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Joseph C. LaManna
Michelle A. Puchowicz
Kui Xu · David K. Harrison
Duane F. Bruley *Editors*

Oxygen Transport to Tissue XXXII

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Oxygen Transport to Tissue XXXII

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As President of the 2009 Meeting of the International Society on Oxygen Transport to Tissue, held from July 5–9, 2009 in Cleveland, Ohio, USA, I would like to acknowledge the tremendous support of the following sponsors:



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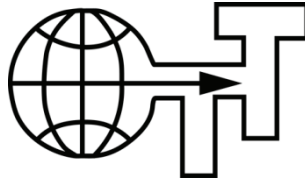
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**The 37th Annual Meeting of
the International Society on Oxygen Transport to Tissue**
July 5–9, 2009, Cleveland, Ohio, USA

The International Society on Oxygen Transport to Tissue is an interdisciplinary society comprising about 250 members worldwide. Its purpose is to further the understanding of all aspects of the processes involved in the transport of oxygen from the air to its ultimate consumption in the cells of the various organs of the body.

The annual meeting brings together scientists, engineers, clinicians and mathematicians in a very unique international forum for the exchange of information and knowledge, the updating of participants on latest developments and techniques, and the discussion of controversial issues within the field of oxygen transport to tissue.

Founded in 1973, the society has been the leading platform for the presentation and discussion of many of the technological and conceptual developments within the field, both at the meetings themselves and in the proceedings of the society. These have been published in the “Advances in Experimental Medicine and Biology” series.

Examples of some of the areas in which members have made highly significant contributions to the field include spectrophotometric and magnetic resonance methods, electrode techniques, mathematical modeling of oxygen transport, and the understanding of local regulation of oxygen supply to tissue and fluorocarbons-blood substitutes.

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Dedication

The 37th ISOTT Conference President, Joseph C. LaManna, would like to dedicate this volume in memory of **Marco E. Cabrera**, who had attended previous ISOTT meetings and was an integral part of the Local Organizing Committee for the Cleveland meeting before his sudden and untimely death in February, 2009.



Joseph C. LaManna and Marco E. Cabrera at ISOTT 2007, Uppsala, Sweden.

Marco E. Cabrera received his undergraduate degree in physics from the Universidad del Valle de Guatemala in 1978 and his Ph.D. degree in biomedical engineering from Case Western Reserve University in 1995. He achieved the rank of Associate Professor in the Departments of Pediatrics Biomedical Engineering, and Physiology and Biophysics. His research focused on regulation of energy metabolism in cardiac and skeletal muscles in response to exercise and adaptations to physical inactivity and training. It combined dynamic experimental measurements and computational models that encompassed mechanisms at the cellular, tissue, and whole body levels.

Marco believed passionately in a quantitative systems physiology approach for the *in vivo* study of organisms. His vision was endorsed by NIH funding of the Center for Modeling Integrated Metabolic Systems (MIMS). He was active professionally on the editorial board of the *Journal of Biological Chemistry* and assistant editor of *Exercise and Sports Sciences Reviews* as well as a Fellow of the American College of Sports Medicine and a member of the American Physiological Society, Biomedical Engineering Society, and American Society of Biochemistry and Molecular Biology.

Marco was a dear friend, valued research collaborator, and esteemed mentor. His ready smile, enthusiasm, and breadth of vision engaged many friends and collaborators. Marco's research scope encompassed a wide variety of fields including exercise physiology, human and animal performance evaluation, metabolic systems biology, mathematical modeling, and computer simulation. He had an exceptional ability to develop collaborations with theoretical and experimental researchers from different fields that could contribute to quantitative understanding of exercise and metabolism. Marco had a variety of wonderful collaborations locally at Case Western Reserve University, University Hospitals of Cleveland, and the Cleveland Clinic as well as nationally and internationally. To achieve the research goals that Marco set forth, his collaborators and students will continue along the path that he started.

Awards

The Melvin H. Knisely Award

The Melvin H. Knisely Award was established in 1983 to honor Dr. Knisely's accomplishments in the field of the transport of oxygen and other metabolites and anabolites in the human body. Over the years, he has inspired many young investigators and this award is to honor his enthusiasm in assisting and encouraging young scientists and engineers in various disciplines. The award acknowledges outstanding young investigators. This award was first presented during the banquet of the 1983 annual conference of ISOTT in Ruston, Louisiana. The award includes a Melvin H. Knisely plaque and a cash prize.

