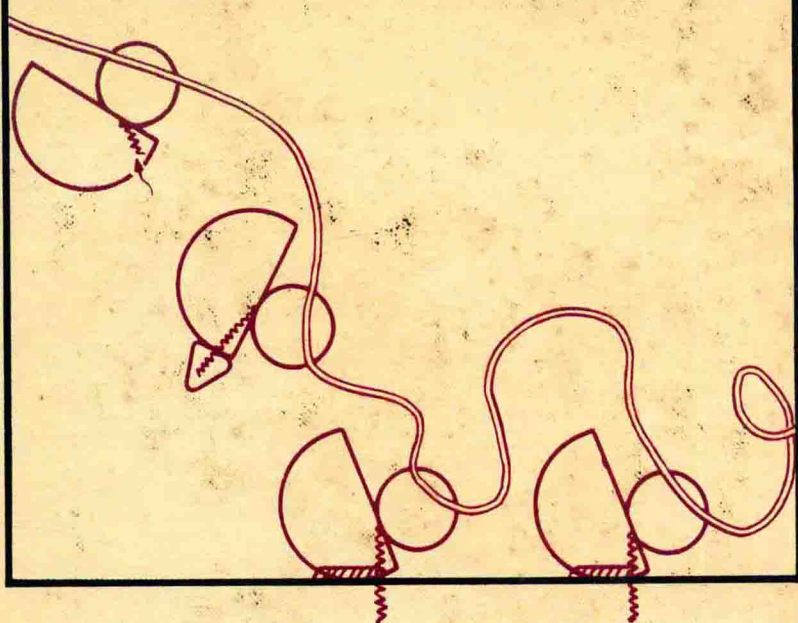


ALEXANDER S. SPIRIN



RIBOSOME STRUCTURE AND PROTEIN BIOSYNTHESIS

Ribosome Structure and Protein Biosynthesis

Alexander S. Spirin

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Preface

This book is based on an advanced course of lectures on ribosome structure and protein biosynthesis that I offer at Moscow State University. These lectures have been part of a general course on molecular biology for almost 20 years. It is quite natural that they have undergone considerable evolution as knowledge has progressed in this field. This evolution continues, and readers should be prepared that some of the statements and ideas that I have ventured to put in this book may not stand the test of time. Nevertheless, since I decided to keep a lecture style as far as possible, I took these risks in writing this book. After all, this is a textbook which, on the one hand, should provide a background of knowledge and current ideas in the field and, on the other hand, should stimulate students to think, discuss, and formulate problems. The presentation of some of the topics should perhaps be regarded just as examples of today's interpretations or generalizations. Anyway, in a number of cases I have preferred not to leave white spots but to give a tentative interpretation of disputable and controversial results as I do in my lectures.

The literature sources in this book are cited mainly for teaching purposes. Each of the chapters is not intended as a review, and the reference lists are far from complete. To give an insight into the histories of discoveries I have tried to cite pioneer studies in the fields discussed. To provide information on the present state of knowledge, I

have referred the reader to some of the recent papers. As this is an advanced textbook, I thought it would be helpful to give several dozen references in each chapter rather than limiting them to the very minimum. Many chapters are also supplemented with a list of books, reviews and particularly fundamental papers for further reading; these include titles where the point of view and interpretations may differ from my own.

In any textbook the choice of illustrations is the most complex and difficult part. When lecturing and using the blackboard, it is quite easy to draw a diagram, whereas providing a corresponding drawing for a written textbook is quite another matter. I decided in the main not to reproduce standard diagrams used in other books or textbooks but to create my own. In making the final illustrations I was greatly assisted by the Department of Scientific Information of the Institute of Protein Research, and, personally, by its Head, Mr Ariel Raiher; I am particularly grateful to Pavlina Zavozina and Vera Nevskaya for doing these drawings.

The illustrations to some of the chapters could not have appeared without the personal assistance of Dr. Valery Lim and Dr. Victor Vasiliev from the Institute of Protein Research, who not only supplied the pictures of stereochemical models and the majority of the original electron micrographs for this book, but were my constant consultants during the writing of the corresponding sections. Their associates Andrey Kayava, Dmitry Lyakhov, Olga Selivanova, and Sergei Ryazantsev also helped with the drawings and photographs of models.

I am grateful to the scientists who have read parts of the manuscript and made their comments. Particularly valuable comments were made by Dr. Vadim Agol, Dr. Alexey Bogdanov, Dr. Alexander Chetverin, Dr. Alexander Efimov, Dr. Alexander Girshovich, Dr. Anatoly Gudkov, Dr. Lev Kiselev, Dr. Dmitry Knorre, Dr. Alexander Krayevsky, Dr. Marina Kukhanova, Dr. Oleg Ptitsyn, Dr. Evgeny Shakhnovich, Dr. Valery Schwartz and Dr. Leonid Voronin. Dr. Georgyi Gause who has translated this book into English made several valuable suggestions which contributed to clearer formulations.

