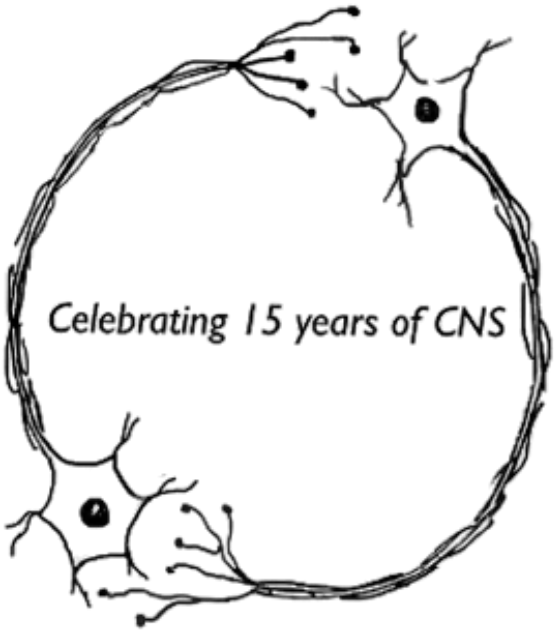
भारतीय विज्ञान संस्थान

CENTRE FOR NEUROSCIENCE

CNS ANNUAL SYMPOSIUM 2024



Centre for Neuroscience,

Indian Institute of Science

CNS Symposium, 31st August 2024, Saturday

Venue: CNS Seminar Hall

Event schedule

Teams link for the symposium:

Join the meeting now

Meeting ID: 416 581 006 587
Passcode: Khcng9

Pre-symposium inaugural lecture on 30/08/2024, 04:00 pm

Speaker: Dr. Suman Nag, Co-founder and Director of research – Kainomyx

Title: Cytoskeleton-based Therapeutics for Mankind and Beyond:
From Hypertrophic Cardiomyopathy to Malaria and a Journey of Entrepreneurship.

Schedule for 31st August, 2024

Time	*Event*	*Speaker*	*Lab/Organization*	*Talk Title*
08:00 am	**Tea/Coffee**			
08: 30 am	Welcome address	Prof. S. P. Arun	CNS	
08:45-09:00 am	Talk1	Priyanka Gupta	Sridharan Lab	A surprising lack of presaccadic benefits during visual change detection
09:00-09:15 am	Talk2	Srishty Aggarwal	Supratim Lab	Neural noise: Changes in brain signals due to aging and meditation
09:15-09:30 am	Talk3	Sukalyan Deb	Sreekanth Lab	Reward driven proactive control of emotional conflict
09:30-09:45 am	Talk4	Niloy Maity	Supratim Lab	Studying the effect of electrical stimulation on gamma rhythm in visual cortex
10:00-11:00 am	**Keynote address**	**Prof. Suvarna Alladi**	**NIMHANS**	**Paradigm shift in diagnosis of dementia in context of diversity**
11:00-11:15 am	Talk5	Sini Simon	Arun Lab	Position tuning in single neurons of monkey inferior temporal cortex
11:15-11:30 am	Talk6	Jagat Narayan Prajapati	Arnab Lab	Role of Lateral hypothalamus in stress modulation of itch
11:30-11:45 am	Talk7	Monmita Bhar	Kavita Lab	Eavesdropping on worm conversations- transfer of memory from one *Caenorhabditis elegans* to another and investigating its underlying molecular mechanisms
11:45am-12:00 pm	Talk8	Mahatabb Nundy	Adi Lab	Inferring the role of basal ganglia circuits and dopamine in the initiation, execution and control of movements in Parkinson's Disease
12:00-01:00 pm	**Poster session**			
01:15-01:45 pm	**Lunch**			
02:00-03:00 pm	**Poster session**			
03:15-03:30 pm	Talk9	Shubhankar Saha	Arun Lab	High-level sensory and motor regions encode object mass after real-world object interactions
03:30 -03:45pm	Talk10	Aishwarya Ahuja	Kavita Lab	Characterizing the role of claudins in C. elegans neurons
03:45-04:15 pm	**Tea & CNS group photo session**			
04:15-04:30 pm	Talk11	Aritra Dutta	Balaji Lab	When does our brain integrate the memories?
04:30-04:45 pm	Talk12	Navneet Shahi	Kavita Lab	Is unity always a strength?- Insights into the neuronal circuit underlying collective feeding behaviour
05:00-06:00 pm	**Panel Discussion**	**Moderator: Prof. S. P. Arun**	**CNS**	**Neuroscience Research: Past, Present and Future** **Panel members:** - **Prof. L.S. Shashidhara, Director – NCBS** - **Prof. Suvarna Alladi, Head, Department of Neurology, NIMHANS** - **Prof. Aditya Murthy, Movement Control Lab, CNS, IISc** - **Dr. Swami Subramaniam, CEO- Ignite Life Science Foundation** - **Dr. Suman Nag, Co-founder and Director of research – Kainomyx**
06:00 pm	Vote of thanks, closing remarks	Dr. Deepak Nair	CNS	
HIGH TEA				