Melvin H. Knisely Award Recipients:

1983 Antal G. Hudetz, Hungary	1984 Andras Eke, Hungary
1985 Nathan A. Bush, USA	1986 Karlfried Groebe, Germany
1987 Isumi Shibuya, Japan	1988 Kyung A. Kang, Korea/USA
1989 Sanja Batra, Canada	1990 Stephen J. Cringle, Australia
1991 Paul Okunieff, USA	1992 Hans Degens, Netherlands
1993 David A. Benaron, USA	1994 Koen van Rossem, Belgium
1995 Clare E. Elwell, UK	1996 Sergei A. Vinogradov, USA
1997 Chris Cooper, UK	1998 Martin Wolf, Switzerland
1999 Huiping Wu, USA	2000 Valentina Quaresima, Italy
2001 Fahmeed Hyder, Bangladesh	2002 Geofrey De Visscher, Belgium
2003 Mohammad N. Khan, USA	2004 Fredrick Palm, Sweden
2005 Nicholas Lintell, Australia	2006 No award was made
2007 Ilias Tachtsidis UK	2008 Kazuto Masamoto, Japan
2009 Rossana Occhipinti, USA	

The Dietrich W. Lübbers Award

The Dietrich W. Lübbers Award was established in honor of Professor Lübbers's long-standing commitment, interest, and contributions to the problems of oxygen transport to tissue and to the society. This award was first presented in 1994 during the annual conference of ISOTT in Istanbul, Turkey.

Dietrich W. Lübbers Award Recipients:

1983 Antal G. Hudetz, Hungary	1984 Andras Eke, Hungary
1985 Nathan A. Bush, USA	1986 Karlfried Groebe, Germany
1987 Isumi Shibuya, Japan	1988 Kyung A. Kang, Korea/USA
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The Britton Chance Award

The Britton Chance Award was established in honor of Professor Chance's long-standing commitment, interest, and contributions to the science and engineering aspects of oxygen transport to tissue and to the society. This award was first presented in 2004 during the annual conference of ISOTT in Bari, Italy.

Britton Chance Award Recipients:

2004 Derek Brown, Switzerland	2005 James Lee, USA
2006 Hanzhu Jin, China/USA	2007 Eric Mellon, USA
2008 Jianting Wang, USA	2009 Jessica Spires, USA

The Duane F. Bruley Award

The Duane F. Bruley Award was established in 2003 and first presented by ISOTT at the 2004 annual conference in Bari, Italy. This award was created to provide travel funds for student researchers in all aspects of areas of oxygen transport to tissue. The awards signify Dr. Bruley's interest in encouraging and supporting young researchers to maintain the image and quality of research associated with the society. As a co-founder of ISOTT in 1973, Dr. Bruley emphasizes cross-disciplinary research among basic scientists, engineers, medical scientists, and clinicians. His pioneering work constructing mathematical models for oxygen and other anabolite/metabolite transport in the microcirculation, employing computer solutions, were the first to consider system nonlinearities, time dependence, including multidimensional diffusion, convection, and reaction kinetics. It is hoped that receiving the Duane F. Bruley Award will inspire students to excel in their research and will assist in securing future leadership for ISOTT.

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Preface

The International Society on Oxygen Transport to Tissue (ISOTT) is an interdisciplinary society comprising about 250 members worldwide. Its purpose is to further the understanding of all aspects of the processes involved in the transport of oxygen from the air to its ultimate consumption in the cells of the various organs of the body. Oxygen has played a substantial role in the evolution process of biological systems, including human, as the key molecule for energy production and genetic adaptation to the environment. Considering that the physiological function of oxygen is an extremely diverse and multidisciplinary research area, increased involvement of basic medical scientists, clinicians, and biomedical engineers in ISOTT was encouraged.

The annual meeting brings together scientists, engineers, clinicians and mathematicians in a unique international forum for the exchange of information and knowledge, the updating of participants on latest developments and techniques, and the discussion of controversial issues within the field of oxygen transport to tissue.

Founded in 1973, the society has been the leading platform for the presentation and discussion of many of the technological and conceptual developments within the field, both at the meetings themselves and in the proceedings of the society.

