, CBR organised a half-day event on 12 May 2023. This outreach event titled 'CBR Initiative for Collaborative Research



in Aging Brain' was attended by more than 30 reputed neurologists, neurosurgeons, neuro-physicians, and medical directors from leading hospitals such as NIMHANS, St. Johns, Apollo, Narayana Hospitals, M.S. Ramaiah Hospital, People Tree Maarga Hospital, and Shri Atal Bihari Vajpayee Medical College. Prof. Narahari (Director, CBR) introduced CBR's vision and initiatives and Prof. Navakanta Bhat (Dean, Division of Interdisciplinary Sciences, IISc) gave a presentation on the IISc Medical Sciences Program. CBR faculty members presented an overview of research and innovation activities and opportunities for collaboration. This was followed by a guided tour of CBR facilities. The attendees expressed overwhelming interest in exploring avenues for collaboration with CBR.

Expression of gratitude to CBR-TLSA Volunteers

On 7 July 2023, CBR hosted a special interactive session for volunteers of the Tata Longitudinal Study of Aging (CBR-TLSA). The in-person event was attended by over 230 study participants and their families. The CBR-TLSA team provided detailed updates on the progress of the study and the major outcomes thus far. Plans for the near and far future were outlined. An elaborate interactive session, moderated by Prof. Narahari, provided an opportunity for the attendees to share their expectations and feedback on their unique experiences as participants of CBR-TLSA. The session also enabled the discussion/clarification of specific queries regarding enrollment and assessments and general questions related to healthcare, dementia prevention and management, and caregiver support. Volunteers with longstanding involvement in the study were specially thanked and felicitated. On behalf of the funder, Ms. Daphne Vallado (Program Coordinator, Tata Trusts) affirmed continued support and commended the progress of the study and CBR's initiative to strengthen engagement with the volunteers.



Alzheimer's Awareness Event



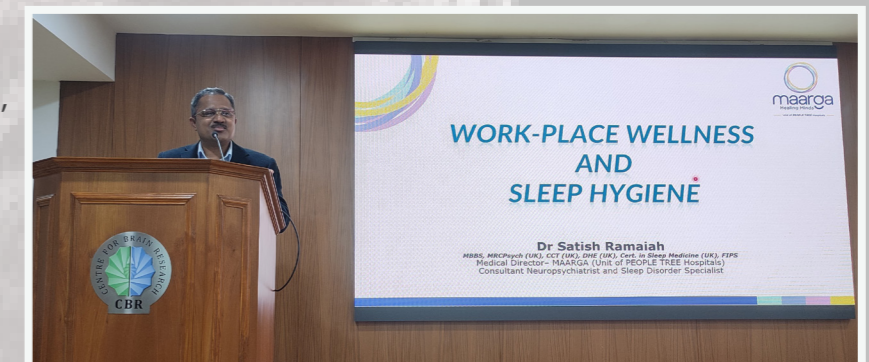
To commemorate World Alzheimer's Month, CBR organised an Awareness Meet on 27 September 2023. This session, attended by over 100 enthusiastic participants, included a brief Yoga session and an interaction with CBR-TLSA volunteers wherein updates on the longitudinal study were presented and feedback was sought. Col (Dr) MP Cariappa, Technical Advisor – Tata Education Trusts, gave insights on healthy aging, and Ms. Daphne Vallado, Program Officer – Tata Education

Trusts, offered words of felicitation. The event was further marked by the release of the first edition of the CBR-TLSA monthly newsletter and the inauguration (by Dr. Uma Nambiar, Advisor and Consultant – Bagchi-Parthasarathy Hospital, IISc campus) of an audiology facility that will enable detailed speech and audiological assessments as part of CBR's flagship cohort studies.



World Mental Health Day

On the occasion of World Mental Health Day (10 October), CBR facilitated a seminar on workplace wellness and sleep hygiene by Dr. Satish Ramaiah, an eminent psychiatrist and Medical Director at Maarga Mindcare Hospital, Bengaluru. This talk was open to the other centres and departments of IISc as well. It was followed by a well-received quiz (on neuroscience and brain health) put together by the CBR-TLSA team.



Launch of CBR-TLSA Intervention

As part of Phase II of CBR-TLSA, a multimodal intervention trial for the prevention of dementia was conceptualized. This drew inspiration from the initial findings of CBR-TLSA Phase I and the initial revelations from the CBR-SANSCOG cohort as well as from the landmark Finnish Geriatric Intervention Study to Prevent Cognitive Impairment and Disability (FINGER). The intervention will involve physical exercises, Yoga, cognitive retraining, dietary changes, control

of cardiovascular risk factors, and positive mental health practices like mindfulness activities. Subsequent to planning, resource procurement, and approval, the trial was rolled out on 15 November 2023 when the CBR-TLSA team interacted with the study participants, handed over participation kits, and laid out guidelines related to their involvement in the study. Prof. Narahari felicitated the participants and thanked them for their enthusiastic contributions.



