

Mitochondrial Physiology Network 25.16(01):1-6 (2020)

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Updates: https://wiki.orooboros.at/index.php/MiPNet25.16_Virtual_O2k-Workshop

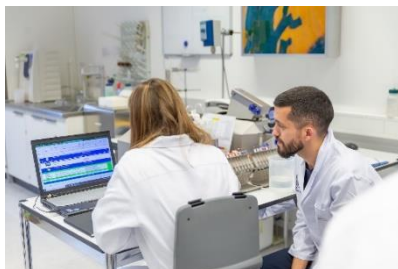
Virtual O2k-Workshop Basic and Advanced



The **Oroboros O2k-Workshop on high-resolution respirometry (HRR)** provides an overview of the **O2k-FluoRespirometer**, including applications of the **Titration-Injection microPump TIP2k** and data analysis by **DatLab 7.4**. The **Virtual O2k-Workshop** offers flexibility to the participants, allowing you to choose the virtual coaching sessions that most fit your personal needs. This provides a unique opportunity to receive a start-up introduction and learn about new developments in HRR.



Via a live video link, Oroboros experts guide you step-by-step on **O2k instrumental setup** and service of the polarographic oxygen sensors (**OroboPOS**) for instrumental quality control, an essential component of HRR. The **virtual coaching sessions include 10 individual training hours**. This offers the opportunity to analyse and discuss your first experimental DatLab files obtained with your O2k-FluoRespirometer with the bioenergetics experts of Oroboros. Instrumental and biological experiments demonstrate the unique advantages and limitations of monitoring of oxygen concentration and respiration, simultaneously with monitoring hydrogen peroxide production and several other MultiSensor options.



A wide range of standardized substrate-uncoupler-inhibitor-titration (**SUIT**) protocols is available to address your specific research questions, which can be further customized for application to your biological samples. **Online supporting material** is provided to make it easy for you to use the many features of the DatLab software from instrumental control to the analysis of results.

At our workshops, IOC participants invariably ask for a detailed discussion about protocol design. The **Blue Book** (5th edition in prep.) and the MitoEAGLE Bioenergetics Communication **Mitochondrial physiology** provide a basic introduction to mitochondrial physiology, as an introduction to get prepared for the training course.

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).



SUIIT

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

Individual face-to-face **virtual coaching** sessions (this takes place on the dates to be confirmed). The virtual coaching includes tutoring, guidance, questions and discussions. **10 hours** of virtual coaching are included in the Virtual O2k-Workshop.

Materials for self-study







» https://wiki.oroboros.at/index.php/Virtual_O2k-Workshop_study_material






It is recommended that participants prepare for their first live sessions by going through the self-study material found at the "**Materials for self-study**" file. The content will lead participants through the set-up of the instrument and introduce the field of HRR. The date of the live sessions will be communicated to the participants once a registration form is received. Each participant will receive 10 h to be used on these **virtual coaching** sessions.

DatLab 7.4 has to be installed on the computer to which the O2k is connected ([O2k-Videosupport: DatLab 7 installation](#)).

Program





For the 10 hours of individual virtual coaching sessions, we recommend that new users follow the O2k-Basic sessions denoted by as Start-up *. Advanced users may choose to select sessions from both the O2k-Basic and Advanced programs.

O2k-Basic	
Session	Duration
Part 1.1: OroboPOS service and O2k instrumental setup	
Hands-on: OroboPOS service <ol style="list-style-type: none"> 1. OroboPOS 2. Cathode cleaning 3. Anode cleaning 4. Membrane mounting 	Start-up 2 h * 
Hands-on: O2k instrumental setup <ol style="list-style-type: none"> 5. O2k FluoRespirometer 6. Insert OroboPOS 7. Insert O2k Chamber 8. Chamber volume calibration 	Start-up 2 h * 
Part 1.2: DatLab	
DatLab overview	Start-up 1 h * 
Part 1.3: O₂ calibration and instrumental background	
Hands-on: Quality control 1: Oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	Do-it-yourself 1.5 h 
Hands-on: Quality control 2: Oxygen background Select one DL-Protocol according to your needs: Instrumental O ₂ background TiP2k Instrumental O ₂ background manual injections Instrumental high O ₂ background TiP2k Instrumental high O ₂ background manual injections	Do-it-yourself 2 h 
DatLab 7.4 analysis and discussion	1 h * 