Examples of some of the areas in which members have made highly significant contributions to the field include Near Infrared Spectroscopy (NIRS) and other spectrophotometric and magnetic resonance methods, electrode techniques, mathematical modeling of oxygen transport, and the understanding of local regulation of oxygen supply to tissue and fluorocarbons-blood substitutes.

The 37th Annual ISOTT conference was held in Cleveland, Ohio, USA from July 5–9, 2009. The meeting consisted of one featured presentation by Jay Dean, Ph.D., from the Department of Molecular Pharmacology and Physiology, Hyperbaric Biomedical Research Laboratory at the University of South Florida. His topic was “Oxygen and the World War II Aviator.” In addition, there were 21 featured lectures, 12 organized sessions, 56 general oral presentations, and 19 poster presentations. We welcomed 134 total participants comprised of 71 full, 13 social, 34 student, 10 daily, and 6 outside exhibitor registrations.

Our venue was the campus of Case Western Reserve University (CWRU), including the recently built Village at 115 dormitory-style housing facility where most

participants stayed. Participants were provided with many opportunities to interact, both scientifically and socially, during the conference and after hours in an informal atmosphere. Evening activities were structured to take advantage of Cleveland as well as CWRU's proximity to the University Circle cultural institutions. The highlight of the 2009 ISOTT meeting was the Closing Banquet held at the Rock and Roll Hall of Fame and Museum where several of our participants entertained us with their musical talents! Visit the website of <http://www.case.edu/isott09/> to view information on the Annual Meeting in Cleveland, Ohio.

Joseph C. LaManna, Ph.D.
President, ISOTT 2009

Contents

Editors	v
Acknowledgments	vii
Preface	xv
Part I Near Infrared Spectroscopy	
1 The Western Reserve, Edward Morley, and Oxygen	3
Joseph C. LaManna, Ph.D.	
1.1 Introduction	3
1.2 The Western Reserve of Connecticut	4
1.3 Edward Williams Morley (1838–1923)	4
1.4 The Composition of the Atmosphere (1879–1882)	6
1.5 The Michelson–Morley Collaboration (1884–1887)	6
1.6 The Atomic Weight of Oxygen (1884–1895)	7
1.7 The Rest of the Story	8
References	8
2 Analysis of the Changes in the Oxidation of Brain Tissue Cytochrome-c-Oxidase in Traumatic Brain Injury Patients during Hypercapnoea	9
Ilias Tachtsidis, Martin M. Tisdall, Caroline Pritchard, Terence S. Leung, Arnab Ghosh, Clare E. Elwell, and Martin Smith	
2.1 Introduction	9
2.2 Methods	10
2.3 Results	11
2.4 Discussion	12
References	14

3 Effects of Assuming Constant Optical Scattering on Haemoglobin Concentration Measurements Using NIRS during a Valsalva Manoeuvre 15
 Lei Gao, Clare E. Elwell, Matthias Kohl-Bareis, Marcus Gramer, Chris E. Cooper, Terence S. Leung, and Ilias Tachtsidis

3.1 Introduction 15
 3.2 Methods 16
 3.3 Analysis 16
 3.4 Results 17
 3.5 Discussion 19
 References 20

4 Speech Therapy Changes Blood Circulation and Oxygenation in the Brain and Muscle 21
 Martin Wolf, Dietrich von Bonin, and Ursula Wolf

4.1 Introduction 21
 4.2 Methods 22
 4.3 Results 22
 4.4 Discussion 24
 4.5 Conclusion 24
 References 25

Part II Oxygen Sensors and Measurement

5 Evaluation of Lithium Naphthalocyanine (LiNc) Microcrystals for Biological EPR Oximetry 29
 Ramasamy P. Pandian, Simi M. Chacko, M. Lakshmi Kuppusamy, Brian K. Rivera, and Periannan Kuppusamy

5.1 Introduction 29
 5.2 Materials and Methods 30
 5.2.1 Preparation of particulates for cell culture studies 30
 5.2.2 Z-stack localization studies of nanocrystalline LiNc in cells 31
 5.2.3 Preparation of mice 31
 5.2.4 pO₂ measurements in gastrocnemius muscle tissue of mice 31
 5.3 Results 32
 5.3.1 Oxygen-sensitivity of LiNc probes 32
 5.3.2 Evaluation of LiNc for in vivo oximetry 33
 5.3.3 Endocytosis of LiNc by MSCs 34
 5.4 Discussion 34
 5.4.1 Conclusions 35
 References 35

