Choosing the right plate reader.

revvity

Introduction

Selecting the right plate reader for your lab can be challenging. There are multiple factors to consider including: **detection type, additional features, support,** and **price.** With numerous options for each variable, it can be confusing to navigate the selection process. Focusing on striking a balance between functionality, optimization, and growth potential requires keen insight and continued vendor support throughout the life cycle of the plate reader.

This detailed guide will help you choose the right plate reader for your needs by examining the marketplace and pointing out considerations to keep in mind when making your decision.

Understanding the process

A few key questions can help customers navigate toward the best fit for a reader meeting the individual specification requirements for your lab:

- What detection technology should you look for when selecting a plate reader for your lab?
- Is this technology ideal for multiple therapeutic areas?
- How can you get the best performance optimization out of your reader?
- What support options does your vendor offer in conjunction with the purchase?

What detection technology should you look for?

Whether a lab performs development, high-throughput screening, or a more specialized area of focus, a reader should offer, at minimum, the requirements needed for each individual laboratory.

For example, a growing lab focused on performing reporter gene assays requires a plate reader that delivers on the importance of sensitivity while offering the potential for future upgrades or additional features as the lab matures over time. Vendors with reader option focused on providing sensitivity, speed, and multiplex capabilities can meet the sensitivity needs of reporter gene assay performance while offering additional reading technologies for customization and accommodating the fluctuation of industry trends in support of long-term growth.

The majority of readers purchased have multimode configurations offering detection via fluorescence, luminescence, and absorbance.

You want to find a plate reader that offers:

1. Broad applicability
2. Long-term growth functionality
3. Options for compatibility of software including:
   (a) Proprietary and/or **(b)** Vendor-generated laboratory information management systems (LIMS)

Key detection features of Revvity multimode plate readers

The most commonly known assay types for absorbance are DNA/Protein absorption and traditional ELISA assays. The latter types are often measured using fluorescence, too. With the detection of the fluorophore's polarization characteristics, binding assays (e.g., protein-protein interactions) become detectable as well. Luminescence configurations offer a straight-forward mix and measure format with high sensitivity and specificity.

VICTOR® Nivo™ Multimode Plate Reader

EnSight® Multimode Plate Reader

EnVision® Nexus™ Multimode Plate Reader

	VICTOR Nivo	EnSight	EnVision Nexus
Absorbance	Filter or spectrometer	Filter and quad monochromators	Filter
Fluorescence intensity	Filter	Quad monochromator	Filter
Luminescence	▪[1]		▪[1]
Ultrasensitive luminescence		▪	▪
TRF and TR-FRET	Lamp-based[2]	Lamp-based	Lamp- or laser-based[2]
Fluorescence polarization	▪		▪
Alpha (laser-based)	Alpha standard	Alpha HTS	Enhanced Alpha or HTS Alpha
AlphaPlex (laser-based)			Enhanced Alpha
Dual PMT detector			▪

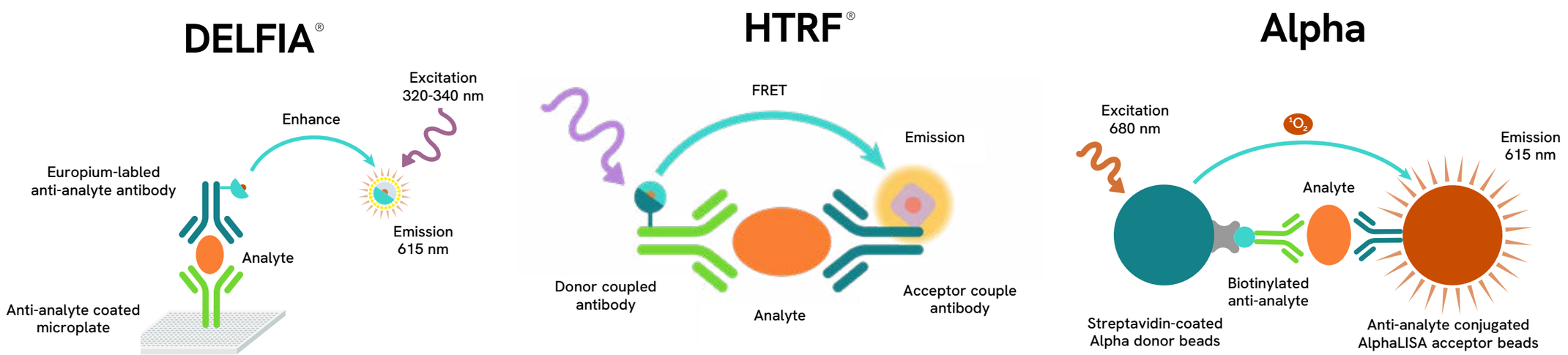
[1] - Capable of BRET/BRET2 Assays. [2] - HTRF® Certified.

