Indian Society for Chronobiology

JAN 2025

# SAMAY

## THE BI-ANNUAL NEWSLETTER

*https://chronobiologyindia.org*

## Inside this issue..



**FOR JULY 2025 ISSUE, SEND YOUR ENTRIES TO:**


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# Editor's Note

Dear Readers,
The editorial team of the biannual newsletter of the Indian Society for Chronobiology (InSC) is pleased to bring you the January 2025 issue of SAMAY, albeit with a slight delay. We hope the year has been productive and fulfilling for you so far and wish you continued success in the months ahead.

This issue features a collection of insightful articles that we hope you will find engaging. Additionally, we have highlighted key events that InSC co-organized this year in the InSC Events section, along with a section on upcoming events for your ready reference.

The successful publication of this newsletter is a collective effort, and I extend my gratitude to the editorial board for their dedication and to all the contributors who made this issue possible.

On a personal note, this will be my last issue as the Editor of SAMAY. It has been a privilege to serve in this role, and I deeply appreciate the support and contributions of our readers and fellow researchers. The next issue will be helmed by a new Editor, and I am confident that SAMAY will continue to grow under their leadership.

We always welcome your feedback! Please write to us at inscdu@gmail.com with your suggestions on topics you'd like to see covered or any thoughts on how we can improve. Your input is invaluable to us.

Warm regards,
Aakansha
Editor, SAMAY

# From President's Desk

Dear Colleagues,

I greet you at the end of 2024, and I hope the year was as good as possible for you and your academic team. I wish you the best of health, joy, happiness and incremental progress during the current year, 2025.

I congratulate the editorial team for the present issue of SAMAY in which various articles contributed by the members seem to be very interesting and meaningful. I thank all the contributors, who form a very young group of Indian Chronobiologists, and I do hope that they will continue to have long-lasting interests in the academic affairs of the Indian Society for Chronobiology (InSC).

This delayed issue of SAMAY is coming out near to the time of completion of my term as the President of the InSC. I have mixed emotion as I am penning down this piece at the end of my active association with the InSC, which dates back to the year 1979 as a PhD research scholar. As a happy recall, I have served as the office bearer of the InSC as a member of the Executive Committee, Treasurer, Secretary and President. During my tenure as Secretary and President of the InSC, I have tried my best to raise the visibility and penetration of InSC among Indian as well as global chronobiological community.

The InSC has been very active, and its scientific effort has been at par, if not better, with any Chronobiology society across the globe. In the last decade and half, the InSC has been involved in organizing regular programs of multiple shades, viz. the capacity building programs for researchers, educational and outreach programs for science students and general public, regular meetings and symposia of the Society. Among some of the noteworthy examples include Chronobiology Schools, International conferences, and visits of chronobiologists from all parts of the world. In the year 2024 itself, the InSC shared the organization of very successful "International Symposium on Avian Endocrinology (March 2024)", "Circadian Rhythms in Health and Diseases: From Discovery to Functions" (December, 2024)", Pan-India workshop Pan-India workshop on Neuroendocrinology (November 2024) and EMBO workshop on "Understanding Biological Clocks in health and disease –theoretical framework to cellular basis (February/ March 2025)".

I am happy to note that the new Executive Committee of the InSC under the leadership of Professor Sheba Vasu, FNA, is taking charge from 01 April 2025. The new team is young, dynamic and represents diverse group of Chronobiologists both geographically as well as academically in India. I extend very warm wishes to the new team, and I hope that InSC will keep supporting the InSC community in all possible ways in conducting an activity that comes under its mandate.

This is my last message from the Presidential Desk. I sign off with my gratitude to the InSC, and to all its members for having given me an opportunity and full support to serve the InSC, which I tried to do to the best of my ability.

Very best wishes to all of you.

