

Meet Leo

*The Simple Way to Maximize
Throughput for Reproducible
Protein Quantitation with
High Specificity*



Reimagine Protein Analysis

In today's fast-paced research environment, traditional protein analysis methods fall short, slowing discovery with manual workflows, inconsistent data, and results you can't fully trust. When precision matters and time is critical, you need more than just a workaround.

It's time for a better way.

Introducing the Leo™ System, the next leap in Simple Western™ Technology—where high-throughput, hands-free automation meets quantitative accuracy. Say goodbye to compromise and hello to confidence in every result. Discover the simple way to do next-level protein quantitation.

Explore Leo with an immersive 3D experience and navigate Leo's features at your own pace in a virtual environment.



Take 3D Tour

Scan the QR Code or Visit:
embed.envoke-demos.com/bio-technne/leo_platform/web.html



Meet Leo:

The Ultimate Analytical Tool for Protein Quantitation

The Leo System, powered by Simple Western Technology, is a high-throughput, fully automated capillary immunoassay platform designed to elevate your bioanalytics with unmatched speed, simplicity, and sensitivity. Built on proven Simple Western Technology, Leo offers reproducible protein detection and quantitation with exceptional efficiency. Process up to 100 capillaries per run, expanding your experimental capacity for quantitative assays and delivering reliable results in as little as 3 hours.



Request a Quote or Talk to a Specialist Today

Scan the QR Code or Visit:
bio-techne.com/leo

THE LEO ADVANTAGE

✓ **Automated Platform**
That is fast, hands-free, and reproducible

✓ **100 Capillaries**
Processed in a 3-hour run time

✓ **High Precision**
With intra-assay peak area CV <15% and inter-run peak area CV <15%

✓ **Accurate**
Protein quantitation with intra-assay, inter-run, and inter-instrument CVs <10%

✓ **3 μ L Sample**
Do more with your precious samples

✓ **Low Picogram Sensitivity**
Even from complex samples such as cell and tissue lysates

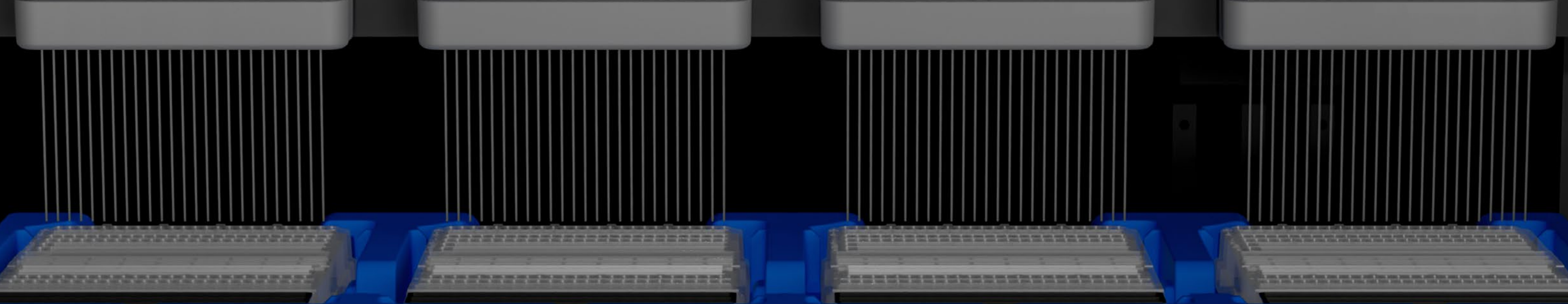
✓ **3-4 log**
Dynamic range

✓ **Powerful Data Analysis**
Enables 21 CFR Part 11 Compliance

✓ **RePlex & Resample**
Detect up to 8 targets per sample

✓ **Upgradeable**
To fluorescence detection





Leo On the Inside

 **4** 25-Capillary Cartridge Holders

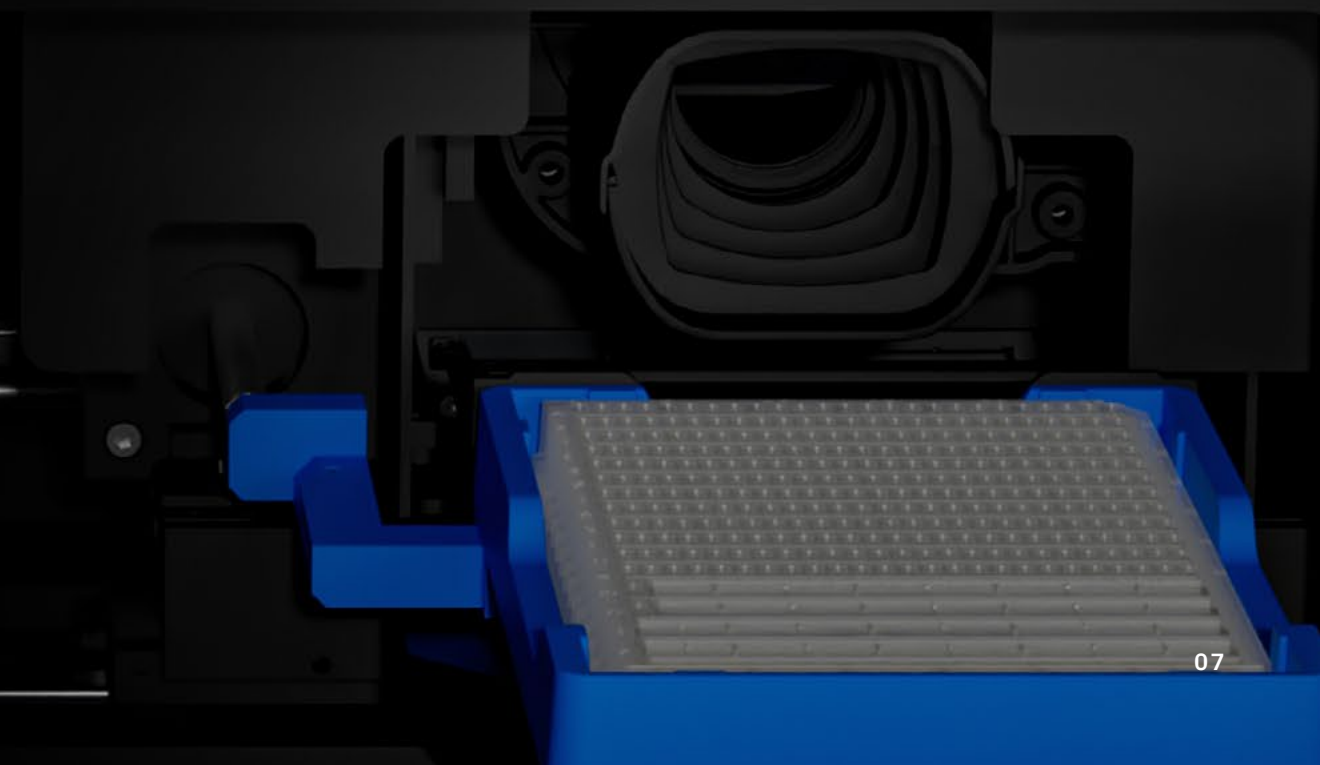
 **4** Pre-filled Reagent Plates

 **1** Sample Plate

How Does Leo Work?