6 Challenges to Intestinal pO₂ Measurement Using EPR 37
 Elaine Fisher, Mahmood Khan, Richard Steiner, and Periannan Kuppusamy

6.1 Introduction 37

- 6.2 Methods 38
 - 6.2.1 Animal Preparation 38
 - 6.2.2 Probe Placement and EPR Measurement 39
 - 6.2.3 Statistical Methods 40
- 6.3 Results 40
- 6.4 Discussion and Conclusions 42
- References 44

- 7 Quantification of Systemic Interference in Optical Topography Data during Frontal Lobe and Motor Cortex Activation: An Independent Component Analysis 45**

Sundeep Patel, Takusige Katura, Atsushi Maki, and Ilias Tachtsidis

 - 7.1 Introduction 45
 - 7.2 Methods 46
 - 7.3 Results 48
 - 7.4 Discussion 48
 - References 50

- 8 Measuring Oxygen in Living Tissue: Intravascular, Interstitial, and “Tissue” Oxygen Measurements 53**

David F. Wilson, Olga S. Finikova, Artem Y. Lebedev, Sophia Apreleva, Anna Pastuszko, William M.F. Lee, and Sergei A. Vinogradov

 - 8.1 Introduction 53
 - 8.2 Materials and Methods 54
 - 8.3 Results and Discussion 55
 - 8.4 Conclusions 56
 - References 58

- 9 Cerebral Oxygenation of the Cortex and Striatum Following Normobaric Hyperoxia and Mild Hypoxia in Rats by EPR Oximetry Using Multi-Probe Implantable Resonators 61**

Huagang Hou, Hongbin Li, Ruhong Dong, Sriram Mupparaju, Nadeem Khan, and Harold Swartz

 - 9.1 Introduction 61
 - 9.2 Materials and Methods 62
 - 9.2.1 Multi-probe implantable resonators 62
 - 9.2.2 Animal preparation 62
 - 9.2.3 Multi-site EPR oximetry 64
 - 9.2.4 Statistical analysis 64
 - 9.3 Results 64
 - 9.4 Discussion 65
 - References 66

10	³¹P-MRS Studies of Melanoma Xenografts with Different Metastatic Potential	69
	Lin Z. Li, Rong Zhou, Dennis B. Leeper, and Jerry D. Glickson	
10.1	Introduction	69
10.2	Materials and Methods	70
10.3	Results and Discussion	71
	References	73
11	Modulation of Tumor Hypoxia by Topical Formulations with Vasodilators for Enhancing Therapy	75
	Zrinka Abramovic, Huagang Hou, Kristl Julijana, Marjeta Sentjurc, Jean P. Lariviere, Harold M. Swartz, and Nadeem Khan	
11.1	Introduction	76
11.2	Materials and Methods	76
	11.2.1 Animals and tumor models	76
	11.2.2 Experiment design	77
	11.2.3 EPR oximetry	77
	11.2.4 Data analysis	77
11.3	Results	78
	11.3.1 Effect of the BN in hydrogel formulation on RIF-1 tumor pO ₂	78
	11.3.2 Effect of the BN in microemulsion formulation on RIF-1 tumor pO ₂	79
11.4	Discussion	79
	References	81
Part III Blood and Blood Substitutes		
12	MP4, a Vasodilatory PEGylated Hemoglobin	85
	Russell H. Cole and Kim D. Vandegriff	
12.1	Introduction	85
12.2	Oxygen Affinity Mediated Vasoactivity	86
12.3	PEGylation	88
12.4	Conclusion	89
	References	90
13	Zymogen Protein C to Prevent Clotting without Bleeding during Invasive Medical Procedures	91
	Duane F. Bruley, Sanjay B. Jagannath, and Micheal B. Streiff	
13.1	Introduction	92
13.2	Emergency Procedure	93
13.3	Discussion/Results	94
13.4	Product Cost/Production	95
13.5	Conclusion	95
	References	96