Young Clinician Researchers Meeting

In order to attract bright clinicians to potential research positions, CBR organised a Young Clinician Researchers Meeting on 19 January 2024. This in-person meeting was attended by aspiring clinician-researchers and public health researchers from across the country, motivated to embark on a research journey at CBR. Director Prof. Hari and Former Director Prof. Narahari gave elaborate overviews of the initiatives and opportunities at CBR. Representative faculty members gave detailed presentations on the various research projects. Prof. Navakanta Bhat (Dean, Interdisciplinary Sciences Division, IISc) and Dr. Uma Nambiar offered a sneak peek into the IISc Medical School Foundation's vision for healthcare, training, research, and innovation and kindly interacted with the attendees. A guided tour of the facilities provided a firsthand look at CBR's infrastructure and research environment.



CBR representation at the India Science Fest

CBR was represented at the India Science Fest, a highly sought-after public engagement event organised by the Foundation for Advancing Science and Technology (FAST India) at the Indian Institute of Science Education and Research Pune (20-21 Jan 2024). In collaboration with the Tata Institute for Genetics and Society, India, the CBR team passionately curated an interactive booth and a hands-on workshop aimed at demystifying and spreading enthusiasm about genetics, genetic variations in humans, and the groundbreaking advancements in gene editing technologies.



CBR's showcase at the IISc Open Day

The IISc Open Day is an annual flagship event that provides an immersive dive into the world of cutting-edge research and innovation at the various departments and centres of the Indian Institute of Science. This event allows visitors to engage with groundbreaking projects, interact with leading scientists, and explore the institute's state-of-the-art facilities, igniting a passion for science and discovery. Over 5,500 members of the public, spanning various age groups, visited CBR on IISc Open Day (24 February 2024). CBR's showcase featured compelling poster presentations that highlighted ongoing research projects,





and a captivating display detailing the intricacies of the human brain. Additionally, there were neuroscience quiz contests, engaging demonstrations (including real-time brain activity detection using a headband EEG setup and cardiac autonomic function testing), and educational fun activities for children



and the elderly, making the experience enriching for attendees of all ages.

Monthly Newsletters of CBR-SANSCOG and CBR-TLSA

Spurred by the enthusiastic demands from the volunteers of CBR-SANSCOG and CBR-TLSA, for regular updates on the progress of the cohort studies, CBR launched two separate informative bilingual monthly newsletters ಬೆಂಗಳೂರು Brainwaves (CBR-TLSA Newsletter) and ಚೇತನ ತರಂಗ (CBR-SANSCOG Newsletter).

Other Events

An Evening of Stories

CBR organised an event titled 'Evening of Stories' on 21st July 2023 to host a book talk by Ms. Nandita Jayaraj, journalist and co-author of 'Lab Hopping: A Journey to Find India's Women in Science'. She provided an overview of her motivation to co-author the book and her experience interviewing multiple stakeholders to gauge the issue of gender gap in the Indian academic research ecosystem and other hurdles faced by women scientists. The talk was followed by a panel discussion (moderated by Dr. Shweta Ramdas, Assistant Professor, CBR) with Prof.



Bhavana Kanukurthi (Department of Computer Science and Automation, IISc), Prof. Hiya Ghosh (National Centre for Biological Sciences), and Dr. Reshma SV (PES University). The panelists shared their stories of persistence and gave tips on what it takes to build a successful career in academia in India. The talk and panel discussion were well-received by not only the CBR fraternity but also young scientists from various departments and centres of IISc. Prior to this session, CBR students had the opportunity to interact

online with Ms. Aashima Dogra, co-author of the said book.

Felicitation for Prof. H. P. Khincha

On 23 November 2023, CBR organised a felicitation ceremony to honour Prof. H. P. Khincha and express gratitude for his phenomenal contributions as the Chair of the CBR Building Construction Committee (2017-22) and an esteemed Member of the CBR Governing Board (2016-23). Dr. Kris Gopalakrishnan joined the meeting virtually and thanked Prof. Khincha for his indomitable support in various capacities over the years.



Thanksgiving to Prof. Narahari



On 5 January 2024, CBR organised a thanksgiving event to celebrate the visionary and empathetic leadership of Prof. Narahari and to express gratitude for his inspiring contributions since June 2022. The Director, faculty, and staff members fondly recalled the warm support extended by Prof. Narahari and sought his continued guidance in CBR's endeavours. Prof. Narahari acknowledged the cooperation of all stakeholders of the CBR community and wished Prof. Hari astounding success in his long innings ahead as Director.

Women's Day

In honour of International Women's Day, on 7 March 2024, CBR orchestrated a thought-provoking open forum led by faculty members, postdoctoral researchers, and students. Delving into the profound challenges encountered by women researchers, the event passionately explored strategies to dismantle gender disparities within academia and its allied domains. This empowering exchange of opinions and ideas also underscored CBR's unwavering commitment to inclusivity and diversity in the pursuit of scientific excellence.