A closer look

For increased sensitivity, more advanced detection technologies can be used. Both time-resolved fluorescence (TRF) and Alpha (amplified luminescent proximity homogeneous assay) avoid background effects from the samples usually visible in fluorescent assays. In TRF assays, lanthanide chelates or kryptates based on e.g. europium with long-lived fluorescence lifetimes are excited by flash lamp or laser light sources. The detected signal consists of only the excited lanthanides (**DELFIA** assays) or of fluorophores excited via time-resolved fluorescence resonance energy transfer (TR-FRET), as in HTRF or LANCE® assays. To avoid background effects, fluorescence light is collected in a confined time window with a delay after the excitation light pulse.

Alpha on the other hand is a bead-based system, where a donor bead is excited with a laser source. When an acceptor bead is in the vicinity, a singlet oxygen transfer can happen which in the end produces excitation light with shorter wavelength than the exciting laser source, again, to avoid background effects. This easily enables the study of biological binding effects by attaching the beads to analytes, if a signal is produced, the analytes have bound together.

Alpha and **HTRF** are proprietary technologies of Revvity that allow you to assay complex samples with no wash steps to simplify your assay workflow and provide faster time-to-results. Alpha even allows for multiplexing assays where two different acceptor bead types are used, emission light is split into two different wavelength channels, so that two single well otherwise different assays can be run simultaneously.



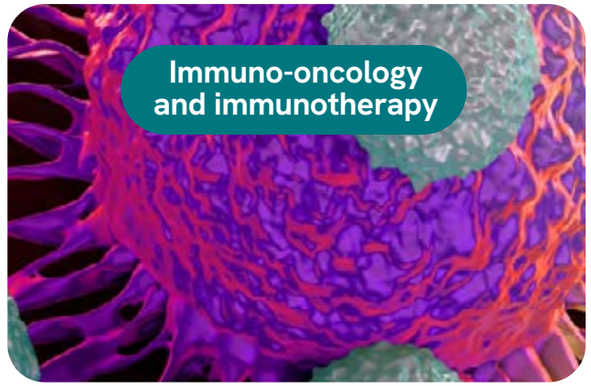
Is this technology ideal for multiple therapeutic areas?

Single-mode plate readers can be a good starting point, but they lack the versatility of a multimode plate reader. For example, neuroscience is a diverse field with many research pathways and finding the best instruments that offer solutions for biomarker and drug discovery research can be difficult.

For **neuroscience researchers**, the search to find a vendor that offers support in neuroscience solutions including protein aggregation, neuroinflammation, altered cell processes, rare diseases, and biomarker and drug discovery can be complex.

Immuno-oncology researchers are faced with challenges when working to better understand the relationship between the immune system, tumor biology, and tumor microenvironments. They need versatile and powerful detection instruments to develop personalized, life-changing immunotherapies to treat cancer.

