



## Seahorse XFp Extracellular Flux Analyzer

THE POWER OF XF TECHNOLOGY FOR EVERY LAB

 **Seahorse Bioscience**

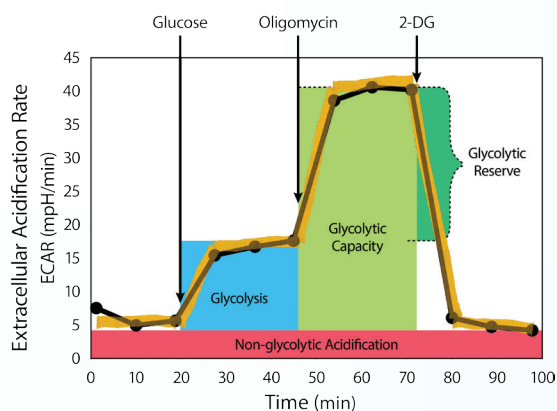
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# SEAHORSE XF ASSAYS – THE STANDARD FOR METABOLIC MEASUREMENTS

The role of metabolism in cellular and physiological processes from cardiovascular function to immune response is well established, with many diseases now linked to metabolic dysfunction or reprogramming. Using Seahorse XF technology, scientists can quickly and easily obtain functional metabolic data and gain a greater understanding of cell metabolism, enabling new advancements in life science research.

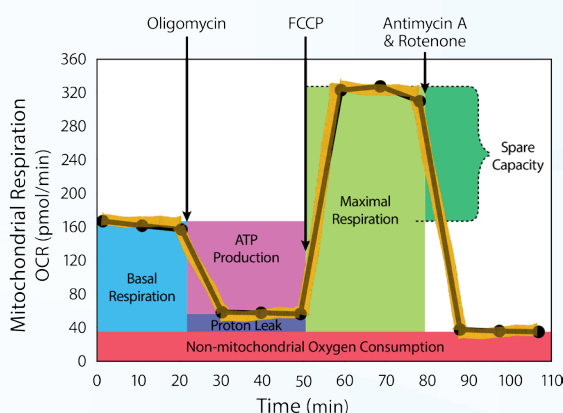
## Functional Metabolic Data on Live Cells in Real Time

### Seahorse XF Glycolysis Stress Test Profile Glycolytic Function



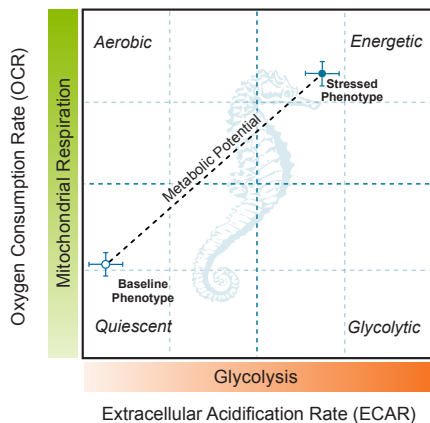
The Seahorse XF Glycolysis Stress Test Profile illustrates the three key parameters of glycolytic function: glycolysis, glycolytic capacity, and glycolytic reserve.

### Seahorse XF Cell Mito Stress Test Profile Mitochondrial Respiration



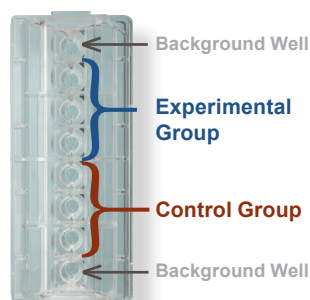
The Seahorse XF Cell Mito Stress Test Profile illustrates the key parameters of mitochondrial function: basal respiration, ATP production, proton leak, maximal respiration, and spare respiratory capacity.

### Seahorse XF Cell Energy Phenotype Test Metabolic Phenotype & Potential



The Seahorse XF Cell Energy Phenotype Test measures the key parameters used to determine the energy phenotype of a cell: baseline phenotype, stressed phenotype, and metabolic potential.

### The Power of Six Samples Pairwise Comparison

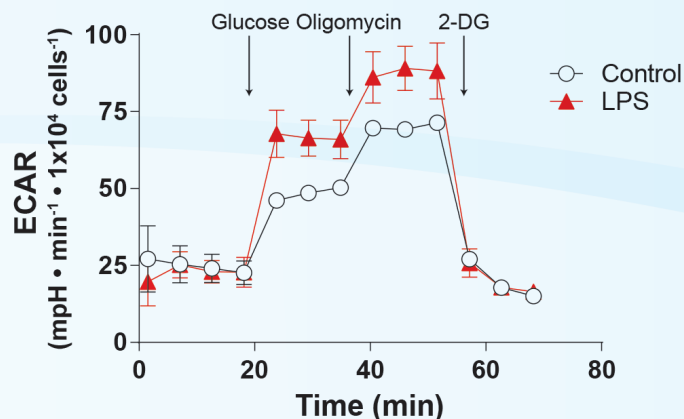


The Seahorse XF Miniplate is ideal for pairwise comparisons and the analysis of precious samples, such as patient-derived and other rare samples.