Keynote Address

Paradigm Shift in the Diagnosis of Alzheimer's Disease and Related Dementia in the context of Diversity

Prof. Suvarna Alladi, Professor and Head, Department of Neurology, National Institute of Mental Health and Neurosciences (NIMHANS), Bengaluru, Karnataka

Alzheimer's Disease and Related Dementias (ADRD) represent a group of neurological disorders characterized by a progressive decline in cognitive functions, affecting memory, language, executive function, complex attention, perceptual-motor skills, and social cognition. With the global incidence of dementia on the rise, recent research has significantly enhanced our understanding of the underlying neurobiological mechanisms, clinical manifestations, prognosis, and potential treatments for these complex disorders. These advancements have catalyzed a paradigm shift in the methods used for diagnosing ADRD, moving toward more sophisticated approaches. There is increasing awareness of the critical need to consider global diversity in diagnosing and developing treatments for dementia to ensure that these are accurate and effective across different populations. This presentation will explore the challenges and opportunities associated with diagnosing dementia in diverse populations, particularly those with varying languages and literacy levels. I will introduce a proposal for a novel framework for harmonizing dementia research across diverse groups, acknowledging the genetic and pathological heterogeneity inherent in neurodegenerative dementias. The shift from traditional clinical diagnostic methods to biomarker-based approaches will also be examined, underscoring its importance for the development and implementation of innovative disease-modifying therapies for ADRD. Furthermore, the presentation will highlight state-of-the-art multidisciplinary interventions that are being actively researched and employed in the field, aiming to provide a comprehensive overview of the current landscape and future directions in dementia care and research.

Oral Presentations

A Surprising Lack of Presaccadic Benefits During Visual Change Detection

Priyanka Gupta[1] and Sridharan Devarajan[1]

[1] Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

Abstract:

Planning a rapid eye movement (saccade) changes how we perceive our visual world. Even before we move the eyes visual discrimination sensitivity improves at the impending target of eye movements, a phenomenon termed "presaccadic attention." Yet, it is unknown if such presaccadic selection merely affects perceptual sensitivity, or also affects downstream decisional processes, such as choice bias. We report a surprising lack of presaccadic perceptual benefits in a common, everyday setting—detection of changes in the visual field. Despite the lack of sensitivity benefits, choice bias for reporting changes increased reliably for the saccade target. With independent follow-up experiments, we show that presaccadic change detection is rendered more challenging because percepts at the saccade target location are biased toward, and more precise for, only the most recent of two successive stimuli. With a Bayesian model, we show how such perceptual and choice biases are crucial to explain the effects of saccade plans on change detection performance. In sum, visual change detection sensitivity does not improve presaccadically, a result that is readily explained by teasing apart distinct components of presaccadic selection. The findings may have critical implications for real-world scenarios, like driving, that require rapid gaze shifts in dynamically changing environments.

