Overview

The pulmonary function testing (PFT) and cardiopulmonary exercise testing (CPET) core lab facility supports investigators in pulmonary function and cardiopulmonary exercise testing studies. PFT consists of an array of non-invasive tests of abnormality of lung mechanics and pulmonary gas exchange. These are standard tests used to detect the presence of, and quantify the severity of, a range of lung diseases. CPET provides a whole-body assessment of the integrative exercise responses involving the pulmonary, cardiovascular, hematopoietic, neuropsychological, and skeletal muscle systems, which are not adequately reflected through the measurement of individual organ system function. It is a noninvasive, dynamic, physiologic overview which permits the evaluation of both submaximal and peak exercise responses, providing the relevant information for clinical decision making.

CPET is used in a wide spectrum of clinical and clinical research applications, such as for the evaluation of undiagnosed exercise intolerance and exercise-related symptoms, the objective determination of functional capacity and impairment, assessment of pre-operative risk, or evaluation of intervention efficacy. The CPET Core Lab will provide consultation, training, and services for clinical research using PFT and CPET. The Core Lab has a 40-year history in PFT and CPET assessments and contributed to initial development of the technique as well as current international guidelines for its application and interpretation. The Core Lab is also highly-experienced in multicenter clinical trials using PFT and CPET measurements.

Core Resources

The Core Lab suite of equipment was updated in 2014 and is state-of-the-art.

Pulmonary Function

- Vmax Encore (Ver 20.1, CareFusion, Yorba Linda, CA) pulmonary function system with spirometry, maximal inspiratory and expiratory pressure, body plethysmography, transfer factor (DLCO), nitrogen washout, single breath oxygen (CV) test, and airway resistance measurement modules
- Impulse Oscillometry System (IOS) for pulmonary impedance measurement (airways resistance R5, R20, and reactance X5, AX, and fres)
- V62J autobox body plethysmograph for lung volumes

Cardiopulmonary Exercise Testing

- Vmax Encore computerized breath-by-breath gas exchange, ventilation, and cardiac measurement and analysis system (Ver 29, CareFusion, Yorba Linda, CA), with JLAB, DBX Connect and SentrySuite Software
- MGC Diagnostics Ultima Cardio2 computerized breath by breath gas exchange, ventilation and cardiac measurement and analysis with BreezeSuite software (MCG Diagnostics, St.Paul, MN)
- Integrated pulse oximetry (Radical 7, Masimo) and transcutaneous PCO2 monitoring (TOSCA, Radiometer)
- Non-invasive cardiac output and exercise DLCO determination by the intrabreath DLCO/acetylene method
- Integrated Cardiosoft (Ver 6.71, Cam 14) computerized 12-lead electrocardiography and Frank vectorcardiography
- Manual auscultatory blood pressure measurement during rest and exercise

Ergometry

- Electromagnetically-braked cycle ergometry with pedal force measurement, and ‘zero watt’ startup (Excalibur Sport, Lode BV, Groningen, NL)
- Programmable Medical treadmill ergometry (TMX428CP Trackmaster, Newton, KS)

Blood analysis, electromyography, near-infrared spectroscopy, muscle biopsy, peripheral vascular ultrasonography, and muscle fatigue assessment methods are also available for research applications. The CPET Core Lab is equipped with a maintained crash cart and an automated defibrillator (AED).

Services Available

- Consultation: The core is available for consultation to assist investigators with experimental design in single site or multicenter trials
- PFT: Data collection, quality control, normal values for the pulmonary function tests, with pre- and post-bronchodilator testing
• **CPET**: Data collection, quality control, data processing and reporting during cycle or treadmill ergometry
• **Training**: Training is available to CTSI-supported fellows or junior faculty on CTSI approved projects

**Location**

CDCRC and RB3 Buildings, LA BioMed at Harbor-UCLA  
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**Contact Information**

The CPET Core Lab principal investigators include 3 licensed physicians for assessment and reporting of clinical cases.

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