Vinod Kumar
President, InSC

# Unlocking the link between central and peripheral circadian clocks in fruit flies: a role for gut peptides

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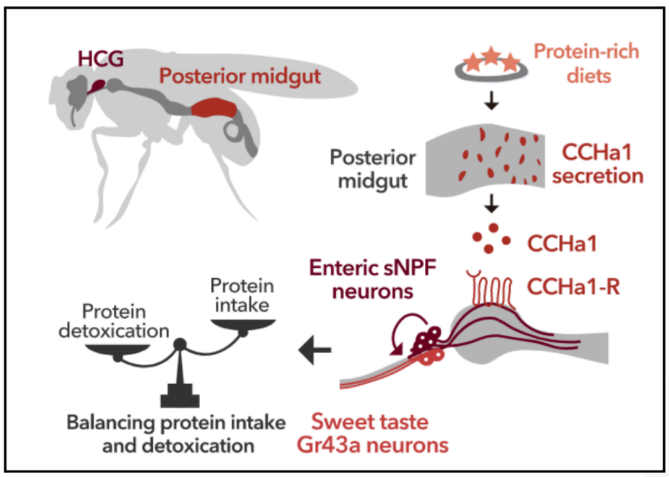
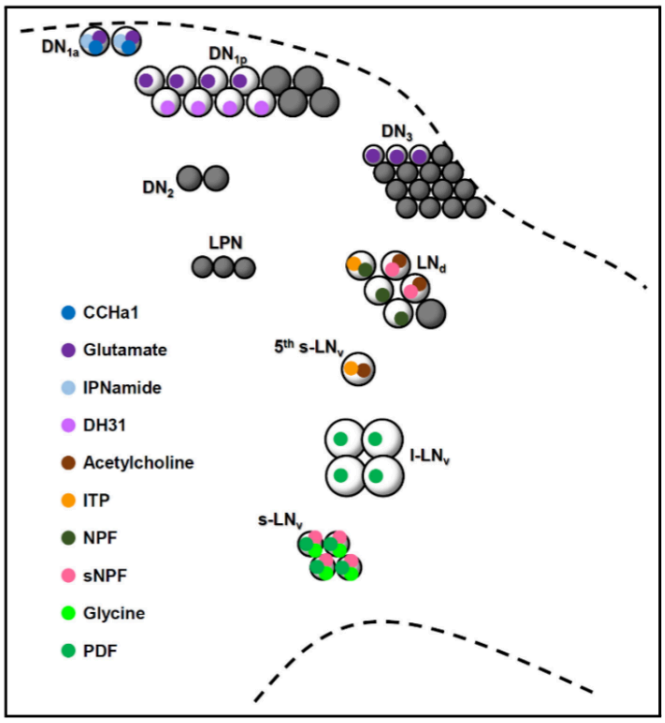
Almost all living organisms, from humans to bacteria, possess a circadian clock. This internal timekeeping system enables organisms to anticipate and adapt to daily environmental changes over a 24-hour cycle. At its molecular core, circadian clocks rely on cell-autonomous transcription-translation negative feedback loops (Takahashi, 2017). In most animals, the master circadian clock in the brain receives external cues (photic or nonphotic zeitgebers) and facilitates synchronization (or entrainment) of internal physiology to the outside environment. Interestingly, the central clock is not the only biological clock present in the organism, most tissues also have their own clock called the peripheral clock which are mostly supervised by the central clock. Positioned at the top of the circadian hierarchy, the master clock modulates downstream neuronal activity and coordinates peripheral clocks in tissues throughout the body via endocrine and systemic signalling. Unlike the mammalian suprachiasmatic nucleus (SCN), the *Drosophila* central clock is decentralised, comprising approximately 240 neurons distributed across the brain in clusters (Reinhard et al., 2024). While central-to-peripheral clock signalling is well characterized, mechanisms from peripheral-to-central clock remain largely underexplored. For simplicity, we focus on recent advances in nutrient-sensing gut neuropeptides that modulate the central clock. The circadian clock ensures that sleep occurs during environmentally advantageous times. In *Drosophila*, the central clock promotes sleep initiation at dusk and anticipatory arousal before dawn (Kunst et al., 2014; Liu et al., 2014). Sleep-wake cycles arise from an interplay between circadian-driven wakefulness and sleep homeostasis, which balances restorative sleep pressure. Disruptions to this equilibrium trigger compensatory mechanisms. Beyond these systems, dietary composition has emerged as a modulator of sleep quantity and quality. For instance, Catterson et al. (2010) demonstrated that yeast supplementation fragments sleep in a sex-specific manner, whereas Linford et al. (2012) contested this, attributing sleep architecture changes to carbohydrate-to-protein ratios rather than protein alone. This shifted focus toward studying carbohydrate diets as the regulator of sleep. Concurrently, CCHamide peptides 1 and 2 were identified in *Drosophila* as nutrient sensors (for both glucose and protein) in the gut (Ida et al., 2012). Originally discovered in the brain and gut of *Bombyx mori* (Roller et al., 2008), CCHamides are conserved across arthropods. Two *Drosophila* CCHamide receptors (CCHa1-R and CCHa2-R) were found to be homologous to the human Bombesin receptor subtype 3 (BRS-3); however, their ligands (CCHa1 and CCHa2 respectively) lack human homologs (Hansen et al., 2011; Ida et al., 2012). BRS-3, an orphan receptor in human pancreatic beta cells, regulates glucose-stimulated insulin secretion (Feng et al., 2011). Out of the two CCHamides discovered, CCHa2 was of much interest in the initial years due to its role in

