Introduction

Exploring the RNA World

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It has been a pretty impressive few years when we consider our deepened understanding of the role that RNA plays in many biological processes. From short interfering RNAs (siRNA) capable of inducing RNA interference (RNAi) and specific gene silencing, to long non-coding RNAs with the ability to regulate gene expression through interactions with chromatin and proteins, the fact is that life in the “RNA World” is much more diverse—and complex—than anyone could have predicted ten years ago.

With the emergence of genome-wide analysis tools such as microarrays and next-generation DNA sequencing, an entire universe of RNA molecules has been revealed that are transcribed from regions of the genome and previously thought of as “junk.” While at first researchers suspected that many of these RNA species were nothing more than transcriptional noise with no functional significance, it has come to be realized that this is not the case—this myriad of RNA regulates a diverse range of cellular functions.

Through a collection of research articles and a news feature in this special section of *BioTechniques*, we are celebrating new findings, as well as the tools, techniques, and methods being used to make such discoveries possible. To provide context to the new “RNA World,” Kevin Morris and Anne-Marie Turner from The Scripps Research Institute in La Jolla, California review some of the most recent discoveries on the roles of non-coding RNAs in controlling mammalian transcription. In a series of basic research articles, Larry McReynolds and colleagues from New England BioLabs describe the development of a protein-mediated small RNA purification system with greater sensitivity and selectivity than Northern blotting, while Todd Lamitina and Elizabeth Morton from the University of Pennsylvania report on a new set of software tools to assist in the analysis of data from flow cytometry RNAi screens. Finally, in a special news feature, *BioTechniques* Editor-in-Chief Nathan Blow details the story behind one of the latest groups of non-coding RNAs to be uncovered: large intergenic non-coding RNAs, or the so-called lincRNAs.

The editors at *BioTechniques* are confident that this collection of articles will not only give our readers a better insight into our current understanding of the “RNA World,” but also provide a glimpse into what discoveries might lay down the road and the technologies and methods that will lead us there.

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Our cover illustration represents a multi-layered window into the world of RNA, connecting the scientific to the universal. This juxtaposition of diverse visual elements—mandalas, microarrays, phylogenetic trees, periodic charts, and models—celebrates the idea of RNA as an essential, critical molecule to life. Design by Tavares Jones.