# Contents

**Preface** ......................................................... v  
**Contributors** ...................................................... ix  

## Part I Imaging of the Nucleolus

1. The Relationship Between Human Nucleolar Organizer Regions and Nucleoli, Probed by 3D-ImunoFISH ................................................................. 3  
   *Marjolein van Sluis, Chelly van Vuuren, and Brian McStay*  

2. Analysis of the *C. elegans* Nucleolus by Immuno-DNA FISH ............ 15  
   *Christian Lanctôt*  

3. Correlative Light and Electron Microscopy of Nucleolar Transcription in *Saccharomyces cerevisiae* .......................................................... 29  
   *Christophe Normand, Maxime Berthaud, Olivier Gadal, and Isabelle Léger-Silvestre*  

4. High-Throughput Live-Cell Microscopy Analysis of Association Between Chromosome Domains and the Nucleolus in *S. cerevisiae* ............... 41  
   *Renjie Wang, Christophe Normand, and Olivier Gadal*  

5. Quantitative Immunofluorescence Analysis of Nucleolus-Associated Chromatin .................................................. 59  
   *Stefan Dillinger and Attila Németh*  

6. Visualization of the Nucleolus in Living Cells with Cell-Penetrating Fluorescent Peptides ........................................... 71  
   *Robert M. Martin, Henry D. Herce, Anne K. Ludwig, and M. Cristina Cardoso*  

## Part II Analysis of Ribosomal RNA Transcription and Processing

7. Purification of Crystallization-Grade RNA Polymerase I from *S. cerevisiae* .................. 85  
   *Christoph Engel*  

8. Analysis of *S. cerevisiae* RNA Polymerase I Transcription In Vitro ........... 99  
   *Michael Pilsl, Philipp E. Merkl, Philipp Milkereit, Joachim Griesenbeck, and Herbert Tschochner*  

9. Preparation of Chromatin Templates to Study RNA Polymerase I Transcription In Vitro .......... 109  
   *Gernot Längst*  

10. A Nonradioactive Assay to Measure Production and Processing of Ribosomal RNA by 4sU-Tagging .................................................. 121  
    *Kaspar Burger and Dirk Eick*  

11. Metabolic Labeling in the Study of Mammalian Ribosomal RNA Synthesis .................................................. 133  
    *Victor Y. Stefanovsky and Tom Moss*
12 Quantitative Northern Blot Analysis of Mammalian rRNA Processing
Minshi Wang and Dimitri G. Pestov

PART III  GENOMICS AND PROTEOMICS OF THE NUCLEOLUS

13 Complete Sequence Construction of the Highly Repetitive Ribosomal RNA Gene Repeats in Eukaryotes Using Whole Genome Sequence Data
Saumya Agrawal and Austen R.D. Ganley

14 Analysis of rRNA Gene Methylation in Arabidopsis thaliana by CHEF-Conventional 2D Gel Electrophoresis
Gireesha Mohannath and Craig S. Pikaard

15 Fluorescence-Activated Nucleolus Sorting in Arabidopsis
Frédéric Pontvianne, Myriam Boyer-Clavel, and Julio Sáez-Vásquez

16 Purification of RNA Polymerase I-Associated Chromatin from Yeast Cells
Astrid Bruckmann, Jan Linnemann, and Jorge Perez-Fernandez

17 Bioinformatic Analysis of ChIP-seq Data on the Repetitive Ribosomal RNA Gene
Uwe Schwartz and Gernot Längst

18 Deep Sequencing Analysis of Nucleolar Small RNAs: RNA Isolation and Library Preparation
Baoyan Bai and Marikki Laiho

19 Deep Sequencing Analysis of Nucleolar Small RNAs: Bioinformatics
Baoyan Bai and Marikki Laiho

20 Quantitative Proteomic Analysis of the Human Nucleolus
Dalila Bensaddek, Armel Nicolas, and Angus I. Lamond

21 Analysis of Mass Spectrometry Data for Nucleolar Proteomics Experiments
Armel Nicolas, Dalila Bensaddek, and Angus I. Lamond

Index

Contents
The Nucleolus
Methods and Protocols
Németh, A. (Ed.)
2016, XI, 279 p. 55 illus., 43 illus. in color., Hardcover
A product of Humana Press