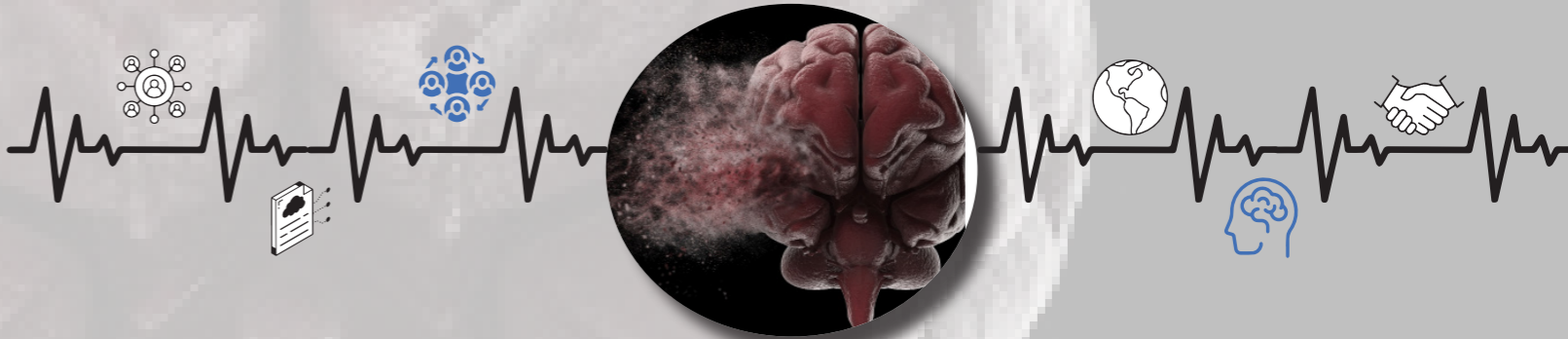
Distinguished Visitors to CBR

CBR had the pleasure and privilege of hosting and engaging with numerous esteemed researchers, academicians, clinicians, industrialists, and administrators. The list included the following dignitaries.

- Prof. Siddhartha P. Sarma, Molecular Biophysics Unit, IISc
- Dr. Debasish Kumar Ghosh, Department of Medical Genetics, KMC Manipal
- Dr. Uma Nambiar, Consultant, Bagchi Parthasarthy Hospital & IISc Medical School
- Dr. Usha Narayan, Global Commercial Strategy, Merck Life Science
- University of Cote d'Azur President's delegation
- Prof. Vyjeyanthi Periyakoil, Founding Director, Stanford Aging, Geriatrics and Ethnogeriatrics Transdisciplinary Collaborative Research Center, Stanford University
- Prof. LS Shashidhara, Director, National Centre for Biological Sciences
- Delegates from Vayah Vikas, a not-for-profit organisation working for the well-being of senior citizens
- Prof. Gilles Mithieux, Director, Centre National de la Recherche Scientifique, Lyon
- Dr. H Paramesh, Visiting Professor, Divecha Centre for Climate Change, IISc
- Delegates from EDM2023, the 16th International Conference on Educational Data Mining organised in IISc
- Prof. Sathees C. Raghavan, Department of Biochemistry, Chair – Central Animal Facility, IISc
- Prof. V John Mathews, College of Engineering, Oregon State University
- Prof. Shubha Tole, Department of Biological Sciences, Tata Institute of Fundamental Research, Mumbai
- Delegation from the University of Copenhagen led by Prof. Henrik Wegener (Rector) and Prof. David Dreyer Lassen (Prorector)
- Prof. Bhisadev Chakrabarti, School of Psychology and Clinical Language Sciences, University of Reading
- Delegation from the Washington University in St. Louis led by Prof. Vijay Ramani (Vice-provost for Graduate Programs and International Affairs) and Prof. Shantanu Chakrabarty (Vice-Dean for Research and Graduate Studies)
- Prof. Yogesh Shouche and team, SKAN Research Trust, Bengaluru
- Prof. Maneesh Sahani, Gatsby Computational Neuroscience Unit, University College London and Smt. Sudha Murty Chair Professor, IISc
- Delegation from Sri Sri Institute for Advanced Research, Bengaluru, led by its Executive Director Dr. Divya Kanchibhotla
- Prof. Sunil Sharma, Translational Genomics Research Institute (TGen) and City of Hope Comprehensive Cancer Center

