Discover the Drivers of Cell Fate, Function, and Fitness

Agilent Seahorse XF analysis platform
Are You Measuring What’s Really Important to Your Cells?

To fully understand what drives cell phenotype and function, you must consider the influences of energy metabolism.

Examining energy metabolism has led to new insights into biological function. In fact, some of the decade’s most significant discoveries have hinged upon elucidating the role of energy metabolism in cellular processes.

Live-cell, functional metabolic data is impacting research and discovery in areas like these:

**Immunology**
- Determining metabolic fitness of immune cells
- Measuring and modulating immune cell activation in real time
- Targeting metabolic pathways to improve immunotherapy design and performance

**Cancer**
- Rewiring metabolism to support rapid growth
- Understanding which nutrients fuel cancer cells
- Uncovering how metabolism impacts the tumor microenvironment

**Toxicology**
- Detecting mitochondrial liabilities among potential therapeutics
- Assessing the risk of mitochondrial toxicity *in vitro* with high specificity and sensitivity
- Determining the mechanism of action of mitochondrial toxicants

**Obesity, diabetes, and metabolic disorders**
- Measuring functional effects of genetic changes to metabolic pathway components
- Examining nutrient use in healthy and diseased cell models
- Assessing fatty acid oxidation and glycolysis in different cell types
Complete Platform for Live-Cell Metabolic Assays

Comprising instruments, assay kits, software, and consumables, Agilent Seahorse XF platforms are designed to support you from sample to insight.

- **State-of-the-art data analytics tools**
- **Real-time calculation of results**
- **Validated kits, media, and reagents**
- **Label-free pH and O₂ sensor cartridge**
- **More relevant injection ports for real-time modulation**
- **Live-cell analysis with 2D and 3D plate options**

**Move beyond analyzing what your cells are and get a clear picture of what they do**

- Instrumentation for real-time extracellular flux (XF) measurements in live cells
- Validated kits, media, and reagents for standardized XF assays
- Patented sensors, plastics, and consumables for reliable XF data
- Powerful analytics to help interpret and share your results
**Agilent Seahorse XF analyzers: The standard for measuring energy metabolism in live cells**

Seahorse XF analyzers enable robust measurements of mitochondrial activity, glycolysis, and ATP production rates in a microplate format.

- Automatic calculation of oxygen consumption and proton efflux rates
- Label-free detection of discrete bioenergetic changes in live cells—in real time
- Compatibility with both adherent and suspension cells, as well as isolated mitochondria
- Instrument-controlled gentle mixing, measuring, and compound injections
- High sensitivity to analyze as few as 5,000 cells per well
- Temperature controlled to maintain cell health and kinetics

**Agilent Seahorse XF HS Mini Analyzer**

High-sensitivity capabilities—combined with an easy-to-use interface—make this eight-well analyzer accessible for every lab while delivering robust XF analysis on limited cell numbers.

Key applications:
- Optimization of experimental conditions before scaling up
- Rare, sorted, and/or primary immune cells
- Quiescent and low-respiring cell types
- Ideal for cell lines and ex-vivo samples

**Agilent Seahorse XFe96 Analyzer**

Maximize your capacity for XF assays and minimize cost per sample. The Seahorse XFe96 enables many experimental groups per assay, maximizing design flexibility and sample throughput.

Key applications:
- Phenotypic screening
- Testing many conditions at one time
- Dose-response studies
- Spheroids

**Agilent Seahorse XFe24 Analyzer**

Featured in hundreds of peer-reviewed publications, the Seahorse XFe24 uses a larger well format suitable for islets and other specialty samples.

Key applications:
- Islets
- Small-model organisms
Take a Closer Look at Seahorse XF Technology

The patented Agilent Seahorse XF platform lets you measure both metabolic energy pathways simultaneously with speed and precision.

Cells are seeded in the wells of the custom Seahorse XF cell culture microplate.

Sensor probes gently lower to create a transient microchamber. This process allows rapid, real-time measurement of changing oxygen and proton concentrations in the extracellular medium.

Integrated injection ports sequentially deliver up to four compounds, allowing you to test multiple conditions per well.

Biologically compatible optical microsensors simultaneously measure rates of oxygen consumption and extracellular acidification, without adding dyes.

The microplate well requires 10- to 20-fold fewer cells than conventional respirometers.

Instrument mechanics gently raise and lower the cartridge to mix the fluid in the wells for optimal dispersal of modulators and analytes.
Quality XF sensor cartridges and cell plates are integral to the Seahorse XF measurement system

**XF sensor cartridges: essential to sensitive, simultaneous measurement of bioenergetic pathways**
- Non-invasive sensors measure dissolved oxygen and free protons.
- Built-in injection ports deliver compounds at preprogrammed intervals.
- Precision manufacturing process ensures consistent lot-to-lot performance.