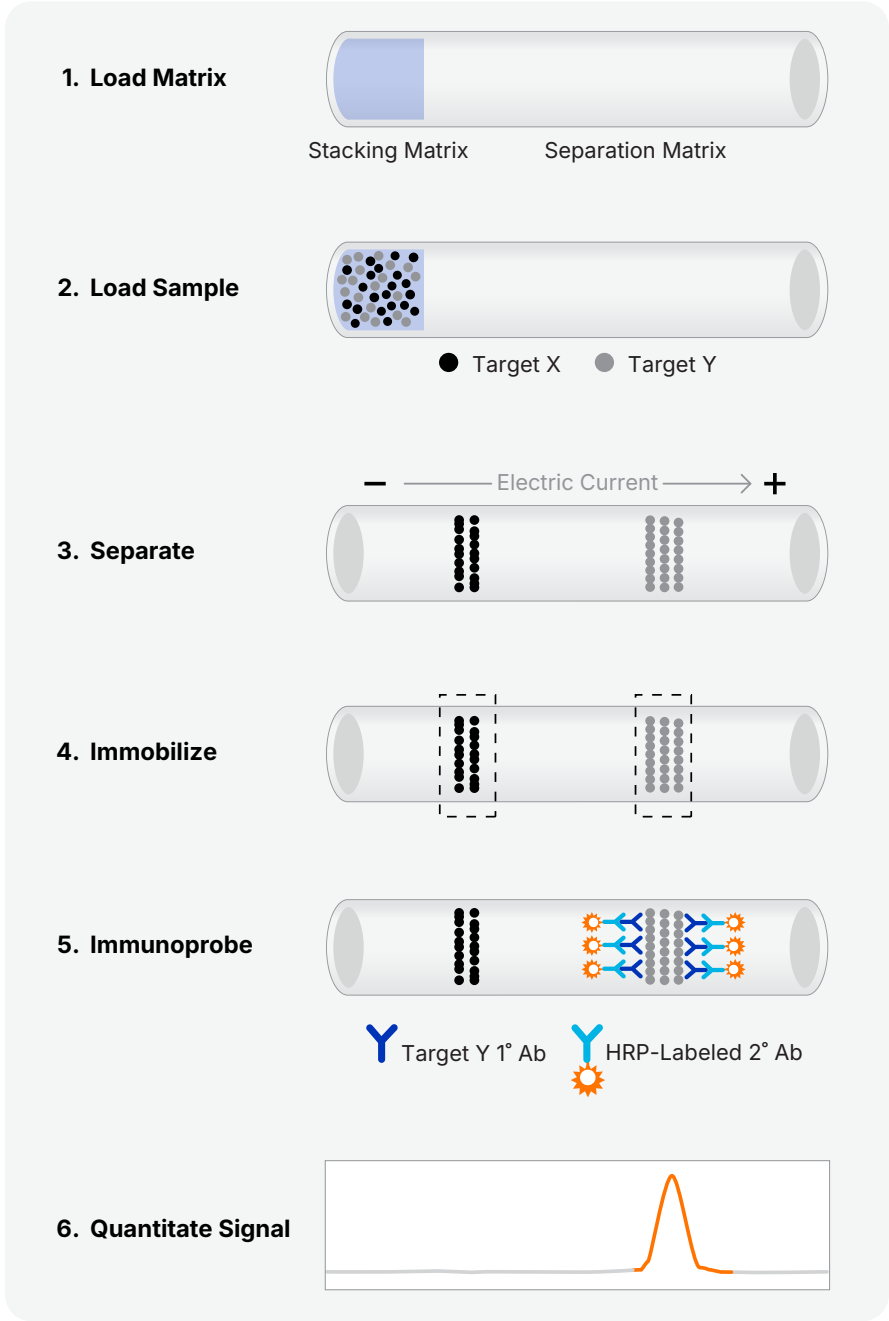
Leo is built on proven and trusted Simple Western technology. It separates proteins by size using capillary electrophoresis. Separated proteins are immobilized on the capillary surface and can be identified using an immunoassay. Simply load your samples and reagents into the microplate, and Leo takes care of the rest. It precisely manages every step: protein separation by size, antibody additions, incubations, washes, and even detection. Return to thoroughly analyzed, quantified results in just 3 hours.

Leo holds up to 4 capillary cartridges, 4 peel and go pre-filled reagents and 1 sample plate with room for 96 samples and 4 molecular weight ladders per run. Supporting Leo is a complete set of reagents and consumables and Compass for Simple Western software. The capillary cartridges move back and forth between pre-filled reagent plates and the sample plate to load samples and reagents into the capillaries, perform protein separation, immobilization, and detection.

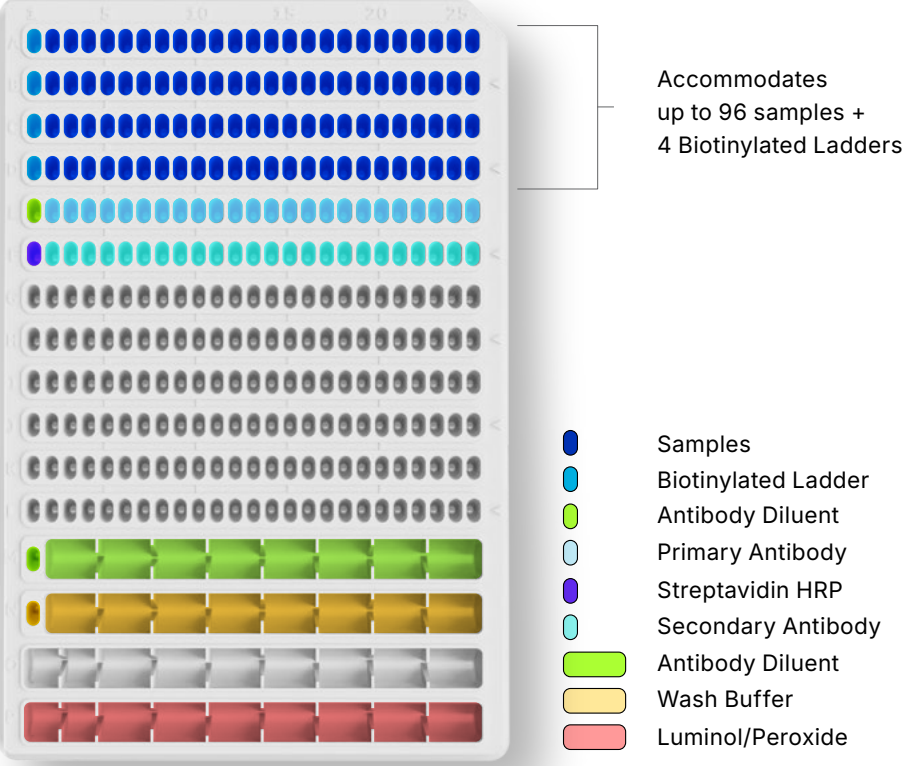


What Happens Inside a Capillary?

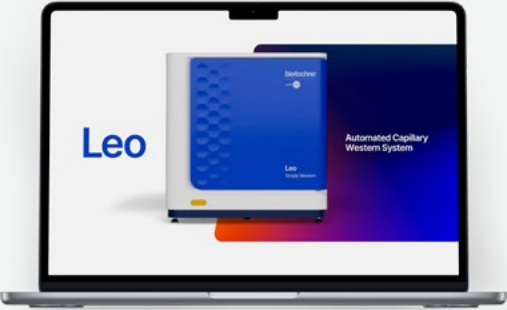
*Built on Proven, Trusted
Simple Western Technology*



Leo Sample Plate



CE-ing is Believing
Watch Video to See How Leo Works
Scan the QR Code or Visit:
bio-technne.com/leo



Discover More with Leo

Process Up to 100 Capillaries in 3 Hours

Leo allows you to process more samples in a day, with a capacity of up to 100 capillaries in a single 3-hour run.