Part IV Tumor Biology

14 Oxygenation Status of Urogenital Tumors 101
 Peter Vaupel, Michael Hoeckel, and Arnulf Mayer

14.1 Introduction 101

14.2 Oxygenation status of urogenital tumors 102

 14.2.1 Oxygenation status of solid tumors 102

 14.2.2 Oxygenation status of benign leiomyomas 103

14.3 Conclusions 104

References 104

15 Tumor pO₂ as a Surrogate Marker to Identify Therapeutic Window during Metronomic Chemotherapy of 9L Gliomas 107
 Sriram Mupparaju, Huagang Hou, Jean P. Lariviere, Harold M. Swartz, and Nadeem Khan

15.1 Introduction 108

15.2 Methods 108

 15.2.1 Animal and tumor models 108

 15.2.2 Implantation of oximetry probe (LiPc) for pO₂ measurements using multi-site EPR oximetry 109

 15.2.3 Tumor volume measurements 109

 15.2.4 Data analysis 110

15.3 Results 110

 15.3.1 Effect of metronomic cyclophosphamide on 9L tumor pO₂ 110

 15.3.2 Effect of metronomic cyclophosphamide on 9L tumor growth 111

15.4 Discussion 111

References 112

16 Hypoxia-Induced Extracellular Acidosis Increases p-Glycoprotein Activity and Chemoresistance in Tumors *in Vivo* via p38 Signaling Pathway 115
 Oliver Thews, Martin Nowak, Christoph Sauvant, and Michael Gekle

16.1 Introduction 116

16.2 Methods 116

 16.2.1 Animals and tumors 116

 16.2.2 Acidosis treatment 117

 16.2.3 pO₂ and pH measurements 117

 16.2.4 Daunorubicin and kinase inhibitor treatments 117

16.3 Results 118

16.4 Discussion 120

References 121

17	Evidence against a Major Role for TKTL-1 in Hypoxic and Normoxic Cancer Cells	123
	Arnulf Mayer, Angelika von Wallbrunn, and Peter Vaupel	
17.1	Introduction	123
17.2	Methods	124
17.3	Results	126
17.3.1	Lack of target specificity of anti-TKTL1 mAb clone JFC12T10	126
17.3.2	Clone JFC12T10 yields implausible immunohistochemical staining results	126
17.3.3	Analysis of TKT, TKTL-1, and TKTL-2 expression in six cancer cell lines	127
17.4	Conclusions	127
	References	128
18	NMR Metabolic and Physiological Markers of Therapeutic Response	129
	Seung-Cheol Lee, Harish Poptani, E. James Delikatny, Stephen Pickup, David S. Nelson, Stephen J. Schuster, Sunita D. Nasta, Jakub Svoboda, Steven C. Goldstein, Stephen G. Wallace, Laurie A. Loevner, Eric A. Mellon, Ravinder Reddy, and Jerry D. Glickson	
18.1	Introduction	130
18.2	NMR Therapeutic Response Markers in Non-Hodgkin's Lymphoma	131
18.2.1	³¹ P MRS of non-Hodgkin's lymphoma patients	131
18.2.2	¹ H MRS/MRI of NHL xenografts	131
18.2.3	¹ H MRS of non-Hodgkin's lymphoma patients	134
18.3	Discussion	134
18.4	Conclusions	135
	References	135
19	Characterizing Breast Cancer Mouse Xenografts with T_{1ρ}-MRI	137
	Lin Z. Li, He N. Xu, and Ravinder Reddy	
19.1	Introduction	137
19.2	Methods	138
19.3	Results and Discussion	139
19.4	Discussion	140
19.5	Conclusions	141
	References	141
20	Effect of AEM Energy Applicator Configuration on Magnetic Nanoparticle Mediated Hyperthermia for Breast Cancer	143
	Krishna K. Sanapala, Kapila Hewaparakrama, and Kyung A. Kang	
20.1	Introduction	143
20.2	Materials, Instruments, and Methods	144
20.3	Results and Discussion	144

