

Monday, 26. July, 2021

13.00 – 14.00 Virtual get together

14.00 – 14.15 **Ursula Wolf**, *ISOTT President, University of Bern, Switzerland*
Welcome and introduction

Session: Brain 1 – Chair: Felix Scholkmann

14.15 – 14.30 **Geisa Ortet**, *Case Western Reserve University, USA*
Impaired cognitive performance in mice exposed to prolonged hyperoxia

14.30 – 14.45 **Aarti Sethuraman**, *University of Tennessee Health Science Center, USA*
Diet induced ketosis confers a pro-survival phenotype via HIF1 α mediated interleukin 10 expression in mice brain

14.45 – 15.00 **Takuma Sugashi**, *The University of Electro-Communications, Japan*
Long-term tracking of changes in microglial morphology during and after hypoxia adaptation in the mouse cortex

15.00 – 15.15 **Victor Ochoa-Gutierrez**, *University of Glasgow, UK*
Changes in oxygenation levels during moderate altitude simulation (hypoxia-induced): A pilot study towards diversity in oximetry

15.15 – 16.15 **Poster session 1**

P1.01. Sho Kojima, *Niigata University of Health and Welfare, Japan*
Relationship between exercise capacity and changes of cortical oxygenation immediately before maximal exercise during incremental exercise

P1.02. Fernando Arias-Mendoza, *University of Pennsylvania, USA*
Assessment of nicotine adenine dinucleotides in human tissues by in vivo phosphorus-31 magnetic resonance spectroscopic imaging at 1.5 Tesla

P1.03. Masaru Kanda, *Niigata University of Health and Welfare, Japan*
Intramuscular Circulation of Lumbar Multifidus in Different Trunk Positions in Standing

P1.04. Tim Hermans, *KU Leuven, Belgium*
Using EEG-NIRS wavelet coherence to assess neurovascular coupling in neonates with hypoxic ischaemic encephalopathy

P1.05. Marta Zanoletti, *ICFO-The institute of photonic sciences, Spain*
Non-invasive bedside assessment of microvascular and endothelial health in severe COVID-19 patients: the international HEMOCOV-19 study

P1.06. Filippo Schiavo, *Stockholm University and Karolinska Institutet, Sweden*
Acute hypoxia determines the outcome of radiation therapy of hypoxic tumours

P1.07. Alexander Shestov, University of Pennsylvania, USA

Metabolic network analysis with 13C metabolomics on two TNBC xenograft models

P1.08. Dmitry Sergeev, Privolzhsky Research Medical University, Russia

Cerebral critical closing pressure at concomitant traumatic brain injury.

P1.09. Masamichi Moriya, Teikyo Heisei University, Japan

Changes in prefrontal cortical oxygenation and systemic circulation during mobilization in subarachnoid hemorrhage patients

P1.10. Akinori Ebihara, Tokai University Tokyo Hospital, Japan

Silent hypoxemia in covid-19 pneumonia

P1.11. Christel Cariddi, University of Bari, Italy

Evaluation of intraoperative end-tidal oxygen change relates to length of hospitalization in peridiaphragmatic surgery: a pilot study

P1.12. Christina Wolfsberger, Medical University of Graz, Austria

Impact of carbon dioxide on cerebral oxygenation and vital parameters in stable preterm and term neonates immediately after birth

Session: Clinical application 1 – Chair: Sebastiano Cicco

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| 16.15 – 16.30 | Edwin Nemoto, University of New Mexico, USA
Low Flow and Microvascular Shunts: A Final Common Pathway in Cerebrovascular Disease - a Working Hypothesis |
| 16.30 – 16.45 | Katsunori Oyama, Nihon University, Japan
Classification of Dementia Risk Using Time-resolved Near-infrared Spectroscopy and General Blood Test |
| 16.45 – 17.00 | Ateyeh Soroush, University of Calgary, Canada
NIRS studies show reduced interhemispheric functional connectivity in Multiple Sclerosis patients that exhibit cortical hypoxia |
| 17.00 – 17.15 | Damilola Adingupu, University of Calgary, Canada
Non-invasive detection of persistent cortical hypoxia in multiple sclerosis using frequency domain near-infrared spectroscopy (fdNIRS) |
| 17.15 – 18.15 | Virtual get together |