FIGURE // 01

3-Hour Leo Run

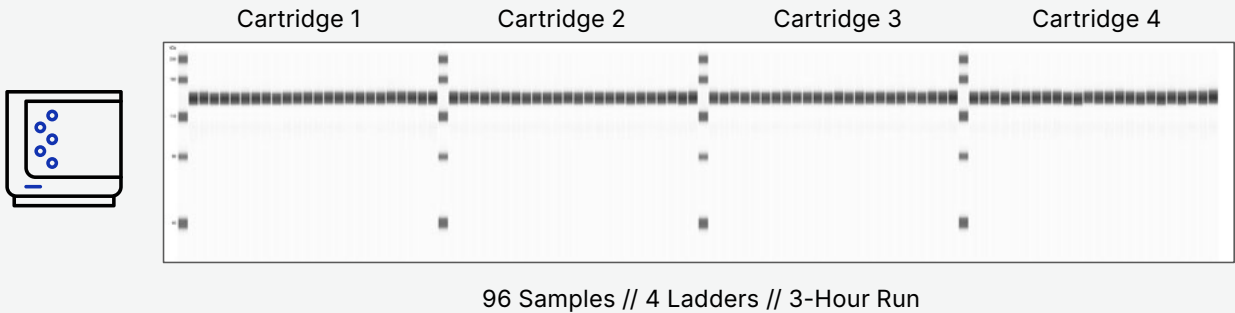


Figure 01. A single 3-hour run, Leo has space for 4 cartridges to run 25 capillaries, translating to 4 MW ladders and up to 96 unique samples.

Large Experimental Size for Enhanced Quantitation

Leo can accommodate up to 96 sample experiments in a single high-precision Leo run, providing enough room for large standard curves, replicates, calibrators, QC samples, and test samples.

FIGURE // 02

Large Experimental Size

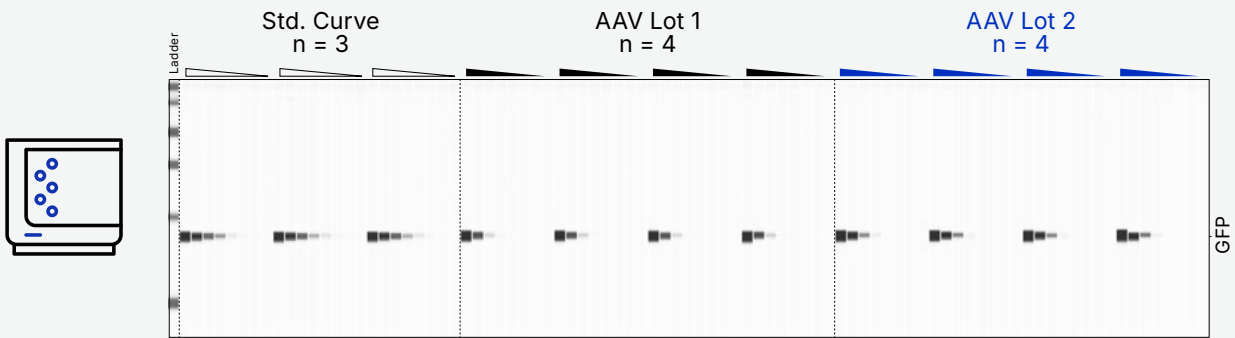


Figure 02. In this example, one Leo run was used to measure GFP transgene expression in HEK293 cells transduced with two lots of AAV8. An 8-point standard curve of recombinant GFP is run in triplicate on the 1st cartridge, and 16 samples are run in triplicate on cartridges 2–4. Furthermore, the RePlex feature was used for total protein normalization for more accurate quantification. [Download the Application Note](#) for more information.

Consistent Data Within & Between Runs

Leo offers robust and consistent performance with low CVs across cartridges within and between runs. CVs that are less than 15% for well optimized assays underscores the high precision and reliability of Leo.

INTRA-ASSAY PRECISION

	Cart. 1	Cart. 2	Cart. 3	Cart. 4	Intra-Run
% CV without Cartridge Correction	3.8%	5.8%	5.3%	3.7%	6.8%
% CV with Cartridge Correction	3.8%	5.8%	5.3%	3.7%	5.0%

Table 01. Cartridge correction further improves Intra-Assay Precision. FANCD2 average peak areas across four cartridges were measured on Leo. With the new cartridge correction feature in Compass for Simple Western software, potential variations between cartridges can be normalized. Cartridge correction improved the intra-assay CV to 5.0% compared to the intra-run CV of 6.8% without cartridge correction.

FIGURE // 03

Leo Inter-Run Precision

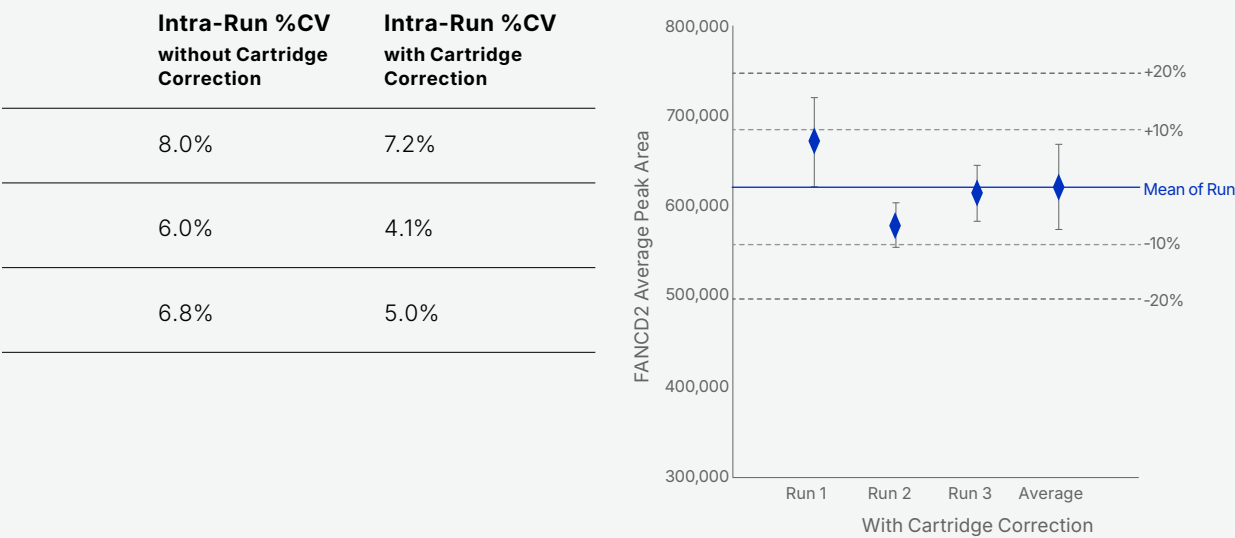


Figure 03. Three independent runs were preformed on the same Leo instrument analyzing FANCD2 peak area, using split samples and matched lots of reagents, pre-filled plates, and cartridges. Even without cartridge correction, the intra-run CVs are consistently low, ranging from 6.0% to 8.0%. With cartridge correction, the CVs are further reduced, ranging from 4.1% to 7.2%. This demonstrates the inherent precision of the Leo instrument and the effectiveness of the cartridge correction algorithm. The graph on the right displays the average peak area for each run after cartridge correction, along with the overall mean and lines representing plus/minus 10% and 20% deviation from the mean of all runs. Also, the inter-run precision of the data was calculated when using cartridge correction. The inter-run CV is notably low at 7.5%, which indicates that the Leo system delivers highly reproducible results across multiple runs, ensuring consistency and reliability in your experiments.

Excellent Inter-Instrument Precision

Leo delivers highly consistent results across multiple instruments, ensuring data comparability and reliability regardless of the instrument used. This level of inter-instrument reproducibility is critical for studies involving multiple sites or laboratories. It allows for better comparison across different locations, ensuring instrument variability does not influence results. This is particularly important for large-scale collaborative studies, clinical trials, and other applications where data consistency is paramount.