20.3.1	Effect of probe configuration on magnetic field distribution	144
20.3.2	Effect of MNP concentration on heating	145
20.3.3	Effect of nanoparticle size on heating	147
20.4	Conclusions	147
	References	147
21	Highly Specific, NIR Fluorescent Contrast Agent with Emission Controlled by Gold Nanoparticle	149
	Jianting Wang, Martin O'Toole, Archana Massey, Souvik Biswas, Michael Nantz, Samuel Achilefu, and Kyung A. Kang	
21.1	Introduction	149
21.2	Materials and Methods	151
21.2.1	Synthesis of short spacer and Cypate Conjugation	151
21.2.2	Conjugation of SL-Cy to GNP and fluorescence measurement	151
21.3	Results and Discussion	152
21.3.1	Fluorescence quenching	152
21.3.2	Fluorescence de-quenching	152
21.4	Conclusions and Future Study	153
	References	154
Part V Presidential Symposium		
22	Oral Pioglitazone Reduces Infarction Volume and Improves Neurologic Function Following MCAO in Rats	157
	D'Arbra Blankenship, Jon Niemi, Elizabeth Hilow, Molly Karl, and Sophia Sundararajan	
22.1	Introduction	157
22.2	Methods	158
22.3	Results	159
22.4	Discussion	160
	References	162
Part VI Angiogenesis		
23	Chronic Mild Hypoxia Ameliorates Chronic Inflammatory Activity in Myelin Oligodendrocyte Glycoprotein (MOG) Peptide Induced Experimental Autoimmune Encephalomyelitis (EAE)	165
	Paula Dore-Duffy, Marie Wencel, Vladimir Katyshev, and Kristen Cleary	
23.1	Introduction	165
23.2	Methods	166
23.2.1	Immunization protocol for MOG-induced chronic EAE ..	166
23.2.2	Determination of capillary density	166
23.2.3	Exposure to normobaric hypoxia	167
23.2.4	Immunocytochemistry	167

23.3	Results	167
23.3.1	Normobaric hypoxia induced adaptive angiogenesis in C57BL/6 mice	167
23.3.2	MOG-induced EAE	168
23.3.3	Effect of hypoxia on MOG-induced EAE	169
23.4	Conclusions	170
	References	171
24	Effect of Oxygenation on Stem-Cell Therapy for Myocardial Infarction	175
	Mahmood Khan, Sarath Meduru, Ramasamy P. Pandian, Brian K. Rivera, and Periannan Kuppusamy	
24.1	Introduction	175
24.2	Materials and Methods	176
24.2.1	Reagents	176
24.2.2	Bone marrow-derived mesenchymal stem cells	176
24.2.3	Induction of MI and MSC transplantation	176
24.3	Echocardiography and Myocardial pO ₂ Measurements	177
24.3.1	Immunohistological staining of cardiac tissue	177
24.3.2	Data analysis	177
24.4	Results	177
24.4.1	Hyperbaric oxygenation and myocardial pO ₂	177
24.4.2	HBO enhances the recovery of cardiac function	178
24.4.3	Immunostaining for angiogenesis and VEGF expression	178
24.5	Discussion	178
24.6	Conclusion	179
	References	180
Part VII Mitochondrial Metabolism		
25	Regulation of Cytosolic and Mitochondrial Oxidation via Malate-Aspartate Shuttle: An Observation Using Dynamic ¹³C NMR Spectroscopy	185
	Ming Lu, Suhanti Banerjee, Gerald M. Saidel, and Xin Yu	
25.1	Introduction	186
25.2	Methods	186
25.2.1	Isolated heart perfusion	186
25.2.2	NMR spectroscopy	187
25.2.3	Kinetic analysis and statistical evaluation	187
25.3	Results	188
25.3.1	Physiological function, glutamate content	188
25.3.2	Fatty acid utilization	189
25.3.3	Dynamic ¹³ C NMR spectra	189
25.3.4	Determinations of TCA cycle flux and M-A shuttle activity	190
25.4	Discussion	191
	References	191

26 *In Vivo* Assessment of Oxygen Consumption via Deuterium Magnetic Resonance193
 Gheorghe D. Mateescu, Allen Ye, Chris A. Flask, Bernadette Erokwu, and Jeffrey L. Duerk

26.1 Introduction 193
 26.2 Materials and Methods 194
 26.3 Results 195
 26.4 Discussion 197
 26.5 Conclusion 197
 References 198

27 Elevated Mitochondrial DNA Copy Number and POL- γ Expression but Decreased Expression of TFAM in Murine Intestine Following Therapeutic Dose Irradiation201
 Hengshan Zhang, David J. Maguire, Mei Zhang, Lurong Zhang, and Paul Okunieff

27.1 Introduction 201
 27.2 Materials and Methods 202
 27.3 Results and Discussion 203
 27.4 Conclusions 206
 References 206

