TRANSLATION TECHNOLOGY

The UCLA-CTSI provides many state of the art technology cores and specialized service cores available to investigators (http://people.ctsi.ucla.edu/institution/core-display). The technology core described below is available at Lundquist/Harbor-UCLA. Applications for utilization of these resources are reviewed by the Scientific Advisory Committee of the UCLA-CTSI at Lundquist/Harbor-UCLA. Support for investigators using this core is provided through a voucher system. Please contact the UCLA-CTSI office at 310-222-2503.

HIGH RESOLUTION TISSUE RESPIROMETRY (MITOCHONDRIAL PHYSIOLOGY AND PATHOPHYSIOLOGY)

Description

The high-resolution respirometry (HRR) facility supports investigators in mitochondrial physiology and pathophysiology studies. This core will provide consultation, training, and services for assessment of oxidative phosphorylation (OXPHOS) and electron transport system (ETS) capacities in isolated mitochondria, permeabilized cells, or tissue preparations. Applications of HRR include:

- Diagnosis of acquired and genetic mitochondrial diseases
- Diagnosis of myopathies and neuromuscular pathologies
- Study of pathologies with reduced cellular respiration
- Studies on cell function and cell death
- Aging and senescence
- Oxidative stress and antioxidant systems
- Ischemia-reperfusion injury
- Cancer research / pharmacological tests
- Environmental stress
- Metabolic substrate balance

Using HRR assessment of OXPHOS and ETS in living and permeabilized cells requires only a small tissue sample to obtain accurate results even at high sample dilution. Less than 10 mg fresh muscle tissue or <500,000 cells are required (each sample is assayed in duplicate), 10-fold less compared to conventional instruments. Substrate uncoupler/inhibitor titration protocols (SUIT) extend the information gained on various ETS complexes in a phosphorylating or uncoupled state in a single incubation.

HRR Core Lab Resources

Ororboros Oxygraph-2k and DatLab software

Titration-Injection micropump TIP2k

Services Available

Consultation: The core director is available for consultation to help investigators with experimental design or method development.

Sample preparation: HRR results are best when fresh tissue is used. Some tissues can be assayed from frozen samples, but require preparation in respiratory media before freezing.

Tissue Respirometry: Quantitative tissue respirometry using SUIT protocol and flux control ratio analyses are available. Each sample is assayed in duplicate, and the measurement procedure takes approximately 2 hours per duplicate sample. Media will be provided to use for tissue collection.

Training: Training is provided to CTSI-supported fellows or junior faculty on CTSI approved projects.

Costs

There is no charge for consultation on experimental or assay design for mitochondrial function

HRR is designed for assaying fresh tissue. The full HRR assay takes about 2 hours per duplicate sample using fresh tissue and fresh media. With recalibration between samples, this means that up to 3-4 duplicate samples can be processed per day. Depending on total sample number, and number of samples per day, and frequency of samples, HRR ranges between approximately $150 and $450 per duplicate sample. Please contact Dr. Rossiter (the Core Director) for a quote for your study.

Contact Information

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