dietary glucose-mediated signalling to other tissues. Further, CCHa2 research revealed its role in feeding and metabolism: mutant larvae exhibit reduced food intake, locomotor activity, larval development, and *Drosophila* insulin-like peptide-2 and -3 (*dilp2* and *dilp3*) mRNA levels (Ren et al., 2015). CCHa2 acts as a nutrient-dependent regulator of *dilp2* and *dilp3* secretion in the brain during larval stages, with gut and fat body expression tied to dietary glucose (Sano et al., 2015). Nutrient sensing is not only limited to metabolism but is also linked to memory formation. Interestingly, the dietary glucose sensing CCHa2 also links metabolism and memory and consolidates appetitive long-term memory (LTM) by signalling to reward-associated dopamine neurons. Genetic disruption of CCHa2 abolishes LTM but spares short-term memory (STM), establishing its role in energy homeostasis and memory consolidation (Yamagata et al., 2022).

In contrast to a glucose-mediated secretion of CCHa2 in the gut, CCHa1 secretion in the gut is stimulated by dietary proteins. Protein is essential for all living organisms; however, excessive protein intake can have adverse effects, such as hyperammonemia. Although mechanisms responding to protein deficiency are well-studied, there is a significant gap in our understanding of how organisms adaptively suppress excessive protein intake. The peptide CCHa1 is secreted by enteroendocrine cells in response to protein in the diet and Yoshinari et al., 2024 showed that it is vital for suppressing overconsumption of protein. Gut-derived CCHa1 is received by a small subset of enteric neurons that produce short neuropeptide F, thereby modulating protein-specific satiety. Importantly, impairment of the CCHa1-mediated gut-enteric neuronal axis results in ammonia accumulation and a shortened lifespan under high protein diet conditions. In recent years, the “protein-leverage hypothesis” has attracted attention as an interesting hypothesis for considering the relationship between protein intake and total food intake in mammals (Raubenheimer and Simpson, 2019). This hypothesis proposes that once a mammal has ingested a certain amount of protein, intake of additional food is suppressed. CCHa1 is supposed to be one of the genes playing a role in this protein intake suppression in the *Drosophila*. Although the CCHa1 peptide is not conserved across *Drosophila* and humans, their study suggests the importance of intestinal hormones and the nervous system that receives them when testing the protein-leverage hypothesis in mammals.