# THE WORLD'S MOST ADVANCED METABOLIC ANALYZER

Functional metabolic data is essential to tell the complete story of cellular processes and pathologies. The compact and easy-to-use Seahorse XFp Analyzer is specifically designed to perform the metabolic assays that provide this data. A streamlined and affordable platform, the Seahorse XFp Analyzer enables the measurement of metabolic function and phenotype in patient-derived, and other precious samples ... making it ideal for single-lab ownership.

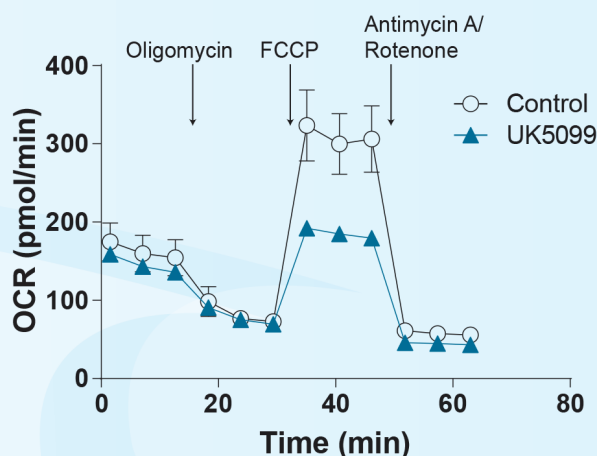
## Analyze metabolic reprogramming in primary immune cells



Immune cells respond to foreign antigens with an increase in metabolism. The example above illustrates macrophages requirement for glucose to fuel a robust response. The mouse bone marrow-derived macrophages were activated overnight by bacterial lipopolysaccharide (LPS) which stimulated glycolytic function. The Seahorse XF Glycolysis Stress Test run on the Seahorse XFp Analyzer illustrated an increase in both glycolysis (measured by extracellular acidification rate, ECAR) and glycolytic reserve compared to quiescent cells.

- Glycolysis Rate: Activated > Control
- Glycolytic Capacity: Activated > Control
- Glycolytic Reserve: Activated = Control

## Verify the impact of disease-linked genes on metabolic phenotype



Oxidative phosphorylation (OXPHOS) is a process that includes the mitochondrial electron transport chain, and access to substrates such as pyruvate. In the example above the Seahorse XF Cell Mito Stress Test was run on the Seahorse XFp Analyzer using C2C12-derived myotubes. The results illustrated that basal OXPHOS (measured by oxygen consumption rate, OCR) is maintained, but that spare respiratory capacity is constrained by inhibition of mitochondrial pyruvate carrier 1 (MPC1). A 90-minute pre-treatment with UK5099 (an inhibitor of MPC1) mimicked the effect of impaired MPC-1 function on the metabolic phenotype.

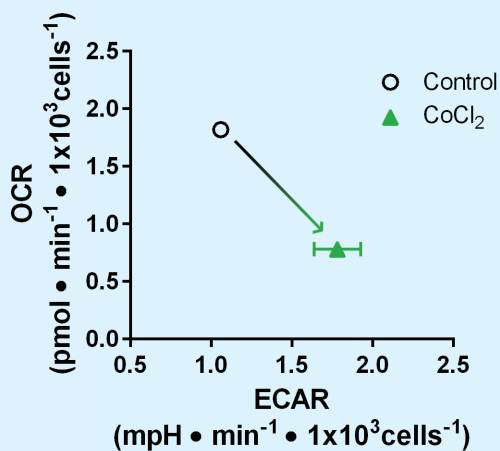
- Basal Respiration: UK5099 = Control
- Maximal Respiration: UK5099 < Control
- Spare Respiratory Capacity: UK5099 < Control
- Proton Leak: UK5099 = Control





The Seahorse XFp Analyzer is ideal for labs with limited bench space.

