## Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dedications</td>
<td>v</td>
</tr>
<tr>
<td>Preface</td>
<td>ix</td>
</tr>
<tr>
<td>Organization of ISOTT-2006</td>
<td>xi</td>
</tr>
<tr>
<td>Awards</td>
<td>xiii</td>
</tr>
<tr>
<td>Sponsorship</td>
<td>xv</td>
</tr>
<tr>
<td>Acknowledgments</td>
<td>xvii</td>
</tr>
</tbody>
</table>

1. **ISOTT: Roots, Founding and Beyond**  
   Duane Frederick Bruley  
   1

2. **Dietrich W. Lübbers: Celebration of a Life Dedicated to Research into Oxygen Transport to Tissue**  
   David K. Harrison  
   9

### Part I Oxygen Transport in Tissue

3. **Investigation of Frontal Cortex, Motor Cortex and Systemic Haemodynamic Changes During Anagram Solving**  
   Ilias Tachtsidis, Terence S. Leung, Martin M. Tisdall, Presheena Devendra, Martin Smith, David T. Delpy, and Clare E. Elwell  
   21

4. **Do Red Blood Cell-β-Amyloid Interactions Alter Oxygen Delivery in Alzheimer’s Disease?**  
   Joy G. Mohanty, D. Mark Eckley, J. D. Williamson, L. J. Launer, and Joseph M. Rifkind  
   29
5 Uncoupling Protein-2 in Diabetic Kidneys: Increased Protein Expression Correlates to Increased Non-transport Related Oxygen Consumption ........................................... 37
Malou Friederich, Johan Olerud, Angelica Fasching, Per Liss, Peter Hansell, and Fredrik Palm

6 Measurement of Oxygenation at the Site of Stem Cell Therapy in a Murine Model of Myocardial Infarction ................................................. 45
Mahmood Khan, Vijay Kumar Kutala, Sheik Wisel, Simi M. Chacko, M. Lakshmi Kuppusamy, Pawel Kwiatkowski, and Periannan Kuppusamy

7 Oxygen Pressures in the Interstitial Space of Skeletal Muscle and Tumors in vivo ................................................................. 53
David F. Wilson, William M.F. Lee, Sosina Makonnen, Sophia Apreleva, and Sergei S.A. Vinogradov

Part II Other Metabolite Transport in Tissue

8 Adjuvant Induced Glucose Uptake by Activated T Cells is not Correlated with Increased Survival .................................................. 65
Sadhak Sengupta, Rebecca J. Vitale, Paula M. Chilton, and Thomas C. Mitchell

9 Lactate, with Oxygen, Incites Angiogenesis ........................................... 73
Thomas K. Hunt, Rummana Aslam, Zamir Hussain, and Stefan Beckert

Part III Blood, Hemostasis and Hemodynamics

10 Activated Protein C Modulates Chemokine Response and Tissue Injury in Experimental Sepsis ................................................ 83
Ganesh R. Sharma, Bruce Gerlitz, David T. Berg, Martin S. Cramer, Joseph A. Jakubowski, Elizabeth J. Galbreath, Josef G. Heuer, and Brian W. Grinnell

11 Manipulation of the Affinity Between Protein and Metal Ions by Imidazole and pH for Metal Affinity Purification of Protein c from Cohn Fraction IV-1 ...................................................... 93
James J. Lee, Duane F. Bruley, and Kyung A. Kang

12 Separation of Factor V Leiden Molecule, a Mutated Form of Factor V, from Plasma of Homozygous Patient .............................. 101
Samin Rezania and Kyung A. Kang
13 A Simple Volume Related Model of Arterial Blood Pressure Generation                      109
Christopher B. Wolff, Benn S. Gooch, and James S. Douglas

Part IV Tumor, Cancer and Oncology

14 Strikingly High Respiratory Quotients: A Further Characteristic of the Tumor Pathophysiome 121
Peter Vaupel

15 Endogenous Hypoxia Markers: Case not Proven!                                    127
Arnulf Mayer, Michael Höckel, and Peter Vaupel

16 RAD18 Signals DNA Polymerase IOTA to Stalled Replication Forks in Cells Entering S-Phase with DNA Damage 137
Shelly Kakar, Nicholas B. Watson, and W. Glenn McGregor

17 Alanine in HI: A Silent Mutation Cries Out!                                        145
J. H. Shah, D.J. Maguire, T.B. Munce, and A. Cotterill

18 Biomathematics in Cancer Detection: Simulation of Lipogenesis in Cancer             151
Ping Huang and Britton Chance

19 Activity of Drug Efflux Transporters in Tumor Cells Under Hypoxic Conditions      157
Oliver Thews, Birgit Gassner, Debra K. Kelleher, and Michael Gekle

20 Antioxidants Reduce Consequences of Radiation Exposure                             165
Paul Okunieff, Steven Swarts, Peter Keng, Weimin Sun, Wei Wang, Jung Kim, Shanmin Yang, Hengshan Zhang, Chaomei Liu, Jacqueline P. Williams, Amy K. Huser, and Lurong Zhang

21 Anti-Cancer Effect of Resveratrol is Associated with Induction of Apoptosis via a Mitochondrial Pathway Alignment 179
Weimin Sun, Wei Wang, Jung Kim, Peter Keng, Shanmin Yang, Hengshan Zhang, Chaomei Liu, Paul Okunieff, and Lurong Zhang

Part V Tissue Engineering

22 Computationally Determined Shear on Cells Grown in Orbiting Culture Dishes          189
R. Eric Berson, Matthew R. Purcell, and M. Keith Sharp
23 Formation of Capillary Tube-like Structures on Micropatterned Biomaterials ........................................ 199
Dahai Gao, Girish Kumar, Carlos Co, and Chia-Chi Ho