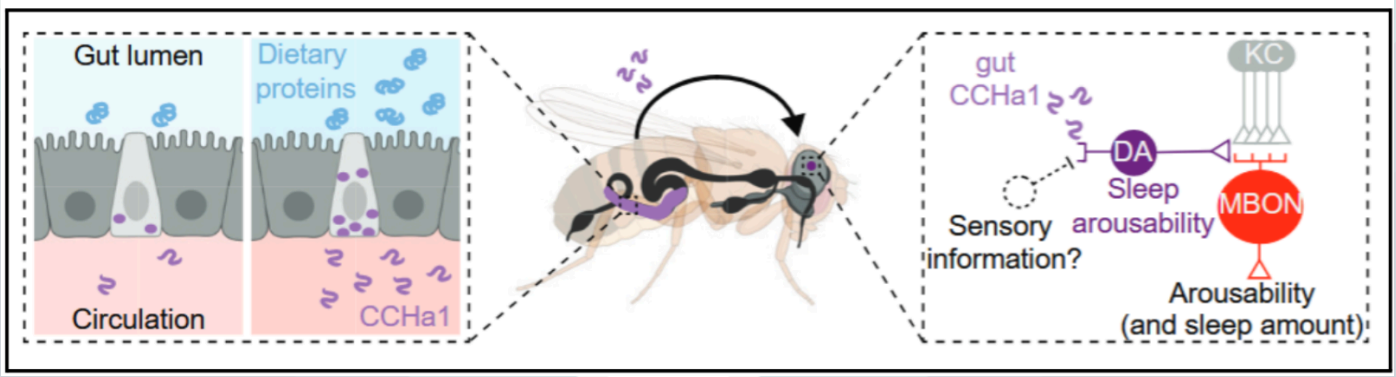



CCHa1 is expressed in both the gut and the brain cells compared to CCHa2 which is expressed majorly in the gut and fat body. Transcriptome studies have revealed that in the brain, CCHa1 is expressed in the dorsal clock neurons (DN1a) clock neurons controlling the morning activity (Ma et al., 2021; Fujiwara et al., 2018) while in the gut it is secreted from the enteroendocrine cells control the protein intake of the *Drosophila* (Hung et al., 2020; Titos et al., 2023; Yoshinari et al., 2024). When CCHa1 was localized in the brain, it was indeed seen to be exclusively expressed in the two DN1a neurons present in the brain. This made CCHa1 an important neuropeptide in the context of the circadian clock. A transcript study in clock gene mutant *per01* confirmed




that CCHa1 is a clock output gene. Further research revealed that CCHa1 connects DN1a neurons to small ventral lateral neurons (s-LNv), which express pigment dispersing factor (PDF), short neuropeptide F (sNPF), and glycine. Fujiwara et al., 2018 conclude that CCHa1 signals from the DN1a neurons modulate PAR domain protein 1 (PDP1) and PDF cycling in the s-LNv neurons, which contribute to a normal morning activity peak. The s-LNv neurons are known as the master pacemaker neurons (Yoshii et al., 2012). However, the s-LNv neurons are not the solitary head of the hierarchy; rather, they seem to act in conjunction with the DN1a (CCHa1 and glutamate) and DN1p (glutamate) neurons to control the phase and level of morning activity (Collins et al., 2012, 2014; Guo et al., 2016). A recent study suggests that PDF signals bidirectionally to CCHa1-positive clock neurons; thus, the clock neuron groups expressing PDF and CCHa1 interact reciprocally (Kuwano et al., 2023).

CCHa1 is also important in sleep, it has been shown to play a role in suppressing sensory arousal which is critical to maintaining sleep state in animals. Strong suppression of sleep represents a deep sleep. Titos et al. (2023) showed that CCHa1 is one of the genes which is responsible for the deep sleep state in flies. In flies, they showed that high protein intake represses the arousibility of flies from sleep and this information is relayed by the CCHa1 peptide secreted in the gut. This study showed the gut-secreted CCHa1 peptide signals to a small group of dopaminergic neurons in the brain to modulate their activity; the dopaminergic activity regulates the behavioural responsiveness of animals to vibrations. Although they were unsure about how this signal is transferred, it is possible that the CCHa1 secreted in the gut could be signalling the enteric neurons (Yoshinari et al., 2024) which convey the information to the brain. Despite these advances, CCHa1's full functional scope remains unexplored. Further studies are needed to elucidate its roles in circadian biology, metabolism, growth and development of *Drosophila melanogaster*.



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# Circannual rhythms in birds

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Circannual (circa= approximately, annual= an year) rhythms are self-sustaining endogenous biological cycles with a period length of approximately one year. These rhythms regulate physiological changes and behaviors in various animals in order to help them adapt to seasonal changes. Circannual rhythms influence seasonal events such as migration, hibernation, reproduction, and moulting. The presence and persistence of circannual rhythms have been demonstrated in gonad development and molt in several birds. The longest record of circannual cycles of gonad development and molt for over 15 years is from African stonechats maintained under a 12.25 of light and 11.75 dark schedule (Gwinner, 1996). In equatorial rainforest that maintains a year round constant environmental conditions, chestnut-winged babblers (*Stachyris erythroptera*) and little spider hunter (*Arachnothera longirostris*) show circannual cycles in breeding and molt with a period length of about 9 months (Gwinner, 1986). Similarly, subtropical spotted munia (*Lonchura punctulata*) show recurrent circannual cycles in gonadal maturation and molt under different light conditions, including light dark cycles and constant light conditions (Budki et al., 2014). Temperate species also show circannual cycles in gonadal maturation. European starlings (*Sturnus vulgaris*) show recurrent testicular cycles under 12 h of light and 12 h of dark schedule (Gwinner, 1986). Similarly, migratory dark-eyed juncos (*Junco hyemalis*) show circannual cycles in both testes and migratory phenotypes (e.g. spring pre-migratory body fattening, *Zugunruhe*) under constant dim light of 1–3 lux (Rani and Kumar, 2013).