Tuesday 27. July, 2021

13.00 – 14.00 Virtual get together

Session: Brain 2 . Chair: Kaoru Sakatani

- 14.00 – 14.15 **Denis Bragin**, *Lovelace Biomedical Research Institute, USA*
Involvement of endothelial nitric oxide synthase in cerebral microcirculation and oxygenation in traumatic brain injury
- 14.15 – 14.30 **Maheen Siddiqui**, *Birkbeck College, UK*
Imaging cerebral energy metabolism in healthy infants
- 14.30 – 14.45 **Christina H, Wolfsberger**, *Medical University of Graz, Austria*
Increased risk for cerebral hypoxia during immediate transition in stable term neonates of mothers who had smoked during pregnancy
- 14.45 – 15.00 **Hamoon Zohdi**, *University of Bern, Switzerland*
Cerebral oxygenation and systemic physiological changes during a verbal fluency task: Differences between men and women

15.00 – 16.00 **Poster session 2**

P2.01. Alexander Kalyanov, *University of Zurich and University Hospital Zurich, Switzerland*
Development and validation of liquid heterogeneous phantom for time domain near-infrared optical tomography (TD NIROT)

P2.02. Marta Lazzeroni, *Stockholm University, Sweden*
Hypoxic target volume determination in PET/CT imaging – the impact of deformable image registration method

P2.03. He Nucleus Xu, *University of Pennsylvania, USA*
Optical Redox Imaging as a Label-free Technique for Probing the Involvement of NAD(H) Redox Status in Some Major Biological Pathways in Breast Cancer

P2.04. Mandy Rauschner, *University of Halle, Germany*
Acidosis-induced regulation of Egr1 and Ccn1 in vitro and in experimental tumors in vivo

P2.05. Yu Okuma, *Fukuyama City Hospital, Japan*
Oxyhemoglobin level measured by near-infrared spectrometer is associated with brain mitochondrial dysfunction after cardiac arrest in rats

P2.06. Wataru Tsuchiya, *Teikyo Heisei University Graduate School of Health Sciences, Japan*
Usefulness of Brain Activity and Autonomic Activity in Motor Imagery Assessment -Focusing on the relationship with psychometric scales-

P2.07. Kseniia Trofimova, *Privolzhsky Research Medical University, Russia*

NIRS-based assessment of cerebral oxygenation during high definition anodal transcranial direct current stimulation in patients with traumatic brain injury.

P2.08. Lorenzo Cortese, *The Barcelona Institute of Science and Technology, Spain*

Hybrid near infrared diffuse optical spectroscopic monitoring of cerebral hemodynamics and cytochrome c oxidase during acute ischemia in the rabbit fetus

P2.09. Sebastiano Cicco, *University of Bari, Italy*

Cardiovascular risk score did not correlate to gas exchange in COVID-19 patients

P2.10. Gerolamo Cicco, *University of Modena and Reggio Emilia, Italy*

Heme Oxygenase 1/ High Mobility Group Box 1 pathway may have a possible role in Covid-19 ARDS (Acute respiratory distress syndrome) : a pilot histological study

P2.11. Peter Vaupel, *University of Freiburg, Germany*

Blood flow and respiratory gas exchange in the maternal-placental-fetal unit at term: A data update

P2.12. Frédéric Lange, *UCL, United Kingdom*

Upper trapezius muscle tonicity, assessed by palpation, relates to change in tissue oxygenation and structure as measured by Time-Domain Near Infrared Spectroscopy

Session: Methods 1 – Chair: Hamoon Zohdi

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| 16.00 – 16.15 | Sabino Guglielmini , <i>University of Zurich, Switzerland</i>
Machine learning enables to distinguish familiar and unfamiliar pairs of subjects performing a prolonged eye contact interaction task: A systemic physiology augmented functional near-infrared spectroscopy (SPA-fNIRS) hyperscanning study |
| 16.15 – 16.30 | Zuzana Kovacsova , <i>UCL, UK</i>
Absolute quantification of cerebral tissue oxygen saturation with multidistance broadband NIRS |
| 16.30 – 16.45 | Frédéric Lange , <i>UCL, UK</i>
Investigating changes in cerebral microvascular blood flow and mitochondrial metabolism together at the cot-side in neonatal encephalopathy |
| 16.45 – 17.00 | Ilias Tachtsidis , <i>UCL, UK</i>
Multivariate network analysis of cerebral and systemic variables for assessment of injury following hypoxic ischaemic encephalopathy |
| 17.00 – 18.00 | Virtual get together |