Finally, I would particularly like to thank Ruma Makarova and Larisa Rozhanskaya for their invaluable help in preparing the manuscript.

Unfortunately, I had no real opportunity to familiarize many of my colleagues with this manuscript, particularly in other countries. I very much hope that they will respond to the publication of the book and send their critical comments which will be greatly appreciated.

*Pushchino and Moscow
January, 1984*

Alexander Spirin

Contents

Preface	xv
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PART I

INTRODUCTION

1. General Scheme of Protein Biosynthesis	3
Further reading	6
2. Messenger RNA and the Genetic Code	7
2-1 Discovery of mRNA	7
2-2 Deciphering the code	9
2-3 Some features of the code dictionary	14
2-4 Structure of mRNA	15
Primary structure	15 / Functional regions 18 /
Folding	21
References	27
Further reading	30
3. Transfer RNA and Aminoacyl-tRNA Synthetases	32
3-1 Discovery	32
3-2 Structure of tRNA	34
Primary structure	34 / Secondary structure 39 /
Tertiary structure	44

3-3 Aminoacyl-tRNA synthetases	48
3-4 Aminoacylation of tRNA	51
3-5 Specificity of tRNA aminoacylation	55
<i>Specificity for amino acids</i>	55 /
<i>Specificity for tRNA</i>	56
References	58
Further reading	60

4. Ribosomes and Translation 62

4-1 First observations	62
4-2 Localization of ribosomes in the cell	64
4-3 Prokaryotic and eukaryotic ribosomes	64
4-4 Sequential readout of mRNA by ribosomes:	
Polyribosomes	68
4-5 Stages of translation: Initiation, elongation, and termination	70
4-6 Cell-free translation systems	71
References	72
Further reading	74

5. Chemical Reactions and the Overall Energy Balance of Protein Biosynthesis 76

Appendix	78
Further reading	80

PART II

STRUCTURE OF THE RIBOSOME

6. Morphology of the Ribosome 83

6-1 Size, appearance, and subdivision	83
6-2 Detailed shape of ribosomal subunits	85
<i>Small subunit</i>	85 /
<i>Large subunit</i>	87
6-3 Association of subunits into the complete ribosome	90
References	91

7. Ribosomal RNA 93

7-1 Significance of ribosomal RNA	93
-----------------------------------	----

7-2 Ribosomal RNA species	94
<i>High-molecular-mass RNA of the small ribosomal subunit</i>	94 /
<i>High-molecular-mass RNA of the large ribosomal subunit</i>	95 /
5S RNA of the large ribosomal subunit	96
7-3 Primary and secondary structures	96
16S (18S) RNA	96 /
23S (28S) RNA	103 /
5S RNA	106
7-4 Structural domains and compact folding of RNA molecules	111
16S (18S) RNA	111 /
23S (28S) RNA	114
References	116
Further reading	121
8. Ribosomal Proteins	123
8-1 Diversity: Nomenclature	123
8-2 Primary structures	126
8-3 Three-dimensional structures	129
8-4 Protein complexes	132
8-5 Interactions with ribosomal RNA	134
References	138
Further reading	140
9. Mutual Arrangement of Ribosomal RNA and Proteins (Quaternary Structure)	142
9-1 Peripheral localization of proteins on the RNA core	142
9-2 Topography of proteins	145
<i>Identification of neighboring proteins</i>	145 /
<i>Measuring distances between proteins</i>	147 /
Immuno-electron microscopy	148
9-3 Topography of RNA	153
Immuno-electron microscopy	153 /
Assignment to protein topography	154
9-4 Quaternary structure	157
References	158
Further reading	160

10. Structural Transformations of Ribosomes (<i>in vitro</i>)	162
10-1 Dissociation of ribosomes into subunits	162
10-2 Unfolding of subunits	167
10-3 Disassembly and reassembly of subunits	173
Disassembly	173 / Reassembly 177
References	181

PART III

FUNCTIONING OF THE RIBOSOME

11. Functional Activities and Functional Sites of the Ribosome	187
11-1 Working cycle of the ribosome	187
11-2 Binding functions	189
Binding and retention of the template polynucleotide (mRNA-binding site)	189 / Retention of peptidyl-tRNA or deacylated tRNA (tRNA-binding P-site) 194 / Binding of aminoacyl-tRNA (tRNA-binding A-site) 197 / Binding of translation factors and GTP (factor-binding site) 200
11-3 Catalytic functions	204
GTPase	204 / Peptidyl transferase 204
11-4 Function of ligand displacement (translocation)	209
References	210
Further reading	214
12. Elongation I: Aminoacyl-tRNA Binding with the Ribosome	216
12-1 Codon-anticodon interaction	216
Adaptor hypothesis and its proof	216 / The concept of anticodon 217 / Wobble hypothesis 218 / Corrections to wobbling rules 222 / Stereochemistry of codon-anticodon pairing 223