What regulates these rhythms is not properly understood yet but studies have suggested that an internal biological clock is separate from circadian clock may be involved. This pacemaker gets its input from photoreceptors residing in multiple locations in the brain and the circannual rhythms synchronize to external cues, especially photoperiod (day-length) and temperature. Changes in the rhythm waveform of circadian clock genes across different seasonal conditions suggest an involvement of circadian clock components in photoperiodic time measurement and annual cycle of reproduction and migration. At the same time, the expression of thyroid hormone responsive pathway that is known to facilitate the seasonal gonadal recrudescence and regression cycle also seem to vary between different seasons. A few evidences from non-avian models have also suggested an involvement of epigenetic regulation of seasonal timings. Perhaps an answer to the question whether annual timing of temporally spaced seasonal behaviors has a common regulatory site, as is the SCN for the regulation of many daily responses, is key to finding the circannual pacemaker. Else, circannual timing might include independent phase-related seasonal processes? Perhaps, uncovering genes and protein pathways underlying the induction and maintenance, and the termination and reinitation of seasonal response (e.g., molecular genetics of migratory or seasonally breeding birds) might enable us to understand the mechanism of circannual

rhythm generation. Current advances in molecular tools, and its usage in studying the non-model organisms have greatly improved and should enhance our ability to understand where and how are the circannual rhythms generated (Kumar and Mishra, 2018).

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## When Is the Right Time to Fight Cancer?


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What if the key to successful cancer treatment lies not only in the drug itself but in the time of day it is given? The circadian clock, a biological mechanism present in many organisms from cyanobacteria to mammals, serves as a master regulator of countless physiological and behavioral processes. In mammals, the clock operates in a hierarchical manner, controlling cellular rhythms and synchronizing them across the body. Researchers have uncovered that a large portion of genes in mammals follow a daily rhythm, affecting functions such as metabolism, cell division, DNA repair, and immune responses. While much is known about this molecular clock's impact, the extent of its influence on disease, particularly cancer, is just beginning to emerge. Disruptions in the circadian clock have been recognized as a potential carcinogen, and its mis-regulation is linked to several cancer types. The interplay between cancer hallmarks—such as uncontrolled growth and metastasis—and the circadian clock is a growing area of research, with evidence pointing to a relationship between clock gene mutations and lower survival rates in cancer patients.

But what if this biological clock, which governs our sleep-wake cycles and metabolism, could also dictate the most effective time to administer cancer drugs? New research by Ector et al. 2024 reveals that aligning chemotherapy with a patient's circadian rhythms can substantially alter drug efficacy. Yet, despite this growing body of evidence,

Yet, despite this growing body of evidence, pinpointing the exact moment to administer these drugs remains a complex challenge. The variation in response to treatment depending on the time of day is a compelling concept, but its practical application has been elusive. While some studies have shown that chemotherapy given at specific times can enhance its effect, many unknowns remain about the cellular mechanisms underlying these time-of-day sensitivities. To bridge this gap, researchers have developed a new method to explore these dynamics in both cancerous and non-cancerous cells.

In this study, an array of experimental techniques was employed to better understand how the circadian clock affects tumor behavior and response to treatments. Using a high-throughput approach, they analyzed the time-of-day responses of both healthy and cancerous cells to various drugs. By comparing these responses, they sought to identify optimal times for treatment, aiming to maximize efficacy while minimizing toxicity. Importantly, this analysis also incorporated publicly available gene-expression data to answer some of the most pressing questions in this field. These include determining the best time of day to administer drugs, identifying which cell types are most receptive to circadian-based treatments, and understanding how cellular characteristics shape time-dependent drug sensitivity.

One of the study's key innovations was the introduction of a "chronotherapeutic index," a tool used to rank the potential benefit of circadian-based treatments for different cancer models. This index considers various factors, such as the strength of the circadian clock in different cells and their growth rates, to predict the ideal timing for drug administration. By integrating this data, researchers have uncovered that even highly aggressive cancers like triple-negative breast cancer (TNBC)—a subtype with limited treatment options—exhibit time-of-day sensitivity to certain drugs.