FIGURE // 04

Inter-Instrument Reproducibility

Instrument	Intra-Run %CV
Leo 1	5.4%
Leo 2	5.2%
Leo 3	5.0%
Leo 4	4.9%
Leo 5	5.6%

INTER-INSTRUMENT PRECISION = 4.2% CV

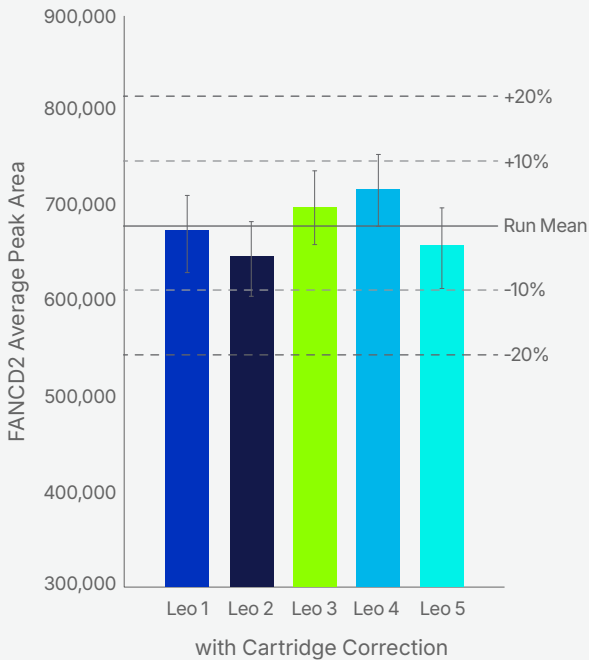


Figure 04. Inter-instrument reproducibility supporting cross-site assay transferability. For 5 Leo instruments, the average peak area of FANCD2 was measured along with the overall mean and 10% and 20% deviations from the mean. The intra-run CVs were consistently low, ranging from 4.9% to 5.6%, and the inter-instrument precision, representing the variability between the five different Leo instruments, was 4.2%. The Leo instruments were run in parallel using split samples and the same lots of cartridges, reagents, and pre-filled reagent plates.

Accurate Protein Quantitation

You can confidently put your standard curve on any of the 4 Leo cartridges and use the other 3 to quantify your samples accurately. Recovery values within the standard 80–120% range expected for bioanalytical method validation can be obtained for well-optimized assays.

FIGURE // 05A

Average % Recovery Using Intra-Cartridge Standard Curves

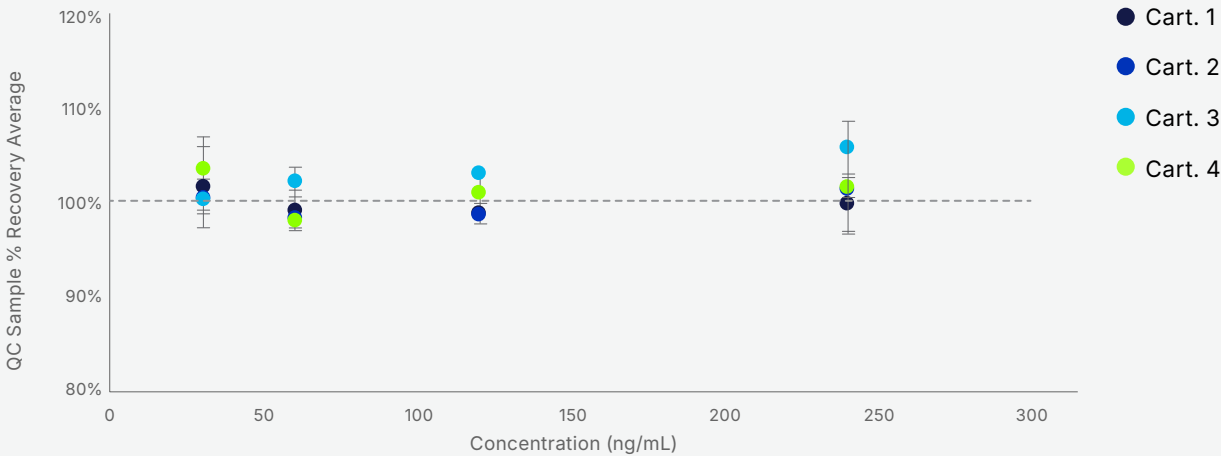


FIGURE // 05B

Average % Recovery Using Standard Curve from Cartridge 1

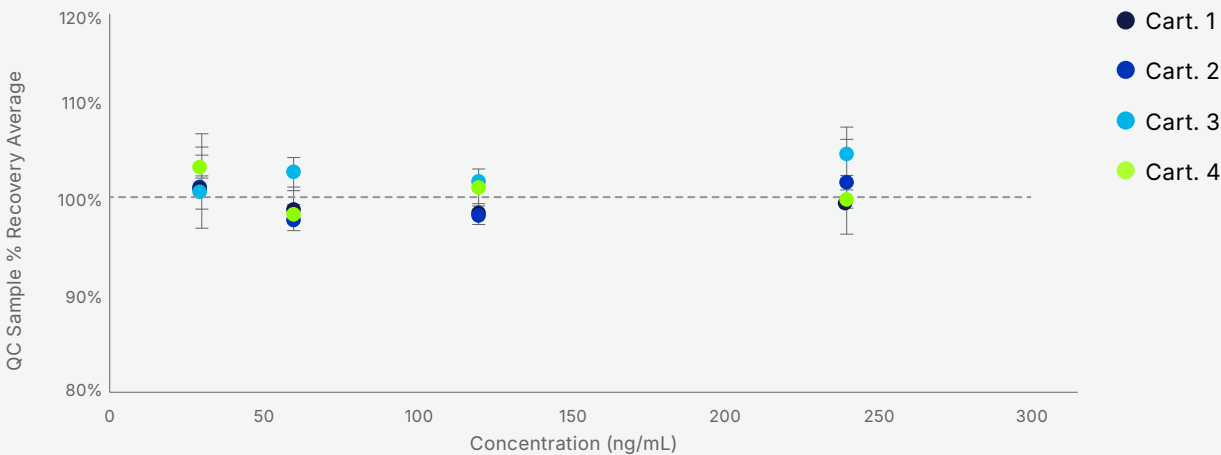


Figure 05. Spike and recovery study confirms excellent accuracy. Standard curves were defined for each cartridge independently within Compass or only for Cartridge 1. Then, the calculated concentrations were exported using either the individual standard curves from each cartridge (05A) or the standard curve from Cartridge 1 (05B), and the % recovery for standards and QC samples was determined by dividing Compass-calculated concentrations by known concentrations for the QC samples within each cartridge.

Picogram-Level Sensitivity

High sensitivity is essential for many applications in biological research, and Leo enables the detection of proteins down to pg/mL levels, which can be critical to measure low abundance protein biomarkers or targets for therapeutic intervention

