

**CHRIST**(DEEMED TO BE UNIVERSITY)
BANGALORE | DELHI NCR | PUNE

Notice for the PhD Viva Voce Examination

Ms Pooja M Dyapanagoudar, Registration Number: 2190040, PhD Scholar at the Department of Life Sciences, School of Sciences, CHRIST (Deemed to be University) will defend her PhD thesis at the public viva-voce examination on Thursday, 14 May 2026 at 12.00 pm in Room No. 044, Ground Floor, R&D Block, CHRIST (Deemed to be University), Bengaluru - 560029, Karnataka, India.

- Title of the Thesis** : **Study on Physiological Changes and Disorders Caused Due to Change in the Circadian Rhythm in *Danio Rerio***
- Discipline** : **Zoology**
- External Examiner - I** : **Dr B P Harani**
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Department of Zoology
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Bengaluru - 560056
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- External Examiner - II** : **Dr Vijay K Bharti**
Scientist 'F' and Group Head
Division of Animal Sciences
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- Supervisor** : **Dr Majesh Tomson**
Assistant Professor
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The members of the Research Advisory Committee of the Scholar, the faculty members of the Department and the School, interested experts and research scholars of all the branches of research are cordially invited to attend this open viva-voce examination.

Registrar (Academics)

Place: Bengaluru
Date: 04 May 2026

ABSTRACT

Circadian rhythm disturbance has emerged as a major public health concern in modern society, with shift work, irregular light exposure and physiological stress, leading to hormonal imbalance and metabolic dysfunction. These lifestyle-associated stressors disrupt the temporal organisation of biological processes, resulting in chronic physiological dysfunction with long-term systemic consequences. The present study establishes and validates *Danio rerio* (Zebrafish), a diurnal vertebrate with close physiological similarity to humans, as a translational model to investigate the systemic effects of circadian misalignment. To stimulate real-world stressors without genetic or pharmacological manipulation, zebrafish were exposed for 96 hours to three experimental paradigms (i) continuous white light combined with red light to induce sensory and alertness-associated stress, (ii) white light with surface wave stimulation to mimic persistent mechanical stress, and (iii) white light with predatory visual cues to induce neurosensory stress. These conditions disrupted the natural light-dark cycle and reduced sleep duration. Melatonin levels revealed a statistically significant decline across all experimental groups, confirming circadian disturbance behaviour. Analysis demonstrated significant reductions. Statistically, MESOR, amplitude and acrophase alterations, along with PCA, Cosinor, and ANOVA analyses, confirmed rhythmic and behavioural alterations. Biochemical analyses revealed significant fluctuation in carbohydrates, proteins and lipids and respective enzyme activities in the muscle tissue of the experimental zebrafish. Histological examinations showed progressive neuronal degeneration, digestive organ pathology and evident cardiac endothelial disruption. This current study examines the circadian rhythm disturbances that induced neurobehavioural, metabolic, hormonal and histological changes, highlights its robustness and translational relevance as a model for studying circadian rhythm and its related disorders observed in humans.

Keywords: *Zebrafish, Circadian Rhythm, Melatonin, Behavioural Alterations, Metabolic Dysregulation, Cardiac Stress, Neurobehavioural Changes*

Publications:

1. **Dyapanagoudar, P.**, Tomson, M. (2025). Cardiac Endothelial Impairment in the *Danio Rerio* Due to Change in the Circadian Rhythm. In: Awasthi, K.K., Srivastava, S., Rathore, S. (eds) *The Green Revolution: Building Sustainable Solutions*. RTESD 2023. Springer Proceedings in Earth and Environmental Sciences. Springer, Cham. https://doi.org/10.1007/978-3-031-93444-5_61
2. **Pooja.M. Dyapanagoudar**, Majesh.Tomson, "Impact of circadian rhythm disruption on red blood cell count in *Danio rerio*", *J. of dynamics and control*, vol.8, no. 9, 2024, doi: <https://doi.org/10.71058/jodac.v8i9034>
3. **Pooja M. Dyapanagoudar**, Majesh Tomson. Methodology for Artificial Induction of Circadian Rhythm Disruption in *Danio rerio* (Zebrafish). Indian Patent 202541039512 A. Published May 16, 2025.