12-2	Participation of the elongation factor (EF- T_u or EF-1) in aminoacyl-tRNA binding	225
	<i>EF-T_u and its interactions</i>	225 /
	<i>Binding the ternary complex with the ribosome</i>	228 /
	<i>Role of GTP hydrolysis</i>	228
12-3	"Nonenzymatic" (factor-free) binding of aminoacyl-tRNA	230
12-4	Inhibitors	231
12-5	Miscoding	234
	<i>Misreading of poly(U)</i>	234 /
	<i>Principal types of mispairing</i>	236 /
	<i>Factors contributing to miscoding</i>	236 /
	<i>Miscoding level in vivo under normal conditions</i>	238 /
	<i>Kinetic mechanisms of miscoding and miscoding correction</i>	241
12-6	Sequence of events and molecular mechanisms	244
	<i>Scanning of tRNA species</i>	244 /
	<i>Recognition of anticodon</i>	246 /
	<i>GTP hydrolysis</i>	247 /
	<i>Correction of aminoacyl-tRNA selection</i>	247 /
	<i>Locking of aminoacyl-tRNA in the A-site</i>	248 /
	<i>General scheme</i>	248
	<i>References</i>	250
	<i>Further reading</i>	256
13.	Elongation II: Transpeptidation (Peptide Bond Formation)	258
13-1	Chemistry of the reaction	258
13-2	Energy balance of the reaction	262
13-3	Inhibitors	263
13-4	Stereochemistry	266
	<i>References</i>	271
14.	Elongation III: Translocation	274
14-1	Definition and experimental tests	274
14-2	Participation of the elongation factor (EF-G or EF-2)	276

14-3	Role of EF-G-mediated GTP hydrolysis	279
14-4	Sequence of events in EF-G-catalyzed translocation: Inhibitors	280
14-5	"Nonenzymatic" (factor-free) translocation	283
14-6	Movement of the template during translocation	285
14-7	Energetics of translocation	286
14-8	Molecular mechanisms of translocation	288
14-9	Summary: The material and energy balance of the elongation cycle	289
	References	290
	Further reading	293
15.	Elongation IV: Rate Modulation	295
15-1	Discontinuities in elongation	295
15-2	Selective regulation of elongation rate on different mRNAs	297
15-3	Total regulation of elongation rate	298
	<i>Slowing-down of elongation upon virus infections</i>	<i>298</i>
	<i>Total repression of elongation by bacterial and plant toxins</i>	<i>299</i>
	<i>Regulation of the elongation rate through endogeneous modifications of elongation factors</i>	<i>304</i>
	References	305
16.	Initiation of Translation and Its Regulation in Procaryotes	308
16-1	Significance of initiation	308
16-2	Initiation codons, initiator tRNA, and protein initiation factors	309
16-3	State of ribosomes before initiation	312
16-4	Association of the ribosome with the template polynucleotide	312
16-5	Sequence of events during initiation	313
16-6	Initiation in the absence of some initiation components	319
16-7	Regulation of initiation: Control of protein synthesis at the translational level	321

<i>Regulation of translation of MS2 phage</i>	
<i>RNA</i>	322 / <i>Regulation of the</i>
<i>synthesis of ribosomal proteins</i>	325
References	332
Further reading	338

17. Initiation of Translation and Its Regulation in Eucaryotes 339

17-1 Characteristics of eucaryotic mRNA	339
17-2 Initiation codon, initiator tRNA, and protein initiation factors	341
17-3 State of ribosomes before initiation	346
17-4 Formation of the complex between the 40S ribosomal subunit and the initiator tRNA	346
17-5 Association of the ribosomal 40S subunit with mRNA	347
17-6 Recognition of the initiation codon	350
17-7 Formation of the initiation ribosomal 80S complex	352
17-8 Regulation of initiation	353
<i>Selective discrimination of mRNA</i>	355 /
<i>Repression of initiation</i>	357
References	361
Further reading	367

18. Termination of translation 369

18-1 Termination codons	369
18-2 Termination protein factors	371
18-3 Ribosomal site for binding termination factors	372
18-4 Hydrolysis of peptidyl-tRNA	373
18-5 Sequence of events during termination	374
References	376

19. Cotranslational Folding, Compartmentalization, and Modifications of Proteins 378

19-1 Contribution of ribosomes to protein folding	378
19-2 Interaction of the ribosome and the nascent peptide with the membrane: Cotranslational transmembrane transport	381

Synthesis of proteins by free and membrane-bound polyribosomes 381 / *Interaction between the ribosome and the membrane* 382 / *N-terminal signal sequence of the nascent polypeptide* 385 / *Signal recognition particles and their membrane receptors* 391

19-3 Cotranslational modifications of proteins 394

 References 398

 Further reading 403

PART I

INTRODUCTION