

## Virtual O2k-Workshop Basic and Advanced NextGen-O2k: Q-Module



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**. 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. In this adapted workshop for NextGen-O2K Key Opinion Leaders (KOLs), the focus will be also on providing specific training on the NextGen-O2k Q-Module and the hands-on demo experiments will be specific for conducting simultaneous measurement of O<sub>2</sub> flux and the redox changes of the Q-pool.

At our workshops, IOC participants invariably ask for a detailed discussion about protocol design. The [Blue Book](#) (5<sup>th</sup> edition) 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).



SUI

**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

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](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.

<b>O2k-Basic</b>	
<b>Session</b>	<b>Duration</b>
<b>Part 1.1: OroboPOS service and O2k instrumental setup</b>	
<b>Hands-on: OroboPOS service</b>  1. OroboPOS 2. Cathode cleaning 3. Anode cleaning 4. Membrane mounting	2 h  
<b>Hands-on: O2k instrumental setup</b>  5. O2k FluoRespirometer 6. Insert OroboPOS 7. Insert O2k Chamber 8. Chamber volume calibration – including Q-Stopper with reference electrode	2 h  
<b>Part 1.2: DatLab</b>	
<b>DatLab overview</b>	1 h  
<b>Part 1.3: Oxygen calibration and instrumental background</b>	
<b>Hands-on: Quality control 1: Oxygen calibration</b>  DL-Protocol: O2k-cleaning BeforeUse  DL-Protocol: O2 calibration air	Do-it-yourself 1.5 h  
<b>Hands-on: Quality control 2: Oxygen background</b>  Select one DL-Protocol according to your needs: Instrumental O2 background TIP2k Instrumental O2 background manual injections Instrumental high O2 background TIP2k Instrumental high O2 background manual injections	Do-it-yourself 2 h  

<b>Hands-on: Quality control 1: Oxygen calibration with the Q-Stopper and reference electrode</b>  DL-Protocol: O2k-cleaning BeforeUse  DL-Protocol: O2 calibration air	Do-it-yourself 1.5 h  
<b>Hands-on: Quality control 2: Oxygen background with the Q-Stopper and reference electrode</b>  Select one DL-Protocol according to your needs: Instrumental O2 background TiP2k Instrumental O2 background manual injections Instrumental high O2 background TiP2k Instrumental high O2 background manual injections	Do-it-yourself 2 h  
<b>Quality Control and DatLab 7.4 analysis and discussion</b>	1 h  

<b>NextGen-O2k Simultaneous determination of O<sub>2</sub> flux and the redox state of the Q-pool</b>	
Session	Duration
<b>Part 2.1: Q-Module, CV, biological samples, and experimental design</b>	
<b>Introduction to the design and functioning of the Q-Module and cyclic voltammetry. Discussion about biological samples, experimental design, SUIT protocols.</b>  Get prepared with "Materials for self-study" Section 2.1 and NextGen-O2k KOL Training – Q-Module	1-2 h  
<b>Part 2.2: Instrumental quality control and Q-Service</b>	
<b>Hands-on: Assembly and Polishing of the Q-Stopper and chamber volume calibration with Q-Sensor</b>	0.25-0.5 h  
<b>Part 2.3: Cyclic voltammetry</b>	
<b>Hands-on: Cyclic voltammetry with and without CoQ2</b>	0.25 h  
<b>Hands-on: O2k-cleaning after CV</b>	0.25 h  

Part 2.4: Biological experiment and analysis	
<b>Hands-on: Biological experiment: simultaneous measurement of O<sub>2</sub> flux and the redox changes of the Q-pool</b>  DL-Protocols: SUIT-006 Q mt D071 SUIT-031 Q mt D072	Do-it-yourself 2 h  
<b>Hands-on: O<sub>2</sub>k-cleaning after use</b>  <a href="#">Cleaning after Q-experiments</a>  Select one DL-Protocol according to your needs: O <sub>2</sub> k-cleaning AfterUse O <sub>2</sub> k-cleaning AfterUse inhibitors O <sub>2</sub> k-cleaning AfterUse stirrer	Do-it-yourself 1 h  
<b>Hands-on: DatLab 7.4 Q redox ratio analysis and DatLab performance evaluation. Discussion</b>	1 h  

## Tutors

<a href="#">Cardoso Luiza</a>	Mitochondrial Wizard, PostDoc, Oroboros Instruments
<a href="#">Komlodi Timea</a>	Mitochondrial Explorer, PostDoc, Oroboros Instruments

## 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\\_Preprints](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>

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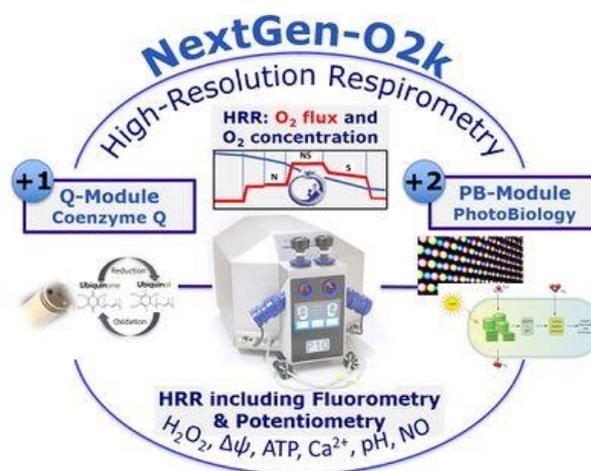


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**NextGen  
O2k**

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.



## Contact

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**Mitochondria and cell research**

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