28 Heterogeneity of Mitochondrial Redox State in Premalignant Pancreas in a PTEN Null Transgenic Mouse Model207
 He N. Xu, Shoko Nioka, Britton Chance, and Lin Z. Li

28.1 Introduction 208
 28.2 Methods 208
 28.3 Results 209
 28.4 Discussion 210
 28.5 Conclusions 211
 References 212

29 Potential Application of ^{17}O MRI to Human Ischemic Stroke 215
 Robert DeLaPaz and Pradeep Gupte

29.1 Limitations of Hemodynamic Imaging of Cerebral Ischemia 216
 29.2 Hemodynamic Failure and Oxygen Metabolism in Cerebral Ischemia 216
 29.3 Limitations of PET and BOLD MRI Measurement of CMRO₂ and OEF 217
 29.4 ^{17}O -MRI Measurement of CMRO₂ and OEF in Human Cerebra Ischemia 218
 29.5 Summary and Conclusion 220
 References 221

Part VIII Development

30 Fetal Cerebral Oxygenation: The Homeostatic Role of Vascular Adaptations to Hypoxic Stress 225
 William J. Pearce, Stacy M. Butler, Jenna M. Abrassart, and James M. Williams

30.1 Introduction 225
 30.2 Responses to Acute Hypoxia 226
 30.3 Responses to Chronic Hypoxia 226
 30.4 VEGF and Hypoxic Vascular Adaptation 227
 30.5 Summary and Conclusions 230
 References 231

31 Impaired Cerebral Autoregulation Using Near-Infrared Spectroscopy and Its Relation to Clinical Outcomes in Premature Infants 233
 Alexander Caicedo, Dominique De Smet, Joke Vanderhaegen, Gunnar Nauelaers, Martin Wolf, Petra Lemmers, Frank Van Bel, Lieveke Ameye, and Sabine Van Huffel

31.1 Introduction 233
 31.2 Data 234
 31.3 Methods 235
 31.3.1 Signal Analysis 235
 31.3.2 Statistical Analysis 235
 31.4 Results 236
 31.5 Discussion 237
 References 238

Part IX Systems Modeling

32 Variable ATP Yields and Uncoupling of Oxygen Consumption in Human Brain 243
 Albert Gjedde, Joel Aanerud, Ericka Peterson, Mahmoud Ashkanian, Peter Iversen, Manoucher Vafae, Arne Møller, and Per Borghammer

32.1 Introduction 243
 32.2 Methods 244
 32.2.1 PET/MRI Methods 244
 32.2.2 Image pre-processing 244
 32.3 Results 245
 32.4 Discussion 247
 References 248

33 Interpretation of NMR Spectroscopy Human Brain Data with a Multi-Compartment Computational Model of Cerebral Metabolism . 249
 Rossana Occhipinti, Erkki Somersalo, and Daniela Calvetti

33.1 Introduction 249
 33.2 Methods 250
 33.3 Results 252
 33.4 Discussion 253

References	254
34 Regional Brain Blood Flow in Mouse: Quantitative Measurement Using a Single-Pass Radio-Tracer Method and a Mathematical Algorithm	255
K. Xu, K. Radhakrishnan, A. Serhal, F. Allen, J. C. LaManna, and M. A. Puchowicz	
34.1 Introduction	256
34.2 Methods	256
34.2.1 Animal preparations and surgical procedures	256
34.2.2 Regional blood flow measurements	256
34.2.3 Mathematical algorithm for regional blood flows	257
34.3 Results	258
34.4 Discussion	259
References	260
 Part X Microcirculation and Wound Healing	
35 Wound Healing in Diabetes: Hemorheological and Microcirculatory Aspects	263
Giuseppe Cicco, Francesco Giorgino, and Sebastiano Cicco	
35.1 Introduction	263
35.2 Hemorheology	264
35.3 Hemorheological Alterations in Diabetes	264
35.4 Microcirculation and Wound Healing in Diabetes	265
35.5 Hyperbaric Oxygen Therapy (HOT)	266
35.6 Laser and Negative Pressure Treatment (NPT)	267
35.7 Conclusions	267
References	268
 36 Modeling O₂-Dependent Effects of Nitrite Reductase Activity in Blood and Tissue on Coupled NO and O₂ Transport around Arterioles	271
Donald G. Buerk, Kenneth A. Barbee, and Dov Jaron	
36.1 Introduction	271
36.2 Methods	272
36.3 Results	273
36.4 Discussion	275
References	276
 37 Skin SO₂ Measurement Using Visible Lightguide Spectrophotometry in a Black Population: A Feasibility Study	277
David K. Harrison, André R. Greenidge, and R. Clive Landis	
37.1 Introduction	278
37.2 Methods	278
37.3 Results	279
37.4 Discussion	280
References	282