Neural noise: Changes in brain signals due to aging and meditation

Srishty Aggarwal[1], Banibrata Mukhopadhyay[1] and Supratim Ray[2]

[1] Department of Physics, Indian Institute of Science, Bengaluru, India

[2] Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

Abstract:

For a long period, neural noise was largely dismissed as an unwanted artifact in brain signal analysis. However, recent research has highlighted its potential as a valuable source of information about brain function and its changes. The aperiodic or arrhythmic component of the power spectral density (PSD) of brain signals, often referred to as neural noise, is characterized by its slope. This slope has been linked to the balance between excitatory and inhibitory neural activity and has been shown to decrease with age. But previous studies were limited to low frequency range of 49 years) who were healthy (N=217) till 800 Hz. Consistent with previous studies, the 1/f slope reduced with healthy aging up to ~150 Hz. However, we found the opposite at higher frequencies (>200 Hz), i.e., the slope increased with age. We also recorded EEG from long-term meditators practicing open-eye meditation and their healthy matched controls (30 pairs). We found that the slope is higher for meditators at ~100 Hz, indicating the opposite effect as that of aging. Thus, these results emphasize the changes in neural mechanisms reflected in slopes. Further, as aging and meditation exert contrasting influences on slope, it suggests that meditation might potentially mitigate some of the neural changes associated with aging.

Reward-driven proactive control of emotional conflict

Sukalyan Deb[1] and Srikanth Padmala[1]

[1] Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

Abstract:

Cognitive control refers to the higher-level executive brain processes involved in dealing with conflicts to drive optimal goal-directed behavior. It has been proposed that cognitive control operates through two distinct modes: *proactive* and *reactive* (Braver, 2012). Proactive control, though efficient, is resource-intensive and hence typically involves a cost-benefit analysis. Previous work in the non-emotional conflict domain has shown that offering performance-based rewards triggers proactive control by offsetting the mental costs involved (Soutschek et al., 2015). However, in many real-life scenarios, one has to deal with conflicts that are emotional in nature and involve distinct resolution mechanisms (Etkin et al., 2006). Moreover, in disorders such as anxiety and depression, cognitive control deficits are more pronounced when dealing with emotional conflicts (Fales et al., 2008). Hence, it is critical to understand if and how reward-driven proactive control helps resolve emotional conflict and the associated brain mechanisms. We conducted a fMRI experiment (N=36; 14 males) using a face-word emotional conflict task. Each trial began with a reward or no-reward cue, signaling the opportunity to win a performance-based bonus reward or not. During the subsequent task phase, participants categorized the facial emotion (fear or happy) while ignoring an overlaid congruent or incongruent ("FEAR" or "HAPPY") word. Accuracy data showed reduced emotional conflict in the reward (vs. no-reward) condition, and a parallel interaction was observed in the Amygdala during the task phase. Notably, enhanced reward-related activations in the fronto-parietal attentional regions during the initial cue phase predicted behavioral interaction patterns at the subsequent task phase. These findings suggest that enhanced proactive control in the presence of reward cues might have led to the efficient resolution of emotional conflict.

Studying the effect of electrical stimulation on gamma rhythm in visual cortex

Niloy Maity[1] and Supratim Ray[1]

[1]Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

Abstract:

Neuronal assemblies often show rhythmic activity, which can be recorded using implanted electrodes in the brain. These brain rhythms occur at several frequencies tightly associated with different behavioral states and could convey valuable information about the underlying neural circuitry. Recent studies have shown that a high-frequency rhythm called "gamma," typically has a centre frequency between 30-80 Hz, is observed during various high-level cognitive tasks and can also be induced by presenting certain visual stimuli called gratings. Significantly, this stimulus-induced gamma has been studied as a marker of excitation-inhibition interactions in the primary visual cortex.

Perturbing the cortical activity and observing how that affects neural firing, oscillatory patterns of brain rhythms, and sensory processing is an established strategy in neuroscience research. Among these techniques, transcranial alternating current stimulation (tACS) delivers oscillatory electrical current and transcranial direct current stimulation (tDCS) involves applying constant electrical current over a task-relevant brain region to induce or suppress cortical activity. These stimulation techniques are being used to treat several neurodegenerative disorders or alleviate disease symptoms. While these results are emerging as avenues of treatment, how stimulation alters brain activity remains shrouded in question.

We have found that stimulating the visual cortex with tACS for 20 minutes at the centre frequency of slow gamma band results in suppression of gamma; on the contrary, application of cathodal tDCS for 20 minutes boosts fast gamma, and both these effects revert to pre-stimulation gamma level, in one and half-hours' time. Interestingly, applying tDCS twice with a gap of 20 minutes boosts Fast gamma further compared to a single bout of stimulation. Collectively, these findings reveal that gamma, which results from the excitatory and inhibitory interplay of neuronal population activity, can be modulated by externally applied transcranial electrical stimulation.

