

Contents

Part I

Introduction

CHAPTER 1

- Cell-Free Protein Synthesis** 3
ALEXANDER S. SPIRIN

Part II

Improved Classical (Batch) Cell-Free Translation Systems

CHAPTER 2

- Improved Batch Translation System Based on *E. coli* Extract** .. 23
THORSTEN LAMLA and VOLKER A. ERDMANN

CHAPTER 3

- Improved Composition and Energy Supply
for Bacterial Batch Systems** 41
DONG-MYUNG KIM and JAMES R. SWARTZ

CHAPTER 4

- PURE System: New Cell-Free Translation System
Reconstructed with Purified Components** 53
TAKUYA UEDA, AKIO INOUE, MIDORI KAIDA,
RYOKO BABA and YOSHIHIRO SHIMIZU

CHAPTER 5

- Direct Expression of PCR Products
in Cell-Free Translation Systems** 61
ANATOLY T. GUDKOV and KIRILL A. MARTEMYANOV

CHAPTER 6

- Yeast Cell-Free Translation Systems** 67
MICHAEL ALTMANN and HANS TRACHSEL

CHAPTER 7
**Poly(A)-Dependent Cell-Free Translation Systems
from Animal Cells** 79
GIOVANNA BERGAMINI and FÁTIMA GEBAUER

Part III
**Continuous-Flow and Continuous-Exchange
Cell-Free Translation Systems**

CHAPTER 8
**Continuous-Flow and Continuous-Exchange
Cell-Free Translation Systems and Reactors** 91
VLADIMIR A. SHIROKOV, PETER N. SIMONENKO,
SERGEY V. BIRYUKOV and ALEXANDER S. SPIRIN

CHAPTER 9
Highly Productive Plant Continuous Cell-Free System 109
KAIRAT MADIN, TATSUYA SAWASAKI and YAETA ENDO

CHAPTER 10
**Matrix Reactor: A New Scalable Reactor Principle
for Cell-Free Protein Expression** 121
BERND BUCHBERGER, WOLFGANG MUTTER, ALBERT RÖDER

Part IV
Protein Folding in Cell-Free Translation System

CHAPTER 11
**Co-Translational Protein Folding in Prokaryotic
and Eukaryotic Cell-Free Translation Systems** 131
VYACHESLAV A. KOLB, AIGAR KOMMER
and ALEXANDER S. SPIRIN

CHAPTER 12
**Expression of an Aggregation-Prone Protein
in the RTS 500 System** 141
JEAN-MICHEL BETTON

CHAPTER 13
**Expression of Soluble Murine Endostatin
with the RTS System** 149
STACEY TRAVIGLIA and MONIQUE VAN HOEK

CHAPTER 14
Cell-Free Expression of Soluble Human Erythropoietin 157
CORDULA NEMETZ, STEPHANIE WESSNER, SIMONE KRUPKA,
MANFRED WATZELE and WOLFGANG MUTTER

CHAPTER 15
**Cell-Free Expression of a 127 kDa Protein:
The Catalytic Subunit of Human Telomerase** 165
ROBIN STEIGERWALD, CORDULA NEMETZ,
BÄRBEL WALCKHOFF and THOMAS EMRICH

CHAPTER 16
**The Expression of Disulfide Bonded Proteins
in Cell-Free Protein Expression** 175
ERHARD FERNHOLZ, KATRIN ZAISS, HÜSEYIN BESIR
and WOLFGANG MUTTER

Part V

Special Topics and Short Communications

CHAPTER 17
**Structural and Functional Compensation
by Proteins for the RNA Deficit
of Animal Mitochondrial Translation Systems** 183
TSUTOMU SUZUKI, TAKASHI OHTSUKI,
YOH-ICHI WATANABE, MAKI TERASAKI,
TAKAO HANADA and KIMITSUNA WATANABE

CHAPTER 18
**Proficient Target Selection in Structural Genomics by In Vitro
Protein Expression on Gateway Recombination Plasmids** 197
RENAUD VINCENTELLI, CHANTAL ABERGEL,
CÉLINE DEREGNAUCOURT, JEAN-MICHEL CLAVERIE
and VINCENT MONCHOIS

CHAPTER 19
**High-Level Cell-Free Protein Expression
from PCR-Generated DNA Templates** 203
THOMAS HOFFMANN, CORDULA NEMETZ,
REGINA SCHWEIZER, WOLFGANG MUTTER
and MANFRED WATZELE

CHAPTER 20

- Optimization of the Translation Initiation Region
of Prokaryotic Expression Vectors: High Yield In Vitro
Protein Expression and mRNA Folding** 211
ANDREA GRAENTZDOERFFER, MANFRED WATZELE,
BERND BUCHBERGER, SABINE WIZEMANN,
THOMAS METZLER, WOLFGANG MUTTER
and CORDULA NEMETZ

CHAPTER 21

- Selective Labeling of Proteins in the RTS 500 System** 219
JEAN-MICHEL BETTON, NICOLAE PALIBRODA,
ABDELKADER NAMANE, THOMAS METZLER
and OCTAVIAN BÄRZU

CHAPTER 22

- In Vitro Protein Production for Structure Determination
with the RTS System** 227
HO S. CHO, JEFFREY G. PELTON, WEIRU WANG,
HISAO YOKOTA and DAVID E. WEMMER

CHAPTER 23

- Sequence Specific Biotinylation and Purification
of Proteins Expressed in the RTS 500 System** 235
MICHAEL SCHRÄML, DOROTHEE AMBROSIUS,
JAN STRACKE and MARTIN LANZENDÖRFER

CHAPTER 21

- Synthesis of the His 6-Tagged Recombinant
Protein APPC99-His and His-PS1 Using RTS 500** 247
MIYUKI MURAYAMA, XIAOYAN SUN and AKIHIKO TAKASHIMA