FIGURE // 06A

RNase A

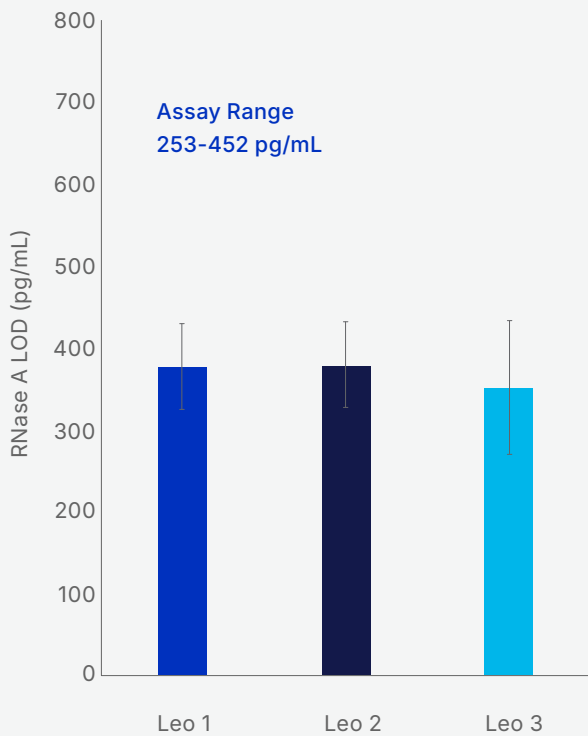


FIGURE // 06B

DnaK

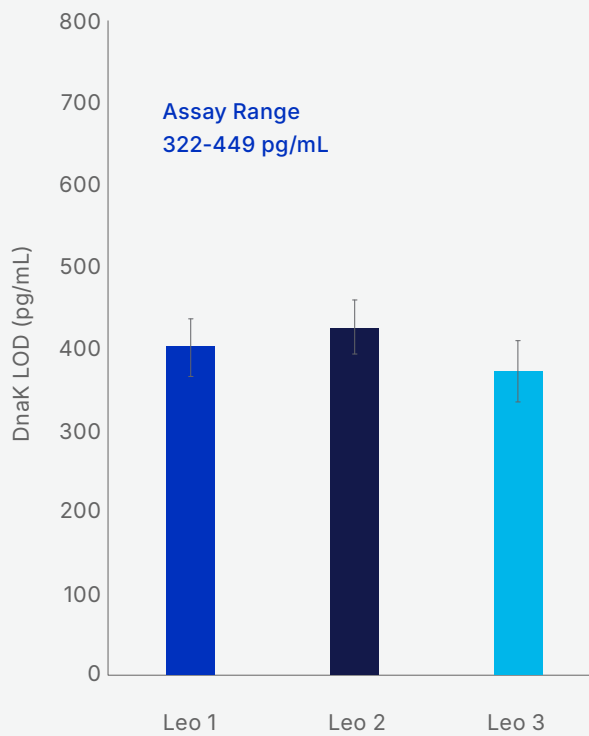


Figure 06. The limit of detection (LOD) was determined for two recombinant proteins, RNase A and DnaK, on 3 independent Leo systems. An 8-point serial dilution for each protein was prepared with 2.5-fold dilutions for RNase A and 3-fold dilutions for DnaK. These dilutions were spiked in HeLa lysate as background, and then the split samples were analyzed in parallel on the 3 Leo systems using lot-matched cartridges, reagents, and pre-filled reagent plates. All samples were run in triplicate within a cartridge, and resampling for the four cartridges provided 12 data points per sample for each Leo instrument.

Broad Dynamic Range

A broad dynamic range is crucial for accurately quantifying proteins in applications where protein levels can vary significantly, such as biomarker discovery. Leo offers a broad 3-4 log dynamic range and excellent inter-instrument reproducibility and linearity within this range.

FIGURE // 07A

RNase A

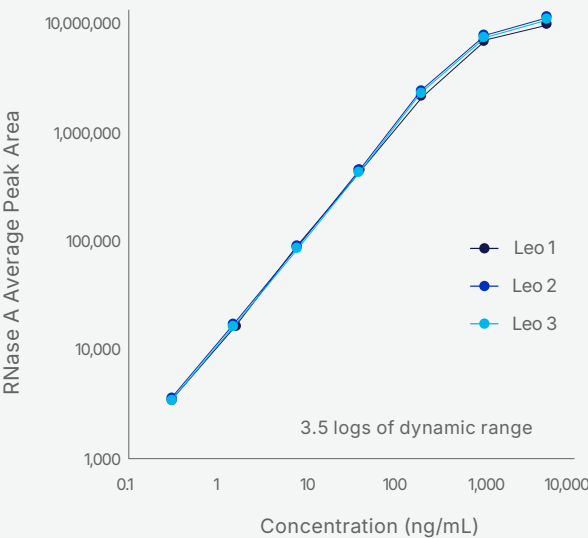


FIGURE // 07B

DnaK

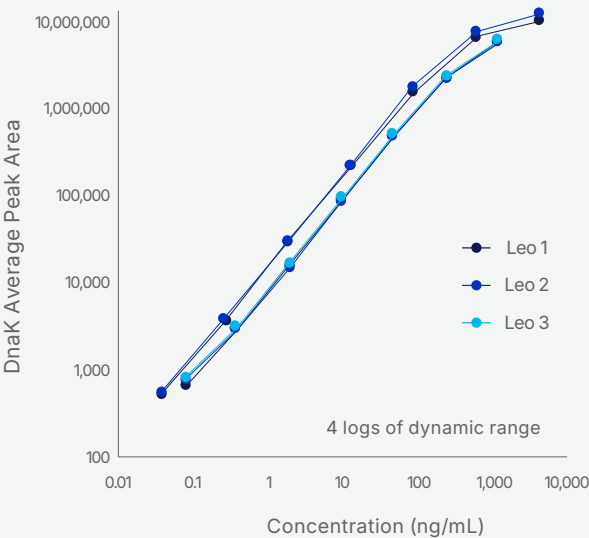


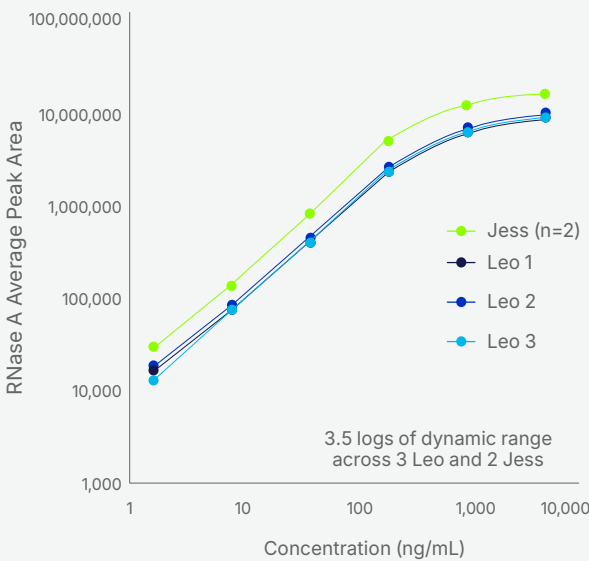
Figure 07. Leo can accurately quantify RNase A over a range spanning 3.5 logs and a range of 4 logs for DnaK. In addition to the broad dynamic range, the data points are tightly clustered across the three instruments, demonstrating excellent inter-instrument reproducibility and linearity within this range. The 3 Leo instruments were run in parallel using split samples and the same lots of cartridges, reagents and pre-filled reagent plates.

Straightforward Transfer and Comparable Performance Across Simple Western Platforms

Antibodies often have quite similar EC_{80} values on Jess and Leo, as well as similar dynamic range and LOD.

Figure 08. RNase A dynamic range and limit of detection experiments across 2 Jess and 3 Leo instruments. Both Jess and Leo produced 3.5 log dynamic ranges for RNase A.

FIGURE // 08 Dynamic Range



Get More Data from Your Precious Samples While Saving on Reagents **with Leo**

Leo combines RePlex with resampling, offering a powerful multiplex option to assess up to 8 target proteins from just 3 μL of sample. This ability to perform multiple analyses from the same sample reduces sample consumption and minimizes the need for repetitive sample preparation. By directing all 4 cartridges to the same row of primary and secondary antibodies, you can save up to 50% on your primary and secondary antibodies.