Triple-negative breast cancer is a particularly challenging disease to treat due to its aggressive nature and lack of targeted therapies. Cytotoxic chemotherapy remains the standard treatment, but it often comes with debilitating side effects and variable success. By examining the growth patterns and drug sensitivities of TNBC cells, the researchers found that some drugs showed up to a 30% variation in effectiveness depending on the time of day they were administered. This reinforces the idea that circadian rhythms might play a crucial role in tailoring cancer treatments for improved outcomes. Among the drugs tested, the DNA synthesis inhibitors 5-fluorouracil (5-FU), doxorubicin, and the DNA-damaging agent cisplatin all demonstrated significant time-of-day dependent effects, further supporting the concept of chronotherapy in cancer treatment.

The complexity of these findings lies in the multifactorial nature of drug response. Each drug interacts with the body in different ways, and the cellular features that govern time-of-day sensitivity can vary from one drug to another. For instance, the study highlighted that the molecular clock network—comprising core genes like *Bmal1* and *Per2*—plays a significant role in shaping these drug responses, but the impact of clock gene expression on drug sensitivity is far from straightforward. In some cases, redundancy and interconnections within the circadian network may obscure direct relationships between gene expression and drug response. This indicates that other factors, such as cell cycle dynamics, might also contribute to the observed time-of-day effects, a topic that invites further investigation.

Despite the promise of this new method, challenges remain. One limitation is that the findings are based primarily on in vitro cell models, meaning they may not yet be applicable to real-world cancer treatments. However, the approach can be adapted for more complex models, including 3D organoids derived from patients or animal models, where circadian rhythms can be more accurately tracked. By scaling up this research, scientists can potentially develop personalized treatment schedules that align with a patient's biological clock, improving treatment outcomes and reducing the harsh side effects often associated with chemotherapy.

The study also revealed intriguing insights into circadian rhythms in cancer. While one might assume that highly transformed cancer cells have lost their circadian rhythms, the research showed that these rhythms are still intact in many cases, albeit altered. This opens up exciting new avenues for research, as it suggests that even aggressive cancers may still be influenced by circadian cycles. Further exploration of how these rhythms interact with the cell cycle and other cellular processes could unlock new strategies for targeting cancer cells when they are most vulnerable.

As researchers continue to dive deeper into the complex interplay between the circadian clock and cancer, one question remains: could the next breakthrough in cancer treatment come not from a new drug, but from a new understanding of when to administer it?

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## Light at night: the problem


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The most dependable environmental cue in nature that schedules the daily and seasonal activity of organisms is the day-night cycle. The behaviours and physiology are synchronized with the external environment by an endogenous clock, and any discrepancy between the two might have detrimental effects on an individual's fitness and survival. The distinction between day and night has become more blurred due to the presence of artificial light at night. ALAN is a result of industrialization, urbanization, and modern lifestyle. The natural environment has been drastically altered by human intervention, to the point where wild creatures are exposed to artificial lights when they should ideally be in the dark. Our nights are brighter than they were previously due to the compounding impact of the ALAN coming from various sources, including security lights, lighted buildings or towers, and streetlights. This trend is growing annually. Individuals may become maladapted to their surroundings as a result, which could impact their level of fitness. A

number of studies have shown how the presence of light at night gives false environmental cues to organisms. A recent experiment in redheaded buntings showed that when birds were exposed to short winter like day length with a dim light at night (6 lux), the birds started to show *Zugunruhe*. They also had higher body mass, fat score and testicular volume when compared to birds under light:dark (0.1 lux) condition. These results suggest that dLAN can induce long day response and development of migration phenotype even under non-stimulatory short days (Tiwari et al., unpublished).

Exposure to light at night has also been shown to disrupt daily rhythm with loss of nocturnal peak in melatonin secretion in the European blackbird (*Turdus merula*) (Dominoni et al., 2013a), great tits (*Parus major*) (deJong et al., 2016; Raap et al., 2015). A study in redheaded buntings (*Emberiza bruniceps*), exposed to a low intensity of light at night (2 lux) during early and late night, showed that the birds remained active during the early and late night when the light was present. Melatonin and temperature rhythms were also disrupted in these birds as compared to those maintained in completely dark night (Kumar et al., 2021). Not only melatonin, light at night also causes a reduction in thyroid hormones suggesting a slower metabolism in European blackbirds (Dominoni et al., 2013b). White light at night exposure to great tits increases nighttime activity levels and sleep debt and affects disease dynamics showed evidence of detrimental effects of light pollution on the health of free-ranging wild animals (Ouyang et al., 2017). At times, the light pollution has also resulted in fatal collisions with aerial structure