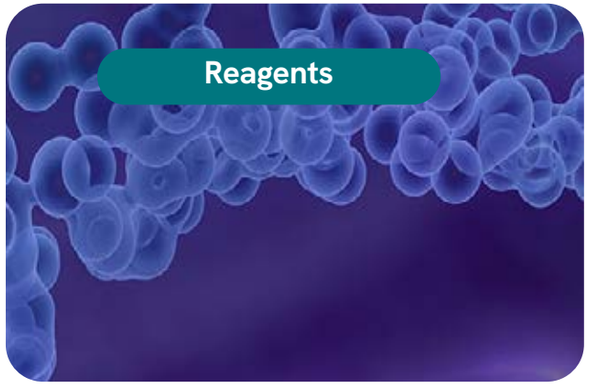
Virologists could be using luminescence to develop a pseudovirus to accelerate vaccine development, but maybe down the line they'd like to screen those vaccine candidates to see if those drugs could be repurposed against other diseases. Because those can be two separate technologies, thinking years ahead and choosing an instrument and vendor that can work in both areas could be highly beneficial.



How can you get the best performance optimization out of your reader?

In comparing plate readers, optimization and performance support are key areas. Reagents and chemistries, sold individually or in kits, offer heightened performance based on troubleshooting results developed and evaluated by in-house technical experts. Additionally, field support specialists need to be trained specifically to visit labs for installation qualification, specialty training, maintenance, software qualification, and troubleshooting. An ideal vendor should offer workflow options based on budget, throughput, and application along with both stackers and fully automated solutions. High throughput still remains most commonly to be a semi-automated process, requiring a scientist to physically prepare and load plates into the instrument, but the stacker and walkway automation customizations can assist in increasing overall reading efficiency in the lab. Stackers offer a semi-automated plate reading capability, with the ability to read stacks of 20 to 50 plates in rapid succession. This allows researchers to load multiple plates at once for high-throughput processing. Adding semi-automated customizations to plate reader instruments offers efficiency solutions saving critical time and resource in the lab. If a higher volume of plates needs to be screened, fully automated solution workflows should be considered for high-throughput screening for research purposes.

Support to include computer systems validation, data integrity, and instrument qualification allows labs to streamline operations efficiencies through a singular vendor. Revvity offers on site installation and operation qualification (IQ/OQ) services designed to meet all regulatory requirements.



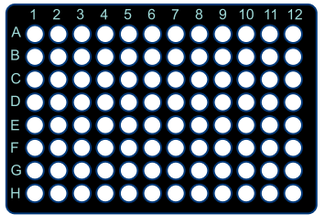
What support options does your vendor offer in conjunction with the purchase?

Compliance compatibility

All Revvity plate readers can be customized to include tools to facilitate 21 CFR Part 11 compliance for integration into regulated environments. This allows for the assignment of different user profiles to include security administrator, administrator, editor, and operator. Each designation is able to access the parts of the plate reader's software consistent with their user profile. This keeps data protected and supports its integrity within the confines of regulatory compliance. The Revvity compliance team can even perform customized computer system validation to commission the new plate reader in your environment.

Software compatibility

Ensuring that the plate reader offers software compatibility is also of pivotal importance when selecting the right plate reader for your lab. A smaller lab may need software as simple as Microsoft® Excel in order to perform simple functions such as method development data analysis, or specialized software for advanced analysis such as 4-parameter curve fitting with $1/y^2$ weighting. Larger biopharmaceutical laboratories may require configuration in conjunction with a proprietary or vendor-generated LIMS system. The workflow of each individual customer drives software and reader compatibility discussions, of which your vendor should have a designated internal team to support customer needs.



Microplate compatibility

Microplate compatibility is a pivotal importance to the optimization and consistent functionality of any plate reader. Finding a plate reader that offers compatibility with microplates sold by multiple leading vendors can protect both the long-term cost and the performance of assays. Some vendors hold the entire market share for not only a plate reader, but also for microplates, read buffers, substrates, and any associated reagents. Depending on the individual needs of each customer, Revvity plate readers offer microplates as an option for purchase, yet not a requirement for the use of their plate reader technologies. Revvity's portfolio of microplates, reagents, readers, and services offer a one-stop shop convenience to researchers across multiple therapeutic areas and within both academia and industry.

