

Guest Editorial

Glimpses of RNA Biology

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RNA has occupied the centre-stage in cell and molecular biology because in all pro- and eu-karyotes, it is the first product in a series of events that converts the genetic information encoded in DNA into the final phenotype. An informal 'RNA Group' has been holding biennial meetings in the country since the beginning of this century with a view to exchange new findings by researchers in the country in RNA biology and to also encourage younger investigators to move into this exciting field. The 9th meeting of this group, supported in part also by the Indian National Science Academy, was held from October 26 to October 28, 2017 at the sprawling green campus of the Banaras Hindu University at Varanasi. About 30 principle investigators and 80 post-docs and graduate students from across the country attended the meeting. In addition to the invited talks in sessions on miRNA and Gene Regulation, Translation Regulation, Structural and Computational RNA Biology, miRNA in Health and Disease, lncRNA Biology, and RNA in Disease Biology, a large number of young investigators and students presented their results as short talks and posters.

The collection of articles in the Special section on RNA Biology in this issue of the *Proceedings of the Indian National Science Academy* is based on some of the invited talks delivered at this meeting. The article by Subhash C Lakhotia (pp. 415-427) provides a historical perspective to the current excitement about the importance of diverse non-coding RNAs, especially the long non-coding RNAs (lncRNA) in cell regulation. Riyaz Ahmad Shah, Sunil Shetty and Umesh Varshney (pp. 429-438) review significance of the two highly conserved features of initiator tRNA in eubacteria during initiation of translation. The review by N Anushree and P V Shivaprasad (pp. 439-453) covers recent advances

in understanding of structural and sequence determinants of plant miRNAs that distinguish them from their precursor regions and play a major role in precise dicing of miRNAs to regulate their abundance and stability. Ankita Punetha, K N R Yoganand, Siddharth Nimkar, and B Anand (pp. 455-477) discuss the varying modes adopted by the CRISPR/Cas systems in diverse bacteria to generate the mature crRNAs in their defense against the invading plasmids, transposons and phages. A good understanding of the diverse CRISPR/Cas system can greatly improve its usage as a powerful tool in genome and gene editing. Raju Roy and Purusharth I Rajyaguru (pp. 479-491) provide an account of diverse cytoplasmic RNA granules like stress granules, P-bodies etc, which require proteins with intrinsically disordered regions for assembly; since these granules play key roles in determining mRNA fate in cytoplasm, their impaired assembly/disassembly is implicated in various neurodegenerative diseases and cancers. The next four articles in this collection consider functional aspects of different lncRNAs which are being increasingly appreciated to be responsible for generating and sustaining the biological complexities through their diverse regulatory roles. Mayuresh Anant Sarangdhar, Divya Chaubey and Beena Pillai (pp. 493-500) summarize the involvement of lncRNAs in dendritogenesis, especially the roles of Zebrafish lncRNA *Durga*, identified in their lab, in modulating expression of the neighbouring *Kalirin* gene and thus the process of dendritogenesis during neuronal differentiation. The review by Bishnupriya Chhatrriya, Piyali Sarkar and Srikanta Goswami (pp. 501-511) summarizes the microRNAs and lncRNAs that have been found to be associated with chronic pancreatitis disease condition in humans. Diverse lncRNAs play significant roles in helping cells survive the stress faced as part of their lives. The brief review by Anshika

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Goenka and Subramaniam Ganesh (pp. 513-520) provides a glimpse of the diverse lncRNAs that cells, especially the mammalian cells, employ to face the stress. Finally, Bakhya Shree and Vivek Sharma (pp. 521-529) discuss the modulatory roles of lncRNAs in homologous recombination and non-homologous end joining modes of DNA double strand break repair through interactions with regulatory proteins and other transcripts involved in DNA repair.

I thank all the authors for contributing these articles, which provide a glimpse of the enormous diversity of actions and functions played by RNA in living systems. We hope that readers would find these interesting and useful.