- A team of clinical researchers and basic scientists from Sree Chitra Tirunal Institute for Medical Sciences and Technology (SCTIMST), Thiruvananthapuram, led by Dr. George C Vilanilam`
- Prof. Pankaj Sah, Director, Queensland Brain Institute [QBI], The University of Queensland, Australia
- A delegation of students of an interdisciplinary course on entrepreneurship and innovation at IIT Madras, Chennai, guided by Prof. Thalappil Pradeep, Department of Chemistry, IIT Madras.
- A delegation led by Prof. Geraint Rees, Vice Provost - Research, Innovation & Global Engagement, University College London
- Prof. George Davey Smith, University of Bristol
- Prof. Caroline Relton, London School of Hygiene and Tropical Medicine
- Prof. Sanjay Kinra, London School of Hygiene and Tropical Medicine
- Mr. Ajaneesh Kumar, Ambassador of India to the Republic of Estonia
- Prof. Arogyaswami Paulraj, Professor Emeritus, Department of Electrical Engineering, Stanford University
- A delegation led by Prof. Ushiki Tatsuo, President, Niigata University
- A delegation led by Prof. Darshan Shankar, Vice-Chancellor, The University of Trans-Disciplinary Health Sciences and Technology, Bengaluru
- Prof. Nigam Shah, Professor of Medicine and Associate Dean for Research, Stanford School of Medicine
- Prof. Pitchaiah Mandava, Head of Neurology, Baylor College of Medicine
- Mr. T. V. G. Krishnamurthy, Trustee, Ola Foundation
- Ms. Heather Rice, Director of Research, Rotherham Doncaster & South Humber NHS Foundation Trust, UK
- Prof. George Brody, President and Director, IISc Foundation
- Prof. B. S. Manjunath, Distinguished Professor and Chair, Electrical & Computer Engineering, University of California Santa Barbara
- Prof. Nambi Seshadri, University of California San Diego
- Dr. Nagendran Ramalingam, Ann Romney Center for Neurologic Diseases, Brigham and Women's Hospital, USA
- Dr. John Jumper, Google DeepMind (facilitated by TNQ Technologies)
- Padma Vibhushan Dr. Vasudev K Aatre, former Head of the Defence Research and Development Organisation (DRDO)
- International delegates from the Ministry of External Affairs' Indian Technical and Economic Cooperation (MEA-ITEC) program on 'Science, Technology, and Innovation Policy' (STIP)
- Prof. Jack Feldman, University of California Los Angeles
- Ms. Nirmala Govindan Pullur
- Prof. Margaret C McDonald, University of Pittsburgh

- Prof. CB Sanjeevi, Karolinska Institute
- Teams from Siemens, GE Healthcare, and Athera Ventures
- Team of collaborators from the Asian Bipolar Genetics Network (ABIGNET) - Prof. Steven E Hyman (Chair, CBR International Advisory Board), Prof. Peter Zandi, Prof. Hailiang Huang
- Dr. Radha S Murthy, Dementia India Alliance
- Dr. Raja Suresh, Arizona State University Research Enterprise (ASURE)
- Dr. Rudra Pratap, Plaksha University
- Prof. Vikram M Gadre, Indian Institute of Technology Bombay
- Dr. Harish Mysore, IEEE India Operations



Finance

Finance

(In Lakhs)

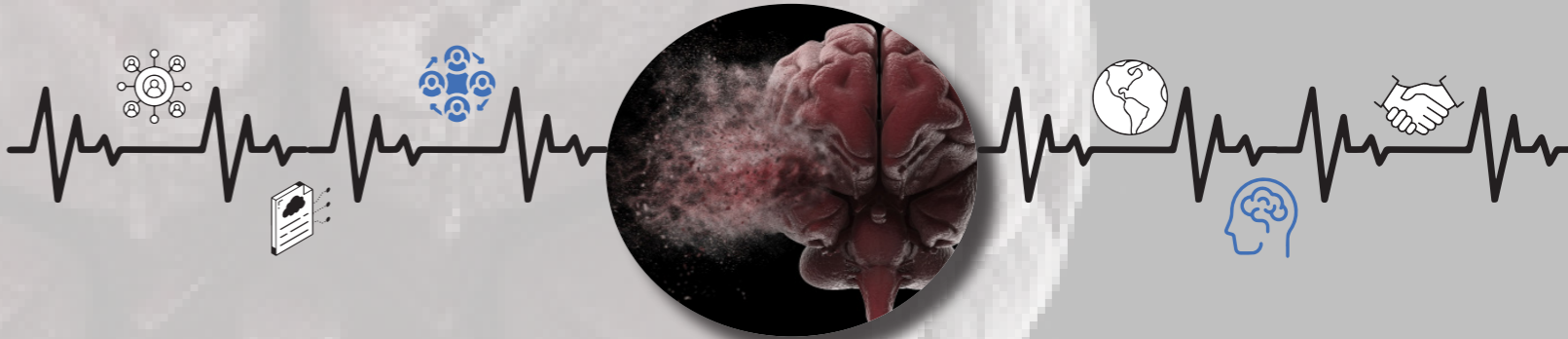
Details of Receipts and Payments for the financial year 2023-24 are as follows.