Part VI  Bio-Instrumentation

24 Error Analysis of Finite-Spectral-Linewidth Illumination in Optical Oximetry Systems ........................................ 209
Joseph L. Hollmann, and Charles A. DiMarzio

25 Changes in the Attenuation of Near Infrared Spectra by the Healthy Adult Brain During Hypoxaemia Cannot be Accounted for Solely by Changes in the Concentrations of Oxy- and Deoxy-Haemoglobin .... 217
Martin M. Tisdall, Ilias Tachtsidis, Terence S. Leung, Clare E. Elwell, and Martin Smith

26 Assessment of Oxygenation and Perfusion in the Tongue and Oral Mucosa by Visible Spectrophotometry and Laser Doppler Flowmetry in Healthy Subjects ........................................ 227
D. B. Singh, G. Stansby and D. K. Harrison

27 Cerebral Tissue Oxygen Saturation Calculated Using Low Frequency Haemoglobin Oscillations Measured by Near Infrared Spectroscopy in Adult Ventilated Patients ........................................ 235
Terence S. Leung, Martin M. Tisdall, Ilias Tachtsidis, Martin Smith, David T. Delpy and Clare E. Elwell

28 Biosensor for Diagnosing Factor V Leiden, A Single Amino Acid Mutated Abnormality of Factor V ........................................ 245
Yongjie Ren, Samin Rezania and Kyung A. Kang

29 Scanning Laser Ophthalmoscope-particle Tracking Method to Assess Blood Velocity During Hypoxia and Hyperoxia .......................... 253
Kristen Lorentz, Astrid Zayas-Santiago, Shanti Tummala, and Jennifer J. Kang Derwent

Part VII  Nano-Bio Technology

30 Highly Sensitive Rapid, Reliable, and Automatic Cardiovascular Disease Diagnosis with Nanoparticle Fluorescence Enhancer and Mems ........................................ 265
Bin Hong, Junhai Kai, Yongjie Ren, Junyoup Han, Zhiwei Zou, Chong H. Ahn, and Kyung A. Kang
31 Tumor-specific Nano-entities for Optical Detection and Hyperthermic Treatment of Breast Cancer ........................................ 275
Hanzhu Jin, Bin Hong, Sham S. Kakar, and Kyung A. Kang

32 LHRH Receptor Targeted Therapy for Breast Cancer .............. 285

Part VIII Translational and Clinical Studies

33 Saturation of Hemoglobin in Intracranial Arteries is Similar in Patients with Hemodynamically Relevant and Irrelevant Stenosis of the Internal Carotid Artery ......................................... 299
U. Jensen, S. Wolff, K. Alfke, K. Börsch, O. Jansen, and R. Stingele

34 A Three-tiered Approach for Calibration of a Biosensor to Detect Estrogen Mimics ................................................. 305
Sarah A. Andres, D. Alan Kerr II, Stefanie B. Bumpus, Traci L. Kruer, Joshua W. Thieman, Irina A. Smolenkova, and James L. Wittliff

35 Biosensors for Detecting Estrogen-like Molecules and Protein Biomarkers ............................................................... 315
James L. Wittliff, Sarah A. Andres, Traci L. Kruer, D. Alan Kerr II, Irina A. Smolenkova, and Judith L. Erb

Part IX Modeling and Analysis of Metabolism and Transport

36 Muscle Oxygen Uptake Differs from Consumption Dynamics During Transients in Exercise ............................................. 325
Nicola Lai, Nakisha Syed, Gerald M. Saidel, and Marco E. Cabrera

37 Modeling Oxygenation and Selective Delivery of Drug Carriers Post-Myocardial Infarction ............................................ 333
Bin Wang, Robert C. Scott, Christopher B. Pattillo, Balabhaskar PrabhakarPandian, Shankar Sundaram, and Mohammad F. Kiani

38 Hypobaric Hypoxia Reduces GLUT2 Transporter Content in Rat Jejunum more than in Ileum ............................................. 345
Elaine M. Fisher, Xiaoyan Sun, Bernadette O. Erokwu, and Joseph C. LaManna

39 Modeling Oxygen and Carbon Dioxide Transport and Exchange Using a Closed Loop Circulatory System .......................... 353
Brian E. Carlson, Joseph C. Anderson, Gary M. Raymond, Ranjan K. Dash, and James B. Bassingthwaigte
40 Effect of Alternate Energy Substrates on Mammalian Brain Metabolism During Ischemic Events .......................... 361
S. S. Koppaka, M. A. Puchowicz, J. C. LaManna, and J. E. Gatica

41 Cerebral Blood Flow Adaptation to Chronic Hypoxia ............... 371
Haiying Zhou, Gerald M. Saidel, and Joseph C. LaManna

42 Mitochondrial Dysfunction in Aging Rat Brain Following Transient Global Ischemia .................................. 379
Kui Xu, Michelle A. Puchowicz, Xiaoyan Sun, and Joseph C. LaManna

Part X Others

43 Measurement of Cerebral Tissue Oxygenation in Young Healthy Volunteers During Acetazolamide Provocation: A Transcranial Doppler and Near-Infrared Spectroscopy Investigation ............... 389
Ilias Tachtsidis, Martin Tisdall, David T. Delpy, Martin Smith, and Clare E. Elwell

44 Measurement of Frontal Lobe Functional Activation and Related Systemic Effects: A Near-Infrared Spectroscopy Investigation ............ 397
Ilias Tachtsidis, Terence S. Leung, Laurence Devoto, David T. Delpy, and Clare E. Elwell

Author Index ................................................ 405

Subject Index ............................................... 407
Oxygen Transport to Tissue XXIX
Kang, K.A.; Bruley, D.F. (Eds.)
2008, XXIV, 410 p. 123 illus., 5 illus. in color., Hardcover