FIGURE // 09

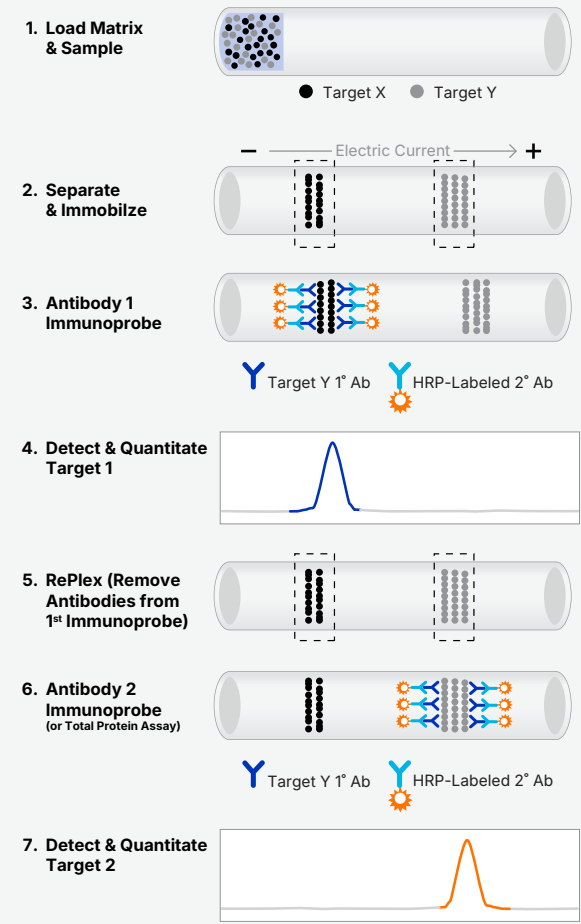
Leo Combines RePlex & Resampling

RePlex Enables Serial Probing:

2 immunoassays OR 1 immunoassay
+ total protein normalization

Resampling:

Up to 4 cartridges can be directed to the
same row of wells on sample plate

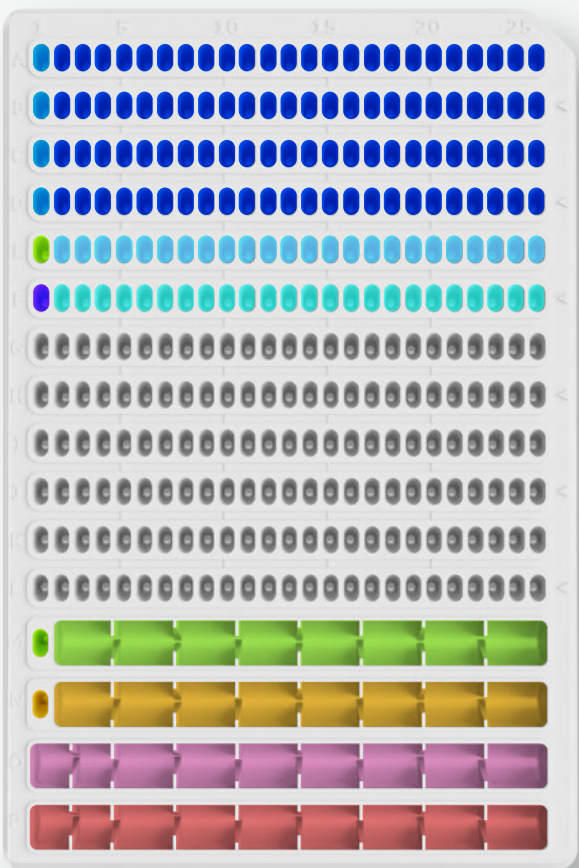


+



1 Sample Row // Eight 1° Ab Rows // Two 2° Ab Rows

OR



4 Sample Rows // One 1° Ab Row // One 2° Ab Row

DATA NOTES

RePlex + Resampling Sample Wells

- Enables analysis of up to 8 target proteins on 25 samples for 100 capillary experiment.

OR

- Run up to 4 immunoassays followed by a total protein assay
- Eliminate concerns with antibody cross-reactivity when multiplexing

Resampling 1° & 2° Antibody Wells

- Save up to 50% on 1° & 2° Antibodies

Figure 09. Leo combines RePlex with resampling, offering a powerful multiplex option to get the most data from your precious samples. RePlex enables serial probing of the same capillary with 2 immunoassays, or an immunoassay followed by total protein analysis. Total protein detection happens in the same capillary on the same sample and offers more reliable protein quantification since it normalizes out experimental variation in protein loading

Powerful Software with Advanced Analysis Features & Support for **21 CFR Part 11 Compliance**

Leo comes with Compass Software for Simple Western that streamlines data analysis with an intuitive interface and robust tools, including built-in standard curves and annotation features. It also enables 21 CFR Part 11 compliance to meet regulatory requirements.

Advanced Standard Curve Tools

- Compass Software has in-software tools to build a standard curve and generate reported concentrations of unknowns.
- Compass for Simple Western v7 supports the following curve fits: Linear, 4PL, Log-Log.

Sample Group Analytics

- Group samples together by attributes defined in the Assay Layout, such as Sample Name, Attribute, or more.
- Compare your replicates and get variability data quickly and easily with sample grouping.

Leo Assay Setup and Analysis

- Compass for SW v7 lets you set up assays for Leo using 25–100 capillaries and 1–4 cartridges.
- Normalizes cartridge-to-cartridge variability using a reference control across each cartridge, allowing for quantitative comparisons between data from one cartridge and another.



Unleashing Analytical Applications **with Leo**

Leo is used in a wide variety of applications where traditional methods struggle to deliver with enough speed and quantitation. These include high-throughput targeted protein degradation, relative potency assays for QC and lot release for cell and gene therapy products and measuring key biomarkers in clinical trials. Researchers also use Simple Western for diverse applications, including vaccine development, bioprocess impurity testing, pharmacokinetics/ pharmacodynamics, and measuring target expression in different tissues.