(In Lakhs)			
Sl. No.	Particulars	Receipts	Payments
1	Donations from Pratiksha Trust towards Activities Account	4002.00	3171.45*
2	Other Receipts	109.74	0.00
3	Funds from External Agencies	2341.45	2848.92
Total		6453.19	6020.37

Funds Received from External Agencies during 2023-24					
Project	Funding Agency/ PI	Total Amount Sanctioned	Funds Received during 2022-23		
			For Existing Projects	For New Projects	Total Funds Received
GenomeIndia	Department of Biotechnology (Prof. Bratati Kahali)	5652.00	1648.63	0.00	1648.63
INSACOG Project Phase I & Phase II	Department of Biotechnology (Prof. Bratati Kahali)	226.23	3.63	0.00	3.63
Research in Alzheimer's disease (AD) – Understanding Mechanisms for Early Diagnosis and Treatment	Tata Education Trust (Prof. Thomas Gregor Issac)	3713.20	400.00	0.00	400.00
Student Fellowships (INSPIRE, DBT JRF)	Department of Science & Technology, Department of Biotechnology	25.18	25.18	0.00	25.18
Software AG Autonomic Nervous System Lab (SANSLab) & Software AG Community Outreach Program for Elderly (SCOPE)	Software AG (Dr Jonas Sundarakumar)	290.00	70.00	0.00	70.00

Cell and Molecular Mechanisms of Noninvasive Brain Stimulation (Intermediate Fellowship in Basic Biomedical Research)	DBT/Wellcome Trust India Alliance (Dr Chinnakkaruppan Adaikkan)	358.89	91.75	0.00	91.75
International Travel Scheme (ITS) Grant	Science and Engineering Research Board (Dr Jonas Sundarakumar)	1.61	0.00	1.61	1.61
Brain-Computer Interface to Modulate Neural Activity in Neurodegenerative Diseases (Early Career Fellowship in Basic Biomedical Research)	DBT/Wellcome Trust India Alliance (Dr Justin Joseph)	168.62	0.00	8.58	8.58
Investigating the genetic underpinnings and causal role of adiposity-related metabolic disorders upon cognitive scores in Indian population studies for gaining insights into dementia (Intermediate Fellowship in Basic Biomedical Research)	DBT/Wellcome Trust India Alliance (Prof. Bratati Kahali)	367.74	0.00	23.83	23.83

Role of glypican-4 in APOE4-mediated neurodegeneration (Alzheimer's Association Research Grant-Diversity)	Alzheimer's Association (Dr Sivaprakasam Ramamoorthy)	165.26	0.00	53.97	53.97
Effects of transcranial electrical stimulation on neuromodulators (Young Investigator Grant)	Brain & Behavior Research Foundation (Dr Chinnakkaruppan Adaikkan)	57.36	0.00	14.27	14.27
Total		11026.09	2239.19	102.26	2341.45



Governance Structure, Faculty,
and Staff at CBR

Governance Structure, Faculty and Staff at CBR

CBR Society

Centre for Brain Research (CBR) is a registered society under the Karnataka Societies Act 1960. The Society has very eminent persons from different fields as its members. The members of the Society, as of March 31, 2024, are the following.

Prof. G Rangarajan, Director, IISc (**Ex officio**) [Chair]
Chair, Governing Council, IISc, (**Ex officio**)
Chief Secretary to Government of Karnataka (**Ex Officio**)
Additional Chief Secretary to Government of Karnataka (**Ex Officio**)
Principal Secretary (Finance) Government of Karnataka (**Ex Officio**)
Secretary, Dept. of IT & BT, Government of Karnataka (**Ex Officio**)
Shri. Kris Gopalakrishnan, Co-Founder, Infosys
Mrs. Sudha Gopalakrishnan
Shri. Dinesh Krishnaswamy, Co-Founder, Infosys
Shri. S D Shibulal, Co-Founder, Infosys
Prof. Y Narahari, Dept. of Computer Science and Automation, IISc
Prof. Navakanta Bhat, Dean, Division of Interdisciplinary Sciences, IISc
Prof. Vijayalakshmi Ravindranath, Founder Director, CBR
Prof. D N Rao, Dept. of Biochemistry, IISc
Prof. Usha Vijayraghavan, Dean, Division of Biological Sciences, IISc
Prof. P S Anil Kumar, Dean, Administration & Finance, IISc
Prof. G Mugesh, Dean, Division of Chemical Sciences, IISc
Prof. H P Khincha, Dept. of Electrical Engg. (Retd), IISc
Dr. Ramesh Babu
Dr. Girija Ramesh Babu
Prof. Anurag Kumar, Dept. of Electrical Communication Engg., IISc
Prof. N Balakrishnan, Supercomputer Education and Research Centre, IISc
Dr. P Satish Chandra
Prof. P Kondaiah, Dept. of MRDG, IISc
Prof. Satyajit Mayor, NCBS, Bangalore

Mrs. Sudha Murty, Hon'ble Member of Parliament, Rajya Sabha
Dr. U B Muthane
Prof. G Padmanabhan, Emeritus Professor, Dept. of Biochemistry, IISc
Mr. S V Ranganath
Dr. M S Valiathan
Justice M N Venkatachaliah
Mr. Ashok Soota
Prof. K V S Hari, Director, CBR

Governing Board

The affairs of the CBR are administrated, directed, and controlled by the Governing Board. The Governing Board of the Society shall consist of the following members.

