Seahorse XF<sup>e</sup> Extracellular Flux Analyzers

THE WORLD’S MOST ADVANCED METABOLIC ANALYZERS

Seahorse Bioscience
A part of Agilent Technologies
The role of metabolism in cellular and physiological processes, from cardiovascular function to immune response, is well established; many diseases are now linked to metabolic dysfunction or reprogramming. Using the Seahorse XF® Extracellular Flux Analyzer, scientists are now able to easily obtain powerful functional metabolic data to gain a greater understanding of cell metabolism and enable new advancements in life science research.

**Functional Metabolic Data on Live Cells in Real Time**

**Seahorse XF Cell Mito Stress Test**

- Mitochondrial Respiration
- Oxygen Consumption Rate (OCR)
- Time (minutes)

- Basal Respiration
- ATP Production
- Proton Leak
- Maximal Respiration
- Spare Capacity
- Non-mitochondrial Oxygen Consumption

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

**Seahorse XF Glycolysis Stress Test**

- Glycolytic Function
- Extracellular Acidification Rate (ECAR)
- Time (minutes)

- Glucose
- Oligomycin
- 2-DG
- Glycolytic Reserve
- Glycolytic Capacity
- Non-glycolytic Acidification

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

**Seahorse XF Fatty Acid Oxidation Assay**

- Exogenous & Endogenous Fatty Acid Oxidation
- Oxygen Consumption Rate (OCR)
- Time (minutes)

- Oligomycin
- FCCP
- Rotenone & antimycin A

The Seahorse XF Fatty Acid Oxidation assay measures both exogenous palmitate oxidation and endogenous fatty acid oxidation.

**Seahorse XF Cell Energy Phenotype Test**

- Metabolic Phenotype & Potential
- Oxygen Consumption Rate (OCR)
- Extracellular Acidification Rate (ECAR)

- Aerobic
- Energetic
- Stressed Phenotype
- Baseline Phenotype
- Quiescent
- Glycolytic

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.
SEAHORSE XF TECHNOLOGY — GENERATING NEW INSIGHTS INTO DISEASE

Functional metabolic data is required to tell a complete story of cellular processes and pathologies. The Seahorse XF® Extracellular Flux Analyzer provides the capability to examine the intact and functional cellular system, enabling comprehensive investigations into metabolic pathways, substrate preference and utilization, catabolic and anabolic processes, and metabolic phenotypes.

**Cancer**


**Obesity/Diabetes**

Seahorse XF technology reveals Hedgehog pathway-induced switch to a glycolytic phenotype in adipocytes.


**Immunology**

Seahorse XF Cell Mito Stress Test demonstrates fatty acid oxidation is required for memory T cell formation.


**Neurodegeneration**

Seahorse XF Cell Mito Stress Test reveals metabolic signatures of embryonic stem cells with Huntington mutations.

How XF Technology Works

The Seahorse XFe Analyzer simultaneously measures the two major energy pathways of the cell — mitochondrial respiration and glycolysis — in live cells using a label-free, solid-state sensor cartridges in a microplate format. The Seahorse XFe Analyzer works with all cell types, including primary cells, cell lines, suspension cells, as well as islets, *C. elegans*, yeast, and isolated mitochondria.

**GLYCOLYSIS — ECAR (Extracellular Acidification Rate)**

Cells generate ATP via glycolysis independent of oxygen, producing lactic acid and protons. The Seahorse XFe Analyzer measures glycolysis by measuring the extracellular acidification rate (ECAR) of cells.

**MITOCHONDRIAL RESPIRATION — OCR (Oxygen Consumption Rate)**

Mitochondria consume oxygen when oxidizing fatty acids or other substrates to generate ATP. The Seahorse XFe Analyzer measures mitochondrial respiration by measuring the oxygen consumption rate (OCR) of cells.

**THE PATENTED MICROCHAMBER MAKES IT ALL POSSIBLE**

The Seahorse XFe Analyzer utilizes patented transient microchambers which enable sensitive, precise, and nondestructive metabolic measurements in real time.

**Seahorse XF Data in Publications**

There are over 2,000 papers utilizing Seahorse XF technology published in leading scientific journals such as Nature, Cell, Science and PNAS. Scientists are embracing Seahorse XF technology to identify metabolic phenotypes and reprogramming, as well as target metabolic changes for therapeutic purposes.
Built on innovative and proven Seahorse XF technology, the Seahorse XF® Extracellular Flux Analyzer makes it easy to perform functional metabolic measurements in live cells, in real time. A complete platform that includes hardware, software, consumables, and reagents, the Seahorse XF® Analyzer is a powerful and flexible system that is accelerating life science research around the world.
## Specifications

### Seahorse XF²4 Analyzer

<table>
<thead>
<tr>
<th>Specifications</th>
<th>Seahorse XF²4 Analyzer</th>
<th>Seahorse XF²96 Analyzer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dimensions</td>
<td>41cm x 61cm x 43cm (16” x 24” x 17” )</td>
<td>41cm x 61cm x 43cm (16” x 24” x 17” )</td>
</tr>
<tr>
<td>Weight</td>
<td>20 kg (45 lb)</td>
<td>14 kg (35 lb)</td>
</tr>
<tr>
<td>Power Requirements</td>
<td>100-240VAC 50/60Hz</td>
<td>100-240VAC 50/60Hz</td>
</tr>
<tr>
<td>Primary Measurements Made</td>
<td>OCR &amp; ECAR</td>
<td>OCR &amp; ECAR</td>
</tr>
<tr>
<td>Assay Format</td>
<td>Live cells in a specialized 24-well microplate</td>
<td>Live cells in a specialized 96-well microplate</td>
</tr>
<tr>
<td>Software</td>
<td>Wave supports assay design, instrument control, and data analysis. Can be installed on Windows® PC for analysis or data export to MS® Excel™ or GraphPad Prism®.</td>
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</tr>
<tr>
<td>Injection Ports</td>
<td>4 per well, 75 µL each</td>
<td>4 per well, 25 µL each</td>
</tr>
<tr>
<td>Assay Running Volume</td>
<td>500-1000 µL/well</td>
<td>80-200 µL/well</td>
</tr>
<tr>
<td>Sample Requirements</td>
<td>10,000-1,000,000 cells/well</td>
<td>4,000-500,000 cells/well</td>
</tr>
<tr>
<td>Instrument Controller</td>
<td>Combination computer and touch-screen display with full assay design, control, and analysis capability.</td>
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</tr>
<tr>
<td>Best For/Key Advantages</td>
<td>Islets</td>
<td>Maximum experimental flexibility Highest throughput Spheroids Dose-response studies</td>
</tr>
</tbody>
</table>

### Key Advantages
- Cancer
- Cardiovascular Disease
- Cell Physiology
- Immunology
- Neurodegeneration
- Obesity, Diabetes, and Metabolic Disorders
- Stem Cell Biology
- Toxicology and Hepatobiology
- Translational Medicine

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