CHEMISTRY DEPARTMENT SEMINAR

The Interplay of XRN2 and DDX23 in Preventing R-loop-induced Genomic Instability

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Host: Praveen Patidar, PhD

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Lopez 106

Abstract

R-loops, DNA-RNA hybrids with displaced single-stranded DNA, are associated with genomic instability and cause neurodegenerative disorders, autoimmune diseases, and cancer if they are not resolved promptly. Therefore, understanding the mechanisms involved in R-loop metabolism is essential. Several factors have been reported to regulate R-loops, including RNA processing and splicing factors, elongation factors, helicases, and nucleases. The 5'→3' exoribonuclease 2 (XRN2) plays an important role in R-loop resolution and DNA repair. Although the role of XRN2 in cellular processes such as transcription termination and RNA metabolism is well studied, its function in DNA repair, resolving replication stress, and promoting cell survival remains elusive. Our previous studies identified XRN2's association with DEAD-box helicase 23 (DDX23). Moreover, others have also shown that XRN2 as well as DDX23 depletion lead to the accumulation of R-loop and DNA damage. Based on these findings, we hypothesized that XRN2 and DDX23 interplay is critical in preventing R-loop-induced genomic instability. The overall goal of my research project is to determine the biochemical basis, functional implications, and biological significance of XRN2-DDX23 interaction in R-loop metabolism and genome maintenance. In this presentation, I will discuss the background and initial findings related to my project.

Bio

During my studies at Khulna University in Bangladesh, I pursued both a Bachelor's and Master's degree in Biotechnology and Genetic Engineering. My research focus was on "Bioprospecting of Medicinal Plants in the Sundarbans, the Largest Mangrove Forest in the World - in search of New Medicines". I am doing my PhD under the mentorship of Dr. Praveen Patidar. My doctoral research focuses on the cooperation of XRN2 and DDX23 in preventing R-loop-induced genomic instability