

Oroboros FAT4BRAIN Virtual O2k-Workshop



Mitochondrial Physiology Network 26.09(01):1-6 (2021)

Version 01: 2021-08-15 NextGen-O2k DatLab 7 ©2021 Oroboros

Updates: https://wiki.orooboros.at/index.php/FAT4BRAIN_Advanced_O2k-Workshop_IOC150_Virtual

FAT4BRAIN Virtual O2k-Workshop Advanced – TMRM and Calcium Green



The **Oroboros O2k-Workshop on high-resolution respirometry (HRR) – Advanced** provides an overview of the **O2k-FluoRespirometer**, including data analysis with **DatLab 7.4**. This provides a unique opportunity to receive advanced training in simultaneous O₂ flux and mitochondrial membrane potential (mtMP) or Ca²⁺ measurements.



Via a live video link, Oroboros experts will guide you step-by-step on **O2k-Multisensor applications**, with hands-on training on mtMP using TMRM and Ca²⁺ uptake and release using Calcium Green.



During the **FAT4BRAIN School IOC147 Virtual Event** topics covered in the **Blue Book** (5th edition) and the MitoEAGLE Bioenergetics Communication **Mitochondrial physiology** were presented and discussed, providing a basic introduction to mitochondrial physiology and protocol design, and during **FAT4BRAIN Virtual O2k-Workshop – Basic** the participants received hands-on training on the quality controls for high-resolution respirometry and SUIT protocols performance and analysis. The **FAT4BRAIN Virtual O2k-Workshop – Advanced – Amplex UltraRed** gave the participants the first contact with fluo-respirometry. Now the **FAT4BRAIN Virtual O2k-Workshop – Advanced – TMRM and Calcium Green** will introduce further O2k-Multisensor applications.



The Virtual O2k-Workshop is composed of:



O2k
Manual

O2k-Manual: Repository of online manuals (unlimited access) which guide beginners and experienced users from the instrumental set-up to data analysis.



O2k
Videosupport

The **O2k-Videosupport** provides valuable assistance, complementary to the O2k-Manual. These video clips are Open Access. Exclusive videos will also be available for Virtual O2k-Workshop participants.



O2k
Procedures

O2k-Procedures (unlimited access) explain various applications of the O2k (i.e. mitochondrial pathways, O2k-Demo experiments, O2k-Analysis, chemicals and media, O2k-mitochondrial preparations and mitochondrial and marker-enzymes).



SUIT

Substrate-uncoupler-inhibitor titration (SUIT) protocols are applied to living cells and mitochondrial preparations. Oroboros [library of SUIT protocols](#) and the [SUITbrowser](#) offer help to find the best SUIT protocol for your research questions. Instrumental and SUIT **DL-Protocols** (DatLab 7.4 software) provide a guide through the sequence of steps for instrumental and biological experiments. The library of SUIT protocols and the SUITbrowser are available online with unlimited access. DL-Protocols are included in **DatLab 7.4**.



DatLab



MitoPedia

MitoPedia includes a continuous development of a consistent nomenclature, terms, abbreviations, and concepts in mitochondrial physiology and nonequilibrium thermodynamics, in the spirit of Gentle Science.



BIOENERGETICS
COMMUNICATIONS

Bioenergetics Communications is the Open Access journal for publishing scientific and technical advances in bioenergetics and mitochondrial physiology as Living Communications.



O2k
Publications

O2k-Publications include relevant information of high-resolution respirometry.



O2k
Virtual Coaching

Virtual coaching sessions includes tutoring, guidance, questions and discussions.









Materials for self-study

» https://wiki.oroboros.at/index.php/FAT4BRAIN_Advanced_O2k-Workshop_IOC150_Virtual#Virtual_O2k-Workshop_self-study_material









It is recommended that participants prepare for the live sessions by going through the self-study material found at the link above.

Program

August 24th:

O2k-Advanced	
Simultaneous determination of O₂ flux and mitochondrial membrane potential	
Session	
08:00-08:30 (CEST), 09:00-09:30 (EEST): Hands-on: Quality control 1: Oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	Do-it-yourself 
08:30-09:00 (CEST), 09:30-10:00 (EEST): Introduction to mitochondrial membrane potential measurements and discussion Get prepared with " Materials for self-study "	
09:00-09:30 (CEST), 10:00-10:30 (EEST): Hands-on: TMRM calibration DL-Protocol: TMRM_calibration * One O2k will be selected to show the traces real time for those who are present only virtually – Afterwards the DLD files will be shared among all participants	
09:30-11:00 (CEST), 10:30-12:00 (EEST): Hands-on: Biological experiment: simultaneous measurement of O₂ flux and mt membrane potential SUIT protocol: SUIT-006 * One O2k will be selected to show the traces real time for those who are present only virtually – Afterwards the DLD files will be shared among all participants	
11:00-12:00 (CEST), 12:00-13:00 (EEST): Lunch break	
12:00-13:00 (CEST), 13:00-14:00 (EEST): Hands-on: O2k-cleaning after use DL-Protocol: O2k-cleaning AfterUse	Do-it-yourself 
13:00-13:30 (CEST), 14:00-14:30 (EEST): Hands-on: Chemical background with TMRM SUIT protocol: TMRM_calibration, SUIT-006 chemical background * One O2k will be selected to show the traces real time for those who are present virtually – Afterwards the DLD files will be shared among all participants	
13:30-15:00 (CEST), 14:30-16:00 (EEST): Hands-on: DatLab 7.4 mitochondrial membrane potential and O₂ flux analysis and performance evaluation (and hands-on: O2k-cleaning after use) DL-Protocol: O2k-cleaning AfterUse	
15:00-16:00 (CEST), 16:00-17:00 (EEST): Discussion: Applications of mitochondrial membrane potential measurements	