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# InSC events

## Two-Day Conference on Biological Timing, Animal Diversity, and Conservation

August 27-28, 2024

Government Model Higher Secondary School, Doru, Anantnag, Jammu and Kashmir

**Sponsors:** Indian Society for Chronobiology
**Academic Support:** G. G. Foundation of Education and Public Health, Lucknow
**Organizing secretary:** Dr Malik Zahid, Lecturer Zoology, Education department, J &K

**Target Audience:** Students (11th & 12th grade) and Lecturers from Inter Colleges across Kashmir

**Plenary Lectures:** Prof. Mewa Singh and Prof Vinod Kumar

**Popular Lecture:** Dr Sajad Hussain Parray

The conference aimed to educate students and lecturers on biological timing, animal diversity, and conservation.



# InSC events

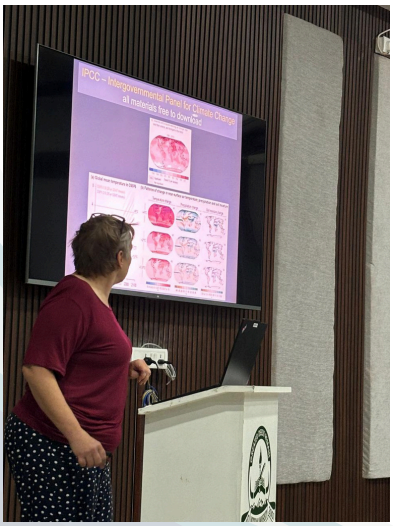
## A week long International workshop on Mechanisms underlying Daily and Seasonal Processes

September 11-17, 2024

Department of Zoology Mizoram University, Tanhril, Aizawl, Mizoram

**Convener: Dr. Amit Kumar Trivedi**

The workshop was primarily focused to provide platform to students residing/working particularly in North-east region of Inda. Total 30 students belonging to 8 different states were selected for the workshop. Three foreign faculties Dr. Barbara Helm, Leader, Unit of Bird Migration Swiss Ornithological Institute, Sempach, Switzerland, Prof. Takashi Yoshimura from Institute of Transformative Bio-Molecules Nagoya University, Furo-cho, Chikusa-ku, Nagoya, Japan, Dr. Akiko Satake, Professor, Department of Biology Faculty of Science Kyushu University Japan along with Indian faculties; Dr. Vinod Kumar, President, InSc and Prof. Mewa Singh, Distinguished Professor (for Life), and INSA Distinguished Professor, Institution of Excellence, Vijnana Bhavan, University of Mysore, Manasagangotry, Mysore delivered lectures. Theme of workshop included Rhythms: concept and definition; Circadian and circannual clocks; Daily and seasonal biological periodicities across taxa; Photoreception and Photoperiodism; Plant clock; Gene synchrony and ecosystem; Seasonal reproduction and migration; Daily and seasonal plasticities at multiple levels; Not-photoperiodic cues and daily/ seasonal processes, Neural and molecular mechanisms; Evolution and conservation: Clocks in a degrading environment; Clocks and human health, Not-photoperiodic cues and daily/ seasonal processes.

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Upasona C.


YANKEES


InSc Workshop on
Mechanisms Underlying Daily and Seasonal Biological Processes
Date: 11th – 17th September, 2024
Venue: Mizoram University, India
Organised by the Department of Zoology, Mizoram University, Aizawl, Mizoram, India
Core faculty
Themes
Supported by the
Sponsored by
Indian Society for Chronobiology

# InSC events

## International Conference on Circadian Rhythms in Health and Diseases: From Discovery to Function (CRHD 2024)

In conjunction with the

## Biennial Meeting of the Indian Society for Chronobiology (InSC)

December 5-7, 2024

Convention Center, Indian Institute of Technology Hyderabad

**Convener: Dr. Dr. Sandipan Ray**

The Indian Institute of Technology, Hyderabad, recently hosted the International Conference on Circadian Rhythms in Health and Diseases: From Discovery to Function (CRHD 2024) in conjunction with the Biennial Meeting of the Indian Society for Chronobiology (InSC) from 5th to 7th December 2024 at the Convention Center on the campus. Dr. Sandipan Ray, an assistant professor and group leader of the Circadian Rhythms and Disease Biology Laboratory at the Department of Biotechnology,
IIT Hyderabad hosted this international event as the convenor and chair. Dr. Neeraj Kumar, an Assistant Professor of Cognitive Science at the Department of Liberal Arts, IIT Hyderabad, acted as the co-convenor.