Position tuning in single neurons of monkey inferior temporal cortex

Sini Simon[1] and SP Arun[1]

[1]Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

Abstract:

Humans can discriminate small offsets between nearly collinear lines. A common example is a vernier scale, where we use the alignment of vernier and main scale markings to make measurements. However, the underlying neural correlates have not been investigated. To investigate this, we asked whether monkeys show similar behavior as humans and how it is represented in the higher visual areas.

We created stimuli containing a square frame with a disk that moved along a horizontal or vertical line, in the presence of a horizontal or vertical bar at the center. If monkeys show similar behavior as humans, they should show greater sensitivity to small changes in the horizontal position of the disk when a nearby bar is oriented vertically (vernier condition) rather than horizontally. Conversely, there should be greater sensitivity to changes in vertical position when the nearby bar is oriented horizontally. We tested these predictions on monkeys performing a same-different task, as well as using neural responses recorded from their inferior temporal cortex, in a passive fixation task.

In Experiment 1, we tested 3 monkeys trained to perform a same-different task. Here, all three animals showed higher sensitivity to position changes in the vernier conditions than non-vernier ones. In Experiment 2, we tested these predictions using wireless brain recordings from the inferior temporal cortex, while monkeys viewed these stimuli in a fixation task. Here too, we observed greater neural dissimilarity between the stimuli in the vernier condition compared to the non-vernier condition. Interestingly, this effect arose late in the neural response, suggesting that this effect arises through computation and is not simply inherited from the early visual areas.

Taken together, our results show that monkeys can easily detect position shifts in the vernier condition, and this effect is likely driven by single neurons in the inferior temporal cortex.

Role of Lateral Hypothalamus in Stress Modulation of Itch

Jagat Narayan Prajapati[1] and Arnab Barik[1]

[1]Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

Abstract:

Stress is a potent modulator of emotion, cognition, homeostasis, pain and itch perception. Most studies have found that stress can exacerbate itch by the release of neuropeptides and hormones, and activation of the immune system. However, the brain circuit for stress modulation of itch is not known. Here we have used TRAP2 mice to capture LH restraint stress activated neurons (LH^{stress} neurons) and studied the role of LH^{stress} neurons in itch perception. Chemogenetic activation of LH^{stress} neurons decreases acute itch, however it increases imiquimod induced psoriatic itch in mice. In contrast, Kir2.1 mediated inhibition of LH^{stress} neurons increases acute itch, but has no effect on chronic itch. Next, we used fiber photometry to record the calcium activity of these LH^{stress} neurons. We found that these neurons do not respond to acute stress induced scratching, suggesting that these neurons are not directly involved in itch scratch processing. Interestingly, in the case of chronic itch we found that these LH^{stress} neurons increase their calcium activity in response to spontaneous and evoked scratching, suggesting the induction of some plastic changes in LH^{stress} neurons. Aberrant plastic changes are known to drive the transition of acute itch to chronic itch. Next, we used the viral anterograde and retrograde tracing, and found that the LH^{stress} neurons are heavily interconnected with brain regions involved in stress perception and pain and itch modulation. Altogether we revealed an ensemble of LH^{stress} neurons, which can be targeted for treatment of stress-induced exacerbation of chronic itch.

Eavesdropping on worm conversations - transfer of memory from one *Caenorhabditis elegans* to another and investigating its underlying molecular mechanisms

Monmita Bhar[1], Tanumoy Nandi[1], Shrinithi Natarajan[2], Hari P Narayanan[3], Kamal Kishore[1] and Kavita Babu[1]

[1]Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

[2] Department of Computer Science and Engineering, PES University, Bangalore

[3] Max-Planck Institute of Animal Behaviour, Germany

Abstract:

Native preference and behaviour in organisms can be modified from experience through learning. *Caenorhabditis elegans* has been proven to be an extremely important model system to study behavioural plasticity. In this study, we have looked at long-term associative memory (LTAM) in *C. elegans* by training them using two cues – the native chemoattractant isoamyl alcohol (IAA) and heat as the repulsive cue. This training method results in LTAM formation, observed in the form of loss of attraction from IAA due to aversive learning, lasting for up to 24 hours. Here we report that during training, *C. elegans* release some factors onto the plate that act as signaling molecules for maintaining the LTAM. Hence, removal of worms from these plates causes them to lose this memory despite undergoing aversive training. These molecules can in turn be taken up by naïve and other known memory-defective mutant worms, that have not undergone training, inducing aversive learning in these worms. To further investigate the underlying molecular mechanism, we have performed RNA sequencing to look at differential gene expression in different conditions. Candidate genes have been shortlisted that may also be responsible for this phenomenon. Additionally, we have performed liquid chromatography mass spectroscopy (LC-MS) from the plates worms were trained on, to identify the externally released factors.