**XF cell culture microplates: specific to application and instrument type**
- Tissue-culture treated and irradiated for cell culture operations.
- Unique well geometry enables rapid, sensitive XF measurements.
- Adheres to SBS standards for plate reader compatibility.

**Did you know...**

**Having papers with functional data improves your chances of getting published in a top-tier journal?**

Observing intact cell behavior in real time provides much-needed context and confirmation of omics data. No wonder it’s playing a growing role in peer-reviewed literature.

**Nearly 7,000 publications to date**

Agilent cell analysis publications (through 2019)
Gain Deeper Insight into Your Cell Function with Agilent Seahorse XF Assay Kits

How are the cells generating energy? Has my treatment changed the phenotype? Agilent Seahorse XF assay kits—built on validated biology—help you answer these questions and more.

**Agilent Seahorse XF Cell Mito Stress Test kit**
This assay is well-recognized for gaining insight into the components of mitochondrial function. Investigate functional differences among cell types and drug candidates, as well as genetic or biochemical interventions.

**Agilent Seahorse XF Real-Time ATP Rate Assay kit**
The only assay that measures the rates of ATP production from glycolysis and mitochondrial respiration simultaneously. Quantification of ATP production rate delivers a dynamic picture of cellular bioenergetics, giving you a unique understanding of cellular phenotype and function.

**Agilent Seahorse XF Glycolytic Rate Assay kit**
Precisely measures glycolysis in live cells, revealing transient responses and rapid metabolic switches not discernible in endpoint lactate assays. You can also quantify proton efflux specific to glycolysis.

**Agilent Seahorse XF Substrate Oxidation kits**
A suite of optimized kits for rapidly measuring cellular substrate oxidation by assessing changes in oxygen consumption (OCR) in live cells. These kits facilitate investigation of how cells alter or shift oxidation of specific substrates to perform key cellular functions, as well as respond to genetic or pharmaceutical interventions.

**Agilent Seahorse XF Cell Energy Phenotype Test kit**
This simple assay simultaneously measures mitochondrial respiration and glycolysis with just a single injection, so you can rapidly determine energy phenotypes of cells and investigate metabolic switching. It’s also a useful assay for screening compounds that can modulate mitochondrial and/or glycolytic function.
Transform Data into Insights

Control without the complexity

The Agilent Seahorse XFe analyzer and XFp analyzer software interfaces provide an intuitive, streamlined experimental setup and data acquisition experience.

- Predefined templates designed for each Seahorse XF assay kit ensure accurate, consistent experiment setup.
- Kinetic rate data is automatically calculated and displayed in real time, allowing you to observe time-dependent biological responses throughout your assay.

Turn raw metabolic data into publishable results

Agilent Seahorse analytics, the next generation of XF data analysis, provides secure data storage and intuitive data analytics in the cloud. Features include:

- Desktop-like interactivity for accessibility from anywhere on both PC and Mac
- Built-in formulas for automatic calculations and summaries of Seahorse XF assay parameters
- Customizable analysis views for turning data to insight—or for easy data sharing
- Flexible tools for easily exporting your data into third-party graphing and statistical software applications, such as GraphPad Prism and Microsoft Excel
Complete Your Workflow—and Advance Your Live-Cell Metabolic Analysis

Agilent offers a complete workflow for live-cell metabolic analysis including cell metabolism analyzers, liquid handling automation, imaging plate readers, and high-quality consumables. All work together to help you achieve consistent, reproducible data.

Sample preparation

- Seed cells Manual or Bravo
- Wash cells Bravo
- Image and incubate Cytation imager with imaging and normalization solution
- Dilute compounds Bravo
- Load cartridge ports Bravo
- Run assay Seahorse XFe96 analyzer
- Analyze data Wave software Seahorse analytics

Consistent data starts with consistent sample preparation

Getting reliable data from live cell-based assays can be challenging if your assay prep methods are not reliable. Automated sample preparation can maximize productivity and minimize human error.

The Bravo Seahorse Assay Workbench allows users of all experience levels to:
- Standardize sample preparation. Intuitive software ensures consistent results between users.
- Increase walk-away time, improve the efficiency of your lab personnel.
- Minimize variability, generating consistent data no matter who is running the protocol.
Integrate imaging and normalization into your Seahorse XF analysis platform for more interpretable results

The BioTek Cytation combines automated digital microscopy and conventional microplate detection in a configurable, upgradable platform.

- Take advantage of powerful imaging, data capture, and data analysis.
- Count cellular objects \textit{in situ}.
- Easily document wells of interest.
- Normalize cell count to compare across treatment groups.
- Seamlessly integrate normalization data and well images into your XF assay result file.
Agilent Value Promise

We guarantee you at least 10 years of instrument use from your date of purchase. Otherwise, we will credit you with the residual value of the system toward an upgraded model.

Learn more about Agilent Seahorse XF technology:
www.agilent.com/chem/discoverXF

Find a local Agilent customer center:
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