FIGURE // 10
Simple Western Research Areas

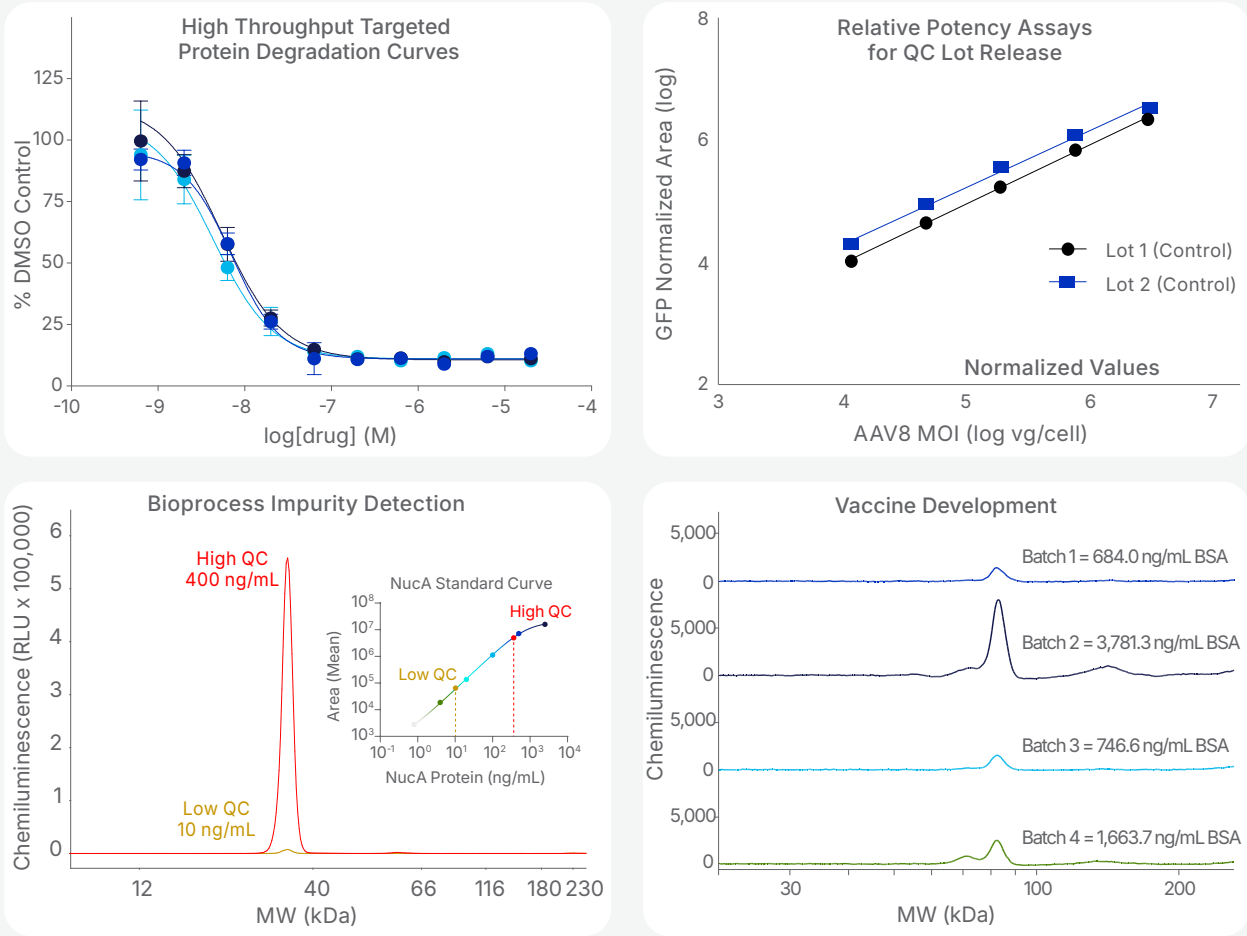


FIGURE // 10
Simple Western Research Areas

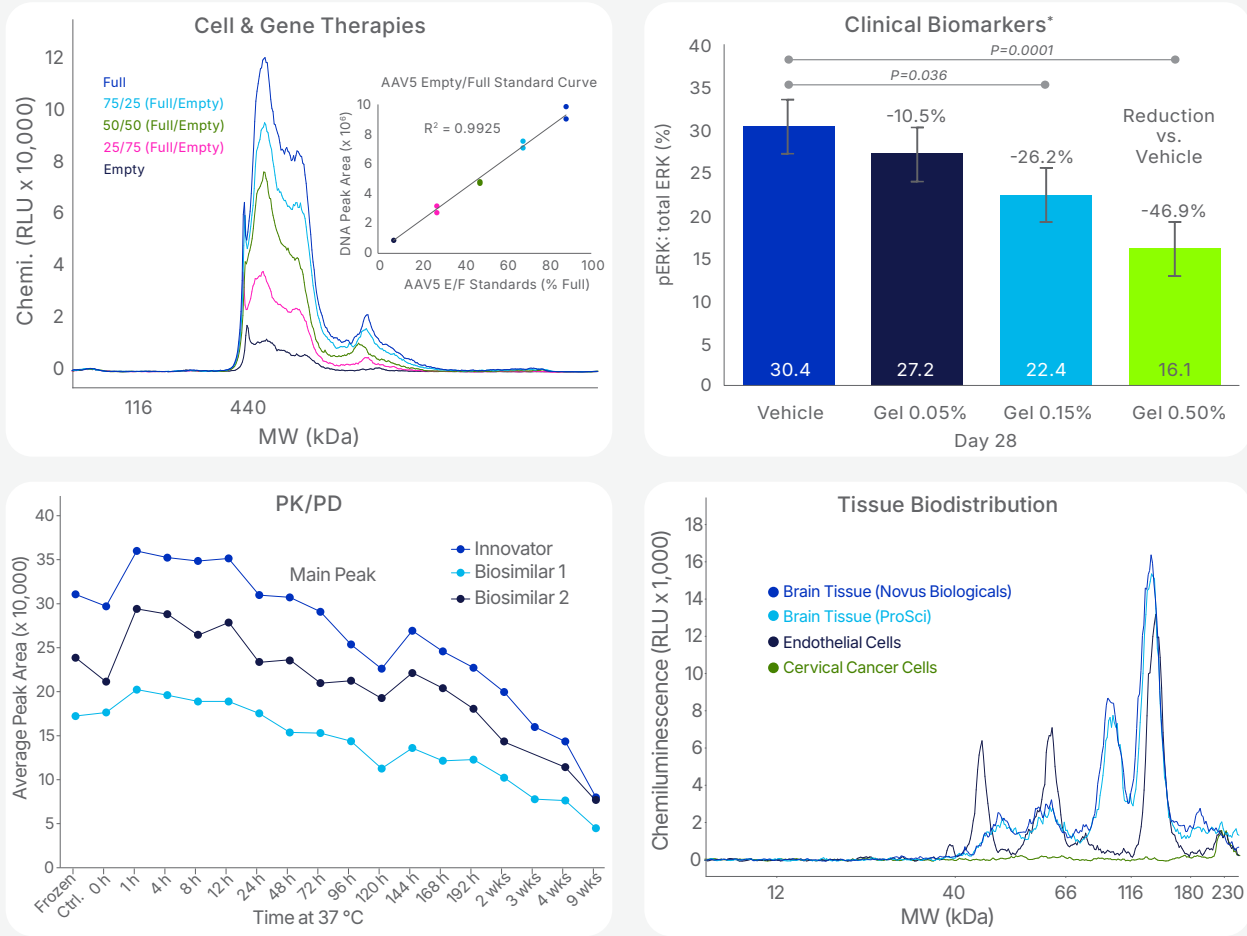


Figure 10. Simple Western Platforms have been utilized in various research areas, from cancer biology and neuroscience to drug discovery and development.
*Source: Effect of NFX-179 MEK inhibitor on cutaneous neurofibromas in persons with neurofibromatosis type 1. Sci Adv. 2024 May 3;10(18):eadk4946.

Leo Consumables

ASSAYS & CONSUMABLES

Separation Modules (200 capillaries)	Separation Modules (600 capillaries)	Detection Modules (200 capillaries)	Detection Modules (600 capillaries)	Additional Modules	Pre-filled Plates & Reagents Kit (200 capillaries)	Pre-filled Plates & Reagents Kit (600 capillaries)	Sample Plates
12-230 kDa (SWSM-W014)	12-230 kDa (SWSM-W015)	Anti-Rabbit (DM-001)	Anti-Rabbit (SWDM-021)	RePlex (RP-001)	12-230 kDa (SWPR-W014)	12-230 kDa (SWPR-W015)	Leo Sample Plate Kit, 2 Plates (SWSP-001)
66-440 kDa (SWSM-W016)	66-440 kDa (SWSM-W017)	Anti-Mouse (DM-002)	Anti-Mouse (SWDM-022)	Total Protein, 600 cap. (SWDM-TP21)	66-440 kDa (SWPR-W016)	66-440 kDa (SWPR-W017)	Leo Sample Plate Kit, 6 Plates (SWSP-002)
2-40 kDa (SWSM-W018)	2-40 kDa (SWSM-W019)	Anti-Goat (DM-006)	Anti-Goat (SWDM-026)	Total Protein, 200 cap. (DM-TP01)	2-40 kDa (SWPR-W018)	2-40 kDa (SWPR-W019)	
		Anti-Human IgG (DM-005)	Anti-Human IgG (SWDM-025)				
		No Secondary (DM-003)	No Secondary (SWDM-023)				
		Biotin (DM-004)	Biotin (SWDM-024)				



Leo Instrument Specifications

SPECIFICATIONS

Runtime	<3 hours, RePlex: 5 hours
Max Capillaries Per Run	100
Samples Per Run	96
Volume Required	3 µL
Sample Cooling	No
Detection	Chemiluminescence (upgradeable to Fluorescence)
RePlex	Yes
Weight	350 lbs
Dimensions (closed) (H x W x D)	72 x 74 x 74 cm / 28.3 x 29.1 x 29.1 inch
Dimensions (open) (H x W x D)	72 x 74 x 122 cm / 28.3 x 29.1 x 48 inch
Power	US/CAN 120 V AC, 60 Hz, 5.0 amps China 220 V AC, 50 Hz, 2.7 amps Europe 230 V AC, 50 Hz, 2.6 amps Japan 100 V AC, 50/60 Hz, 6.0 amps
Operating Temperature	18–23 °C
Operating Relative Humidity (non-condensing)	20–60%

REPRESENTATIVE PERFORMANCE DATA*	Leo Chemiluminescence Immunoassay	Leo Total Protein Assay
Intra-assay Peak Area CV (%)	<15%**	<15%**
Inter-run Peak Area CV (%)	<15%***	<15%***
Intra-assay Quantitation CV (%)	<10%****	N/A
Inter-run Quantitation CV (%)	<10%****	N/A
Inter-instrument Quantitation CV (%)	<10%****	N/A
Dynamic Range	3–4 logs	2–3 logs
Sensitivity	Low pg	ng
Size Range	Molecular weight (MW) ladder ranges from 2–440 kDa	
Sizing CV (%)	<10%	
Resolution (± Difference in MW)	± 10% for MW >20 kDa ± 15–20% for MW <20 kDa	
Sample Required	0.3–1.2 µg†	0.6–1.2 µg†

*Representative performance data for well-characterized assays using split samples, with the same lots of reagents, plates, and cartridges for each experiment.
**Based on a model assay system with a signal-to-noise ratio >250, n=96, and cartridge correction.
***Based on model assay system with a signal-to-noise ratio >250, n=3, and cartridge correction.
****%CV of calculated concentration generated using a standard curve for all samples above LLOQ using cartridge correction.
†Sample volume required is 3 µL/well

Simple Western

Proven, Trusted Technology

3,000+

Publications on PubMed

6,500+

Validated Antibodies

Thousands

Of Instruments Installed



Jess

The simple way to experience powerful multiplex western results.