Wednesday 28. July, 2021

13.00 – 14.00 Annual General Meeting

Session: Clinical application 2 – Chair: Oliver da Silva-Kress

14.00 – 14.15 **Paul Buehler**, *University of Maryland School of Medicine, USA*
Modelling the effects of moderate hypoxia on the progression of pulmonary hypertension in sickle cell disease

14.15 – 14.30 **Sebastiano Cicco**, *University of Bari, Italy*
Pulmonary Embolism in COVID-19 patients is not related to a worsening in tissue oxygenation

14.30 – 14.45 **Jonas Fischer**, *The Barcelona Institute of Science and Technology, Spain*
Effect of non-medical face masks on cerebral blood oxygenation and blood flow

14.45 – 15.00 **Susanna Tagliabue**, *The Barcelona Institute of Science and Technology, Spain*
Does hyperventilation therapy lead to periods of "misery perfusion" in neurocritical care patients? A pilot study by transcranial optical monitoring

15.00 – 16.00 Poster session 3

P3.01. Weixiang Qin, *Niigata University of Health and Welfare, Japan*
The relationship between end-tidal carbon dioxide partial pressure changes and Oxyhemoglobin concentration in prefrontal cortex changes during long-term exercise

P3.02. Felix Scholkmann, *University of Bern & University Hospital Zurich, Switzerland*
Frontal cerebral oxygenation in humans at rest: A mirror symmetry in the correlation with cardiorespiratory activity

P3.03. Andrey Oshorov, *Burdenko Neurosurgery Institute, Moscow, Russia*
Assessment of Cerebral Autoregulation and Optimal Mean Arterial Pressure with Near-Infrared Spectroscopy in Patients with Traumatic Brain Injury.

P3.04. Oliver Thews, *University of Halle, Germany, Germany*
Evaluation of betulinic acid derivatives as PET tracers for hypoxia-induced carbonic anhydrase IX (CA IX) expression

P3.05. Yu Okuma, *Fukuyama City Hospital, Japan*
A case of intracranial vertebral artery stenosis treated with percutaneous transluminal angioplasty and stenting under a brain oximeter

P3.06. Gino Bopp, *University Hospital Zurich, University of Zurich, Switzerland*
Cross-frequency coupling between brain and body signals: A systemic physiology augmented functional near-infrared spectroscopy (SPA-fNIRS) hyperscanning study

P3.07. Asahi Tanaka, *Teikyo University Hospital, Japan*
The relationship between advance notice of pain and prefrontal cortex

P3.08. Alexey Trofimov, *Privolzhsky Research Medical University, Russia*
Can eye tracking be used to predict the level of cerebral oxygen saturation in mild traumatic brain injury? A preliminary study.

P3.09. Leif Bulow, *Lund University, Sweden*
Interactions between hemoglobins and nucleic acids

P3.10. Shinichiro Morishita, *Fukushima Medical University, Japan*
Rating of Perceived Exertion Compared to Multiple Physiological Parameters and Leg Muscle Oxygenation during Supine Cardiopulmonary Exercise Testing in Healthy Adults

P3.11. Aldo Di Costanzo Mata, *UZH/USZ, Switzerland*
Phantoms with tunable chambers mimicking microvasculature and hemodynamic optical phenomena

P3.12. Howard Halpern, *University of Chicago, United States*
Directing local hypoxia radiation boosts in three tumor models with EPR pO₂ imaging

Session: Tumor oxygenation – Chair: Sally Pias

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| 16.00 – 16.15 | Peter Vaupel , <i>University of Freiburg, Germany</i>
Blood supply and oxygenation status of the liver: From physiology to malignancy |
| 16.15 – 16.30 | Pablo Fernández Esteberena , <i>The Barcelona Institute of Science and Technology, Spain</i>
Potential of multi-modal clinical ultrasound and hybrid diffuse optics (LUCA platform) for malignant thyroid nodule detection |
| 16.30 – 16.45 | Qi Wang , <i>New Mexico Institute of Mining and Technology, USA</i>
Towards personalizing radiotherapy treatment: de novo lipid effects on intracellular oxygenation |
| 16.45 – 17.00 | Ana Ureba , <i>Karolinska Institutet, Sweden</i>
Photon and Proton Dose Painting based on Oxygen Distribution – Feasibility Study and TCP Assessment |
| 17.00 – 18.00 | Virtual get together |