## Detect metabolic switching in a single pairwise experiment

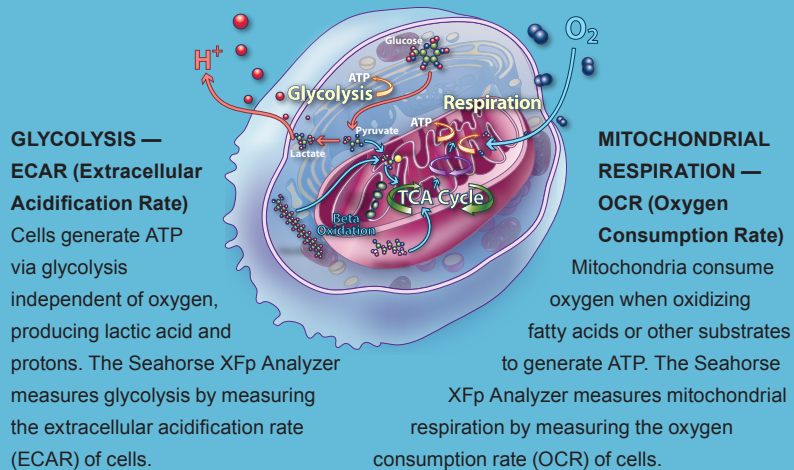


Cells shift their mode of energy production from OXPHOS to glycolysis upon induction of certain signaling pathways. Activation of the HIF-1 $\alpha$  pathway by cobalt chloride (CoCl<sub>2</sub>) induces such a metabolic switch in human ovarian cancer cells (SKOV-3). The pairwise comparison shown in the above Seahorse XF PhenoGram illustrates the Warburg effect, in which OXPHOS (measured by OCR) of the treated cells is reduced even in the presence of oxygen, and is accompanied by an increase in glycolysis (measured by ECAR) relative to the control.

- Basal respiration (measured by OCR): CoCl<sub>2</sub> < Control
- Glycolysis (measured by ECAR): CoCl<sub>2</sub> > Control
- Phenotype of Control: Aerobic
- Phenotype of CoCl<sub>2</sub> Treated: Glycolytic
- Metabolic Switch: Warburg effect

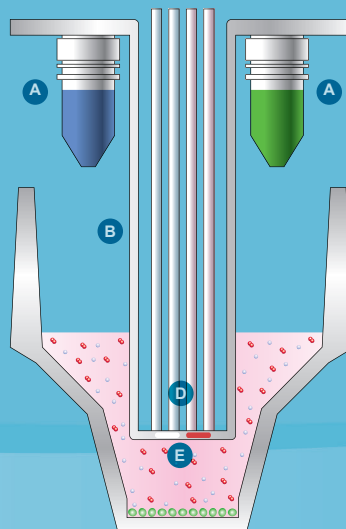
## HOW SEAHORSE XF TECHNOLOGY WORKS

The Seahorse XFp Analyzer simultaneously measures the two major energy pathways of the cell – mitochondrial respiration and glycolysis – in live cells using label-free, solid-state sensor cartridges in a miniplate format. The Seahorse XFp Analyzer works with most cell types, including primary cells, adherent cells, and suspension cells.



## THE PATENTED MICROCHAMBER MAKES IT ALL POSSIBLE

The Seahorse XFp Analyzer utilizes patented transient microchambers which enable sensitive, precise, and nondestructive extracellular flux measurements in minutes.



Cutaway graphic of a single probe and well

- Integrated injection delivery ports sequentially deliver up to 4 compounds allowing dose response, agonist or antagonist response, or pathway perturbation analysis of each sample.
- Sensor probes gently lower to create a Transient Microchamber, allowing rapid, real-time measurement of changes in both oxygen and proton concentrations in the cell medium.
- XFp Miniplates support virtually all cell types.
- Inert optical micro sensors measure rates of oxygen consumption and extracellular acidification simultaneously.
- The ~200  $\mu$ L well requires a small number of cells, 10-20 fold fewer cells compared to conventional respirometers.

# PROVEN SEAHORSE XF TECHNOLOGY – NOW MORE AFFORDABLE

Built on innovative and proven Seahorse XF technology, the Seahorse XFp Analyzer makes it even easier to perform functional metabolic measurements in live cells in your own lab. A complete platform that includes hardware, software, consumables and reagents, the Seahorse XFp Analyzer is designed to enable every lab to perform and interpret the XF assays without the need for expertise in metabolism.

**PHENOTYPING • PAIRWISE COMPARISONS • PATIENT-DERIVED SAMPLES**

Intuitive touch screen operation. Select from built-in assay templates or create your own.

**Wave**

Wave software on your desktop or PC for XFp data analysis.



Seahorse XFp Miniplate designed for pairwise comparisons and phenotyping samples.



Seahorse XF Test Kits provide reagents in single-use aliquots for consistency and convenience.





Cancer | Cardiovascular Disease | Cell Physiology | Immunology | Neurodegeneration  
Obesity/Diabetes | Stem Cell Biology | Toxicology | Translational Medicine

### Specifications

Dimensions	43.0cm H x 30.3cm W x 56.8cm D (16.9" H x 11.9" W x 22.4" D)
Weight	14.7 kg (32.5 lb)
Power Requirements	100-120/200-240VAC 6A/3A; 50/60Hz
Measurements	OCR & ECAR
Assay Format	Live cells in a miniplate
Number of Samples	6 samples
Injection Ports	4 per well, 25 $\mu$ L each
Assay Running Volume	150-275 $\mu$ L/well
Sample Requirements	10K-500K cells/well
Plate Material	Tissue-culture treated polystyrene
Instrument Controller	Integrated full-color touch-screen interface; network-capable; e-mail support; USB port.
Analysis Software	Wave. For use on a Windows laptop or desktop computer.

 **Seahorse Bioscience**

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