The conference was graced by the presence of the distinguished chief guest, Prof. Ch. Mohan Rao, President of Telangana Academy of Sciences and ex-director of the Centre for Cellular & Molecular Biology (CCMB). The honorable director of IIT Hyderabad, Prof. B.S. Murty, Dean of Sponsored Research & Consultancy of IIT Hyderabad, Prof. G. Narahari Sastry, and the convenor of CRHD 2024, Dr. Sandipan Ray, addressed the gathering with their opening welcome notes at the inauguration session of the event. Prof. Vinod Kumar, President of the Indian Society for Chronobiology, was honored with a Lifetime Achievement Award at this international event in recognition of his remarkable contributions to the advancement of chronobiology research and education in India.

This scientific assembly embarked on a dynamic exchange of intellect to showcase the advancements in chronobiology research in healthcare and related fields. Circadian rhythms extensively impact human health as they are fundamental to regulating our daily physiological, metabolic, emotional and behavioral processes. The 2017 Nobel Prize in Physiology or Medicine for the discoveries of molecular mechanisms controlling circadian rhythms clearly emphasizes the immense significance of this field in biomedical research, healthcare, and pharmacology. This outstanding scientific meeting engaged esteemed scientists from 11 countries around the globe (Australia, Denmark, Germany, Ireland, Japan, Singapore, United Arab Emirates, the United Kingdom, Israel, the United States of America, and India), with 55% of speakers from abroad, each bringing a wealth of knowledge and insight that substantially broadened our knowledge horizons. The meticulously curated program featured an array of distinguished keynote speakers, captivating exhibits from young researchers, and thought-provoking panel discussions, each designed to inspire innovation and foster profound collaboration.

Besides the excellent scientific talks and poster presentation, two extremely engaging panel discussion sessions attributed a different dimension to the event. The first panel discussion session was “Circadian Rhythms in Translational Clinical Research: Prospects and Challenges”. It was moderated by Dr. Sandipan Ray, the convenor of CRHD 2024. It included seven highly accomplished leading scientists across the globe, namely, Prof. Greg Murray (Swinburne University of Technology, Australia), Prof. Shanthakumar Wilson Rajaratnam (Monash University, Australia), Prof. Vinod Kumar (President of the Indian Society for Chronobiology, India), Prof. Ian Hickie (University of Sydney, Australia), Prof. Sridhar Vasudevan (University of Oxford, UK), Prof. Karl Obrietan (The Ohio State University, USA), and Dr. Filipa Rijo-Ferreira (University of California, Berkeley, USA).

In this panel discussion session, the esteemed panelists emphasized why it is high time to consider circadian factors as an integral part of translational clinical research. They also discussed the challenges in translating the chronobiology research into clinical practice.

The second panel discussion session, “The Future of Industry-Academia Collaboration for Creating a Start-up-Friendly Ecosystem,” moderated by Prof. Chandra Shekhar Sharma (Professor, IIT Hyderabad), included three established academicians from IIT Hyderabad (Prof. G. Narahari Sastry, Prof. C Malla Reddy, and Dr. Mudrika Khandelwal), three senior industry representatives, namely, Ms. Sandhya Sreepathy (Novartis), Mr. Mahesh Natarajan (Thermo Fisher Scientific), and Dr. Nilanjan Guha (Agilent Technologies). Additionally, the valuable presence of Dr. Krishna Kanth Pulicherla from the Technology, Translation and Innovation (TTI) Division, Department of Science and Technology, Government of India, heightened the eminence of that panel discussion session.

This international conference is undoubtedly a milestone for the Indian chronobiology research community. Dr. Ray, the convenor of CRHD 2024, said, “The event marks a pioneering initiative in India, showcasing the profound implementations of circadian rhythms in health and diseases. It will accelerate the opportunities for international engagement and collaborations in this vital research field.”


# Upcoming events

## Chronobiology
## Gordon Research Conference

**Circadian Clock Dynamics and Physiology Across Biological Scales**

**July 6th to 11th, 2025**

**Avinguda de l'Hotel**
**Castelldefels, Barcelona, Spain**

**Find out more:**
**https://www.grc.org/chronobiology-conference/2025/**

## 19th International Congress of Comparative Endocrinology

**July 8th to 12th, 2025**

**Sendai, Japan**

**Find out more:**
**https://icce19.com**

## Share your feedbacks

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## Join Indian Society for Chronobiology

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