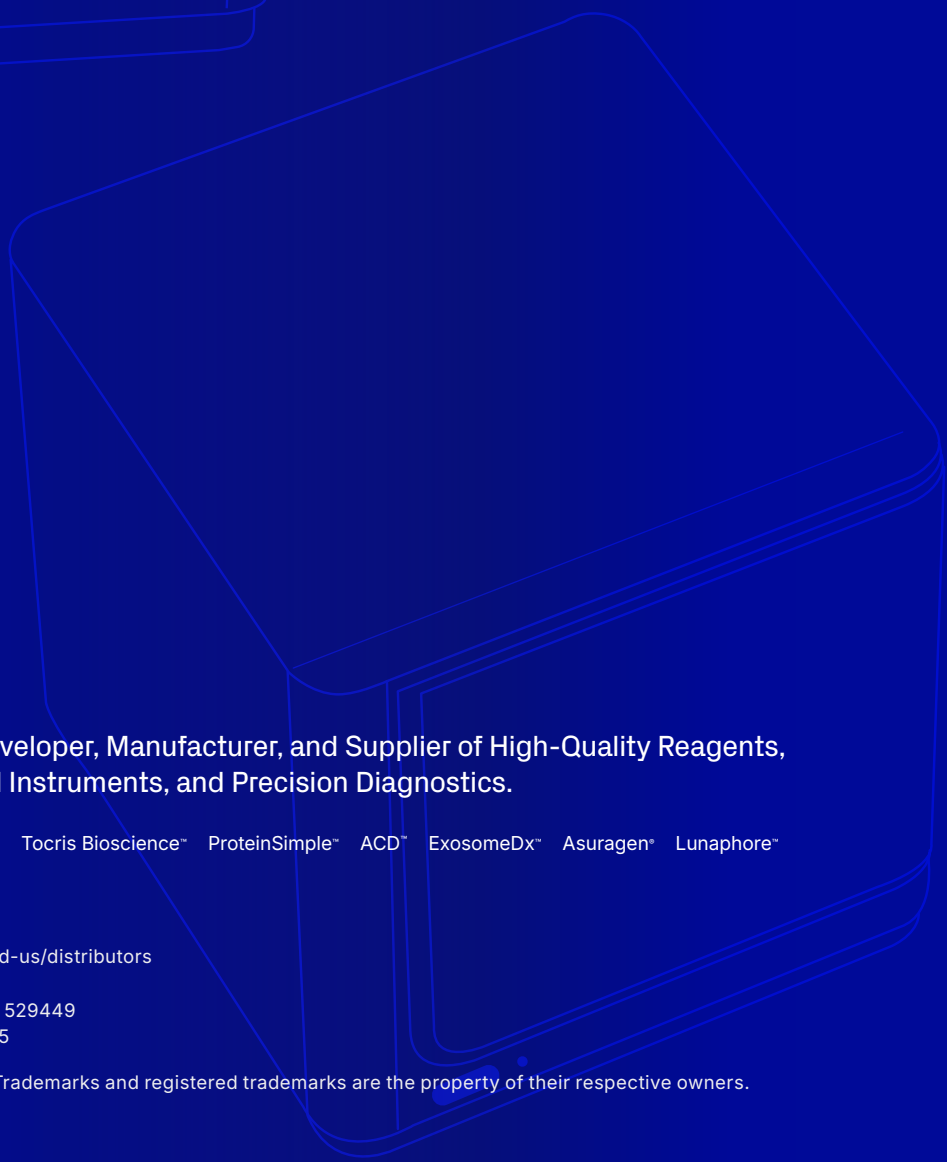
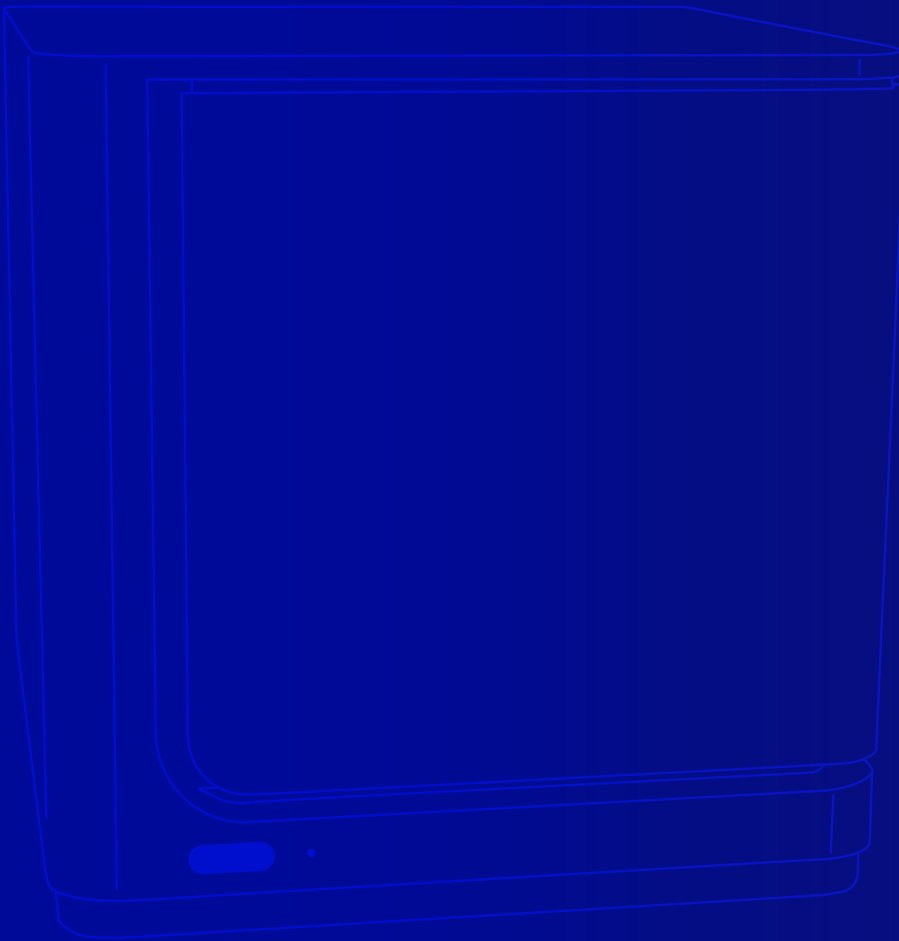
Leo

The simple way to maximize throughput for quantitative western results.



Abby

The simple way to faster publication-ready western results.



biotechne®

Global Developer, Manufacturer, and Supplier of High-Quality Reagents,
Analytical Instruments, and Precision Diagnostics.

INCLUDES R&D Systems™ Novus Biologicals™ Tocris Bioscience™ ProteinSimple™ ACD™ ExosomeDx™ Asuragen™ Lunaphore™

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