38	Antioxidant Properties of Quercetin	283
	Mei Zhang, Steven G. Swarts, Liangjie Yin, Chaomei Liu, Yeping Tian, Yongbing Cao, Michael Swarts, Shanmin Yang, Steven B. Zhang, Kunzhong Zhang, Shaoqing Ju, David J. Olek, Jr., Lisa Schwartz, Peter C. Keng, Rob Howell, Lurong Zhang, and Paul Okunieff	
38.1	Introduction	283
38.2	Materials and Methods	284
	38.2.1 Reagents, equipment, and cells	284
	38.2.2 Experimental methods and assays	284
38.3	Results	285
38.4	Discussion	287
38.5	Conclusions	288
	References	288
39	Antioxidant Properties of Select Radiation Mitigators Based on Semicarbazone and Pyrazole Derivatives of Curcumin	291
	Steven G. Swarts, Mei Zhang, Liangjie Yin, Chaomei Liu, Yeping Tian, Yongbing Cao, Michael Swarts, David J. Olek, Jr., Lisa Schwartz, Louie Zhang, Shanmin Yang, Steven B. Zhang, Kunzhong Zhang, Shaoqing Ju, Sadasivan Vidyasagar, Lurong Zhang, and Paul Okunieff	
39.1	Introduction	292
39.2	Methods	292
39.3	Results and Discussion	293
39.4	Conclusion	296
	References	296
Part XI Gas Transport		
40	Impact of Intracellular Diffusion of Oxygen in Hypoxic Sensing	301
	Eiji Takahashi and Michihiko Sato	
40.1	Introduction	301
40.2	Methods	302
40.3	Results	303
40.4	Discussion	304
	References	306
41	Micropores in the Vitelline Layer of the Eggs of the Dragonfly <i>Oligoeshna pryeri</i>: A Preliminary Observation from the Viewpoint of Oxygen Uptake	307
	Tomiyasu Koyama, Hiroko Takano, and Tohru. Yokoyama	
41.1	Introduction	307
41.2	Methods	308
41.3	Results	308
41.4	Discussion	308
41.5	Conclusion	310
	References	310

Part XII Hypoxic Adaptation

42 A Heat-Shock Protein Co-Inducer Treatment Improves Behavioral Performance in Rats Exposed to Hypoxia 313
 Kui Xu, Xiaoyan Sun, Bernadette O. Erokwu, Ibolja Cernak, and Joseph C. LaManna

42.1 Introduction 313

42.2 Methods and Materials 314

 42.2.1 Animals, simulated altitude exposure, and behavioral tests 314

 42.2.2 Immunohistochemistry 314

 42.2.3 Statistical analysis 315

42.3 Results 315

 42.3.1 Physiological variables 315

 42.3.2 Behavioral performance 316

 42.3.3 Immunohistochemistry and TUNEL staining 316

42.4 Discussion 317

References 317

43 Chronic Intermittent Hypoxia-Induced Augmented Cardiorespiratory Outflow Mediated by Vasopressin- V_{1A} Receptor Signaling in the Medulla 319
 Prabha Kc, Kannan V. Balan, Richard J. Martin, Joseph C. LaManna, Musa A. Haxhiu, and Thomas E. Dick

43.1 Introduction 320

43.2 Methods 320

 43.2.1 Neuroanatomical studies 320

 43.2.2 Physiological studies 321

43.3 Results 322

 43.3.1 Neuroanatomical studies 322

 43.3.2 Physiological studies 322

43.4 Conclusions 324

References 325

44 Effect of Inspiration of 12% O_2 (Balance N_2) on Cardiac Output, Respiration, Oxygen Saturation, and Oxygen Delivery 327
 M. Bell, C. D. Thake, and C. B. Wolff

44.1 Introduction 328

44.2 Methods 328

44.3 Results 329

44.4 Discussion 330

References 332

Part XIII Exercise Physiology