

Identification of Novel Lectins from Freshwater prawn, *Macrobrachium rosenbergii* and expression analysis in response to *Vibrio harveyi* and *M. rosenbergii* nodavirus

Snigdha Baliarsingh and Bharat Bhusan Patnaik*

PG Department of Biosciences and Biotechnology, Fakir Mohan University, Vyasa Vihar, Nuapadhi, Balasore-756089, Odisha,

India

*drbharatbhusan4@gmail.com

ABSTRACT

Background: The commercial cultivation of *M. rosenbergii* has been affected due to infection of *Vibrio* species and *M. rosenbergii* nodavirus (*Mr*NV). *Mr*NV is responsible for 100% mortality in post-larval prawns within 2-3 days of infection. The white-tail disease (WTD) caused by *Mr*NV accounts for an economic loss of about US\$15 million annually. Presently, studies are limited reporting the underlying immune mechanisms of *M. rosenbergii* against *Mr*NV and *V. harveyi* infection.

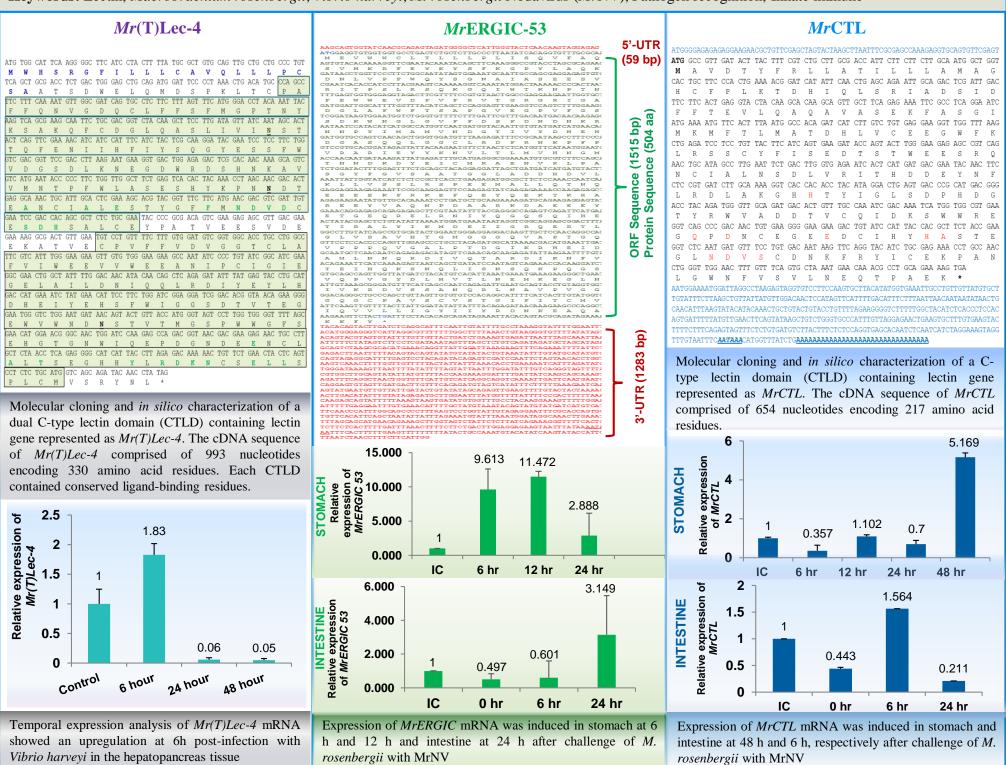
Objectives: This study was undertaken to identify lectin transcripts involved in immune response mechanisms of M. rosenbergii.

Methodology: We cloned and characterized the full-length cDNA using RACE-PCR, sequencing and bioinformatics approaches. The expression analysis of the lectins post-challenge with *Mr*NV and *V. harveyi* were studied using the qRT-PCR approach.

Findings: Out of the lectin transcripts identified, two of them [MrCTL and Mr(T)Lec4] showed C-type lectin domain (CTLD) and one L-type lectin domain, later identified as endoplasmic reticulum-Golgi intermediate compartment 53-kDa protein (MrERGIC-53). While MrCTL and Mr(T)Lec4 encoded polypeptides of 217 and 330 amino acid (aa) residues, MrERGIC-53 encoded a protein of 504 aa. MrCTL mRNA was expressed in stomach and intestine tissue at 48 h and 6 h, respectively post-challenge with MrNV, while Mr(T)Lec4 mRNA was induced at 6 h in hepatopancreas after V. *harveyi* challenge. MrERGIC-53 was also found to be induced in stomach and intestine tissues of the host post MrNV challenge (Baliarsingh et al., 2019; Baliarsingh et al., 2022).

Conclusion: These results demonstrate that MrCTL, Mr(T)Lec4, and MrERGIC-53 may putatively act in the innate immune defense response of M. *rosenbergii* against the pathogens.

Keywords: Lectin, Macrobrachium rosenbergii, Vibrio harveyi, M. rosenbergii Nodavirus (MrNV), Pathogen recognition, Innate immune



This work was supported by grant from Department of Biotechnology, Government of India (BT/PR12710/AAQ/03/713/2015) under Aquaculture and Marine Biotechnology Category