August 25th:

O2k-Advanced	
Simultaneous determination of O₂ flux and mitochondrial Ca²⁺ uptake and release	
Session	
08:00-08:30 (CEST), 09:00-09:30 (EEST): Hands-on: Quality control 1: Oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	Do-it-yourself  DatLab
08:30-09:00 (CEST), 09:30-10:00 (EEST): Introduction to Ca²⁺ measurements in mitochondria and discussion Get prepared with " Materials for self-study "	 Virtual Coaching
09:00-10:30 (CEST), 10:00-11:30 (EEST): Hands-on: Ca²⁺ uptake - experiment with biological sample. DL-Protocol: Ca ²⁺ uptake and release * One O2k will be selected to show the traces real time for those who are present o virtually - Afterwards the DLD files will be shared among all participants	 Virtual Coaching
10:30-11:00 (CEST), 11:30-12:00 (EEST): Hands-on: O2k-cleaning DL-Protocol: O2k-cleaning BeforeUse	Do-it-yourself  DatLab
11:00-12:00 (CEST), 12:00-13:00 (EEST): Hands-on: CaG calibration with biol sample Protocol: Ca ²⁺ calibration * One O2k will be selected to show the traces real time for those who are present o virtually - Afterwards the DLD files will be shared among all participants	 Virtual Coaching
12:00-13:00 (CEST), 13:00-14:00 (EEST): Lunch break	
13:00-14:00 (CEST), 14:00-15:00 (EEST): Hands-on: O2k-cleaning after use DL-Protocol: O2k-cleaning AfterUse	Do-it-yourself  DatLab
14:00-15:00 (CEST), 15:00-16:00 (EEST): Hands-on: Ca²⁺ analysis and DatLab performance evaluation	 Virtual Coaching
15:00-16:00 (CEST), 16:00-17:00 (EEST): Discussion on Ca²⁺ in mitochondria and applications	 Virtual Coaching

Tutors

Cardoso Luiza	Mitochondrial Wizard, PostDoc, Oroboros Instruments
Cecatto Cristiane	Mitochondrial Phoenix, PostDoc, Oroboros Instruments

Acknowledgements

Program prepared by Cardoso LHD, Cecatto C, Gnaiger E, Tindle-Solomon L, Oroboros Instruments.



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COST Action CA15203 MitoEAGLE



Mitochondrial physiology. Gnaiger Erich et al – MitoEAGLE Task Group (2020) Mitochondrial physiology. Bioenerg Commun 2020.1.

doi:10.26124/bec:2020-0001.v1.

» [Mitochondrial physiology](#)

MitoFit Preprints



The Open Access preprint server for mitochondrial physiology and bioenergetics

» https://www.mitofit.org/index.php/MitoFit_Preprints

Bioenergetics Communications

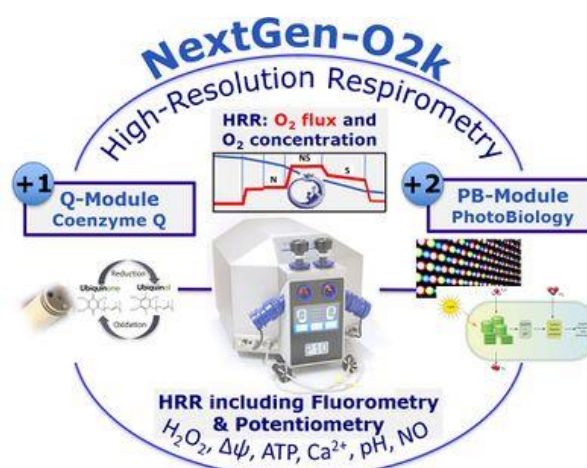


The Open Access journal for publishing scientific and technical advances in bioenergetics and mitochondrial physiology as [Living Communications](#)

» <https://www.bioenergetics-communications.org>

NextGen O2k

Oroboros - as a driving force in mitochondrial physiology - extends the analytical and diagnostic power of high-resolution respirometry by integration of NADH- and Q-redox monitoring in the **NextGen-O2k**. We aim at establishing the Oroboros quality control management for dissemination to our worldwide O2k-Network laboratories. This will become an effective contribution to address the acute *reproducibility crisis* of scientific investigation. In the spirit of Open Science and global networking, we will enable data sharing across projects and institutions in an Open Access database on mitochondrial physiology and pathology, to resolve the *inflation crisis* and ultimately the *value-impact crisis* of present academic publication. This will support key developments in mitochondrial medicine. In addition, we expand our business to algal biotechnology and ecology with the photobiology module of the NextGen-O2k, widening our focus from medicine to environment and climate.



Contact

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Mitochondria and cell research



Virtual O2k-Workshops are listed as [MitoGlobal Events](#)