Here, we propose a mechanism by which *C. elegans* due to aversive training, release some factors onto the plate, through environmentally released extracellular vesicles (EVs), which can further be taken up by any worm (naïve or memory-defective mutants) and induce aversive learning in worms without any prior training. Hence, in this study, we report that memory can be transferred from a trained worm to an untrained worm, paving a new avenue of communication and signaling in *C. elegans*.

Inferring the role of basal ganglia circuits and dopamine in the initiation, execution and control of movements in Parkinson's Disease

Mahatabb Nundy[1], Nitish Kamble[2], A.T. Prabhakar[3] and Aditya Murthy[4]

[1]Department of Bioengineering, Indian Institute of Science, Bengaluru, India

[2] Department of Neurology, NIMHANS, Bengaluru

[3] Department of Neurology, Christian Medical College, Vellore

[4] Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

Abstract:

Parkinson's disease (PD), a widely prevalent neurodegenerative disease with an incompletely understood pathophysiology is characterized by disruptions in planning and control of movement. A battery of behavioural tasks were designed to examine the specific and relative contributions of dopamine versus impairments in basal ganglia circuits (dopamine-independent effects) in the context of movement in PD patients and controls. Our findings indicate that parameters related to movement initiation, such as reaction time, are affected by dopamine deficits, as they improve with dopamine administration. On the other hand, changes in movement execution parameters like movement time and velocity are more an outcome of ageing and circuit effects (dopamine-independent effects). Apart from dopamine status, the age of onset of disease also significantly impacts behavioural processes like central processes of motor inhibition, and conflict and performance monitoring. These experiments provide valuable insights into the roles of dopamine and basal ganglia circuits in driving and regulating motor functions.

High-level sensory and motor regions encode object mass after real-world object interactions

Shubhankar Saha[1], Prithu Purkait[1] and SP Arun[1]

[1]Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

Abstract:

We experience real-world objects not just by seeing them but by interacting with them. Such interactions give us information about their physical properties such as mass. Are such physical properties integrated into the underlying object representations? To investigate this fundamental question, we performed wireless brain recordings from two monkeys with electrodes implanted into high-level sensory and motor regions before and after they interacted with real-world objects of varying mass.

We created 5 water bottles painted with different colors, and added weights (100-500 grams) chosen to be uncorrelated with their (R,G,B) colors. We then recorded neural responses to images of these bottles on a screen while each animal passively viewed these images, prior to any interaction with these bottles. Each bottle was then loaded with a small juice reward and presented to each monkey in randomized order. Monkeys readily interacted with these bottles, lifting them up to drink the juice, thereby ensuring that they had experience with the varying masses of these bottles. Following these interactions, we again recorded neural responses to images of these bottles on a screen as before.

We hypothesized that neural activity would show a greater correspondence with the experienced mass of these objects, following the real-world interaction compared to before the interaction. To this end, we calculated the correlation between the multiunit firing rate from each electrode with the object mass. Our main finding is that neural responses showed an increased correlation with object mass after real-world interactions. This effect was present in the premotor/prefrontal cortex (PMv/vlPFC) as well as in inferior temporal cortex (IT).

Taken together, our results show that object mass is rapidly encoded into both high-level sensory and motor regions of the brain following real-world interactions with objects.