Thursday 29. July, 2021

13.00 – 14.00 Virtual get together

Session: Tissue oxygenation 1 – Chair: Michelle Puchowicz

- 14.00 – 14.15 **Timothy Burton**, *Ryerson University, Canada*
Feasibility of perfusion imaging for flap viability assessment
- 14.15 – 14.30 **Tarcisi Cantieni**, *University of Bern, Switzerland*
Feasibility to measure tissue oxygen saturation using textile-integrated polymer optical fibres
- 14.30 – 14.45 **Sally Pias**, *New Mexico Institute of Mining and Technology, USA*
Do vascular and extracellular measurements consistently reflect intracellular pO₂?
- 14.45 – 15.00 **Harold Swartz**, *Geisel College of Medicine at Dartmouth, USA*
A radiation biological analysis of the possible mechanism for the oxygen effect in FLASH

15.00 – 16.00 **Poster session 4**

P4.01. Edwin Nemoto, *University of New Mexico, USA*

Cerebrovascular Reserve (CVR) and Stages of Hemodynamic Compromise

P4.02. Atsuhiko Tsubaki, *Niigata University of Health and Welfare, Japan*

Cerebral blood volume and cerebral oxygen exchange in the motor-related area during and after a 20-min moderate-intensity cycling exercise: A near-infrared spectroscopy vector analyses

P4.03. Masaru Kanda, *Niigata University of Health and Welfare, Japan*

Effects of neck and shoulder pain and the position of the head and neck on the intramuscular circulation of the cervical muscles

P4.04. Kaoru Sakatani, *The University of Tokyo, Japan*

Effects of exercise-diet therapy on cognitive function in healthy elderly people evaluated by deep learning based on basic blood test data

P4.05. Carmen Degitz, *Halle, Halle (Saale), Germany*

Role of acidosis induced signaling pathways on mitochondrial O₂-consumption of tumor cells

P4.06. Felix Scholkmann, *University Hospital Zurich, University of Zurich, Switzerland*

Problems of oxygen transport to tissue in COVID-19 patients: The relevance of methemoglobin and carboxyhemoglobin

P4.07. Masamichi Moriya, *Teikyo Heisei University, Japan*

Long-term effects of physical exercise on physiological conditions evaluated by the Internet of medical things system

P4.08. Emanuele Russomanno, *ETH Zurich and University Hospital Zurich, Switzerland*
Effects of a range of head tissues optical properties on near-infrared spectroscopy

P4.09. Zuzana Kovacsova, *University College London, UK*
Investigation of confounding factors affecting the accuracy of the brain tissue oxygen saturation as derived by spatially resolved spectroscopy

P4.10. Eiji Takahashi, *Saga University, Japan*
Further evidence that gradients of extracellular pH direct migration of MDA-MB-231 cells in vitro.

P4.11. Giuseppe Cicco, *DETO – Section of Internal Medicine, Endocrinology, andrology and Metabolic Diseases, Italy*
Microcirculation and tissue oxygenation in diabetics wound healing - HIF influence

P4.12. Gennadi Saiko, *Swift Medical Inc, Canada*
An improved optical tissue model for tissue oximetry imaging applications

P4.13. Denis Bragin, *Lovelace Biomedical Research Institute, United States*
Effect of drag-reducing polymers on vascular hemodynamic and tissue oxygen supply in mouse model of diabetes mellitus

P4.14. Sang-Suk Lee, *Sangji University, South Korea*
T-cell activation inhibition for the effect of patch-type immunotherapy based on conjugation of anti-CD3 antibody and magnetic nanoparticles

Session: Methods 2 – Chair: Oliver Thews

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| 16.00 – 16.15 | Hiroshi Hirata , <i>Hokkaido University, Japan</i>
Simultaneous mapping of the partial pressure of oxygen, pH and inorganic phosphate using electron paramagnetic resonance: in vitro experiments |
| 16.15 – 16.30 | Inna Gertsenshteyn , <i>University of Chicago, USA</i>
Validation and correction of [18]F-Misonidazole PET with pO ₂ EPR and DCE-MRI |
| 16.30 – 16.45 | Lin Z. Li , <i>University of Pennsylvania, USA</i>
Feasibility of noninvasive measurement of NAD(H) in tumor xenografts by in vivo phosphorus-31 magnetic resonance spectroscopic imaging |
| 16.45 – 17.00 | Eiji Takahashi , <i>Saga University, Japan</i>
On the mechanism of sustained mitochondrial membrane potential without functioning complex IV |
| 17.00 – 18.00 | Virtual get together |

