



Course on High-Resolution Respirometry

IOC74. *Mitochondrial Physiology Network* 18.02: 1-4 (2013)

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74th International Workshop on HRR And TPP/ISE

2013 January 22-25
Innsbruck, Tyrol, Austria



The **O2k-Workshop TPP/ISE** is customized for participants interested in **O2k-MultiSensor applications**, particularly ion selective electrodes (**ISE**) for measurement of [mitochondrial membrane potential](#) (TPP⁺, TPMP⁺) and Ca²⁺.

IOC74 covers an introduction to basic concepts on mitochondrial membrane potential: proton pumps, ion gradients, electrochemical potential (proton motive force) and the measurement of mt-membrane potential in biological samples (homogenate, permeabilized fibres).

Furthermore, data analysis - from TPP⁺ to mt-membrane potential - constitutes a major topic.

According to the interest of participants, other O2k-MultiSensor applications will be discussed and demonstrated:

- [O2k-Fluorescence LED2-Module](#)
- [Measurement of Ca²⁺](#), calibration and calculation of free Ca²⁺ in buffered solutions ([O2k-TPP⁺ and Ca²⁺ ISE-Module](#))
- [Acidification rate \(pH\)](#)
- [Nitric Oxide \(NO\)](#)

Lecturers and Tutors

Fasching Mario, PhD
Eigentler Andrea, PhD
Fontana-Ayoub Mona, BMA
Gnaiger Erich, Prof., PhD



Programme IOC74

1	Tuesday, January 22
	Arrival
16:30	Get-together: Introduction of participants and their research interests
17:00	Mario Fasching: O2k-MultiSensor overview

2 Wednesday, January 23, 2013		
Workshop		Weblink
09:00-09:30	Dermination of mitochondrial (mt) membrane potential via the TPP method - Introduction	
09:30-10:30	Hands-on: Assembly and maintenance of TPP and reference electrode	O2k-MultiSensor-Manual
10:30	<i>Coffee / Tea</i>	
11:00-12:30	Hands-on: Set up of the instrument with TPP and reference electrodes	O2k-MultiSensor-Manual
12:30	<i>Lunch break</i>	
14:30-16:00	Introduction in Planning and Performing a TPP experiment; Hands-on: Instrumental background oxygen flux in the presence of the TPP electrode	O2k-Background
16:00	<i>Coffee / Tea</i>	
16:30-18:00	Hands-on: TPP calibration and TPP chemical background	MiPNet 15.08
19:00-21:00	Demonstration of O2k-Fluorescence LED2-Module	MiPNet17.05

3 Thursday, January 24, 2013		
Workshop		Weblink
09:00-10:30	Hands-on: TPP calibration and application for the determination of mt-membrane potential	MiPNet14.05
10:30	<i>Coffee / Tea</i>	
11:00	Hands-on: mt-membrane potential continued	
12:30	<i>Lunch break</i>	
14:30-16:00	From the TPP signal to mt-membrane potential - Guide through the Excel templates.	MiPNet14.05
16:00	<i>Coffee / Tea</i>	
16:30-18:00	Hands-on: continued	

4 Friday, January 25, 2012		
Workshop		Weblink
09:00-10:30	Final analysis of TPP experiment - discussion	Mitochondrial membrane potential on Bioblast
10:30	<i>Coffee / Tea</i>	
11:00-12:15	Other potentiometric, amperometric, and fluorometric O2k-MultiSensor applications	
12:15-12:30	The O2k-Workshop continues with www.bioblast.at	Bioblast wiki
Departure		

IOCF74		Participants	
Name	Lab		
Ali Sameh S	ET_Giza_Ali SS: Center for Aging and Associated Diseases, Helmy Institute of Medical Sciences, IBBE. - Mitochondria, synaptosomes, cardiomyocytes, oxidative stress		
Calzia Enrico	DE_Ulm_Radermacher P: Division APV, Department of Anesthesiology, University Hospital Ulm. - Interactions between H ₂ S and mitochondrial respiration in sepsis, hyperglycaemia and in diaphragm muscle		
Charles Anne Laure	FR_Strasbourg_Zoll J: Faculte de Medicine. - Mitochondrial respiration, uncoupling, skeletal muscles		
Ehinger Johannes	SE_Lund_Elmer E: Mitochondrial Pathophysiology Unit, Lund University. - Clinical diagnostics, drug development, pediatric mitochondrial disorders and neurodegenerative disease		
Eigentler Andrea (tutor)	AT_Innsbruck_Gnaiger E: DSL, Dept Visceral, Transpl Thoracic Surgery, Medical Univ Innsbruck		
Fasching Mario (tutor)	AT_Innsbruck_OROBOROS INSTRUMENTS		
Fontana-Ayoub Mona (tutor)	AT_Innsbruck_OROBOROS INSTRUMENTS		
Gnaiger Erich (tutor)	AT_Innsbruck_OROBOROS INSTRUMENTS		
Kaul Kirti	DE_Duesseldorf_Roden M: Deutsches Diabetes-Zentrum		
Kraunsoe Regitze	DK_Copenhagen_Dela F: Center for Healthy Aging, University of Copenhagen. - Fat liver		
Larsen Steen	DK_Copenhagen_Dela F: Center for Healthy Aging, University of Copenhagen. - OXPHOS capacity, T2DM, statins		
Taulo Lund Michael	DK_Copenhagen_Dela F: Center for Healthy Aging, University of Copenhagen. - Correlation between mitochondrial function and insulin resistance		
Wachter Ulrich	DE_Ulm_Radermacher P: Division APV, Department of Anesthesiology, University Hospital Ulm. - Interactions between H ₂ S and mitochondrial respiration in sepsis, hyperglycaemia and in diaphragm muscle		
Yokota Takashi	DK_Copenhagen_Dela F: Center for Healthy Aging, University of Copenhagen. - Mitochondria, oxidative stress, heart		

Accommodation and Location

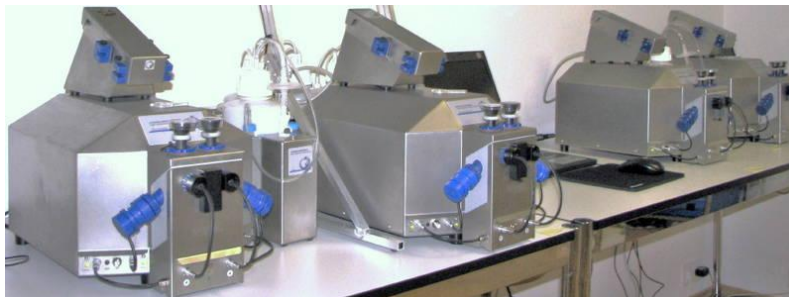


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Further information

O2k-Manual – www.orooboros.at/?O2k-Manual

O2k-Protocols – www.orooboros.at/?O2k-Protocols

O2k-Publications – www.orooboros.at/?O2k-Publications

Recommended Reading

- [O2k-MultiSensor System with Ion Selective Electrodes \(ISE\). MiPNet15.03.](#)
- [Determination of membrane potential using TPP+ and an ion selective electrode \(ISE\). MiPNet14.05.](#)
- [Calculation of mitochondrial membrane potential from measurements with a TPP electrode](#)
- http://wiki.orooboros.at/index.php/Mitochondrial_membrane_potential
- Rottenberg H (1984) Membrane potential and surface potential in mitochondria: uptake and binding of lipophilic cations. J Membr Biol 81: 127-138.

Acknowledgements

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