Part 2.1: Biological samples and experimental design	
Discussion about biological samples, experimental design, SUIT protocols Get prepared by "Materials for self-study" Section 2.1	Start-up 1 to 2 h * 
Part 2.2: Biological experiment and data analysis	
Hands-on: Quality control 1: Oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	Do-it-yourself 1.5 h 
Hands-on: Biological experiment: cell or mitochondrial respiration DL-Protocol: SUIT protocol will be selected/discussed individually	Do-it-yourself 1 to 3 h 
Hands-on: O2k-cleaning after use  Select one DL-Protocol according to your needs: O2k-cleaning AfterUse O2k-cleaning AfterUse inhibitors O2k-cleaning AfterUse stirrers	Do-it-yourself 1 h
Hands-on: DatLab 7.4 analysis and DatLab performance evaluation. Discussion	Start-up 2 h * 

O2k-Advanced

Simultaneous determination of O₂ and H₂O₂ fluxes

Session	Option to select hours for virtual coaching
Introduction to H₂O₂ measurements and discussion Get prepared with "Materials for self-study", "O2k-Advanced, O2k-Applications: Simultaneous determination of O ₂ and H ₂ O ₂ fluxes"	1 h
Hands-on: Quality control 1: Oxygen calibration DL-Protocol: O2k-cleaning BeforeUse DL-Protocol: O2 calibration air	1.5 h 
Hands-on: Amplex UltraRed calibration: Amplex UltraRed calibration in the absence of biological sample. DL-Protocol: AmR calibration	1 h 
Hands-on: Biological experiment: simultaneous measurement of O₂ and H₂O₂ production Suggested SUIT protocol: SUIT-026 DL-Protocol: SUIT-026 AmR mt D064	2 h 
Hands-on: O2k-cleaning after use DL-Protocol: O2k-cleaning AfterUse	1 h 
Hands-on: DatLab 7.4 H₂O₂ flux analysis and DatLab performance evaluation. Discussion	1.5 h [§]

Tutors

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Cecatto Cristiane	Mitochondrial Phoenix, PostDoc, Oroboros Instruments
Di Marcello Marco	Research Magician, 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 Preprint Archives



The Open Access preprint server for mitochondrial physiology and bioenergetics

» [https://www.mitofit.org/index.php/MitoFit Preprint Archives](https://www.mitofit.org/index.php/MitoFit_Preprint_Archives)

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>

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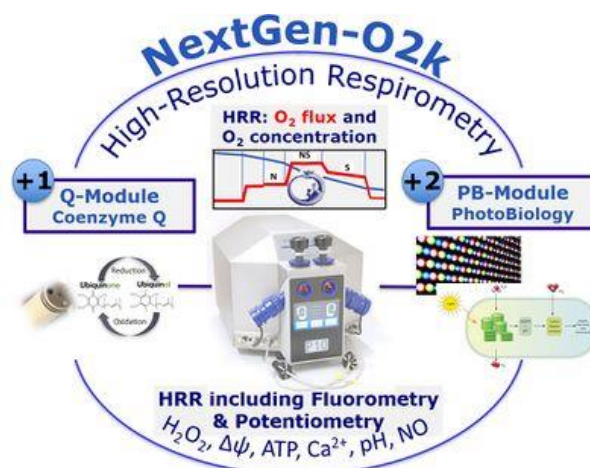


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NextGen O2k

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.



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Mitochondria and cell research

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