Characterizing the role of claudins in *C. elegans* neurons

Aishwarya Ahuja[1], Anusha Rastogi[1], Haowen Liu[2], Akankshya Sahu[1], J Jagannath[1], Zhitao Hu[2], Kavita Babu[1]

[1] Centre for Neuroscience, Indian Institute of Science, Bengaluru

[2] University of Queensland, Australia

Abstract:

Claudins are classified as cell-cell adhesion molecules and serve as vital structural elements within tight junction complexes. They are widely expressed across various tissues and cell types, including the central nervous system, where they contribute to the maintenance of neural barriers such as the blood-brain barrier (BBB). Structurally, these proteins feature a PDZ-binding motif within their intracellular C-terminal domain, enabling interactions with numerous other cellular proteins outside the tight junction complex. These interactions suggest that claudins may undertake additional, unconventional roles beyond their role in regulating cellular permeability. One such possibility is their involvement in influencing neuronal functions.

Via a screening procedure utilizing transcriptional reporters, we identified a minimum of nine claudin-like molecules expressed in *C. elegans* neurons, with CLC-3 and CLC-7 exhibiting substantial neuronal expression. Due to its prominent expression in head, tail, and motor neurons, CLC-3 was selected as a candidate to investigate the neuronal functions of claudins and screened for phenotypes associated with neuronal dysfunction.

Utilizing imaging analysis, we confirmed the presence of CLC-3 within cholinergic neurons located along the ventral cord of the worms. Given the pivotal role of ventral cord neurons in coordinating the worms' sinusoidal movement by regulating balance at the neuromuscular junction, we examined clc-3 mutants for locomotion abnormalities and NMJ defects. Our observations reveal that clc-3 mutants exhibit increased body bend amplitude and heightened sensitivity to the acetylcholinesterase inhibitor aldicarb compared to wild-type worms.

Moreover, aldicarb and locomotion studies with double mutants of *clc-3* and actin-binding protein *nab-1* suggest that the two function together in the same genetic pathway. These findings led us to hypothesize that CLC-3 operates at the neuromuscular junction (NMJ) and acts via NAB-1 to influence locomotion in *C. elegans* worms.

When does our brain integrate the memories?

Aritra Dutta[1], Suraj K[1], Meenakshi PK[1], Swati P[1], Shreya G[1] and Balaji Jayaprakash[1]

[1] Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

Abstract:

Mammalian brain forms memories of different events in their day- to- day life. The neuronal ensemble which is responsible for encoding these memory traces often tend to interact with each other depending on the relatedness of the contexts. Contextual memories, integral representation of different sensory inputs takes representation in hippocampus and the association of aversive event encages amygdala along with other regions such as RSC, ACC etc of the brain to form fear memory for the context.

NMDA receptors are critical for encoding of contextual memory. However, acquisition and encoding of new information that is related to prior experience can be acquired in absence of NMDAR activity. Thus, enabling a molecular definition of related memory. However, the amount of interdependence the underlying neuronal ensemble in such related memories is unexplored.

We show that only when the subjects are made to learn two related contexts, the memories are integrated. Further such integration brings about an asymmetric dependence of one memory on the other. Our results show that this asymmetric dependence of memory is facilitated by Ras and Rac-1 which when inhibited, led to generalised reduction of both contextual memories. This prompted us to hypothesise that the structural reorganization of the synaptic connections is facilitating such encoding of second learning.

We leveraged our custom designed two photon microscope to image the RSC region to study the spine dynamics as a function of learning events. We developed a random forest-based ML classifier and arrive at workflow to identify and extract the digital representation of the dendrites from a large dataset. Our initial analysis shows that encoding of second related information is characterised by pruning of spines.

Is Unity always a strength? Insights into the neuronal circuit underlying collective feeding behaviour

Navneet Shahi[1], Nisha Kumari[1,2], Sharveri Khapre[1] and Kavita Babu[1]

[1] Centre for Neuroscience, Indian Institute of Science, Bengaluru, India

[2] KU Leuven, Leuven, Belgium

Abstract:

Food availability in an organism's environment is a critical determinant of its food-seeking and exploration behaviors. In *Caenorhabditis elegans*, the integration of multisensory cues associated with food perception optimizes the foraging strategies essential for survival. Under favorable conditions, worms disperse to locate food and undergo optimal growth. However, under adverse conditions—such as pathogen presence, increased population, or food depletion—these worms aggregate, delaying their growth. This study investigates a contrasting behavior where worms aggregate and feed in groups despite ample food availability, termed as swarming. While environmental factors are reported to influence swarming behavior, the underlying genetic and molecular mechanisms remain elusive.