Friday 30. July, 2021

13.00 – 14.00 Virtual get together

14.00 – 14.15 **Ursula Wolf**, *University of Bern, Switzerland*
Manuscripts announcements: timelines, templates, review process

Session: Muscle – Chair: Chris Cooper

14.15 – 14.30 **Andreas R. Thomsen**, *University of Freiburg, Germany*
Improved oxygenation of human skin, subcutis and superficial cancers upon mild hyperthermia delivered by WIRA-irradiation

14.30 – 14.45 **Oliver da Silva-Kress**, *University of Bern, Switzerland*
Numerical optimization of a NIRS device for monitoring tissue oxygen saturation

14.45 – 15.00 **Martin Wolf**, *University of Zurich, University Hospital Zurich, Switzerland*
Tissue oximetry with visible light

15.00 – 16.00 Poster session 5

P5.01. Keiichiro Kuronuma, *Nihon University, Japan*
Effect of atorvastatin on microcirculation evaluated by vascular occlusion test with near infrared spectroscopy

P5.02. Ulf Jensen-Kondering, *University Hospital Schleswig-Holstein, Germany*
Electric properties tomography in a rodent model of ischemic stroke

P5.03. Meret Ackermann, *University Hospital Zurich, Switzerland*
Hybrid convolutional neural network (CNN) for image reconstruction in near-infrared optical tomography

P5.04. Martin Wolff, *University of Halle, Germany, Germany*
Role of the mTOR signaling pathway during extracellular acidosis in tumor cells

P5.05. Shun Takagi, *Doshisha University, Japan*
Quadriceps muscle O₂ dynamics in subjects without attenuation of deoxygenated hemoglobin concentration at vastus lateralis muscle near the end of ramp cycling exercise

P5.06. Oxana Semyachkina-Glushkovskaya, *Humboldt University, Germany*
Photomodulation of lymphatic delivery of liposomes to the brain bypassing the blood-brain barrier: the role of singlet oxygen

P5.07. Lei Ma, *Nantong University, China*
Physical stress Attenuates Working memory: An fNIRS Examination

P5.08. Leif Bulow, Lund University, Sweden

Thermodynamic characterization of the binding reaction between human ferric hemoglobins and haptoglobin

P5.09. O.A. Bragina, Lovelace Biomedical Research Institute, USA

Hemorheologic enhancement of cerebral perfusion by drag-reducing polymers for the treatment of the Alzheimer's disease

P5.10. Ilias Tachtsidis, University College London, UK

Monitor cerebral oxygenation, haemodynamic and metabolism in children with epilepsy during a hyperventilation task.

P5.11. Nursyarizah Amirah Jasni, Shibaura Institute of Technology, Japan

Hemoglobin phase of oxygenation and deoxygenation in adults: an fNIRS study

P5.12. Arata Tsutsui, Tokyo Dental College, Japan

Effect of different clenching strength with oral appliance on oxygen dynamics of masseter muscle during exercise and recovery

Session: Tissue oxygenation 2 – Chair: Nucleus He Xu

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| 16.00 – 16.15 | Michael Komarovskiy, Case Western Reserve University, USA
Postnatal exposure to brief hypoxia alters brain VEGF expression and capillary density in adult mice |
| 16.15 – 16.30 | Chris Cooper, University of Essex, UK
Characterization of a novel, genetically engineered, PEGylation site on a putative Hemoglobin Based Oxygen Carrier |
| 16.30 – 16.45 | An Ghysels, Ghent University, Belgium
Oxygen permeation pathways through phospholipid membranes in the liquid ordered and liquid disordered phases |
| 16.45 – 17.00 | Evgeniya Kirichenko, Southern Federal University, Russia
Immunofluorescence and ultrastructural identification of gap junctions in anaplastic astrocytoma |
| 17.00 – 18.00 | Award ceremony and virtual get together |