



Course on High-Resolution Respirometry

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International Course on High-Resolution Respirometry

13-16 Sept. 2005: prior to **MiP2005**

High-Resolution Respirometry

OROBOROS Oxygraph-2k

Schröcken, Vorarlberg, Austria



This course on high-resolution respirometry will include overview presentations on high-resolution respirometry and its applications. Specific emphasis is placed on hands-on practical sessions to introduce participants into the technical and operational details of the methods. Experienced tutors will guide small working groups step-by-step through the approaches of high-resolution respirometry.



The OROBOROS Team: Lecturers, tutors, hardware, and software experts

The course will take place in Hotel Mohnenfluh, Schröcken, Vorarlberg, prior to the 4th Conference on Mitochondrial Physiology (MiP2005, 16-20 Sept. 2005 –

www.mitophysiology.org).

Five Oxygraph-2k with accessories and PCs with DatLab 4, and an ESR spectrometer will be available to provide all participants with a do-it-yourself opportunity for both hardware and software.



Oxygraph-2k, TIP-2k, ISS

During lunch breaks, sufficient time is available for relaxing walks and talks, to enjoy the refreshing scenery of the alpine environment, or use the spare time for specific tutorials.

Programme

Day 1 (13. Sept)

Registration in Hotel Mohnenfluh.

Setting up the Oxygraph-2k (OROBOROS INSTRUMENTS)

19:15 Dinner

21:00 Introductory notes - High-Resolution Respirometry and ESR.

Day 2 (14. Sept)

08:45-12:00 High-resolution respirometry: From switching on the Oxygraph-2k to the experimental result (Demo experiment).

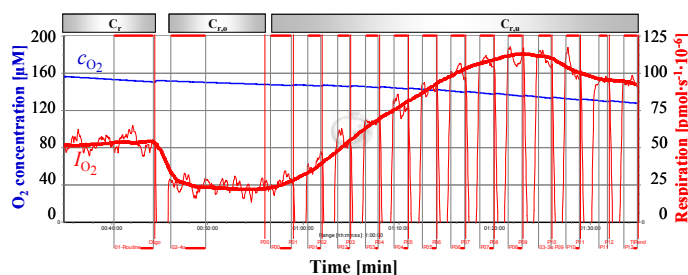
Simultaneous Oxygraph-2k demo experiments with DatLab 4 (four instruments - eight parallel chambers);

Oxygen calibration;

Addition of cells closing the chambers;

Phosphorylation control titration: Routine respiration (C_r), oligomycin-induced state (C_{ro}), uncoupled state (C_{ru}), inhibition by rotenone and antimycin A (C_{RA});

FCCP titration with the TIP-2k.



12:00-16:00 Lunch break; alpine walks and talks.

16:15-19:00 Hands-on with the Oxygraph-2k: Cell respiration experiment and DatLab 4 (Labs 1-3). Instrumental setup and service (Lab 4).

9:15 Dinner

21:00 Hot topics in Mitochondrial Physiology. MiP-Net Session 1.

Day 3 (15. Sept)

08:45-12:00 High-resolution respirometry with the O2k: Calibration of the oxygen signal, instrumental and chemical background flux (Labs 1-3); Instrumental setup and service (Lab 4).

12:00-16:00 Lunch break, alpine walks and talks.

16:15-19:00 High-resolution respirometry and DatLab- 4 (Labs 1-3) Instrumental setup and service (Lab 4).

19:15 Dinner

20:30 Hot topics in Mitochondrial Physiology: MiPNet Session 2.



Day 4 (16. Sept)

**08:45-12:00 High-resolution respirometry and DatLab 4 (Labs 1-3)
Instrumental setup and service (Lab 4).**

12:00-16:00 Lunch break, alpine walks and talks.

16:15-18:00 Special interest groups: TIP-2k, inhibitor titration and flux control / Experimental regimes / Oxygen kinetics (Labs 1-4).

19:00 Welcome of MiP2005.

Contents: Overview on High-Resolution Respirometry

Introduction: Mitochondrial and cellular respiratory physiology; new challenges for high instrumental performance.

High-resolution respirometry; what makes the difference? Presentation of the new Oroboros Oxygraph-2k.

Low oxygen and measurement of cellular oxygen consumption – pushing the limits of detection.

- Optimum system design - the Oroboros Oxygraph-2k.
- On-line recording of oxygen concentration and flux; linear slope versus oxygen flux as a function of time.
- The concept of high-resolution calibrations – overview on instrument demonstration.

Oroboros Oxygraph-2k: On-line instrumental performance

- Instrumental background: measurement and correction as a function of pO_2 .
- High resolution of respiratory flux at various steady-states.
- Conceptual and methodological advantages of measurement at physiological low levels of oxygen.
- High time resolution for kinetic analyses: Determination of the time constant, dynamic corrections.

Polarographic oxygen sensor and Oxygraph service

- Cleaning of anode and cathode.
- Electrolyte and membrane application.
- Oxygraph-2k: instrumental maintenance.

DatLab 4 - the specialized software for High-Resolution Respirometry: Data acquisition and analysis.

Departure: Friday, 16. September 2005

Schröcken-Innsbruck (Schröcken-Bregenz), departures according to departure times in Innsbruck (Bregenz); if possible, please plan your departures in the late afternoon - or continue at [MiP2005, 16-20 September 2005](#).

Lecturers and Tutors (OROBOROS INSTRUMENTS - www.orooboros.at)

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