1. Chair, who shall be ex-officio, Director, IISc
2. Four Members of the Society as may be nominated by Pratiksha Trust.
3. Five Members of the Society as may be nominated by the Council of IISc
4. Member Secretary shall be the Director of Centre for Brain Research

The composition of the Governing Board, as of March 31, 2024, is as follows:

Prof. G Rangarajan, Director, IISc (**Ex officio**) [Chair]
Shri. Kris Gopalakrishnan, Co-Founder, Infosys
Shri. Dinesh Krishnaswamy, Co-Founder, Infosys
Shri. S D Shibulal, Co-Founder, Infosys
Mrs. Sudha Gopalakrishnan
Prof. Y Narahari, Dept of CSA, IISc [Member Secretary till December 2023]
Prof. Navakanta Bhat, Dean, Division of Interdisciplinary Sciences, IISc
Prof. Usha Vijayraghavan, Dean, Division of Biological Sciences, IISc
Prof. P S Anil Kumar, Dean, Administration & Finance, IISc
Prof. G Mugesh, Dean, Division of Chemical Sciences, IISc
Prof. K V S Hari, Director, CBR [Member Secretary since January 2024]

International Scientific Advisory Board

An International Advisory Board, constituted by the Governing Board and consisting of international as well as national experts, advises CBR. The Board meets biannually. The International Advisory Board consists of the following members:

Prof. Steven E Hyman, Broad Institute of Harvard and MIT [Chair]
Prof. John Morris, Washington University
Prof. Maria Corrillo, Chief Science Officer, Alzheimer's Association
Prof. Stanley Fahn, Columbia University
Prof. Sudha Seshadri, UT Health Science Center at San Antonio
Prof. Carla Shatz, Stanford University
Prof. Mary Ganguli, University of Pittsburgh
Prof. Srinath Reddy, PHFI, New Delhi
Prof. B N Gangadhar, NIMHANS, Bangalore
Prof. Bart D Strooper, Director, UK Dementia Research Institute
Prof. Stacie Weninger, President of FBRI, USA
Prof. Vasant Honavar, Penn State University
Prof. K V S Hari, Director, CBR

Scientific Advisory Committee

The Scientific Advisory Committee (SAC) of the Centre for Brain Research monitors and guides the scientific activities of the Centre. The members, as of March 31, 2024, are:

Prof. Srinath Reddy (PHFI, New Delhi) [Chair]
Prof. Ramesh Hariharan (CEO, Strand Genomics, Bangalore)
Prof. Ravindra M Pandey (AIIMS, New Delhi)
Prof. Anurag Agrawal (IGIB, New Delhi)
Prof. K Thangaraj (CDFD, Hyderabad)
Prof. S Ganesh (IIT, Kanpur)
Prof. Pratima Murthy (NIMHANS, Bangalore)
Prof. K V S Hari (Director, CBR)

Finance Committee

CBR has a Finance Committee which meets every three months to review the financial positions

of the Centre and make recommendations to the Governing Board from time to time. The members of the Finance Committee, as of March 31, 2024, are:

Prof. G Rangarajan [Chair]
Prof. K V S Hari, Director, CBR
Mr. K C Ganesh, Pratiksha Trust
Prof. P S Anil Kumar, Dean, Administration & Finance, IISc
Prof. B Gurumoorthy, Director, FSID, IISc
Mr. T S Vishwanath, Manager (Admin), CBR [Secretary]

Ethics Committee

An Ethics Committee has been constituted by the Governing Board, as mandated by the National Ethical Guidelines for Biomedical and Health Research involving human participants, Indian Council of Medical Research (ICMR) Govt. of India.

Dr. Chandramouli, B.A, Apollo Hospital, Bangalore [Chair]
Dr. Kiran Khanapure, Vikram Hospital, Bangalore
Prof. Girish Baburao Kulkarni, NIMHANS Bangalore
Adv. Arvind Moorchung, Sr Consultant
Prof. Anitha Kurup, NIAS Bangalore
Mr. Alaganandan Balaraman
Prof. Raghavan Varadarajan, Dept. of MBU, IISc
Prof. Dipshikha Chakravorty, Dept. of MCBL, IISc
Dr. Debasree Dutta, RGCB, Thiruvananthapuram
Prof. Pankaj Seth, NBRC, Haryana
Prof. Thomas Gregor Issac, Associate Professor, CBR
Dr. Latha Diwakar, Senior Scientific Officer, CBR [Member Secretary]

Institutional Biosafety Committee

Prof. K N Balaji, Dept. of MCBL, IISc [Chair]
Prof. Anita Mahadevan, NIMHANS, Bangalore [DBT Nominee]
Dr. Albert Stezin Sunny, Scientific Officer, CBR [Biosafety Officer]
Prof. Ravi Manjithaya, JNCASR, Bangalore [External Expert]
Prof. Ravi Muddashetty, Associate Professor, CBR

Prof. Bratati Kahali, Associate Professor, CBR
Dr. Latha Diwakar, Senior Scientific Officer, CBR
Dr. Khader Valli Rupanagudi, Scientific Officer, CBR
Dr. Smitha Karunakaran, Assistant Professor, CBR [Member Secretary]

