Preface

Ribonucleic acids are central to cellular and molecular processes and perform vital functions in both structural and functional roles. RNA molecules form the bridge between the stable genetic information contained within DNA and enzymes and proteins that carry out much of the metabolism within the cell. Many of the sites of protein synthesis, the ribosomes within the cell, are composed of these ribonucleic acids as are the tRNA molecules that deliver the amino acid building blocks to the ribosomes. Of all the RNA species, the nucleic acid intermediate, messenger RNA, is a desirable source of material to biologists, since this reflects much of, what ultimately, is translated into enzymes and proteins. In order to determine the qualitative and quantitative changes in mRNA expression, a vast number of molecular biological techniques have been developed.

Key molecular methods that provide the means to initially isolate and analyze RNA molecules are the focus of this volume. In putting together this collection of protocols, we have tried to provide techniques that are most applicable and widely used. In particular, there are a number of isolation techniques included that have been developed, modified, or adapted to enable extraction from a variety of cell types, organisms, or subcellular organelles. Successful isolation of intact RNA is an essential starting point for any subsequent analysis. This is why we have aimed to make this section comprehensive.

The analysis of RNA is the focus of the following chapters. It includes traditional methods of blotting and hybridization, through to those techniques such as differential display, which can measure changes in the expression of specific genes. Readers of this volume will see that many of the methods have been developed through the application of the polymerase chain reaction, which continues to be a profoundly influential technique used today. These and later chapters deal with transcription and translation in vitro and in situ visualization of RNA molecules.

All of the chapters are presented in the familiar style of the Methods in Molecular Biology™ series, with a short description of the basic theory of the technique and an outline of the procedure, followed by a Materials section listing all the reagents necessary for the protocol. The Methods section pro-

vides a full and comprehensive account of the protocol in a step-by-step series of actions. In addition, references to the notes provide valuable and useful pieces of information not found in traditional scientific papers, but which in many cases may mean the difference between success and failure of a particular method. All contributors carry out their own research or lead groups that apply the techniques as a matter of routine and therefore are best suited to providing such methods. In putting together *RNA Isolation and Characterization Protocols,* we would like to thank all the present authors that have taken the trouble and valuable time to prepare the individual chapters, Professor John Walker, the series editor for his helpful advice and guidance, and the staff at The Humana Press.

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