
Contents

<i>Preface</i>	<i>v</i>
<i>Contributors</i>	<i>xi</i>
PART I DETECTION AND QUANTIFICATION OF pADPr	
1 Quantitation of Poly(ADP-Ribose) by Isotope Dilution Mass Spectrometry	3
<i>Tabea Zubeł, Rita Martello, Alexander Bürkle, and Aswin Mangerich</i>	
2 Quantification of PARP Activity in Human Tissues: Ex Vivo Assays in Blood Cells and Immunohistochemistry in Human Biopsies	19
<i>Eszter M. Horvath, Zsuzsanna K. Zsengellér, and Csaba Szabo</i>	
3 Detecting and Quantifying pADPr In Vivo	27
<i>Yi-Chen Lai, Rajesh K. Aneja, Margaret A. Satchell, and Robert S.B. Clark</i>	
4 Compartment-Specific Poly-ADP-Ribose Formation as a Biosensor for Subcellular NAD Pools	45
<i>Magali R. VanLinden, Marc Niere, Andrey A. Nikiforov, Mathias Ziegler, and Christian Dölle</i>	
5 Cell Cycle Resolved Measurements of Poly(ADP-Ribose) Formation and DNA Damage Signaling by Quantitative Image-Based Cytometry	57
<i>Jone Michelena and Matthias Altmeyer</i>	
PART II IDENTIFICATION OF PROTEIN TARGETS	
6 Detecting Protein ADP-Ribosylation Using a Clickable Aminooxy Probe	71
<i>Rory K. Morgan and Michael S. Cohen</i>	
7 ADP-Ribosylated Peptide Enrichment and Site Identification: The Phosphodiesterase-Based Method	79
<i>Casey M. Daniels, Shao-En Ong, and Anthony K.L. Leung</i>	
8 Using Clickable NAD ⁺ Analogs to Label Substrate Proteins of PARPs	95
<i>Lu Zhang and Hening Lin</i>	
9 Identification of Protein Substrates of Specific PARP Enzymes Using Analog- Sensitive PARP Mutants and a “Clickable” NAD ⁺ Analog	111
<i>Bryan A. Gibson and W. Lee Kraus</i>	
10 Identification of ADP-Ribose Acceptor Sites on In Vitro Modified Proteins by Liquid Chromatography–Tandem Mass Spectrometry	137
<i>Mario Leutert, Vera Bilan, Peter Gehrig, and Michael O. Hottiger</i>	

- 11 Proteome-Wide Identification of In Vivo ADP-Ribose Acceptor Sites
by Liquid Chromatography–Tandem Mass Spectrometry 149
*Sara C. Larsen, Mario Leutert, Vera Bilan, Rita Martello,
Stephanie Jungmichel, Clifford Young, Michael O. Hottiger,
and Michael L. Nielsen*

PART III FUNCTIONAL ANALYSIS

- 12 Poly(ADP-Ribose)-Dependent Chromatin Remodeling in DNA Repair. 165
Théo Lebeauvin, Rebecca Smith, Sébastien Huet, and Gyula Timinszky
- 13 Methods to Assess the Role of Poly(ADP-Ribose) Polymerases
in Regulating Mitochondrial Oxidation 185
Edit Mikó, Tünde Kovács, Tamás Fodor, and Péter Bai
- 14 Approaches for Investigating Translational Regulation Controlled
by PARP1: Biotin-Based UV Cross-Linking and Luciferase Reporter Assay . . . 201
Yingbiao Ji
- 15 Methodology to Identify Poly-ADP-Ribose Polymerase 1 (PARP1)–mRNA
Targets by PAR-CLiP 211
Manana Mekishvili, Elena Matveeva, and Yvonne Fondufe-Mittendorf

PART IV REGULATION OF PARP-1 AND ITS PARTNERS

- 16 Biochemical and Biophysical Methods for Analysis of Poly(ADP-Ribose)
Polymerase 1 and Its Interactions with Chromatin. 231
*Maggie H. Chassé, Uma M. Muthurajan, Nicholas J. Clark,
Michael A. Kramer, Srinivas Chakravarthy, Thomas Irving,
and Karolin Luger*
- 17 PARP-1 Interaction with and Activation by Histones and Nucleosomes. 255
Colin Thomas, Elena Kotova, and Alexei V. Tulin

PART V DESIGNING AND TESTING PARP-1 INHIBITORS

- 18 Strategies Employed for the Development of PARP Inhibitors. 271
Stacie Canan, Karen Maegley, and Nicola J. Curtin
- 19 High-Throughput Colorimetric Assay for Identifying PARP-1 Inhibitors
Using a Large Small-Molecule Collection 299
Elena Kotova and Alexei V. Tulin
- 20 Testing PARP Inhibitors Using a Murine Xenograft Model 313
Peter Makhov, Sei Naito, and Vladimir M. Kolenko
- 21 In Vitro Long-Term Proliferation Assays to Study Antiproliferative Effects
of PARP Inhibitors on Cancer Cells 321
Heike Keilback and Paul Chang
- 22 Use of Inosine Monophosphate Dehydrogenase Activity Assay to Determine
the Specificity of PARP-1 Inhibitors 337
Sajitha Anthony, Jeffrey R. Peterson, and Yingbiao Ji

23	The Use of PARP Inhibitors in Cancer Therapy: Use as Adjuvant with Chemotherapy or Radiotherapy, Use as a Single Agent in Susceptible Patients, and Techniques Used to Identify Susceptible Patients	343
	<i>Sydney Shall, Terry Gaymes, Farzin Farzaneh, Nicola J. Curtin, and Ghulam J. Mufti</i>	
PART VI TARGETING THE UNDERSTUDIED COMPONENTS OF pADPr PATHWAY		
24	Purification of Recombinant Human PARP-3	373
	<i>Jean-Christophe Amé, Barbara Camuzeaux, Françoise Dantzer, and Valérie Schreiber</i>	
25	Purification of Recombinant Human PARG and Activity Assays.	395
	<i>Jean-Christophe Amé, Éléa Héberlé, Barbara Camuzeaux, Françoise Dantzer, and Valérie Schreiber</i>	
26	Studying Catabolism of Protein ADP-Ribosylation	415
	<i>Luca Palazzo, Dominic I. James, Ian D. Waddell, and Ivan Abel</i>	
27	Purification of DNA Damage-Dependent PARPs from <i>E. coli</i> for Structural and Biochemical Analysis.	431
	<i>Marie-France Langelier, Jamin D. Steffen, Amanda A. Riccio, Michael McCauley, and John M. Pascal</i>	
28	Identifying and Validating Tankyrase Binders and Substrates: A Candidate Approach	445
	<i>Katie Pollock, Michael Ranes, Ian Collins, and Sebastian Guettler</i>	
29	Computational and Experimental Studies of ADP-Ribosylation	475
	<i>Robert G. Hammond, Xuan Tan, Matthew Chan, Anupam Goel, and Margaret A. Johnson</i>	
	<i>Index</i>	515

Poly(ADP-Ribose) Polymerase

Methods and Protocols

Tulin, A.V. (Ed.)

2017, XV, 528 p. 82 illus., 47 illus. in color. With online
files/update., Hardcover

ISBN: 978-1-4939-6992-0

A product of Humana Press