Internal Committee against Sexual Harassment

Prof. Bratati Kahali, Associate Professor, CBR [Chair]
Dr. Latha Diwakar, Senior Scientific Officer, CBR
Dr. Khader Valli Rupanagudi, Scientific Officer, CBR
Ms. Pragati Shukla, Advocate
Mr. P Manivannan, Finance Officer, CBR

Faculty and Staff at CBR

Academic Staff

Prof. K V S Hari, Director
Prof. Bratati Kahali, Associate Professor
Prof. Ravi Muddashetty, Associate Professor
Prof. Thomas Gregor Issac, Associate Professor
Prof. Neelam Sinha, Associate Professor
Dr. Smitha Karunakaran, Assistant Professor
Dr. Jonas Sundarakumar, Assistant Professor
Dr. Chinnaakkaruppan Adaikkan, Assistant Professor
Dr. Sivaprakasam Ramamoorthy, Assistant Professor
Dr. Shweta Ramdas, Assistant Professor
Dr. Latha Diwakar, Senior Scientific Officer
Dr. Kommaddi Reddy Peera, Senior Scientific Officer

Adjunct Faculty

Prof. Govindan Rangarajan, Dept. of Mathematics, IISc
Prof. Y Narahari, Dept. of Computer Science and Automation, IISc
Prof. HP Khincha, Professor (Retd.), Dept. of Electrical Engineering, IISc

Prof. Arun Kumar, Dept. of Molecular Reproduction Development and Genetics, IISc
Prof. Sridharan Devarajan, Centre for Neuroscience, IISc

Visiting Faculty

Dr. Sanjaya Viswamitra, Sri Sathya Sai Institute of Higher Medical Sciences, Bangalore
Prof. Senthil Kumaran, AIIMS, New Delhi
Prof. Rajesh P. N. Rao, University of Washington, Seattle, USA
Prof. Madhav Thambisetty, National Institute on Aging, NIH, USA
Prof. Vijay Chandru, Co-founder of Strand Life Sciences and Picopeta Simputers Limited, Bangalore

Senior Research Advisor


Prof. Vyjeyanthi Periyakoil, Stanford University School of Medicine, USA

Scientific Staff

Dr. Khader Valli Rupanagudi, Scientific Officer Grade I
Dr. Albert Stezin Sunny, Scientific Officer Grade I
Dr. Deepashri Agrawal, Scientific Officer Grade I
Dr. Shobha Anilkumar, Scientific Officer Grade II
Dr. Shafeeq K Shahul Hameed, Scientific Officer Grade II
Dr. Prathima Arvind, Scientific Officer Grade II
Dr. Madhankumar Anandhkrishnan, Grants Manager

Research Staff

Dr. Abhishek M L, Research Psychiatrist
Dr. Divya N M, Medical Officer
Dr. Shobith P, Medical Officer
Dr. Gnanavathi Reddy Jangam Chandra, Medical Officer
Dr. Ajith Partha, Medical Officer
Dr. Amitha C M, Medical Officer
Dr. Harshitha S, Medical Officer
Dr. Akash B R, Medical Officer
Dr. Jaweriya Tarannum, Medical Officer
Dr. Pooja Rai, Project Scientist I



Dr. Palash Kumar Malo, Research Associate
Dr. Justin Joseph, Post-doctoral Fellow
Dr. Sadhana Singh, Research Scientist
Dr. Camellia Sarkar, Post-doctoral Fellow
Dr. Debanjali Bhattacharya, Research Associate
Dr. Devanand T, Post-doctoral Fellow
Dr. Ramya Burra, Post-doctoral Fellow
Dr. Trisha Chattopadhyay, Post-doctoral Fellow
Dr. Pradeep Kumar G, Post-doctoral Fellow
Dr. Shreesha S Rao, Veterinarian
Ms. Banashree Mondal, Project Scientist
Mr. Raveendra Vukkala, Field Assistant
Mr. Hariprasath Ragupathy, Junior Research Intern
Ms. Rajitha Narayanasamy, Research Fellow
Ms. Meghana R, Research Fellow
Ms. Meenakshi Menon, Research Fellow
Ms. Amrita Mondal, Research Fellow
Ms. Ankita Talukdar, Research Fellow
Ms. Vindhya Vishwanath, Research Fellow
Ms. P S Vaghdevi, Research Fellow
Ms. Aishwarya Ghosh, Research Assistant
Ms. Monisha S, Research Assistant
Mr. Birendra Kumar, Research Assistant
Ms. Arshiya Siddiqha, Research Assistant
Mr. Manish Jayswal, Project Associate II
Mr. Vamshi Krishna Kancharla, Sr Project Associate
Mr. Anand Kumarasamy, Sr Project Associate
Mr. Raghavendra Agrawal, Data Analyst
Ms. Rupanwita Majumder, Data Analyst
Mr. Sohan Angelo A, Data Analyst
Ms. Debasrija Mondal, Project Assistant
Mr. Eric Macwan, Project Assistant
Ms. Anjana Menon, Project Associate I
Ms. Hiba Ali, Project Associate I
Ms. Sakshi Arora, Research Assistant
Mr. Hitesh Pradhan, Research Assistant
Ms. Angeline Jessy, Research Assistant
Ms. Sneha Noble, Research Assistant