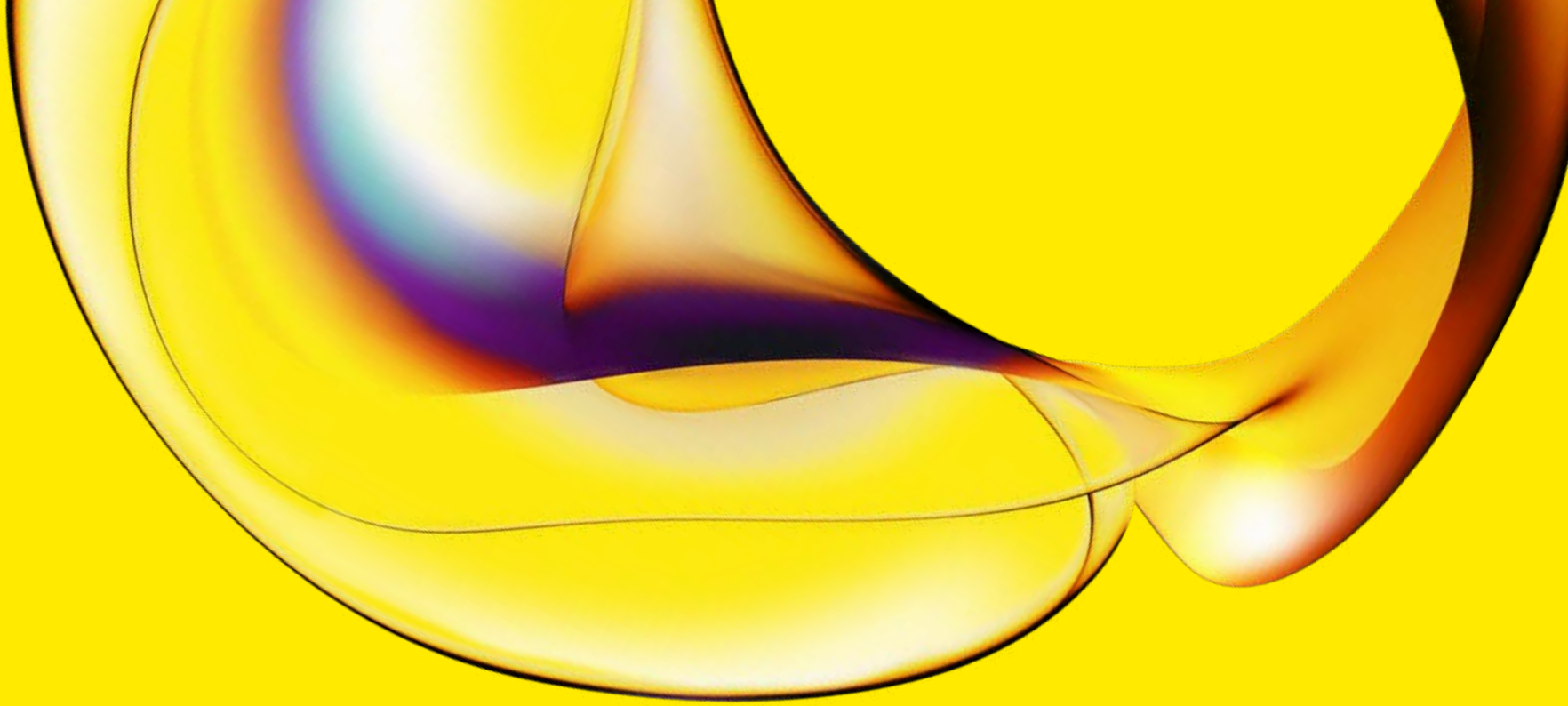
Conclusion

Striking a balance between affordability, performance, and customization when selecting a plate reader is important for labs of any size and nature.

Any plate reader should offer at minimum detection via fluorescence, luminescence, and absorbance.

In addition, workflow, software compatibility, service contract offerings, and microplate and reagent options are all key factors to focus on when selecting the next reader to support your growing lab.

Let us help you pick the perfect plate reader



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