Our research unveils a novel role for a conserved vesicular cargo protein, CASY-1 and its associated neuromodulatory signaling, in regulating swarming. We observed that *casy-1* mutants exhibit aberrant foraging behavior characterized by swarming and reduced food dispersal. Notably, these mutants aggregate during feeding despite facing starvation, a phenotype rescued by restoring CASY-1 expression in sensory neurons.

Notably, Neuromodulatory circuits comprising neuropeptide receptors (NPR) and their ligands regulate the food search and response behaviors in *C. elegans*. Also, we observe parallels in the collective feeding dynamics between casy-1 mutants and mutants affecting neuropeptide processing (egl-3 mutants) and release (unc-31 mutants), implicating neuropeptidergic signaling in swarming behavior regulation. Additionally, our domain-specific CRISPR knock-out experiments suggests that the kinesin-binding C-terminal domain knockout can induce swarming. These findings lead us to hypothesize that casy-1 mutation may diminish neuropeptide release, thereby promoting worm aggregation during feeding. Consequently, we aim to elucidate the neuronal circuit where CASY-1 interacts with neuropeptidergic signalling pathways to orchestrate collective feeding behavior in *C. elegans*.

Poster Presentations

Poster Number	Name of Presenter	Title of Poster
1	Prithu Purkait	Encoding of light direction and object identity in the monkey inferior temporal cortex
2	Rishika Sharma	The Neural Basis of Exploration during Reinforcement Learning
3	Athulya Krishnan	The differential effects of performance contingent and non-contingent rewards on emotional distraction
4	Nirupam Das	Parvalbumin-Interneurons (PV-INs) of dCA1 sufficiently determine the memory specificity and provide social context through projection to dCA2
5	Umer Saleem Bhat	Neuropeptide FLP-15 Functions Through the Receptor NPR-3 to Regulate Foraging Behavior in *C. elegans*
6	Sveekruth S Pai	Gamma Response Estimation to Natural images: A Unified Approach
7	Kamal Kishore	Characterizing the function of PUF family of RNA binding protein in *Caenorhabditis elegans*
8	Vaishnavi V	Peer Learning through Social Interaction and Observation in Water Maze.
9	Mandip Gadpayle	Rem2 GTPase as an activity-dependent regulator of hippocampal pyramidal neuron intrinsic excitability by modulating the sAHP current generating IKCa channels
10	Pritakshi Das	Understanding The Role of Palmitoylation On PSD-95 Structure and Dynamics Using MD Simulations

11	Shrivallabh Deshpande	Investigating the Amyloid Precursor Protein as a Risk Factor for the Development of Alzheimer's Disease
12	Gargi Mandal	To study the growth characteristics of rat primary neuronal cells using PDMS micropillars
13	Debdyuti Bhadra	Stable encoding of partner and grooming state during simultaneous wireless recordings of socially interacting monkeys
14	Vishesh Choudhary	Generalized attention benefits that outlast neurofeedback training
15	Rajesh Mandal	Neuronal Activity Detection with Improvised Broadband functional Near Infrared Spectroscopy (fNIRS) Device: A Neuro-Energetic Approach to Understand Memory Processes
16	Shikha Ramesh T	Decoding the molecular mechanism of endolysosomal trafficking of APP in Alzheimer’s Disease
17	Jhilik Das	Rapid statistical learning of object part co-occurrence in humans and monkeys
18	Aynal Hoque	The hydrophobic ring of residues near the selectivity filter contributes voltage-dependent facilitation of L-type voltage-gated calcium channels
19	Surbhi Munda	Neural basis of real-world vision during monkey-human interactions
20	Tripti Seth	Understanding the functions of claudins in primary neurons
21	Deepak Raya	Flexible representation of visual working memory across gaze shifts
22	Sahana Rao	The role of Edinger-Wetsphal Nucleus in regulating stress responses

23	Somesh	The effect of performance and sensory errors on visuomotor adaptation.
24	Jason Joby	Neural correlates of sleep in the high-level visual and motor cortex of monkeys
25	Ishatpreet Singh	Effects of memory interference on spatial memory in Morris Water Maze
26	Devangshu Nandi	Tac1 and TacrI Mediated Neuronal Circuitry in Pain Processing and Emotional Regulation

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