Ph.D. Students

Ms. Krithika S
Ms. Haseena P A
Ms. Bindushree K R
Ms. Srishti Kushwaha
Ms. Shreya Chakraborty
Ms. Mayank
Ms. Nimisha B
Ms. Nisa Manzoor Shah
Ms. Rupsa Roy Choudhury
Mr. Anant Gupta
Ms. Harsha Bhardwaj
Ms. Jani Sidhi Pushkarbhai
Mr. Mohammed Waseequr Rahman
Ms. Preeti Sharma
Ms. Priya Chatterjee
Ms. Sandhya G
Ms. Shruti Pandey
Mr. Syed Wasifa Qadri
Mr. Aniket Das
Ms. Dwaiti Roy
Ms. Manasvi Chopra
Mr. Rajath D
Mr. Tanmay Panigrahi
Dr. Sumedha Mitra
Mr. Sauma Suvra Majumdar

Technical Staff

Mr. Jothibas V, Information System Manager
Mr. Mohammed Hanif Kaba Mujawar, Senior Technical Assistant
Mr. Karthik S, Technical Assistant
Mr. Sangeethkumar Saminathan, Technical Assistant
Mr. Anand Kumar E, Technical Assistant
Mr. Vinayak Hosawad, Technical Assistant
Mr. Victor Arul Raj, Technical Assistant
Ms. Swathi R, Technical Assistant
Mr. Divakar A, Lab Technician
Mr. Anees N K, Technician
Ms. Rakshitha K N, Radiography Technician
Mr. Rakesh Kh, Lab Technician
Mr. Goutham V, Lab Assistant
Mr. Mohana C, Lab Assistant
Mr. Rajesh G, Lab Assistant
Ms. Pavithra D P, Lab Assistant
Ms. Rupanagudi Sunitha, Lab Assistant
Ms. Rehab Hussain, Lab Assistant

Field Staff

Ms. Maina T S, Office Supervisor
Mr. Rajakumar K M, Psychologist
Ms. Savitha B P, Psychologist
Mr. Naresh G, Psychologist
Mr. Thenash R, Psychologist
Ms. Vijaya K, Psychologist
Mr. Rajesh, Field Supervisor
Mr. Harikrishna G, Field Data Collector
Mr. Yashwanthkumar K, Field Data Collector
Mr. Shashikumar, Field Data Collector
Mr. Shivaraj S, Field Data Collector
Mr. Gangaraja V, Field Data Collector
Mr. Madhuresha, Field Data Collector
Mr. Nagesha C, Field Data Collector
Mr. Shankarappa N, Field Data Collector

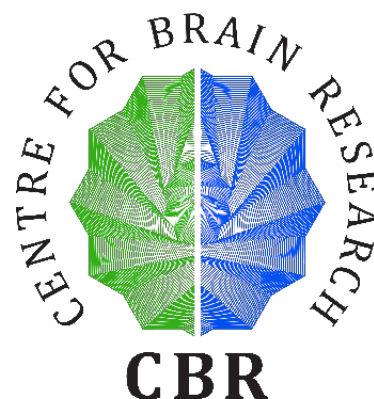
Mr. Venkataramana K V, Field Data Collector
Ms. Chaithra B K, Field Data Collector
Ms. Veena P N, Field Data Collector
Ms. Veena R, Field Data Collector
Ms. Sunitha H S, Nurse
Ms. Shyalashree Deepak, Nurse
Ms. Swathishree A N, Nurse
Ms. Nethravathi, Nurse
Ms. Pavithra K V, Nurse
Ms. Gayathri P S, Nurse
Ms. Chaithra N, Nurse
Ms. Sushma C V, Nurse
Ms. Vedhavathi H S, Nurse
Ms. Poornima K T, Nurse
Ms. Sujatha S N, Nurse
Ms. Gayethamma, Nurse
Ms. Leelavathi, Nurse
Ms. Varalakshmi, Nurse

Administrative Staff

Mr. T S Vishwanath, Manager (Admin)
Mr. Manivannan P, Finance Officer
Ms. Aruna Poojary, Senior Executive Assistant
Ms. Sudha Srikanth, Senior Executive Assistant
Ms. Sudha Rani P, Senior Executive Assistant
Mr. Ravikumar K L, Executive Assistant
Mr. Rahul Dev, Executive Assistant
Ms. Triveni, Executive Assistant
Mr. M R Chandrashekar, Security Advisor
Mr. Krishna R, Horticulture



The CBR fraternity at the aging brain research showcase hosted on IISc Open Day, 24 Feb 2024



CONTACT US



CBR Office
Centre for Brain Research
Indian Institute of Science Campus
CV Raman Avenue
Bangalore 560012. India.



+91 80 2293 3588

Fax: +91 80 2360 7766



office@cbr-iisc.ac.in

cbr-iisc.ac.in